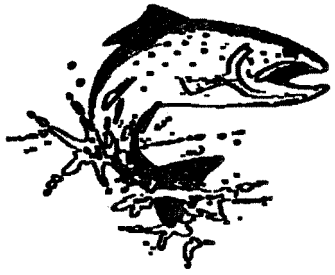
A History of Montana's Fisheries Division from 1890 to 1958

Written by Bill Alvord
1991



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FOREWORD

This History of Montana's Fisheries Management activities has been assembled from many different sources. For this publication, an attempt was made to report the highlights of fisheries management in Montana in a general chronological order. Important information has no doubt been overlooked and some details of minor importance have been excluded in the interest of brevity. Admittedly, this is not a refined document. Its primary value will be as a reference. While most of the information was obtained from the biennial reports of the Montana Department of Fish, Wildlife and Parks, other sources included log books of individual state fish hatcheries and records generously provided by the managers of the federal fish hatcheries at Creston, Ennis and the Fish Cultural Development Center at Bozeman. Harvey Willoughby, former Chief of Fish Hatcheries, U.S. Fish and Wildlife Service, furnished copies of early-day reports of the Bozeman station which are filed in Washington, D.C. Personal conversations with many of Montana's residents have revealed points of interest. The assistance of these individuals is greatly appreciated.

Special thanks are given to the late Dr. C. J. D. Brown for his earlier work in editing this material and for his interest and many suggestions that helped make completion of the project possible.

And, for their efforts in editing and guiding this publication through the many steps necessary for its completion, thanks are given to George Holton, Arthur Whitney and Patrick Graham, and to Margie Peterson, who typed, formatted and proofread the publication.

INTRODUCTION

Almost everyone has some interest in fish or fishing and, apparently, the early-day residents and sojourners of the Montana Territory, such as the traders, trappers, troopers and railroaders, were no exception. Early introductions and transplants of fish were largely due to their efforts. Montana was a land abounding in beautiful lakes and streams, some of which were without fish of any kind and many, certainly, without the species familiar to the settlers. But, there were individuals willing to remedy the situation. An officer or civilian who really enjoyed fishing, living at or near one of the forts in the territory, would have been sadly lacking in imagination and enterprise if he didn't somehow manage to find room in a supply wagon for a barrel of water containing a few fry or fingerlings of his favorite fish which would eventually be introduced into a stream or lake near the fort. Later, as the railroads made their way across the territory, a much more efficient method of transporting fish was provided. The railroads ran adjacent to or bridged many of the major lakes and streams, making stocking an easy matter. Suppose, for example, a railroad executive had a summer home in a lake in the Flathead drainage. He would have had no difficulty in shipping a few "pumpkinseeds" from Minnesota, for instance, to put in the lake for the kids to catch. Actually, the transport of fish by rail later became the principal method of fish distribution. Special railroad cars were developed with aeration systems which made possible the transportation of fairly large numbers of fish over long distances.

Among the early settlers of the territory, there were undoubtedly a few individuals familiar with fish culture. They would have found it a relatively simple matter to set up a trough or two near a good water source and collect, fertilize and hatch eggs taken from a spawning run of native fish. The resulting fry would then be planted into previously barren waters, or perhaps, waters without that particular species.

One can only speculate about the early distribution of fish in Montana since no formal records were kept. Fish were shipped to Montana from federal fish hatcheries in the east to designated stations in the state where they would be unloaded. Their final destination, whatever the species, was left up to the persons who picked up the fish.

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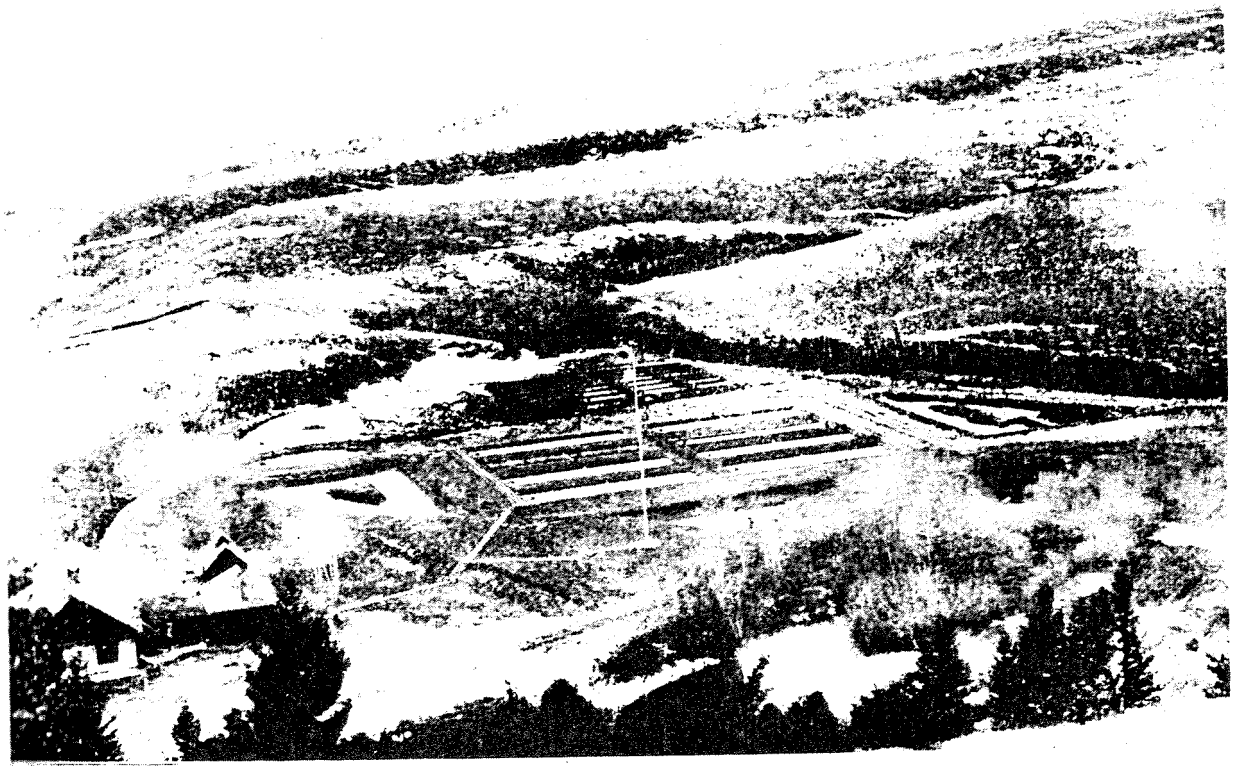
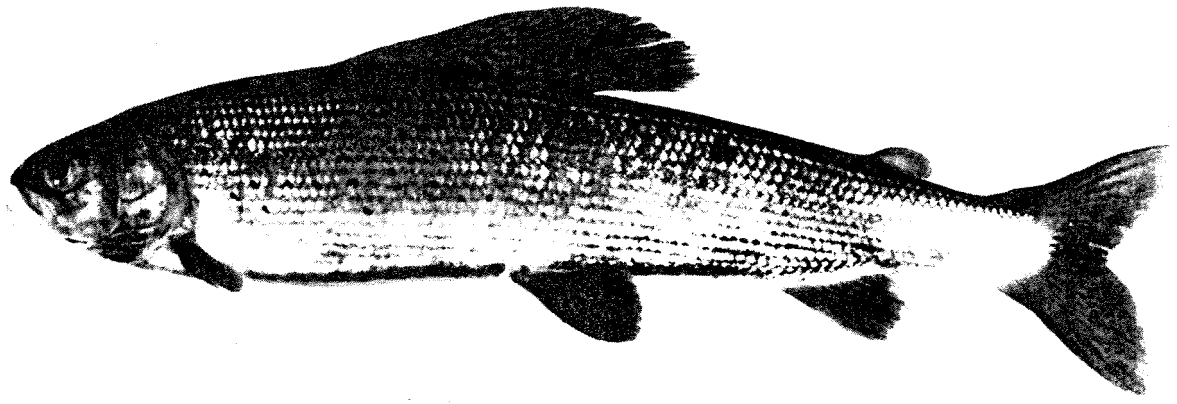
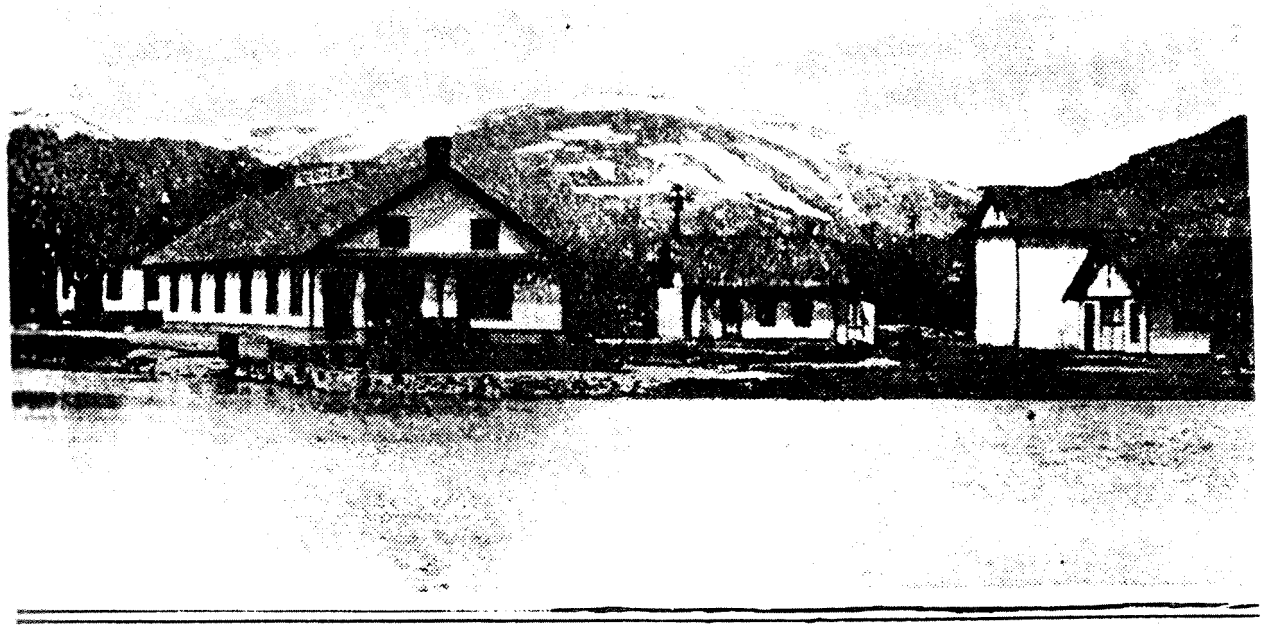
Superintendent's residence at the Bozeman Hatchery.
Dr. James A. Henshall, Superintendent, in foreground. 1897.
(Photo courtesy of the Montana Historical Society, Helena.)



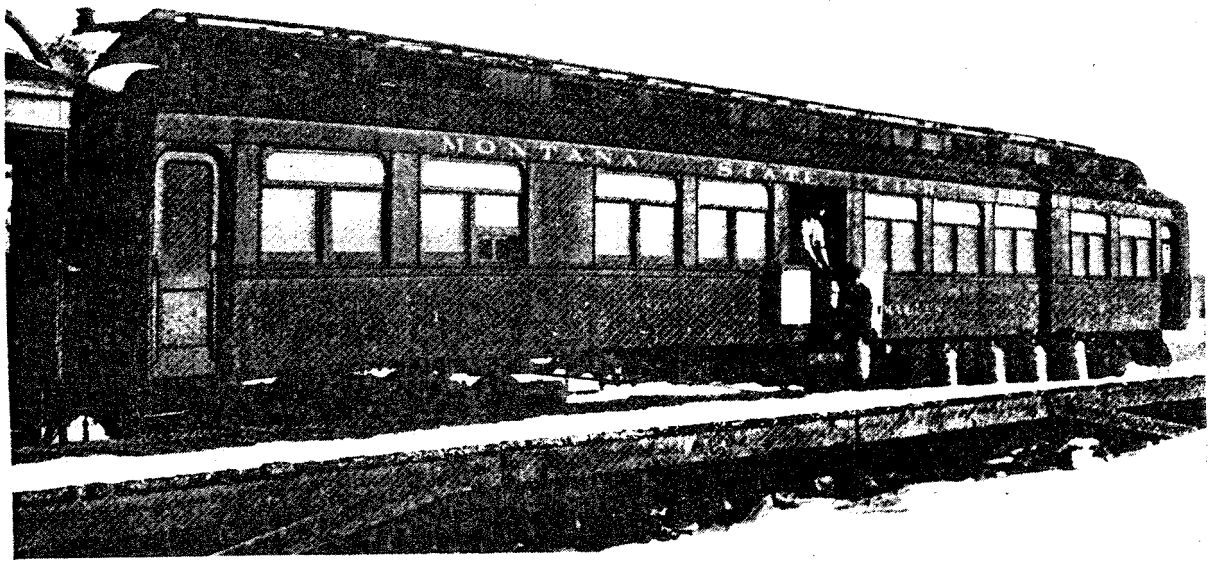
U.S. Fish Hatchery, Bozeman. 1900.
(Photo courtesy of the Montana Historical Society, Helena.)



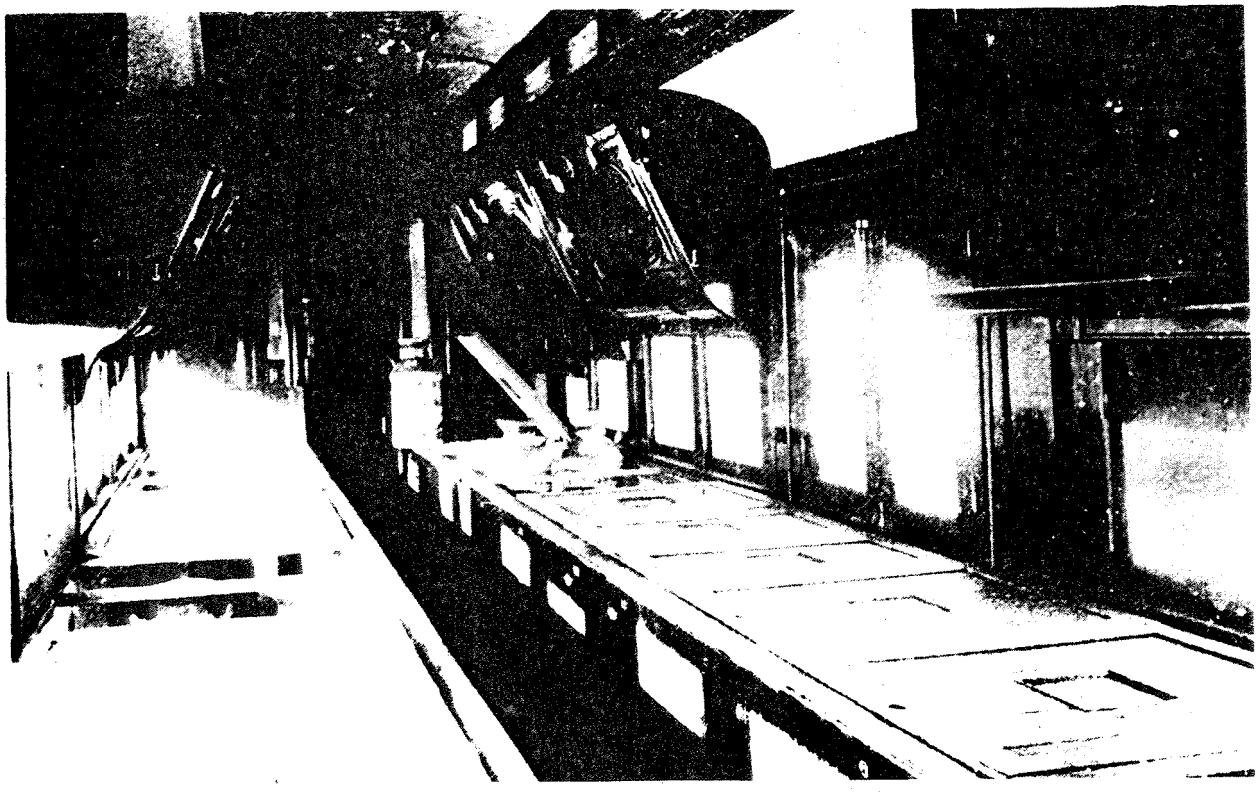
Arctic Grayling.



Original fish hatchery buildings and rearing pond at Anaconda.
The Anaconda Hatchery was the second station built in Montana. 1908.
(Photo courtesy of the Montana Historical Society, Helena).

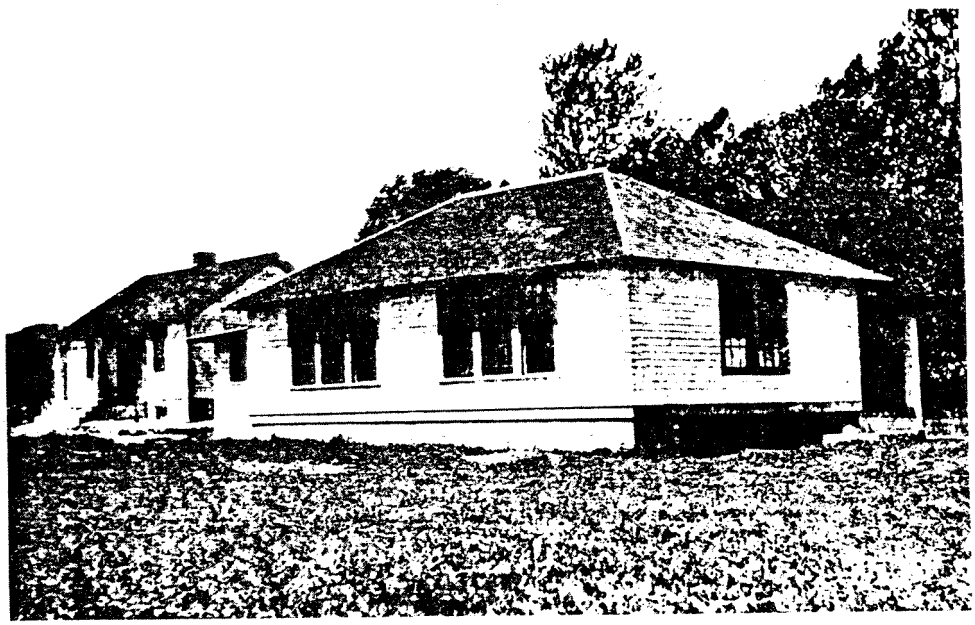


Railroad car, Thymallus, used to distribute fish throughout the state. 1910.

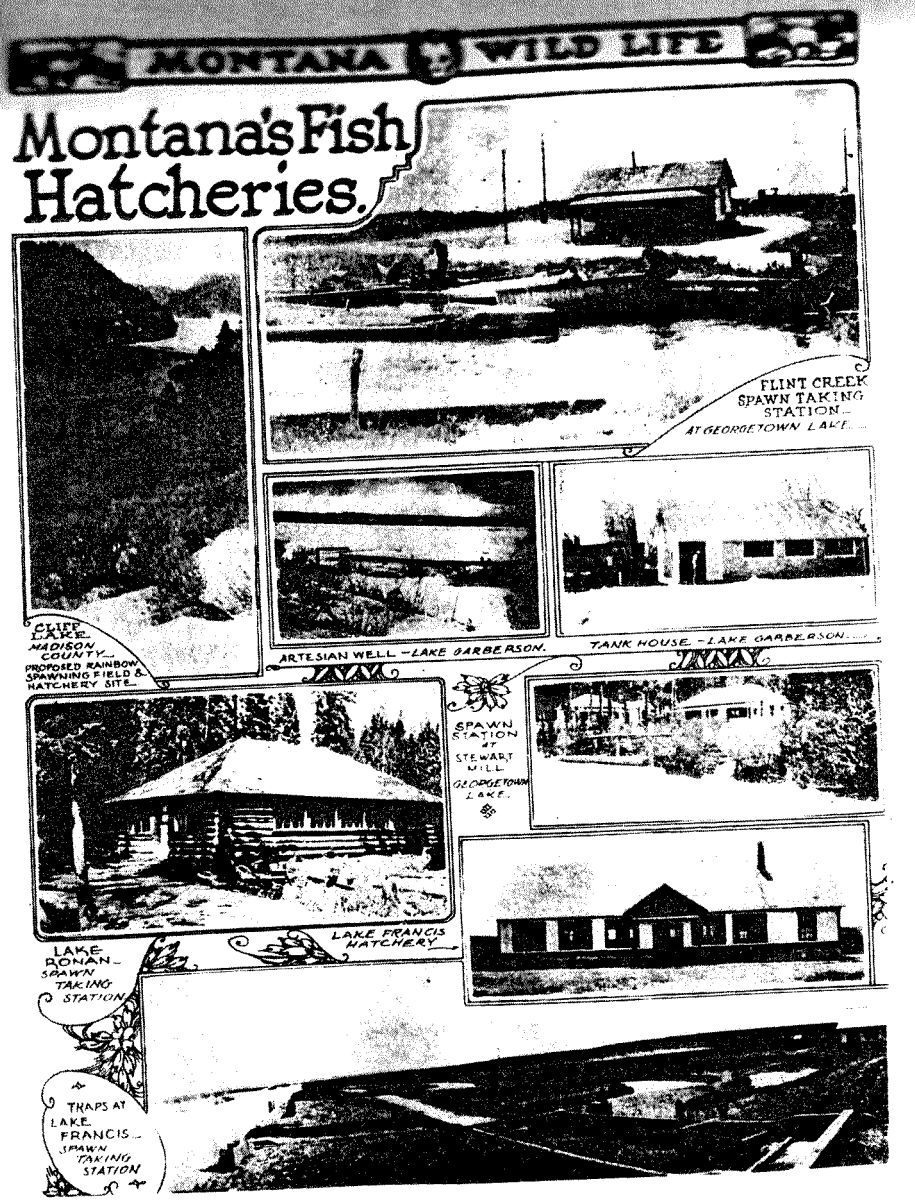


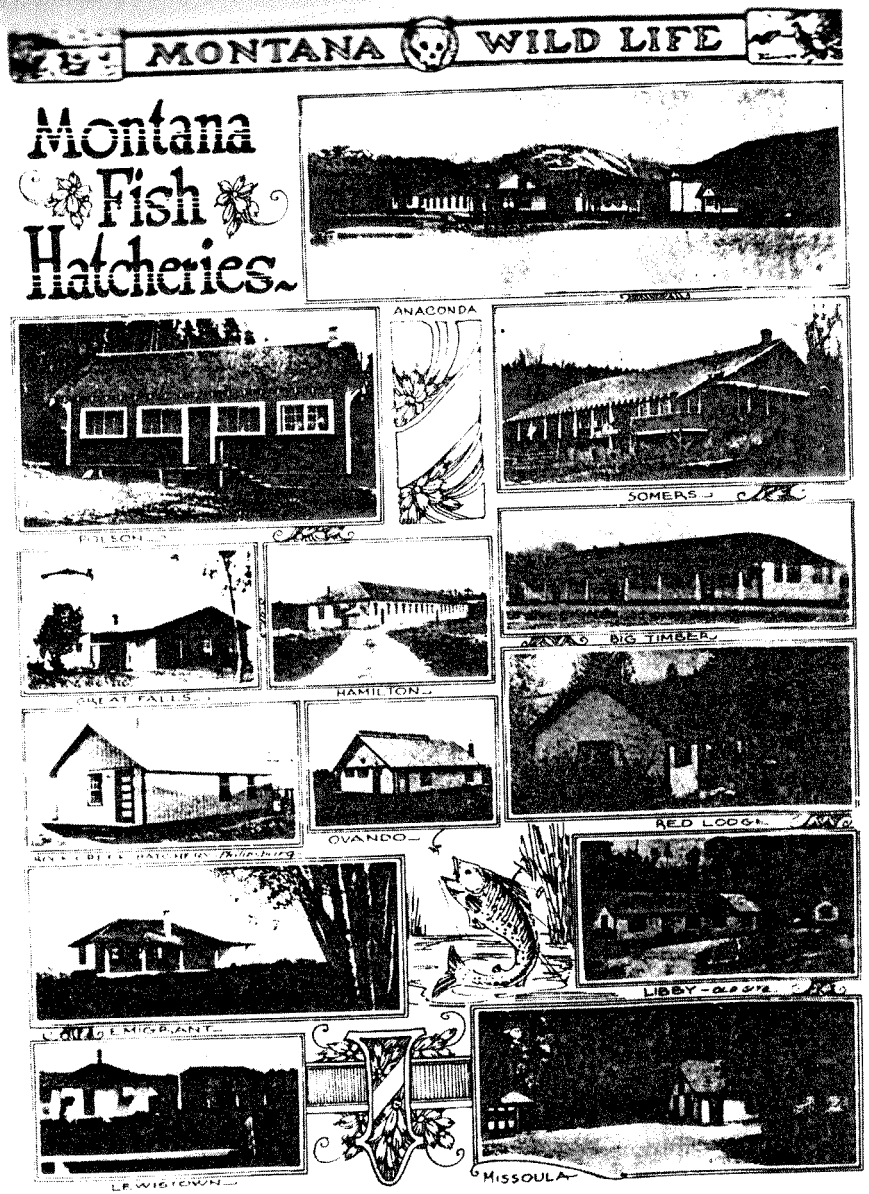
Interior of Thymallus, fish distribution railroad car. 1910.

Yellowstone Cutthroat Trout.

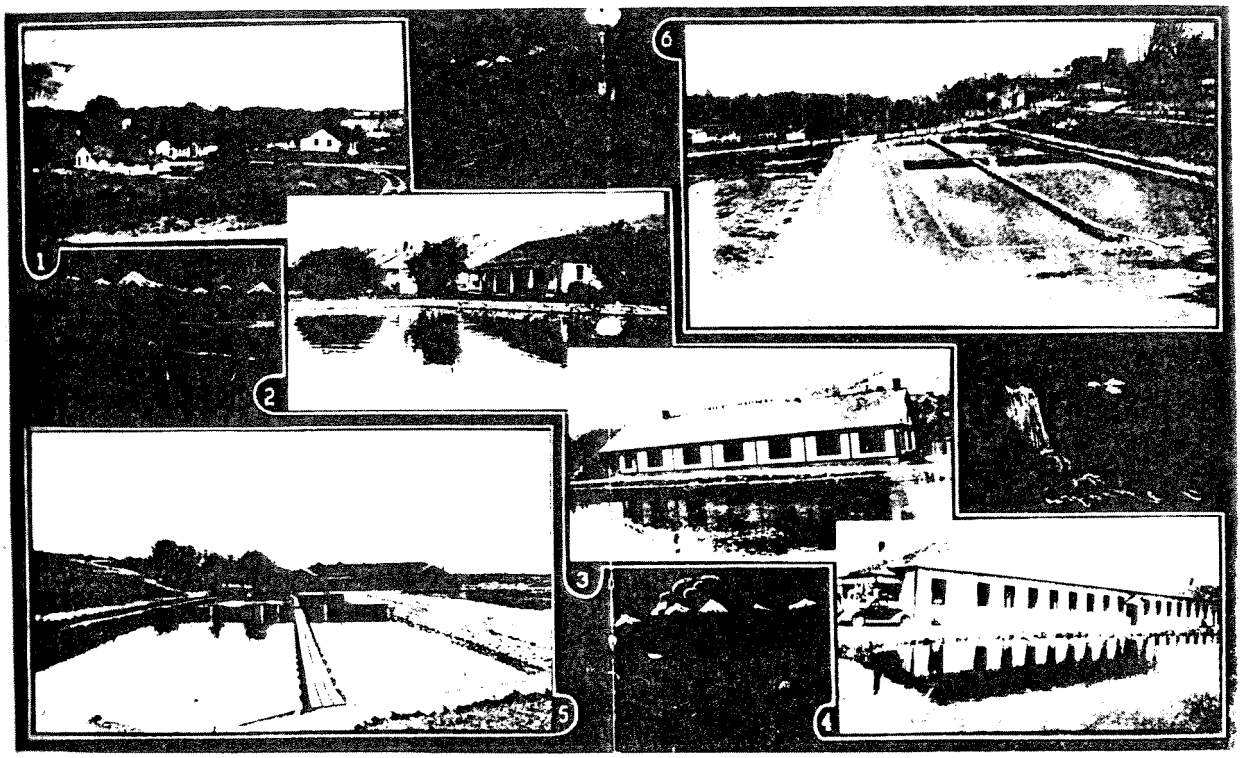


Residence and Hatchery at Emigrant, Montana. 1916. Capacity was only 5,000 fry.



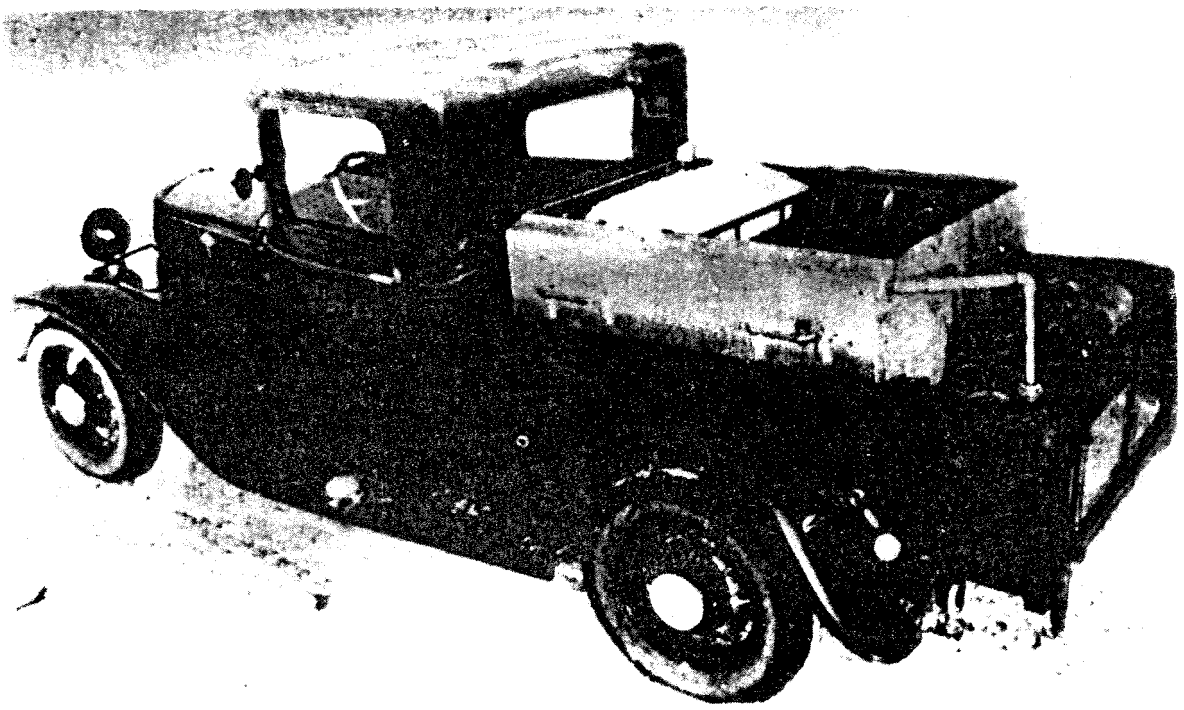


Montana's Fish Hatcheries. 1933. (Photo courtesy of Montana Wild Life.)

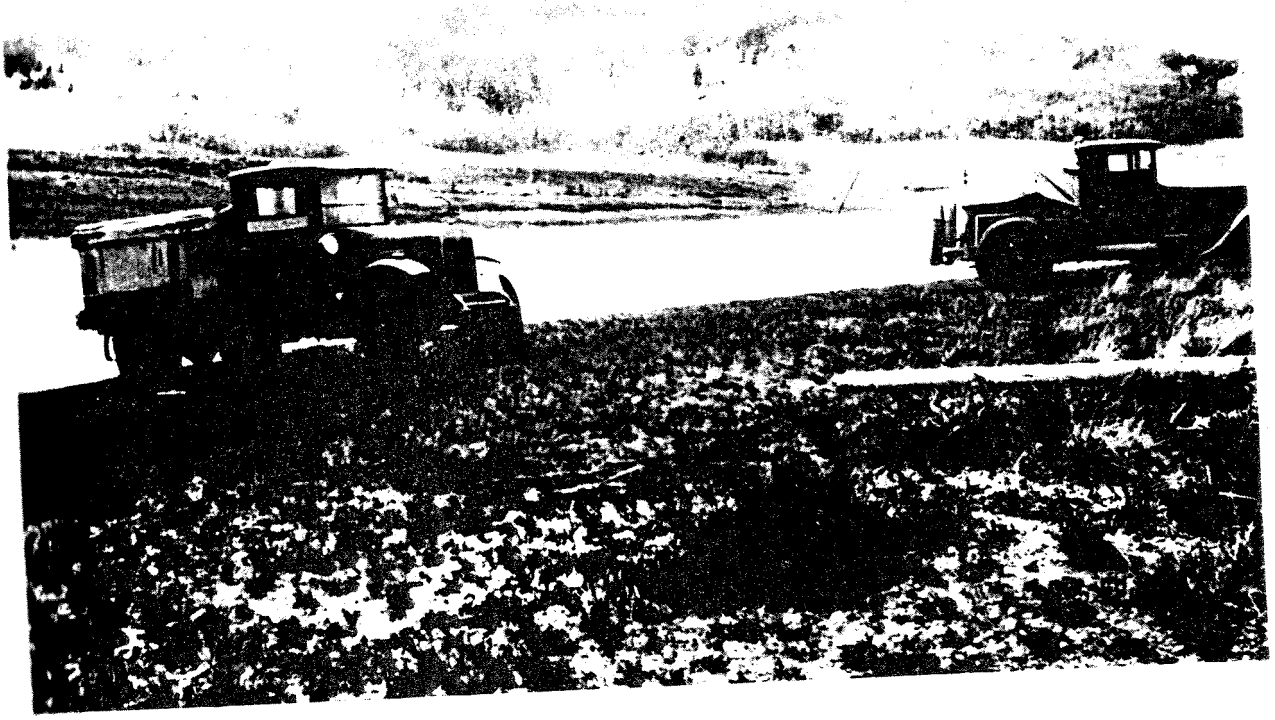


Montana's Fish Hatcheries.
(1) Emigrant (2) and (6) Big Timber (3) Anaconda (4) Hamilton (5) Lewistown.

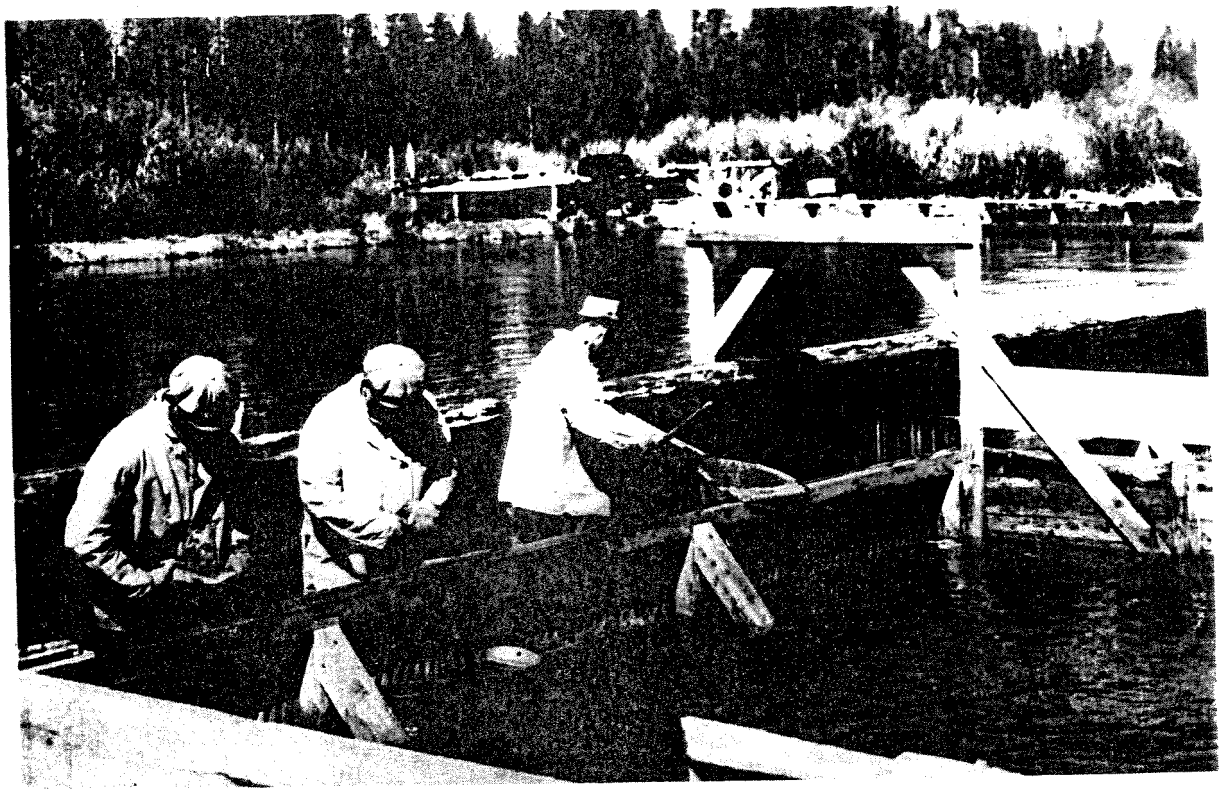
Early fish distribution trucks with water circulation systems.



Another fish distribution truck showing water circulation system.



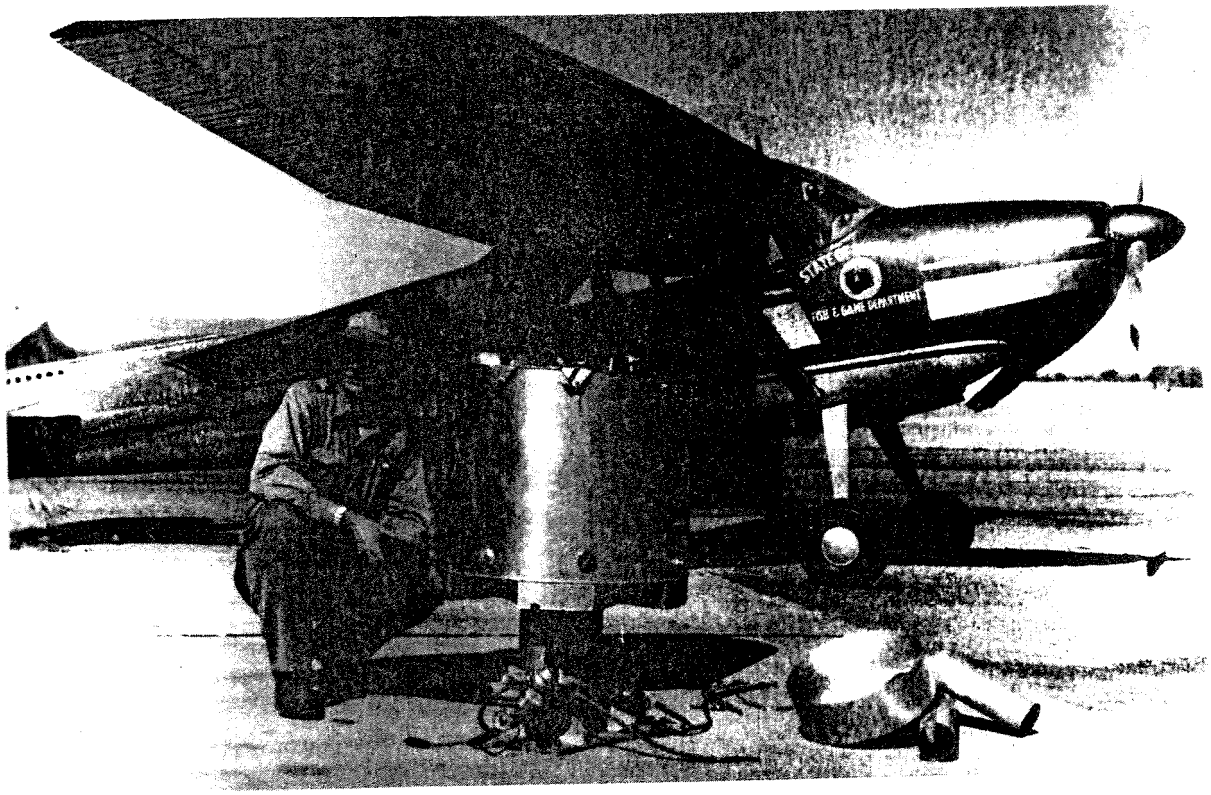
Fish distribution trucks.



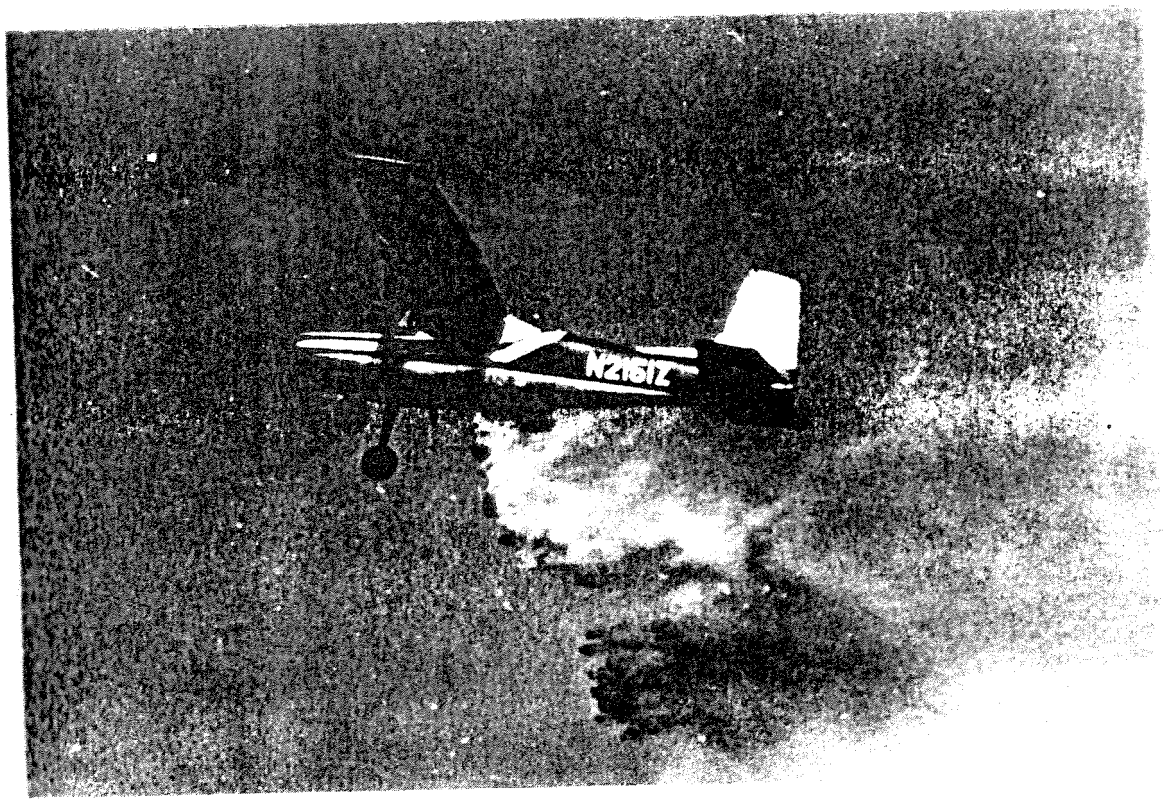
Taking spawn at fish traps on the Madison River in the early 1930s.

Charles K. Phenicie, Chief Fisheries Biologist. 1947.

Pack string with a load of fish for the high country.

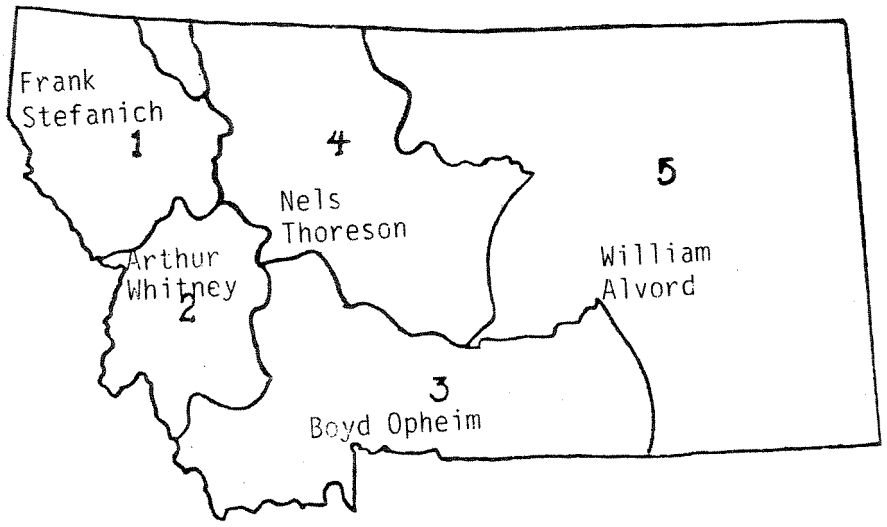


Pilot Ralph Cooper in front of the Fish and Game Department airplane and the tank which was installed to distribute fish.



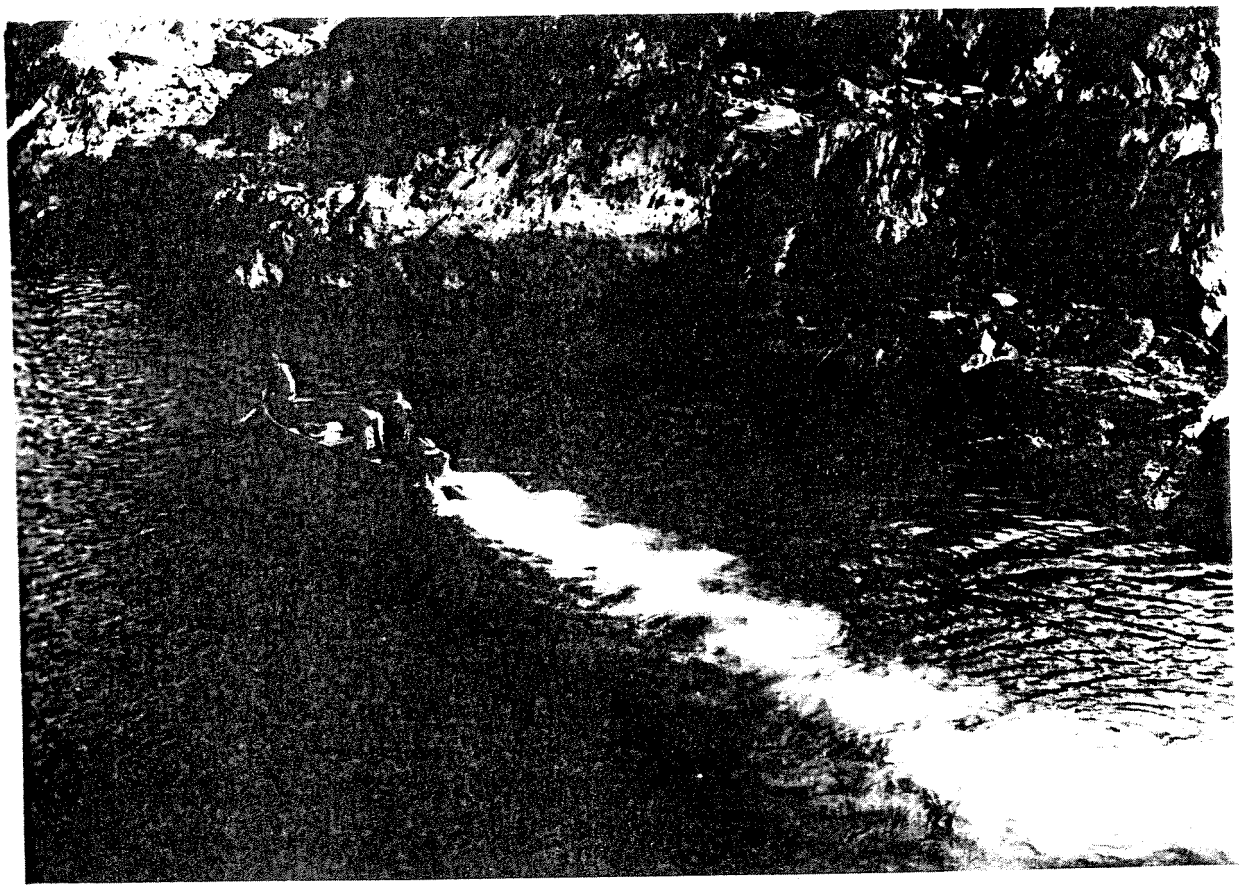
An aerial drop of fish from the Fish and Game Department airplane.

A group of Montana and federal fisheries personnel at a meeting held at Montana State University in Bozeman, Montana, in the mid-1950s. From left to right, ***first row****, Boyd Opheim, Nels Thoreson, Bill Clothier, Jack Bailey, John Spindler, Bob Boone.*
Second row*, Art Whitney, Perry Nelson, Frank Stefanich, John Echo, Bill Peck, John Gottschalk.*
Back row*, Walt Allen, Vern Craig, Dick Graham, Dr. Brown, Chuck Phenicie, George Holton, Marvin Baussu, Clint Bishop, Ron Gumtow, Bill Alvord.*

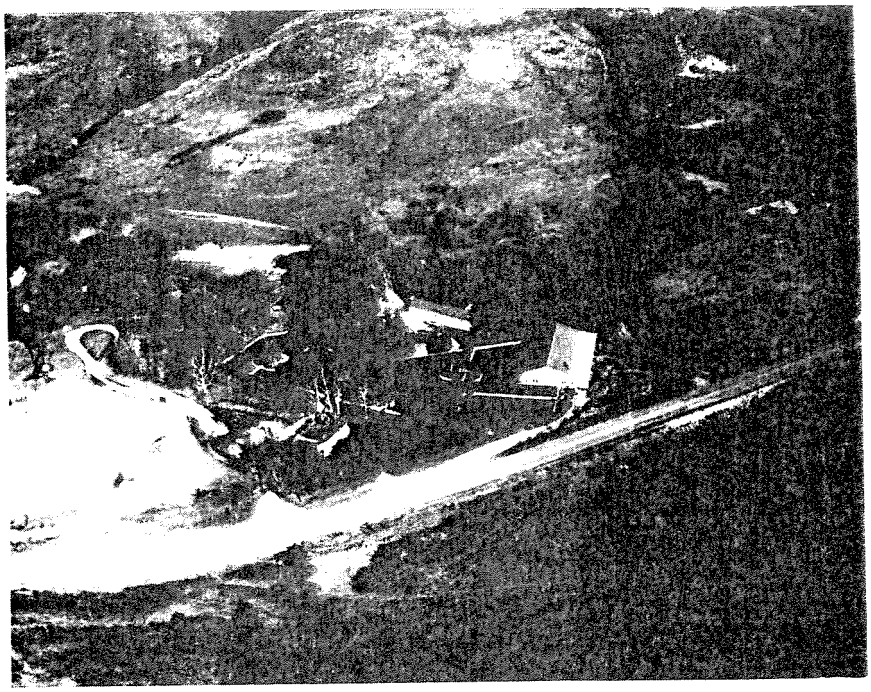


Montana Fisheries Restoration Districts, 1954.
Names of Fisheries Managers for each district are noted.

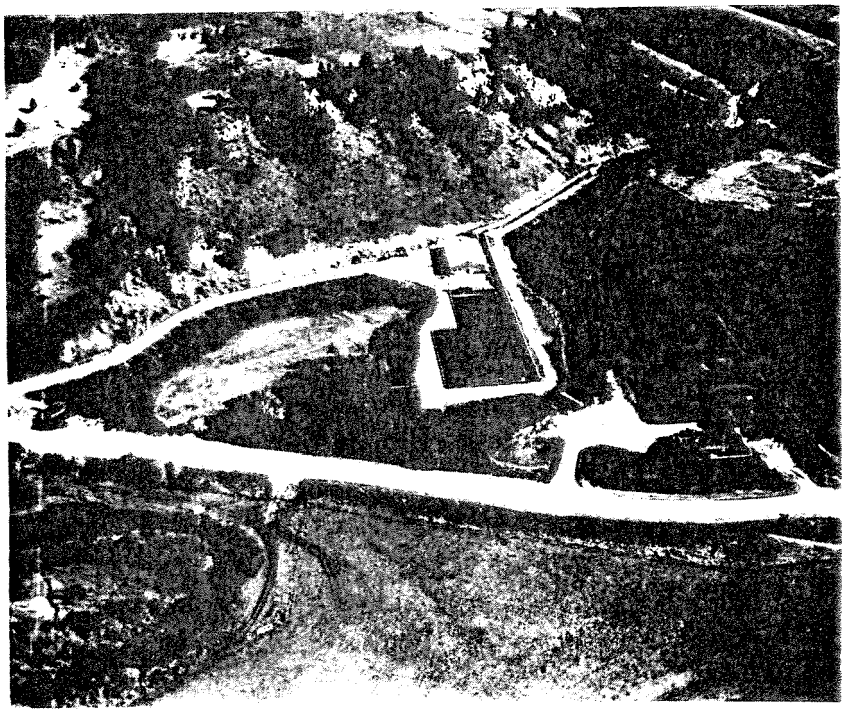
Fish and Game Department airplane distributing fish toxicant. 1959.



Fish and Game Department boat and crew distributing fish toxicant. 1959.



Upper section of Lewistown fish hatchery.



Lower section of Lewistown fish hatchery.

PRIOR TO 1900

The first Montana Territorial Legislature of 1864 was credited with the passage of a bill providing that "a rod or pole, line and hook, shall be the only lawful way trout can be caught in any of the streams of the territory." The same bill prohibited the baiting of hooks with any drug or poisonous substance and made the use of seines, or nets, illegal. The law became effective February 2, 1865. More general and complete fish and game laws were passed by the legislative session of 1871. These formed the basis for many of our present regulations. In 1876, a law was passed making it illegal to use explosives to kill fish. The Territorial Legislature of 1879 appropriated $1,000 for the purpose of removing a part of the "Great Falls" on the Clark Fork of the Columbia River, since the falls prevented migrating salmon from reaching the upper waters of the territory. The concern of sportsmen and conservationists over indiscriminate dumping of sawdust and mill wastes into the streams of the territory, to the detriment of fish life, resulted in the passage of a law in 1881 making all such dumping illegal.

The enforcement of fish and game laws at that time in Montana history was probably quite ineffective since travel was slow, the territory was large and people were few and far between. One would be inclined to believe that fisheries violations would have been really serious to warrant action by the U.S. Marshall. When Montana became the 41st State of the Union in September 1889, county commissioners were empowered by state law to hire one game warden for each county, if needed. Apparently, there was little concern at the county level since no wardens were hired.

The same year that Montana became a state, the U.S. Bureau of Fisheries began stocking fish in the waters of Yellowstone National Park. Many of these waters were tributary to Montana streams or, in some cases, flowed directly into the state. The dates, locations and species planted are found on the following table:

DATE	WATER	SPECIES	NUMBER
September 22, 1889	Gardiner River	Brook trout	4,975
September 22, 1889	Gardiner River	Mountain trout	968
September 22, 1889	Gibbon River	Rainbow trout	990
September 22, 1889	Firehole River	Loch Leven trout	995
October 15, 1889	Yellowstone River	Native whitefish	980
August 9, 1890	Shoshone Lake	Lake trout	18,000
August 15, 1890	Yellowstone River	Native whitefish	5,000
August 23, 1890	Lewis Lake	Lake trout	7,262
August 23, 1890	Shoshone Lake	Lake trout	7,263
September 2, 1890	Lewis Lake	Loch Leven trout	3,350
September 2, 1890	Shoshone Lake	Loch Leven trout	3,350
September 2, 1890	Lewis Lake	Lake trout	4,750
September 2, 1890	Shoshone Lake	Lake trout	4,750
September 11, 1890	Yellowstone River	Native whitefish	5,000
September 15, 1890	Nez Perce Creek	Von Behr trout	9,300
September 15, 1890	Gardiner River	Brook trout	7,875
October 3, 1890	Twin Lakes	Native whitefish	2,000

Except for the Yellowstone and Gibbon rivers, no fish had been previously reported from any of these streams and lakes.

The first official and professional fisheries investigation in Montana began on July 18, 1891, when Dr. B. W. Evermann initiated a study of Montana and Wyoming waters. The study was concerned primarily with discovering sites suitable for fish hatcheries and several locations were recommended: Horsethief Springs at the northwest corner of Yellowstone

National Park; Botteler Springs, just north of Yellowstone National Park and opposite Emigrant Peak; Davies Springs on Bridger Creek near Bozeman; Cottonwood Creek at Deer Lodge; Child's Bedrock Drain, some six miles east of Helena, and Rattlesnake Creek near Missoula. Dr. Evermann's party used a seine to take samples of fish along their route. They reported finding grayling, whitefish, blobs, dace and suckers from the Madison River. Fish sampled with an electric shocker in the Madison River, 78 years later in April 1967, showed the following:

NUMEROUS	COMMON	FEW	RARE
Mountain whitefish	Longnose dace	Arctic grayling	Stonecat
Mountain sucker	Mottled sculpin	White sucker	
Longnose sucker	Brook trout		
Brown trout	Cutthroat trout		
Rainbow trout			

It is interesting to note that the 1967 sample showed only four species of trout and the stonecat as additions to Dr. Evermann's list. Though not taken in the latter Madison River samples, it is expected that carp, yellow perch and Utah chubs are also present. The introduction of incompatible species has probably been the greatest factor in the decline of grayling numbers. Long-time residents of the Ennis area reported that grayling were once very numerous, and, at one time, could be taken by the wagon load.

Al Lucke of Havre, Montana, has extensively investigated the early history of the area surrounding the Bear Paw Mountains. According to Lucke, records from the old Fort Assinniboine show that none of the streams of the Bear Paw Mountains, the Little Rocky Mountains, the Sweetgrass Hills or those north of Glasgow, which drained into the Milk River, contained trout before they were stocked. Eagle Creek, which flows from the Bear Paw Mountains into the Missouri River above the mouth of the Judith River, had a population

of cutthroat trout. Sometime around 1880, soldiers from Fort Assinniboine stocked Beaver Creek, a tributary of Milk River south of Havre, with fish from Eagle Creek. Beaver Creek also received plants of cutthroat trout from the Sun River at Fort Shaw. Good catches of trout were reported from this area in 1890. Since this creek was located almost wholly on the original Fort Assinniboine Military Reserve, fishing was limited mostly to military personnel as Civilians were required to have a special permit.

The U.S. Bureau of Fisheries received many requests for fish to stock Montana waters. In response to an 1893 proposal that a fish hatchery be located in the state, the Bureau sent Juan J. Jiminez from Washington, D.C. to Bozeman to investigate the feasibility of a fish hatchery on Davies Springs on Bridger Creek, one of the sites recommended earlier by Dr. Evermann. After considerable correspondence between Mr. Jiminez and C. Von Behr of the Office of Architecture and Civil Engineering in Washington, details were agreed upon and the appropriations to build the hatchery were authorized. Contracts were awarded and the station, consisting of 11 concrete ponds, three dirt ponds and 70 troughs, was completed in 1896. Fish production at the hatchery began in 1897 under the direction of Dr. James A. Henshall, superintendent of the new facility.

An auxiliary unit of the Bozeman station was established in March of 1898 on Henry's Lake in Idaho. The unit consisted of a small log building located on a spring (water temperature was from 42°F to 50°F) on the Staley Ranch. The spring supplied water to six, eight-foot-long troughs. An identical auxiliary station was constructed in April of the same year on Elk Creek (water temperature there was from 46°F to 55°F), a tributary of Upper Red Rock River. James Blair supervised operations at the Elk Creek station and is credited by early-day residents of the Centennial Valley with the wide distribution of rainbow trout in that general area.

The first Board of Fish and Game Commissioners was established on March 4, 1895 by Governor Robert Smith. Chairman of the first Commission was Morton J. Elrod of the Montana University at Missoula. In September 1900, Chairman Elrod sent a questionnaire on fish and game matters to all

newspapers in the state. The question receiving the most interest and almost unanimous approval was, "Are you in favor of establishing a state fish hatchery?" If sportsmen expected immediate action from this survey, they were due for disappointment because it was another eight years before a state hatchery became a reality.

1900 to 1904

The period around 1900 was an era of real public awareness and interest in fish and game protection, as reflected by the recommendations submitted by the Board of Fish and Game Commissioners. Some of the more important actions included establishment of a fishway at Thompson Falls, registration of all fish ponds with the Board, requirement of fish screens in all ditches before water wheels in mills and power houses, and prohibition of washing coal or placing coal slack or dust in streams. Other important actions were the passage of a law making it illegal to take any fish under six inches in length, requesting all Indians be required to have a permit to hunt and fish, requesting for a higher license rate to be paid by nonresidents, and establishment of a state fish hatchery. The Board also approved passage of the Lacey Act, which dealt nationally with the import and export of game. The Lacey Act was passed by Congress on April 18, 1900.

The Board of Fish and Game Commissioners recognized that the counties had failed to protect game and fish and that such protection should no longer be entrusted to them. Only four of the 24 counties had hired game wardens by this time.

The Montana Fish and Game Department was officially organized on April 1, 1901. W. F. Scott was appointed the first State Game Warden to head the Department. The legislative bill, which established the Department, provided for the division of the state into game and fish districts and the appointment of not less than five nor more than eight deputies, one to each district. The salary of the deputies was set at $100 per month. Upon announcing these positions, the Department received over 1,000 applications and several thousand letters of endorsement for the eight positions. The warden deputies appointed were: J. H. Boucher, Altyn, Teton County; Taylor B. Greene, Malta; A. E. Higgins, Missoula; Samuel Scott, Deer Lodge; John H. Ha.., Great Falls; Henry Avare, Butte; Henry Ferguson, Bozeman; and Thomas

Thompson, Miles City. (Mr. Thompson was replaced in September 1901 by Charles L. Smith.) Since the salary of $100 per month included travel and living expenses, the positions were no bargain. One of the deputies reported that in his first month on the job, he spent all but $9.40 of his monthly wage on travel. One of the first assignments of the deputies was to travel throughout their districts distributing posters giving a synopsis of state game laws.

At this time, there was still no license needed for fishing, either resident or nonresident. But, for the first time, nonresident hunters were required to have a license. According to the report of the state game warden, fishing success throughout the state was generally good. The fish hatchery at Bozeman was credited with doing much toward keeping Montana streams stocked with fish, but the numbers of fish requested were considerably greater than the hatchery could product. Clearly, there was a definite need for a state fish hatchery to meet the increasing numbers of requests. It was estimated that the cost of a state fish hatchery would be approximately $5,000.

It was reported in 1901 that the yellow perch that had been planted in Lake Sewell in 1898 were thriving and multiplying. Lake Sewell is included in that part of the Missouri River now covered by Canyon Ferry Reservoir. The U.S. Commissioner of Fish and Fisheries, George H. Bowers, assured the Department that a liberal allowance of three- to five-inch bass would be provided for stocking Lake Sewell the following year.

The Bozeman Fish Hatchery furnished 3,000 trout fry to the Department for stocking the North Fork of the Sun River. These fish were packed in for 40 miles by the August Chamber of the League of American Sportsmen to an area above the falls where trout were not known to previously exist.

The loss of fish to irrigation systems was a constant concern of state fishermen. An early state law required the screening of all ditches, but the law was repealed by the 1897 Legislature which, in that same year, passed a law requiring fishways over all dams. This law was largely ignored until 1901, when the Department decided to enforce it. The Buck Fishway, a design

adopted earlier by Minnesota, was to be used. However, there are no records of any of these fishways ever being installed.

Stream pollution from coal washings was reported to be extremely bad on the Upper Yellowstone River and on Rocky Creek below the community of Red Lodge. Cyanide waste from gold mining activities was a common pollutant in a number of areas. The Department recommended to the legislature that the dumping of such wastes be made illegal and that settling ponds be required to alleviate the situation.

A new set of fish and game laws which included a number of changes was approved in March 1902. One of the new regulations provided that seines could be used anywhere in the Missouri River, with the exception of Lake Sewell. Because of a clerical error, however, the seining regulation was declared unconstitutional.

W. F. Scott stated that without the fish hatchery at Bozeman streams of the state would be practically depleted of fish. Scott reported that the state of Minnesota had two fish hatcheries, Wisconsin had three and Washington had 15. Following is a list of species planted by the Bozeman station in 1903 and 1904:

SPECIES	FISH PLANTED IN 1903	FISH PLANTED IN 1904
Brook trout	95,000	100,000
Rocky Mountain trout	400,000	600,000
Steelhead trout	50,000	25,000
Mackinaw trout	2,000	6,000
Rainbow trout	40,000	20,000
Grayling	1,500,000	2,500,000
Lake Superior whitefish	800,000	--

George Bowers provided the Department with 500 adult largemouth bass for Lake Sewell in the summer of 1904.

As agriculture developed in Montana, so did irrigation systems. The heavy losses of fish from the irrigation ditches prompted Dr. Henshall, Superintendent of the Bozeman hatchery, to devise a paddlewheel type of barrier in 1903. When installed in canal intakes, the barrier would keep fish from entering. Plans and details of the device were widely distributed and publicized. The Fish and Game Department threatened to discontinue the stocking of fish in any streams having irrigation ditches or canals without the paddlewheel fish excluders. In spite of the threat, very few of the excluders were ever installed. In 1904, in a letter to the editor of Forest and Stream magazine, Dr. Henshall wrote, "It is both disheartening and discouraging to the western fish culturist to know that millions of fish, both large and small, annually perish by being stranded on the meadows and grain fields as a result of unscreened ditches." He noticed that a large percentage of work by the state Fish Commission go for naught from this cause.

George Bowers also reported that many states were extremely indifferent to the preservation of freshwater and anadromous fishes and lacked appreciation for the work carried on by the government through the U.S. Bureau of Fisheries. He proposed to discontinue all government fisheries work in states that exhibited no healthy sentiment in favor of their supply of food and game fishes.

1905 and 1906

Echo Lake in Flathead County was producing excellent black bass fishing in 1905. According to angler reports, specimens up to seven pounds were taken. From Lake Sewell near Helena, anglers reported catching bass weighing as much as one and one-half pounds. Dr. Henshall observed that the waters of eastern Montana were too cold and not well suited for bass. His observation was quite accurate, but since his time, many thousands of largemouth bass have been stocked in eastern Montana ponds, largely because of their availability. Some of the initial plants were successful, but water temperatures were generally not conducive to good growth or reproduction.

In 1905, Dr. Henshall published a list of fishes of Montana. He recorded 36 species that were native to the state. Several species were identified from the descriptions made by the Lewis and Clark Expedition; most, however, were collected in the Missouri River below Great Falls by parties working on government railroad surveys. A few collections were made by the U.S. Bureau of Fisheries. Commenting on the common names of trout, Dr. Henshall said that he preferred the name of red-throat trout to the rather repulsive name of cutthroat trout. Most Montanans of this period apparently had little concern for either name, since it was most frequently called the blackspotted trout or Rocky Mountain trout.

Dr. Henshall also successfully propagated the Montana grayling. This was considered quite an achievement in view of the failures by the bureau in their attempts to propagate the Michigan grayling.

The brook trout stocked in many lakes and streams of the state by the Bozeman fish hatchery were reported to be thriving and producing excellent sport fishing in 1905. During this same period, the U.S. Bureau of Fisheries planted several million Lake Superior whitefish in Flathead Lake and introduced large numbers of steelhead trout into state streams. In a bulletin published by

the University of Montana in 1906, Dr. Henshall listed the species of fish stocked by the bureau in Montana. These included Lake Superior whitefish, rainbow trout, brown trout, lake trout, brook trout, largemouth and smallmouth bass.

In 1905, Senator W. A. Clark built a private fish hatchery at Columbia Gardens near Butte. The facility was capable of producing fairly good numbers of fish. While there may have been other private fish hatchery operations in the state, this was the first one recorded. Fish from the Columbia Gardens Hatchery were given to the Butte anglers club which, in turn, had the deputy game warden distribute the fish to suitable waters in their area. The operation was cited as just one example of the fine spirit of cooperation that existed between the sportsmen and the Fish and Game Department.

The first resident hunting and fishing license was finally adopted in 1905, despite considerable opposition from the public. The cost of the license was $1.00 and only one license per family was needed. With the new licensing system, Department clerical work increased and additional office help was hired in Helena. There were 500 license accounts to process -- 300 Justice of the Peace and 200 Special Deputy accounts. There were more than 30,600 licenses sold in 1905, bringing in as much as $30,600, with expenses about $16,800. The 1906 receipts totaled $24,500 and expenses were $17,400.

1907 and 1908

The first nonresident fishing license was adopted in 1907 and only cost $1.00. This brought increased revenue to the Department and helped to determine the number of out-of-state anglers.

In a 1907, U.S. Bureau of Fisheries Document, Dr. Henshall wrote, "Grayling originally existed only in the tributaries of the Missouri River above Great Falls and were first noticed by Lewis and Clark during their expedition. They were rediscovered by James W. Milner in 1872 in a tributary of the Missouri River near Camp Baker, Montana. Mr. Milner described the fish and named it, Thymallus montanus. Probably the Arctic grayling was parent stock, and had probably been transported south during the glacial period -- a theory strengthened by the abundance of grayling and lake trout in Elk Lake -- the latter nowhere else west of Lake Michigan." The Montana grayling is now considered to be the same species as the Arctic stock and is named Thymallus arcticus.

After a number of years of negative action on a state fish hatchery, the legislature finally appropriated funds for the construction of a station to be located at Anaconda. E. P. Mathewson, Chairman of the State Fish and Game Commission and General Manager of the Anaconda Company Smelter, was instrumental in securing the site and having a hatchery building, a residence and an ice house built. The land occupied by the hatchery and the accompanying water rights were given to the Department by John D. Ryan, President of the Butte, Anaconda, and Pacific Railroad (BA&P), on November 14, 1908. C. F. Healea was placed in charge of the new installation.

1909 and 1910

On January 1, 1909, Governor Edwin Norris selected Henry Avare, who was one of the original deputy game warden appointees, to be State Fish and Game Warden, replacing W. F. Scott.

The Anaconda fish hatchery, under the supervision of C. F. Healea, was credited with noticeably increasing the numbers of fish in Montana streams, a rather questionable accomplishment considering its brief history. Records showed that over 14 million fish had been planted from that station. Brook trout fry from eggs shipped to Anaconda from Rhode Island were planted in Georgetown Lake in 1908. These fish were now reported to range from 6- to 12-inches in length, with some moving into the inlet streams to spawn. It was expected that brood fish from the same lot of fish, held at the hatchery, should produce approximately a million eggs. In 1909, the Fish and Game Commission approved over $9,000 to the Anaconda Company for fish hatchery operations.

By far, the highest production at the Anaconda hatchery was the blackspotted (cutthroat) trout. Large numbers of these fish were widely distributed throughout the state. The results of planting the blackspotted trout was difficult to assess since this species was found naturally in most streams of the state.

"Fishing trains" were becoming common in parts of the state about this time. Fishermen boarded these trains early in the morning, then were dropped off near their favorite fishing spots as the train progressed along a stream. In the evening, the train would return to pick up these anglers waiting along the route. One popular fishing train started at Great Falls and distributed fishermen along Belt Creek. The Department received a number of complaints relative to the activities of the "train fishermen." Local sportsmen accused them of taking and keeping too many trout, particularly the smaller ones.

Some fishermen expressed concern over the large numbers of fish concentrated below the dams. They felt that these fish should be protected since they were extremely vulnerable to anglers. On the recommendation of Henry Avare, fishing was prohibited immediately below existing dams. This regulation was maintained at many dams in the state for more than 50 years. Further protective measures included eliminating winter fishing and restricting the daily limit of 25 pounds of trout, with a possession limit of 50 pounds.

Millions of Lake Superior whitefish had been stocked in Flathead Lake and other large lakes in the state. It was predicted at the time that Flathead Lake alone would be able to supply the entire state with this exceptionally fine-tasting fish. The Department was confident that these whitefish would do as well in Flathead Lake as they had in the Great Lakes.

Information received by the Department from other states described the rainbow trout and steelhead trout as being quite cannibalistic species. To protect other game fish, a policy was adopted by the Department that henceforth rainbow and steelhead would be stocked only in isolated reservoirs.

There were 50,000 grayling planted in Georgetown Lake from the Bozeman Hatchery in April 1909. By 1910, these fish were reported to have a maximum length of up to 11 inches and were being taken on flies. The following year, the grayling were said to average about two pounds. The Bitterroot, Flathead and Yellowstone rivers also received plants of grayling in 1909, apparently with less phenomenal results.

In October 1910, state fish distribution was interrupted when the railroad companies unexpectedly recalled all free transportation granted to the Department, including the fish car. No reason was given for the sudden change in railroad policy, but it is likely they felt a lucrative source of income was being overlooked.

Under the license law enacted by the Eleventh Legislative Assembly, everyone was required to have a $1.00 resident license to hunt and fish. Unlike the original hunting and fishing license which was one license per family, this

law was interpreted to include men, women and children to each have a license. On the recommendation of the Fish and Game Commission, this law was changed to exempt boys under 14 years of age and all women.

Large numbers of immigrants were coming to America at this time, and while Montana did not experience much of this, those who did come added to the problems of the game wardens. According to their reports, the foreign element had no regard whatsoever for fish and game regulations and harvested everything available, including songbirds.

During 1910, forest fires in the Bull River area resulted in the total loss of trout from large sections of this stream, as well as Beaver Creek and Trout Creek. The water in these streams was said to have been steaming hot in the fire area.

1911 and 1912

The Montana Fish and Game Commission, originally created by Legislative Act on March 8, 1907, was increased from three to five members by a new Act passed on February 11, 1911. E. P. Mathewson was President of the Commission. The other members included State Game Warden, Henry Avare of Helena; Secretary, Major G. E. Doll of Helena; Major M. D. Baldwin of Kalispell, and Judge W. M. Bickford of Missoula.

Sportsmen in the northwestern part of the state maintained that the fish hatchery facilities were not adequate to provide desirable fishing in the numerous lakes and streams of their area and they strongly urged the Commission to construct a fish hatchery in the Flathead region to remedy the situation. Funds for a hatchery were appropriated by legislative act in February 1911. After investigation of several probable sites, a location near Somers on the Cramer Ranch was finally selected. The land was donated by Flathead County and the architect for the project was J. B. Gibson of Kalispell. The unit consisted of a hatchery building, 38 feet by 84 feet, with 40 cement troughs; a bungalow-type residence, 32 feet by 42 feet; an ice house, 20 feet by 24 feet, and a garage, 22 feet by 24 feet. Capacity of the new station was estimated to hold about three million trout. A battery of whitefish jars was said to be capable of producing from eight to ten million fish. A six-inch wooden pipeline carried spring water about 3,000 feet to the hatchery. The water head was 228 feet. Construction of the hatchery was completed in 1912 and production was scheduled for the following year.

The residence at the Anaconda hatchery was remodeled and enlarged in 1912 and an addition of 15 feet was made to the hatchery building to provide room for an office and shop. This was the first year that the Anaconda station kept accurate records of all operations. During the 1912 season, the hatchery distributed 660,000 grayling; 16,350 rainbow trout; 1,299,200 brook trout and 2,604,500 blackspotted trout. All of these fish were planted as fry.

A report of the misuse of state funds was investigated at Anaconda and Supervisor C. F. Healea was relieved from duty. J. D. Dean, formerly with the federal fish hatchery at Bozeman, was hired in March 1912 to replace Healea. The salary of the hatchery supervisor was raised from $1,800 to $2,500 per year by the Commission.

Through the efforts of Senator Myers, Montana received over two million cutthroat trout eggs from the U.S. Bureau of Fisheries operations in Yellowstone National Park. It was necessary to build two new tanks and two troughs at the Anaconda hatchery to handle all of the eggs. Hatchery Superintendent Dean reported that the total loss, from eyeing to distribution, was only 12 percent.

The Butte, Anaconda, and Pacific Railroad Company donated a railroad car to the Department in 1911 for fish distribution. The car was remodeled to include sleeping quarters, cooking facilities and air pumps. During the 1912 season, the railroad car traveled more than 8,000 miles on fish planting trips and 2,500 miles on messenger trips. The fish car provided an efficient method of transporting fish over fairly long distances at a time when there were no super highways or large diesel-powered tank trucks. The use of railroad fish cars for distribution was pioneered by the U.S. Bureau of Fisheries. Most states later adopted the practice. Success of the operation demanded careful timing. Once the route of the fish car was established, it was important that sportsmen's groups or individuals scheduled to receive fish meet the fish car and pick up the cans of fish at the appointed time and place. It was the responsibility of those receiving the fish to transport them to the designated lake or stream or, at times, to other waters of their choice.

Various activities throughout the state were reported. The Department was confident that, by 1913, test netting in Flathead Lake, Whitefish Lake and McDonald Lake would confirm the successful establishment of Lake Superior whitefish. Also reported at that time were problems with the Dolly Varden trout, which was becoming known to be very destructive on fish life. These problems caused the Commission to change regulations to permit the taking of these fish with nets.

Practically every accessible water in the state received fish of some kind at the discretion of the planter and without regard to actual need or desirability. A scientific basis for fish stocking was still well in the future. Other than for relatively broad regulations which set limits and closed seasons or areas, fisheries management consisted exclusively of rearing and planting fish. Many of the fish introductions provided excellent fishing, particularly those introductions made into barren waters. Some plants were later found to have been unwise; for example, the establishment of brook trout in waters not suited to the species, the introduction of sunfish into good trout lakes, the elimination of native cutthroat and grayling populations through the stocking of rainbow and brown trout. Yellowstone National Park originally had only three species of native game fish: cutthroat trout, mountain whitefish and grayling. By 1911, lake trout, rainbow trout, brook trout and brown trout had been added. Landlocked salmon were introduced into Yellowstone Lake and largemouth bass were planted in lakes of the Firehole Basin, but neither species became established.

Many millions of Yellowstone cutthroat trout eggs were taken at Yellowstone Lake and shipped to places throughout the world. The federal fish hatchery at Bozeman maintained three eyeing stations in the Park -- at Thumb, Lake Creek and Cub Creek. The log book of the Bozeman station contained an interesting description of the spawning operation of 1912. On June 10th of that year, the station assembled all the equipment and personnel needed for the task. The gear was loaded into three freight wagons, each pulled by a four-horse team. The teams, wagons and men were loaded onto railroad freight cars at Bozeman and transported to Gardiner. From Gardiner, travel was by wagon to Yellowstone Lake. The wagons had been on the road only for a short time when early June rain suddenly became heavy spring snow. The weather turned bitterly cold and both men and horses were exhausted by the time the Yellowstone Lake station was reached. In spite of the rather cold start, the 1912 season turned out exceptionally well. There were 29,320,500 blackspotted trout eggs taken during the balance of June and July. Montana was well supplied with blackspotted trout eggs through the courtesy of the U.S. Bureau of Fisheries.

The Park spawning operations report wouldn't be complete without reference to the very troublesome bears which were a constant menace at the fish traps. One employee commented that the way to handle bears was to give them a good, solid kick in the "tail region." If the bear ran away, it was a black bear; if you ran away, it was a grizzly.

Mystic Lake, near Bozeman, was stocked by the Bozeman hatchery with 6,000 one-inch rainbow trout fry in August 1912. Three years later these same fish averaged six to eight pounds.

1913 and 1914

In 1913, Governor Samuel Stewart replaced the current Game Warden, Henry Avare, with J. L. DeHart, but the Commission remained unchanged. The Hatchery Superintendent position was created by the Commission to handle the expanded fish hatchery program and the numerous requests for fish. H. D. Dean was selected to fill the new position.

Quite a few thousand pounds of Dolly Varden trout were reported seined from Flathead Lake in 1913 during the period of legalized netting. Most of the fish were sold in the Kalispell area, bringing from 20-25 cents per pound. The Commission felt that a sufficient number of Dolly Varden trout had been taken and it was restored to the game fish category with a daily limit of 50 pounds.

Test netting for Lake Superior whitefish in Flathead Lake proved unsuccessful. This was wholly unexpected since large numbers of this species had been stocked over a span of 14 years -- the U.S. Bureau of Fisheries making the first plant in 1890. One theory advanced at the time was that the fish were probably present but were in the deeper waters out of reach of the nets.

By 1913, the railroads refused to haul the old fish distribution car because of its dilapidated condition. The legislature appropriated $6,000 for the purchase of another car which was delivered in August 1913 and made its first trip with fish on August 18. The new unit was patterned after the government fish distribution cars with living quarters aboard. During this year, the original fish car, obtained from the Butte, Anaconda and Pacific Railroad Company, traveled 6,639 miles; the new car traveled 21,455 miles.

The two state fish hatcheries at Anaconda and Somers now reproduced cutthroat trout, brook trout, rainbow trout, grayling and whitefish. Fisheries

Superintendent, H. D. Dean, reported that 15 million fry were liberated from the Anaconda hatchery during the season. All that was needed to make a complete state operation, according to the Commission report, was a fish hatchery in the eastern part of the state to stock pike, perch, bass, catfish and other warmwater species.

At Anaconda, 40 new concrete troughs were constructed, the water supply was changed into a closed system, a new whitefish battery was installed and an aquarium was added. The Department officially thanked the Anaconda Company for the labor and road work involved in improving the entrance to the hatchery. The Anaconda and Somers stations received new 1913 Ford cars.

At the Somers station, an electric light plant was installed and a new 250-foot dock constructed. A 31-foot launch, capable of hauling 50 cans of fish at a trip, was purchased for transporting the cans of fish from the hatchery to the town of Somers where they could be transferred to the railroad fish car.

The federal fish hatchery at Bozeman stocked 20,000 lake trout in 1913 and 4,000 in 1914. These fish were planted as three- to five-inch fingerlings and were from eggs received from Duluth, Minnesota. One-half of the lake trout were stocked in Hauser Lake, the balance in Glacier National Park. This same year, the Bozeman station received 500,000 brook trout eggs from the federal fish hatchery at Leadville, Colorado and 25,000 landlocked salmon eggs from Maine. There is no record where the 18,000 fry resulting from the Maine eggs were stocked. The grayling operation carried out by the Bozeman station at Red Rock Lake was abandoned in 1913 because of a shortage of federal funding.

The U.S. Bureau of Fisheries was investigating possible sites for a fish hatchery in the Madison Valley in 1913. Locations proposed included O'Dell Creek near Ennis for the rearing of grayling and South Meadow Creek near McAllister for grayling and rainbow trout.

Experiments at the Somers Hatchery showed there were enough eggs available from wild sources to supply fish for stocking all of the lakes and

streams of its planting area if a method could be found to reduce the large egg losses incurred during transportation. These heavy egg losses were considerably reduced when the eyeing process was accomplished at field stations located near the traps. Approximately 650,000 native cutthroat trout eggs were eyed at Fish Lake near Stryker with very good results.

The brook trout broodstock held at the Anaconda hatchery produced a half million eggs in 1913. An additional half million eggs were purchased from commercial dealers. In 1914, the Department purchased over three million brook trout eggs, then exchanged two million of those with Michigan for rainbow trout eggs. It was deemed more economical to purchase the brook trout eggs from eastern dealers than to take them from local fish populations. The U.S. Bureau of Fisheries furnished the Department with 200,000 eyed brook trout eggs in 1913 and the same number in 1914. Brook trout were exhibiting good growth in Montana. Fish weighing up to four pounds were being caught in Georgetown Lake and some up to 19 inches in length were taken at Lake Ronan. Judge Bickford stated that the brook trout planted in the Blackfoot River in May 1912 averaged nearly two pounds in the fall of 1914. Brook trout had now been in Montana waters for 20 years.

The rainbow trout is a native of the Pacific slope and its range inward extended just inside Montana's northwestern boundary. Hatchery-reared rainbow from coastal stocks had been widely planted in Montana for 16 years. It was able to survive in somewhat warmer waters than the brook trout and was also less cannibalistic. These rainbows adapted well to the lakes and streams of the state. Rainbows weighing from six to ten pounds were caught in the Big Hole River. A record fish of 17 pounds, 2 ounces was taken by a Mr. Swanson near Maiden Rock on the Big Hole River and a 12-pounder was reported from Georgetown Lake.

Large numbers of grayling eggs continued to be available through state spawn-taking operations. In 1913, the Department furnished the Columbia Gardens Hatchery with a million grayling eggs to provide fish for stocking the

Butte area. Lake plants of grayling were producing excellent results but the stream plants were generally unsuccessful.

The native whitefish was still abundant in Montana waters but was reported to be declining in numbers since it was not propagated or protected. These reports were probably incorrect. In the fall of 1914, the Somers Hatchery took 400,000 mountain whitefish eggs at Big Fork, where the Swan River empties into Flathead Lake. These eggs were placed in hatching jars. This operation constituted the first mountain whitefish propagation in a state fish hatchery.

In the spring of 1914, at the Anaconda hatchery, lethal runoff water from a pile of leaching ashes entered the water supply system, killing a large number of eggs and fingerling fish. Following the disaster, the cinders were removed to prevent a recurrence.

Department records showed the numbers of fish planted during 1913 and 1914 as follows:

HATCHERY	SPECIES	1913	1914
Somers	Lake Superior whitefish	3,000,000	4,860,000
Somers	Lake trout	18,550	4,000
Anaconda	Blackspotted trout	--	1,583,900
Anaconda	Brook trout	--	1,724,175
Anaconda	Rainbow trout	--	1,255,950
Anaconda	Grayling	--	265,000

1915 and 1916

The federal fish hatchery at Bozeman planted large numbers of fish in 1915. Cutthroat, rainbow and brook trout were transferred from the station to railroad fish cars for wide distribution. While Montana waters received a large share of the fish, some were planted by the Oregon Shortline Railroad; others were shipped to Salt Lake City, Utah; Spokane, Washington and to Idaho. Fish for a display aquarium were sent to the Pacific Exposition and a shipment of rainbow trout was sent to Panama. The Bozeman station received 200,000 brook trout eggs from Lehighton, Pennsylvania, in 1915. The fry from these eggs (26 cans) were sent by fish car to Red Lodge for distribution in the waters of that area.

To protect and preserve Montana's excellent sport fishing, a law was enacted that same year setting a daily limit on game fish. It became unlawful to take more than 25 pounds of game fish, or to take more than 10 fish less than six inches in length in one day.

Improved fishing opportunities were anticipated for the 1916 season with the completion of Hebgen Reservoir on the Madison River near West Yellowstone.

Several state streams received plants of steelhead trout in April from the fish hatchery at Bozeman. The steelhead eggs were secured from Clackamas, Oregon. The Bozeman station also shipped 81 cans of brook trout (200 fish per can) and 36 cans of rainbow trout (1,000 fish per can) to Glacier National Park in September. The Park Service hoped to improve the quality of sport fishing in the waters of the Park through expanded stocking operations.

1917 and 1918

The Fish and Game Commission members, under Governor Samuel Stewart, were J. L. Kelly, Chairman; M. D. Baldwin; Nelson Storey, Jr. and W. M. Bickford. State Game Warden J. L. DeHart was Secretary of the Commission.

The cost of a resident hunting and fishing license was increased in 1917 from $1.00 to $1.50.

The legislature appropriated $17,000 for the purchase of a new fish distribution car. The old car, Thymallus, was considered unsafe and in need of replacement. The bids received for a new railroad car were $24,600 and $50,000. The Northern Pacific Railway Company loaned the Department a fish car instead.

The automobile was extending the range for anglers considerably. Waters that were once remote and inaccessible were now within the reach of more fishermen. Because of the increased fishing pressure, the Department planned to put increased efforts into the fish planting program, with special emphasis on waters barren of fish.

Systematic fry planting, particularly in barren waters, was continuing to produce good fishing but the Department needed to select the species of fish to be planted more carefully. There would be better results if prior investigations of the waters were made. Applicants for fish would be required to furnish information on the physical characteristics, irrigation diversions, pollution, etc. of the waters to be planted. Examples cited which showed poor planning included the transplanting of bass from Echo Lake into the Flathead River and the stocking of brown trout into the Madison River. Records fail to show when brown trout were first introduced into the Madison River, but they may have come from early introductions into Yellowstone National Park during 1889.

Brown trout were now reported to be present in the Madison in fairly large numbers and concern was expressed that the brown trout would prove detrimental to the grayling. Future plants were to be restricted to cutthroat and rainbow trout and grayling.

The Department commended the many sportsmen's organizations for their assistance in stocking fish. Members of these groups were encouraged to provide information on stream conditions, locate suitable fish planting sites, help to enforce the 25 pounds per day limit and prevent the use of traps, nets and explosives. Formation of sportsmen's clubs was strongly urged. Support of Department activities and policies by the sportsmen, however, was not unanimous. Largely due to club efforts, a bill was introduced in the 1917 Legislature to abolish the Fish and Game Department and turn the duties over to the county sheriffs. Fortunately, the bill was defeated.

Diverters of water from state streams were still not installing fish screens or excluders and fish losses from ditches and canals continued. There were also a number of dams being constructed in the state and, while the law specifically required the installation of fish ladders, the actual need was questionable and the issue was not forced. Although the ladder at the Divide Dam on the Big Hole River was never used by the fish, some dams were considered a benefit to the fishery.

The McNeil Brothers were permitted to seine carp from Lake Bowdoin during the next fall and winter. With beef in short supply in the state, the fish were deemed to fulfill a need for meat. Carp was never highly prized by most Montanans, even though it was plentiful and inexpensive.

Property owners adjoining the Somers Hatchery claimed the water rights and allowed their cattle to trample the springs which provided the hatchery with water. Additional pipe was installed to collect water unaffected by cattle trampling and also to reduce warming of the water during the summer months. The Commission proposed to select another site in the area for the hatchery if conditions at Somers didn't improve.

Spawning stations were developed by the Department as opportunities arose, making the state fish hatcheries less dependent on outside sources for fish eggs. It was still necessary, however, to purchase some of the eggs needed from commercial dealers. Part of the eggs taken at the fish traps on Willow Creek, a tributary of the Madison River, by the U.S. Bureau of Fisheries, were furnished to the Department in return for help patrolling the traps.

In the fall, the Department purchased one million eyed chinook salmon eggs from Bonneville, Oregon. Half of these eggs were hatched at the Anaconda hatchery and half at Somers. The fry from these eggs were planted in the Clearwater Lakes in August 1917. A year later in July, these salmon were 13- to 16-inches in length and weighed over one pound.

In November 1918, a Department spawning crew seining in Lake Ronan to obtain brook trout eggs was surprised to find a number of blueback salmon (kokanee) in their nets. The male salmon were described as being bright red in color, hump-backed and having hooked jaws with many sharp teeth. The female was said to be more trout-like in appearance. These salmon were spawned and about 50,000 eggs taken. There were no previous records of blueback salmon plants in Lake Ronan and it can only be assumed that they came from eggs that had been mixed in with the shipment of Chinook salmon eggs from Oregon in 1916. The salmon from this lot of Oregon eggs were planted in Lake Ronan and Foys Lake in May 1916, and entered the catch in 1918. By September of 1919, these fish weighed as much as 14 pounds in Lake Ronan. In October of 1919, mature fish from this plant were reported by the Somers Hatchery Superintendent, Eli Melton, to have died and washed ashore in Lake Ronan and one bay in Flathead Lake. Apparently, the fish had been planted in Flathead Lake at the same time Lake Ronan and Foys Lake were stocked, although the introduction was not reported. Oregon was very interested in the success of the blueback salmon in Montana. They had been trying for a number of years to establish this fish in Oregon waters.

A fish display building was erected by the Department at the fairgrounds in Helena. The purpose of the display was to show the public the various

species of fish cultivated in Montana and also to encourage the use of some of the less utilized species. Details of the display were not reported, but Eli Melton was credited with the design and construction of a large aquarium in the building. In addition to being a competent fish culturist, Melton was also an expert glazier.

The overall fisheries program in the state received new interest. Past practices were evaluated and new plans were made for the future. The Bitterroot River fishery showed that good populations of cutthroat trout, whitefish, squawfish, and suckers were present, while over the years, brook trout, grayling, rainbow trout and steelhead trout had been the only species regularly stocked. Grayling had failed to become established in the Bitterroot and only very small numbers of the other stocked species were found. Future fisheries management plans included: (1) a compilation of the lakes, streams and rivers of the state, showing the kinds of fish, characteristics of the water, sources of pollution, the number of fry plants made and the results of the plants; (2) instruction of all sportsmen's clubs and individuals involved in the proper methods of fry planting; and (3) the stimulation of interest in the construction of breeding or holding ponds.

The Department announced plans to cooperate closely with the Forest Service in the introduction of fish into barren waters located on the national forests within the state. In evaluating the fish planting program, the Department recognized that there was greater survival when larger fingerlings were stocked but the higher costs of rearing and distributing the fish discouraged such practice.

The hatchery at Bozeman erected a small auxiliary station at McAllister in 1917 to facilitate operations on the Madison River. Another auxiliary unit was planned for Glacier National Park. The Bozeman station obtained a large number of brook trout eggs in 1917 and stocked fry from these throughout the waters of the Madison Valley.

1919 and 1920

Governor Joseph Dixon appointed T. N. Marlowe to replace long-time Commission member, W. M. Bickford in 1919. J. H. Brunson was appointed Superintendent of Hatcheries in March, but didn't report for duty until November 1920.

Montana experienced a severe drought in 1919. Many of the smaller streams were completely dry. The Fisheries Division, nonetheless, reported a relatively active year. A new state fish hatchery was nearing completion at Emigrant. The station had 12 troughs and a battery of 25 jars for hatching whitefish or grayling. An electric light plant was purchased and bids were advertised for construction of an ice house, garage and shop. However, a surveying error caused considerable problems and was reported in 1921:

> "The Emigrant Hatchery has been in the process of being built since it was first begun in 1919. From the time the hatchery was first used, the largest fish distributed by the Department have always been shipped from the Emigrant station. The thing that has held up the completion of this station more than anything else has been the fact that due to a mistake on the part of the person who located the hatchery building site, he forgot to select the site within the bounds of the land that was donated to the Commission. Rearing ponds were constructed in October 1920 and have been a pronounced success, but the continual trampling of innumerable sheep, cattle and hogs crossing from one side to the other, especially during the time when fish are being held therein, makes the work disheartening. At certain seasons of the year it requires the attention of one employee to keep the newborn lambs out of the ponds. The location of this station would make it one of the most important of all stations operated by the Commission, could it be finally completed. Under present conditions it is impossible to do

any ground work of a permanent nature, or to build a suitable road leading from the Yellowstone Trail to the hatchery, a distance of perhaps two or three hundred yards."

At the Anaconda Hatchery, 60 concrete troughs were installed, the springs tiled and the buildings painted. The Georgetown Lake operation secured nearly 20 million grayling eggs and several million cutthroat eggs.

The Western Montana Fish and Game Association of Missoula built a fisheries station and living quarters at Salmon Lake. The station had approximately the same capacity as the new Emigrant Hatchery.

A small fish hatchery unit was erected by the Department at Hebgen Dam and the racks and traps put in place in May 1919. During the winter of 1920, the installation was completely destroyed by a snow slide. Rather than face the same hazard in the future, the Department planned to rebuild at a location on the West Fork of the Madison River.

The Department leased a private fish hatchery on the Dearborn River for several years. A temporary fisheries station was maintained for taking and hatching grayling eggs on O'Dell Creek near the town of Ennis, but high water in the spring of 1920 washed out the operation, as well as a small dam on the creek.

The Department now operated a total of 12 fisheries units including hatcheries, egg-taking and eyeing stations. No recorded information was found on the number of private fish hatcheries in existence at this time, nor was it known how many fish were produced or where they were planted. Private hatcheries operated by sportsmen's groups generally made plants of fish wherever they desired. The Department was dissatisfied with this situation but was unable to provide a solution. It was impossible, because of the costs involved, to put all of the private fish hatchery operations under Department supervision or to furnish eggs for all of them.

1921 and 1922

T. N. Marlowe was Chairman of Commission with other members E. A. Wilson, H. C. Crippen, J. L. Kelly and John Tressler. C. A. Jakways was State Game Warden and J. H. Brunson was Superintendent of Fisheries.

Rearing ponds were considered an excellent and logical method of keeping streams well stocked with trout. The program was widely publicized by the Department and some were constructed. What system could possibly be more economical than placing fry in a controlled rearing pond, letting them grow on natural food and then releasing the fingerlings into an adjacent stream or lake? Four rearing ponds at Greenough Park in Missoula, supervised by the Western Montana Fish and Game Association, were planted with 80 cans of trout fry in June and July, resulting in 400 cans of fingerlings in October. Other rearing ponds established the same time as those in Missoula included one near Bozeman on the West Gallatin River, one near Belgrade, one near Emigrant and one near Ovando. The latter was said to be teaming with freshwater shrimp.

Because of high distribution costs, the Department felt it was more economical to operate small fish hatcheries spread across the state, than to operate a few large hatcheries. The Department was supported by most sportsmen and communities because they hoped to have a fish hatchery located in their own particular area. The city of Lewistown, through the Rod and Gun Club, raised $1,200 in cash and provided a hatchery building and free water for a station at Big Springs. In July 1922, the Department sent K. F. MacDonald to Lewistown to begin operations at the hatchery. He arrived to find the station without equipment. Cattle and horses were trespassing on the grounds and several windows were broken. He evidently took care of the situation immediately since he received 246,750 rainbow trout eggs on July 11 and 468,720 cutthroat trout eggs on July 15 from the Anaconda Hatchery. The eggs must have hatched and been planted almost immediately. The station

records show that rainbow and cutthroat trout fry were planted in the Hobson area on July 14. The Lewistown station was closed for the season on August 31, 1922.

At Great Falls, the Montana Power Company gave the Department $3,500, provided a hatchery site near Giant Springs and agreed to furnish free electric power for pumping water. The Great Falls station was completed in 1922 and consisted of a hatchery building, caretaker's residence, an auxiliary pumping plant and rearing ponds.

Big Timber furnished the Department a hatchery site complete with free water. The operation of the private hatchery built by Marcus Daly at Hamilton was turned over to the Department. W. A. Clark, Jr., donated funds to the Department for the construction of a fish hatchery at Ovando and the Forestry Department granted the Fish and Game Department a fish hatchery site at Red Lodge. In all, five new fish hatcheries were built during from 1921 to 1922 in Lewistown, Great Falls, Big Timber, Red Lodge and Ovando.

At the Anaconda Hatchery, spring water (57°F) was piped into the hatchery building to provide better temperatures for rearing fish. The Georgetown Lake unit was expanded to handle the eyeing of eggs, as eyed eggs could be transported with very little loss. Log cottages were built at the lake and also at Flint Creek.

Salvaging bass was an important Department operation in the Flathead River drainage. After the river flooded in the spring, bass spawned in the warmer, shallow overflow waters. As a result, many small bass were stranded in the temporary pools that were left when the water receded. These pools were seined and the fish transplanted to lakes and ponds in other areas of the state.

There were good reports of salmon fishing at Lake Ronan. A 36-inch Chinook was caught there in 1922.

1923 and 1924

T. N. Marlowe continued as Commission Chairman under Governor Erickson in 1923, and E. T. Richards replaced John Tressler on the Commission. C. A. Jakways was State Game Warden and R. H. Hill was his assistant. J. H. Brunson, Superintendent of Fisheries, had as his staff, Dr. I. H. Treece, Field Assistant, Western Division at Anaconda and John W. Schofield, Field Assistant, Eastern Division at Emigrant. Twelve units were in operation. Those at Lewistown, Red Lodge, Ovando, Georgetown Lake and Big Timber were operated on a seasonal or part-time basis.

The fish traps at Flint Creek on Georgetown Lake were rebuilt in 1924 and 25 million eggs were taken at the traps that year. Fish traps were also built on four tributaries of Ashley Lake in 1924 and a shelter erected over an eyeing station there. It was predicted that the Ashley Lake operations would produce about four million eggs in the 1925 season.

Brown trout and grayling eggs were exchanged for steelhead trout eggs in a trade arranged with Oregon. Actually, it was a somewhat indirect exchange. Montana traded three million grayling eggs with the U.S. Bureau of Fisheries for three million brown trout eggs. In turn, Montana traded two million of the brown trout eggs for two million steelhead and rainbow trout eggs with Oregon. The Great Falls Hatchery received a million of the rainbow trout eggs and planted the resulting fry in the Missouri River.

As early as 1924, the Department expressed the need for a qualified fisheries biologist. Activities such as the classifying of state fishing waters and directing fisheries studies could not be carried out with existing personnel. The Department hoped that the position could be authorized and filled in the near future, but it was not until 1947 that it became a reality. The Department also proposed that a Division of Education be established to assist in public relations. The Information and Education Division was finally established in 1950.

The control of predators was an important function of the Department. In 1923, the sum of 25 cents was set aside from each license sold and was earmarked as a biology fund. This fund was used in employing hunters and trappers to kill predators.

In June 1924, J. H. Brunson resigned as Superintendent of Fisheries. It was not until April 1925, that former State Game Warden, C. A. Jackways, was selected to fill that position temporarily.

The Forest Service in Red Lodge received a shipment of 20 cans of brook trout from the federal fish hatchery at Bozeman in June 1924. These fish were distributed in lakes and streams in the Red Lodge area.

During the summer of 1924, a survey of the lakes in the Madison River drainage was made by Department personnel. It was reported that none of the residents contacted in the vicinity of Elk Lake knew of any lake trout stocking there. One theory advanced at the time was that the introduction of this species had been made by fish-eating birds.

1925 and 1926

Governor Erickson appointed Robert H. Hill to be the State Game Warden. J. W. Carney was named as his assistant. T. N. Marlowe continued as Chairman of the Commission, with E. C. Carruth and W. K. Moore as new Commissioners.

The Department now operated 14 fish hatcheries -- Anaconda, Big Timber, Emigrant, Georgetown Lake, Great Falls, Hamilton, Lake Ronan, Lewistown, Libby, Missoula, Ovando, Philipsburg, Red Lodge and Somers. Many of the stations operated only in taking eggs, eyeing eggs, or hatching and rearing fry.

The Georgetown Lake station took 37 million cutthroat trout eggs, 16 million grayling eggs, 500,000 rainbow trout eggs and over 800,000 brook trout eggs in 1925. The Meadow Creek station, an auxiliary of the fish hatchery at Bozeman, took more than 11 million brown trout eggs that same year. The Bozeman Hatchery supplied the Department with sufficient brown trout eggs to provide fry for stocking the Missouri River above Great Falls and three large reservoirs constructed by MPC in the vicinity of Helena.

Both the Department and the U.S. Bureau of Fisheries took cutthroat trout eggs in large numbers. The main egg-taking facility of the Department was at Georgetown Lake and that of the Bureau at Yellowstone Lake. To extend the overall period of spawning and hatching operations and facilitate handling a large number of eggs, exchanges of eggs from the two sources were arranged. This worked out exceptionally well as the Georgetown Lake eggs were ready about a month earlier than those from the Park.

The Bozeman station received a shipment of 9,875 landlocked salmon eggs from Craig Brook, Maine, in 1925. While the salmon fry were very likely released into state waters, no record of their distribution was found.

Flathead Lake was planted with Lake Superior whitefish which were hatched from eggs taken at Lake McDonald in Glacier National Park. About 15,000 pounds of the whitefish, averaging one and one-half pounds each, were harvested commercially from Lake McDonald in the 1926 season. Many sportsmen and conservationists opposed proposals to take whitefish from Flathead Lake commercially. Those who favored the action, however, predicted that objections would soon subside once the fishery proved successful.

In June 1926, a break in the water supply line at the Lewistown Hatchery resulted in the loss of 10,000 rainbow trout and 290,000 cutthroat trout.

Requests for fish continued to increase throughout the state and more fish were being produced with the increased number of fish hatcheries. Distribution of fish presented difficulties, however, and the Department was investigating means of expanding the fish transporting system.

1927 and 1928

The administration of the Department did not change much during this period. E. C. Carruth was replaced by G. T. Boyd on the Commission and K. F. MacDonald was selected as Superintendent of Fisheries.

A summary of the bass and sunfish salvage operations in the Flathead area, discussed earlier, showed that 406,800 bass and 1,133,628 sunfish had been transplanted in the period from 1921 through 1928. The operation continued to be popular with almost everyone. Here were fish, stranded and doomed to die, that were being rescued and placed in waters where they could live. The advisability or success of the transplants was not reported.

A limited amount of commercial fishing was carried out in the state with varying success. The McNeil Brothers continued to seine carp for eastern markets and were granted permission to extend their operations from Lake Bowdoin to Medicine Lake in Sheridan County and to the backwaters of Nelson Reservoir in Phillips County. Thomas Medanich received a permit to seine carp from Lake Helena. He constructed a pilot fish oil plant near the northeast corner of the lake in 1927 and seined a total of about 30 tons of carp before giving up the venture. Until recently, there were still remnants of his operation on Lake Helena, a site presently occupied by another commercial carp fisherman. Whitefish could be taken legally in Flathead Lake with nets and the fish sold commercially. The fishery was limited, however, as seines were prohibited in less than 30 feet of water.

Funds were appropriated by the legislature for the Miles City Pond Culture Station. Construction began in July 1927 and the unit was completed in March 1928. A warmwater fish hatchery had long been proposed by the Department as a means of stocking the ponds and lakes of eastern Montana. A dam 590 feet long, 10 feet high and 10 feet across the top, created a 78-acre hatchery pond. The dam had a spillway 30 feet wide which was fitted with a

drain box. Water was supplied by an artesian well flowing 12 gallons per minute. When the hatchery was ready for operation, the U.S. Bureau of Fisheries furnished 199 cans of bass, sunfish and crappies. In the spring of 1920, the fish hatchery at LaCrosse, Wisconsin, shipped 375 adult largemouth bass to Miles City. These fish were held in the pond and 5,000 fingerlings were harvested in October. The fingerlings were planted in the upper Tongue River and in farm ponds near Terry, Rosebud and Cohagen.

The fish hatchery at Bozeman had a record year in 1927. The station handled 32 million fish and eggs, of which 14,400 were brown trout.

In 1927, personnel at the fish hatcheries were:

HATCHERY	FOREMAN	ASSISTANT
Anaconda	K. F. MacDonald	E. A. Allen
Big Timber	Iver Hoglund	E. G. Gunderson
Emigrant	Oren Hathaway	A. E. Tangen
Great Falls	A. G. Stubblefield	S. A. Hamann
Hamilton	J. P. Sheehan	
Lake Ronan	Leo Gilroy	
Missoula	O. E. Johnston	
Somers	M. L. Matzick	Elmer Phillips
Station Creek (Polson)	Eli Melton	

Hatchery personnel also worked at temporary fisheries stations at Lewistown, Red Lodge, Georgetown Lake, Libby and other sites. The fish hatchery at Columbia Gardens continued to be operated by the Butte Anglers Club. Loren Donaldson and J. W. Schofield arrived at the Lewistown station in May 1928 to prepare for egg shipments.

In 1928, the Commission entered into a cooperative agreement with the University of Montana at Missoula to investigate fish foods present in Flathead Lake. The project lasted until 1931 and the results were published by the Department. The studies were carried out at the University Biological Station located at Yellow Bay on Flathead Lake. Historically, the station has an interesting background. It was first envisioned by Dr. M. J. Elrod who had come to the University in the fall of 1897 as a professor of biology and saw an opportunity to study flora and fauna indigenous to Flathead Lake and the surrounding country. Dr. Elrod was also chairman of the first Fish and Game Commission and served on that body for a number of years. The Biological Station was established in the fall of 1899 and consisted of a small wooden building with five acres at the mouth of the Swan River at Big Fork. The station, leased by the University, operated at this location until 1912, when a building was completed at Yellow Bay on land granted in trust to the University by the federal government. From 1912 until 1921, summer work was carried on at Yellow Bay by students, staff and visiting investigators. Owing to lack of funds and other difficulties, work was discontinued in 1921 and the station was idle until the joint project was agreed upon in 1928. Since 1931, the station has been used for classes. Modernization and expansion in recent years has made Yellow Bay an integral part of the University training and research program.

1929 and 1930

There was no change in the Commission or Department administration under Governor Erickson. The Department was making adjustments to the fish stocking program to include more six- to seven-inch fish for stream plants. The Department reported that most of the larger fish needed could be obtained at little added expense by expanding the rearing pond program and the anglers appreciated the larger fish.

A new fish hatchery and spawning station was completed at Lake Francis in 1929 as an auxiliary to the Great Falls Fish Hatchery. The new unit was considered one of the most modern rainbow trout spawning stations in the nation. These expectations were never realized. Records for the station show a general decline for the period of operation. Expenditures were $13,000 in 1929; $8,000 in 1930; $1,700 in 1931 and $860 in 1932. Only 37,000 rainbow trout were distributed by the station from 1930 to 1933.

What were claimed to be the largest trout rearing ponds in the U.S. were completed at Maiden Rock on the Big Hole River in 1929. The Butte Anglers Club and the Department cooperated in the construction of the ponds. The club reported that they helped plant over two million fish in 1929.

Probably one of the most active, and certainly one of the oldest sportsmen's organizations in the state, the Butte Anglers Club had existed since 1902. Its first president was Judge W. M. Bickford who, in 1919, was appointed a member of the Fish and Game Commission. The club started out with 60 members and had over 1,000 when it incorporated in 1916. Time, labor and the use of their automobiles by club members contributed to planting fish and carrying out other projects. They operated the Columbia Gardens Fish Hatchery continuously, beginning in 1905. Under the watchwords of the club, "Propagation, Protection and Conservation," the group worked harmoniously with state and federal agencies.

Dr. D. R. Crawford of the University of Washington, Department of Fisheries was hired by the Department to make a survey of the fish hatchery system. His investigations were carried out during the three-month period from June to September 1929. Briefly, his findings and recommendations were:

1. The Anaconda Hatchery was the best equipped Montana station, but did not have an adequate water supply.

2. The Rock Creek Hatchery, an auxiliary of the Anaconda Hatchery, should be retained as a temporary station. While the buildings and site were in poor condition, the location would be helpful in the distribution of fish.

3. Since the Big Timber Hatchery had an adequate water supply, the station was enlarged from 34 to 64 troughs.

4. The Emigrant Hatchery, an auxiliary of the Big Timber Hatchery, had insufficient water; abandonment of the station was recommended.

5. The Red Lodge Hatchery, also an auxiliary of the Big Timber Hatchery, was dependent upon the city water supply and access to the station was poor; abandonment of the site was recommended.

6. The Lewistown Hatchery had an abundant water supply of excellent quality, but there were very few places to plant the fish. It was recommended that the Lewistown site be abandoned and the fish supplied from Big Timber and Great Falls.

7. The Great Falls Hatchery served an extensive area and warranted enlargement. The water supply at the station was low in dissolved oxygen.

8. The Missoula Hatchery, Greenough Park, received its water supply from Rattlesnake Creek. Since most of the water from the stream was required by the city of Missoula, little was left for the operation of the hatchery. Daytime water temperature in the ponds was warm; abandonment of the site was recommended.

A number of other pond sites and proposed hatchery sites were investigated by Dr. Crawford, but were found generally unsuitable.

The Department purchased the 17-acre Anderson Fish Hatchery located near Emigrant for $8,000 in 1929. The hatchery was a private operation owned by George Miles, a brother of Senator Miles. The Emigrant Hatchery was moved to the Anderson site in 1931.

The Miles City Pond Culture Station was authorized to construct a new cottage. The cost of the building was not to exceed $1,000 and it was to be built by hatchery personnel.

In July 1929, the St. Ignatius Rod and Gun Club planted eyed cutthroat trout eggs in the lakes of the Mission Mountains. The Department sent F. M. O'Brien to assist the sportsmen in the stocking. In July 1929, the Icefloe Lakes were planted with 120,000 eyed cutthroat trout eggs; Falls Creek Lakes with 48,000 and two unnamed lakes with 12,000 and 15,000, respectively. Gray Wolf Lake was stocked with 230,400 eyed cutthroat trout eggs in July. This particular stocking project was initiated because of the successful introduction of eyed cutthroat trout eggs into previously barren Snielman Lake in 1925 and the good catches of cutthroat from this lake by 1928.

Judging from random reports, there were a number of private fish hatcheries operating in the state. Since the private operations were not required to have a license or to send production figures to the Department, details regarding their numbers or activities are not available. Verbal reports are vague as to dates, locations and the size of these operations, but the Columbia Gardens station managed by the Butte Anglers Club was the largest. Most of

the fish reared in private hatcheries were planted in nearby waters. A few were probably sold to sportsmen's groups for stocking favorite lakes and streams. Many private fish hatcheries ceased operations as regulations were adopted by the Department that affected the stocking and selling of game fish.

Changes in water use also gradually affected hatchery water supplies. Remnants of some of the early fish hatcheries still exist. Crumbled pond walls are still visible from a hatchery site on Fishtail Creek which was abandoned some time in the early 1920s. Another small private fish hatchery that ceased operations some time prior to 1930 was located on Congdon Creek, a tributary of Ross Fork Creek, near Medicine Lake in the Pintlar area. Only cutthroat trout were raised at this hatchery operated by George Congdon, and all of the fish were planted in the streams and lakes nearby. Remains of the old cabin used as a hatchery building are still visible. Other private fish hatcheries that were in operation are perhaps only familiar with the local residents.

The 1929 fishing season was closed early because of an extreme drought. With the low water flows that existed, it was feared that many of the smaller streams would be entirely depleted of fish if they were to remain open. Because the fish were available and waters were closed to fishing, there was a considerable increase in the number of fishing violations. Additional wardens were needed to effectively patrol the critical areas.

The U.S. Senate approved a bill in 1930 appropriating $50,000 for construction of a fish hatchery in Madison County. President Herbert Hoover signed the bill and the federal fish hatchery near Ennis began operation in 1933. The station was needed primarily for brown trout operations.

Prior to 1897, both Loch Leven and Von Behr brown trout eggs were propagated in federal fish hatcheries in the eastern part of the country. Efforts were made to keep the two strains separate, but were eventually intermixed. W. T. Thompson, Superintendent of the U.S. Fish Hatchery in Bozeman, said that around 1890 the propagation of brown trout was discouraged because of the reported cannibalism of this species and the inferiority of the brown trout to native trout species.

The Butte Anglers Club completed a small fish hatchery unit at Divide, on the Big Hole River, in 1930. The unit was set up in the powerhouse situated on the river. Operation of the 20 troughs with a few hatching jars was supervised by William Carpenter, President of the Butte Anglers Club.

The McNeil Brothers, using a 3,500-foot net, seined over 14 carloads of carp from Nelson Reservoir in Phillips County during the winter of 1930. A carload of carp weighed 30,000 pounds. These were shipped to eastern markets in New York and Chicago, where they sold for three to five cents per pound.

1931 and 1932

Governor Erickson appointed Charles B. Marrs to succeed Robert H. Hill as State Game Warden in 1931. W. P. Sullivan was Chairman of the Commission, along with B. L. Price, William Steinbrenner, W. F. Flynn and H. P. Stanford. K. F. MacDonald was Superintendent of Fisheries.

Superintendent MacDonald outlined an ambitious and progressive fisheries program. He proposed that each fish hatchery have a capable survey crew to study the streams in their planting area. He pressed for the screening of irrigation ditches and canals, but with no more success than that experienced over the previous 30 to 40 years. MacDonald also suggested that the Department set aside a range area in the state, specifically for the rearing of horses for fish food since there was a continuing decline in the availability of horse meat for fish food. This idea met with disfavor from both the Department and the sportsmen -- it didn't fit the image of the horse in Montana. Through MacDonald's efforts, the Department erected a rough fish drying plant at the Clearwater Lakes in 1930. This plant had a capacity of one ton of fish per day. It would provide supplemental fish food for the state fish hatcheries and also reduce the heavy populations of suckers. The plant was scheduled for Lake Francis in 1931, to utilize rough fish there, but evidently the operation was not successful since no further activity of the plant was recorded.

There was a considerable amount of work done at the state fish hatcheries in 1931. The station at Big Timber was enlarged to 72 troughs and a garage and storeroom were added. Additions to the pipeline at the Somers Hatchery did much to improve the water supply system there. A new two-car garage at Somers helped make the unit more complete. The old hatchery at Libby was abandoned and work was well under way at a new hatchery site about five miles from town on the Kalispell-Libby road. The station at Ovando, which was operated only during the summer, was scheduled for a cottage, garage,

storage building and ice house. The various fisheries installations in the state required 76,000 pounds of liver for fish food in 1931. Foremen at the state fish hatcheries in 1931 were:

HATCHERY	FOREMAN
Anaconda	Leo Gilroy
Big Timber	J. W. Schofield
Emigrant	P. G. Botteler
Great Falls	A.G. Stubblefield
Hamilton	J. P. Sheehan
Lewistown	L. R. Donaldson

HATCHERY	FOREMAN
Libby	Elmer Phillips
Missoula	O. E. Johnston
Ovando	T. E. Day
Philipsburg	Graham Cadwell
Polson	Eli Melton
Red Lodge	A. E. Tangen

A fish rearing station was established on Beaver Creek in the Bear Paw Mountains near Havre in the spring of 1931. Fish reared at this station were transplanted to various streams in the area. The Department sent John Cox to Havre to operate this unit. A Civilian Conservation Corps unit, stationed on Beaver Creek near the rearing station, gave considerable assistance in the rock work and log construction at the site. Two large, rock-walled ponds, a log cottage and two log storage buildings were completed.

Old records from the Beaver Creek station reflect the financial problems of the Department during the economic depression. Pay days were often delayed and only the most urgent necessities of equipment were purchased. Help at the Beaver Creek unit was provided by the local game warden, area sportsmen and the nearby CCC unit. Problems encountered included flooding in the spring and water temperatures in the summer exceeding optimum levels for rearing trout. The station was maintained by the Department for three years and it was then turned over to the Havre sportsmen's organization. Occasional work parties associated with an annual kid's fishing derby sponsored by the sportsmen, kept the unit in partial repair. Fish planted in the ponds for the

derby were released into Beaver Creek following the event. The caretaker for the Beaver Creek Park resided in the cottage for a time and helped to maintain it.

The fisheries station at Greenough Park was closed after the 1931 season. The growing city of Missoula required almost all of the water from Rattlesnake Creek for municipal needs. Another site, to replace the Missoula station, was selected on Marlowe Springs, located about 35 miles north of Missoula.

Rearing ponds were constructed at the Dearborn and upper Sun rivers in 1931, although the Department indicated earlier that very few rearing ponds had been successful.

The first eyed golden trout eggs received in the state consisted of a shipment of 50,000 sent to the fish hatchery at Bozeman from California in July 1930. Of the fish from these eggs, 25,000 were scheduled for lakes in the Mission Range. Another 50,000 eyed golden trout eggs were received from California in June 1931, and 56,025 in June 1932. The Bozeman station planted golden trout in the South Fork of the Little Wind River in Wyoming in July 1931. In August, the Forest Service received 5,200 one-inch golden trout for stocking the upper Gallatin River area. A shipment of 6,000 golden trout was sent from Bozeman to the Helena area in September 1931.

In 1932, the fish hatchery at Bozeman received rainbow trout eggs from Neosho, Missouri; Manchester, Iowa; Wild Rose, Wisconsin and Creede, Colorado. Federal hatcheries at Leadville and Creede, Colorado also shipped brook trout eggs to the Bozeman station.

Excellent results were reported by the Department from a transplant of channel catfish from Nelson Reservoir near Malta to Nine Pipes Reservoir near Charlo.

Surplus grayling eggs were exchanged for walleye eggs with the Michigan Department. The walleye were scheduled for Missouri River reservoirs and the lower Yellowstone and Tongue rivers.

Belt Creek, recovering gradually from severe mine pollution, was planted heavily with brook and rainbow trout to provide desirable fishing for anglers from Great Falls and Belt.

Brown trout plants were increased in the upper Yellowstone River. Through a cooperative agreement, the upper Tongue River was also planted with this species by the Wyoming Department.

Substantial plants of brook trout were made in the waters of the Red Lodge - Cooke City area and additional plants were anticipated. The brook trout was considered well suited to these waters and it was stocked in almost all of the lakes and streams of the Beartooth Plateau. Subsequent fisheries surveys have reported populations of stunted brook trout in most of the waters in this area.

The Department received many requests from sportsmen to do something to improve the quality of fishing in the Clearwater Lakes which abounded with squawfish and suckers. In a renewed attempt to establish sportfish populations, the Department stocked the lakes with cutthroat trout, rainbow trout and largemouth bass in 1932. No noticeable improvement in sport fishing was reported.

Fisheries Superintendent MacDonald requested additional permanent personnel for the fish hatcheries as the temporary help available was not always reliable. Additional help at the hatcheries would permit the regular personnel time to study the fishing waters and general conditions of their planting areas. The information obtained on each body of water in the state would be filed for later use in the fish stocking program.

Under an agreement with the U.S. Bureau of Fisheries on January 1, 1933, that agency assumed the responsibility for operation of the Miles City Pond Culture Station, with the exception of the custodian's salary. On that same date, the Bureau also agreed to supply the Department with two million brown trout eggs from their Madison River trapping operations.

Through the efforts of the Department and interested sportsmen, fishing success was reported to be improving in many state waters. Plants from the Butte Anglers Club Maiden Rock station were credited with improved fishing on the Big Hole River. As a result of Department planting programs, kokanee were increasing in Flathead Lake and brown trout in the Yellowstone River. The excellent brown trout fishing in the Missouri River was more accessible to fishermen with the completion of the new highway between Helena and Great Falls.

The introduction of sunfish into Lake Ronan was soundly condemned by the Department. It is quite possible that the introduction resulted from the bass and sunfish salvage operations which were still being carried out from the Somers Hatchery.

Dr. H. B. Foote, Sanitary Engineer for the State Board of Health, reported that the incidence of stream pollution was increasing in Montana. Much of the increase resulted from domestic rather than industrial wastes. Streams reported to be heavily polluted in some sections were Silver Bow Creek, Milk River and Yellowstone River.

A permit was granted in 1932 for the operation of a fish processing plant at Lake Helena. Fish meal produced from carp and suckers would be used in the preparation of fish feed. The operators of the plant were to determine the long-range availability of rough fish from the lake. The unit never did really get into operation and little was actually accomplished. No reference was made as to the availability of rough fish. If the fish populations of that date were similar to those of recent years, availability would have been the least of their problems. A commercial fisherman has been seining and marketing tons of carp and suckers from Lake Helena periodically for over 20 years and the major effect has been an increase in size and condition factor of the carp he harvests. Many of the smaller streams in the state were dry due to the severe drought experienced during 1931. Some had been excellent trout streams. As a consequence, fish salvage was a quite common emergency activity for Department personnel and sportsmen's groups.

Along with the problems associated with the drought, the Department had to cope with the economic depression which was at its worst about that time. The total income of the Department in 1931 was $223,655. In 1932, receipts dropped to $175,644.

Sometime in the 1930s (probably 1933 and 1934) the Department's income apparently dropped to where there was not enough money to keep everyone in the payroll. Rather than completely eliminating many jobs, all hatchery employees except the foremen went on half-time. All of the Department's fish culturists worked two weeks, then took two weeks off without pay. They considered that it was better for everyone to keep half an income than it would have been for half of them to try to find another job in the midst of the great depression.

This half-time arrangement is not recorded in any of the Department's official reports, but was told to Art Whitney by John Cox who experienced it. It was also verified by Emmett Colley. Emmett did not experience it himself, since he started work later in 1941. However, Emmett's father Josh Colley, worked as a fish culturist in the 1930s, so Emmett was well aware of the situation.

1933 and 1934

In 1933, under Governor Frank Cooney, W. P. Sullivan continued as Chairman of the Commission, which included William Steinbrenner, W. F. Flynn, Ray Lowe and W. C. Keil. J. W. Carney was State Game Warden and K. F. MacDonald Superintendent of Fisheries.

Spawning stations were operated on Flint Creek, Stewart Mill Creek, Ashley Lake, Rogers Lake, Hebgen Lake, Lake Ronan and Lake Francis. In September 1933, Sam Drew selected sites for Department fish traps above Hebgen Reservoir on the Madison River, on the South Fork of the Madison River and on Duck Creek. Traps were installed at the sites and the first eggs taken on October 15 from the Madison River and Duck Creek. The 344,560 brown trout eggs secured were sent to the Anaconda Hatchery.

The federal fish hatchery at Ennis operated several spawning stations on tributaries of the Madison River: Meadow Creek, one-quarter mile north of the Thexton Ranch; Upper O'Dell Creek, at the mouth north of Jeffers. Brown trout spawning operations began in October 1933 and resulted in over 22 million eggs for the season.

The Department purchased the Marcus Daly Fish Hatchery at Hamilton in 1933 for $4,500. This station had been operated by the Department since 1922 under a lease agreement. When Marcus Daly built the hatchery in 1918, the cost was $30,000.

While the economic depression of the 1930s slowed many Department activities, some projects actually benefitted. A large number of construction projects which might not otherwise have been possible, were accomplished at various fish hatcheries through the relief work programs of the Civil Works Administration and the Federal Economics Recovery Administration. Circular, 40-foot concrete ponds were constructed at the Great Falls, Anaconda and

Somers stations. A large rearing pond was completed, the grounds landscaped and an addition made to the hatchery at Big Timber. Development work was done on the springs supplying water to the hatchery at Somers. Two rearing ponds and four fry ponds were constructed, in addition to improving the water supply system at the Hamilton station. Sportsmen provided help and materials in the construction of two large, rock-walled rearing ponds at the Lewistown Hatchery. Improvements to the water supply system, construction of four large ponds and landscaping was in progress at the new Libby Hatchery. Log construction was being utilized in the building of a new bunk house, garage and storage building at the Flint Creek traps on Georgetown Lake. The old hatchery building at Red Lodge was dismantled and a new log building erected there. Predictions were that the Red Lodge unit would prove to be a valuable adjunct to the fish hatchery system. A considerable number of improvements were made in the ponds and buildings at the Miles City station. Some work was also done at the Salish site, on Marlowe Springs, between Ravalli and Arlee.

On the other hand, the economic depression was reported responsible for a decrease in the number of eggs taken at the traps on Georgetown Lake in 1933 due to over-fishing by the large numbers of unemployed workers from Butte, Anaconda and Philipsburg.

A rough fish control project on Georgetown Lake resulted in the removal of 48 tons of suckers in 1933 and 74 tons in 1934. The fish were taken in "plant nets." Since suckers were first reported in Georgetown Lake in 1926, they had shown remarkable speed in populating the lake.

Silver salmon eggs received on January 1, 1933 at the Lewistown Hatchery were reported to be bursting on by January 18, rather than hatching normally. Similar results were reported later in attempts to hatch silver salmon in the relatively warm waters of the upper hatchery at Lewistown. More recent shipments of silver salmon eggs were successfully hatched at the lower hatchery unit at Lewistown where the water is somewhat cooler.

Public Works Administration (PWA) projects throughout the state included construction of a large number of stockwater and irrigation reservoirs -- many of which still provide fine fishing. With the large number of dams being constructed, the Department proposed a set of regulations which would govern the operation of reservoirs to be stocked with fish. Fish screens were to be installed at all reservoir outlets and minimum low water levels were required to provide sufficient water to sustain fish life. Where fish were present in feeder canals, sufficient water was required to sustain the fish. While the intent was good, these regulations were never implemented, probably because they would have been extremely difficult to enforce.

There were no regulations at this time prohibiting the transplanting of fish in state waters. Irresponsible introductions of fish proved detrimental to many of the lakes and streams that were already providing excellent fishing. The Department supported legislation making unauthorized fish plants illegal. It also recommended that the legislature give control of all water use in the state to the Water Conservation Board or the State Engineer. Many streams were dry because their entire flows were diverted.

The numbers of kokanee in Flathead Lake continued to increase. Thousands of them spawned along the east and west shores of the lake and heavy runs were ascending the Flathead and Swan rivers. It was estimated that the sportsmen took approximately 100 tons of kokanee from Flathead Lake. Through the efforts of the Montana Relief Commission and the cooperation of the Department, a large number of kokanee were seined from the lake and 21,000 cans were packed for distribution to the needy.

Stream improvement was a popular activity nationally at this time as a result of some successful experiments and test programs pioneered by Dr. Clarence Tarzwell in Michigan in 1930. Basically, this consisted of creating pools, riffle areas and cover by the installation of artificial devices, collectively known as barriers, in the stream; thus making the improved area more attractive for trout. The barriers were modeled after those which occurred naturally in good trout streams.

Elmer Phillips succeeded K. F. MacDonald as Superintendent of Fisheries in 1934. Through the cooperative efforts of the U.S. Forest Service, Region 1 and the U.S. Bureau of Fisheries Division of Inquiry, initiated a pilot stream improvement program in Montana. The program was under the supervision of Dr. Tarzwell, representing the U.S. Bureau of Fisheries. The project site selected was the West Fork of Rock Creek in the Deer Lodge National Forest near Philipsburg. Joe Halterman, who later worked as a deputy game warden for the Department and following that as a fisheries biologist for the U.S. Fish and Wildlife Service, was Tarzwell's straw boss on this project. Extensive and detailed measurements were made of fish populations, fish food organisms and the physical characteristics, prior to installation of log dams, water deflectors and cover structures in and along the stream. Fish samples were collected by seining as electric-fishing methods had not yet been developed. Subsequent duplicate measurements were planned to determine the effects of the various structures, but these were never carried out. Some of the structures were still in place and functioning when the area was resurveyed by Department crews in the late 1950s. The U.S. Bureau of Fisheries also did some stream improvement work at this same time in the Gallatin River drainage. This work was under the supervision of Dave McClay.

Prior to the stream improvement projects, the Bureau carried out a number of surveys on streams situated on federal lands. Dr. Albert S. Hazzard, in a personal communication, reported that he was a member of a field party that conducted stream surveys in Glacier National Park in 1932. There was no stream improvement work done in the Park.

1935 and 1936

The Commission under Governor Elmer Holt was composed of Ray Lowe, Chairman; W. C. Keil, J. J. Harper, P. G. Gutensohn and A. C. Baumgartner. K. F. MacDonald was appointed State Game Warden and Elmer Phillips was selected as Superintendent of Fisheries.

The Department was gradually beginning to recover from the many setbacks caused by the economic depression. There was a considerable amount of building at many of the hatcheries, much of which was repair and replacement. Recommendations submitted for new construction included a second dwelling at the Lewistown, Great Falls, Libby, Anaconda and Big Timber hatcheries. These were required to permit the assistant hatchery foremen to reside at the station where he would be of immediate help in emergency situations. A second man residing at the hatchery would also reduce the possibility of vandalism. Dwellings and ponds were needed at the Salish site, but the need was never fulfilled. A large refrigeration unit was planned at the Anaconda station for storage of the large number of suckers being removed from Georgetown Lake with fyke nets.

The Department tested a number of fish diets within the hatchery system, including the utilization of suckers from Georgetown Lake. The growing shortage of horse meat, beef livers, lungs and other meat products made development of satisfactory alternative diets imperative. Various feeding experiments included a mixture of cooked suckers and carp; a mush made of flour, middlings and liver meal; chick starter meal; and a blend of dried milk, seal meat and salmon carcass meal. None of the experimental diets proved entirely satisfactory for proper fish growth. In all cases, some essential vitamins and nutrients were lacking. It eventually took 20-25 years of testing nationally to develop a totally satisfactory pelleted fish food.

The Department received a request from the National Park Service in 1935 for rainbow trout to be planted in the Gibbon River in Yellowstone National Park. In September, a total of 18,000 advanced rainbow trout fry were stocked there by the Big Timber Hatchery.

Over 12 million rainbow trout eggs were taken at the Hebgen Lake traps in the spring of 1935 and almost as many in the spring of 1936. Extremely heavy ice conditions prevented the taking of any brown trout eggs at the Hebgen traps during the fall of 1935. Rogers Lake, in the northwestern part of the state, provided the hatcheries with approximately 12 million grayling eggs each spring in 1935 and 1936.

The first reported airplane distribution of trout in the state occurred in 1935. The event aroused no great interest and elicited no glowing predictions of the use of the airplane in future fish distribution programs. Only minor mention was made in the biennial report which stated simply that Pilot Burt Walker flew six five-gallon cans of cutthroat trout fry from the Lewistown Hatchery to the Middle Fork of the Judith River on August 4 and two cans to the same stream on September 1. The plane was used only to transport the cans of fry and not in the actual planting.

Big Spring Creek near Lewistown has had a history of excess nitrogen in the water, particularly during the period of spring run-off. The Lewistown station reported that on April 5, 1935, two trout caught by fishermen in the stream below the hatchery had their heads covered with what was termed "air blisters."

C. F. Healea, who initiated operations at the first state fish hatchery at Anaconda when it started production in 1908, was now supervisor of the Maiden Rock Hatchery operated by the Butte Anglers Club. Eggs for the Maiden Rock station were provided by the Department and the Federal Service. The fish hatchery at Ennis furnished the Butte Anglers Club 50,000 rainbow trout eggs annually. The Department provided the station with cutthroat trout and grayling eggs. In addition to the eggs given to the Maiden Rock facility,

the Department furnished about one million cutthroat trout eggs to private fish hatcheries in the vicinity of Kalispell and St. Ignatius.

Construction was reported to be progressing well on the huge Fort Peck Dam on the Missouri River near Glasgow. The Department expressed hope that when the dam was completed and flows controlled on the lower river, flows could return to normal at Hebgen Dam at the headwaters. There was little concern evidenced for the future fisheries in Fort Peck Reservoir itself.

The Polson Hatchery at Station Creek on Flathead Lake was scheduled to remain open for hatching salmon eggs during the winter of 1936. Heretofore, the unit had been operated only during the summer months.

Fisheries Superintendent Phillips reported that the Zoology Department of Montana State College offered a short course in fisheries management in 1936, open to personnel of the state Fisheries Division, the U.S. Forest Service and the U.S. Bureau of Fisheries. Dr. C. J. D. Brown was the instructor. A class of 215 attended the course which was the first such offering in the state. Included in their fisheries biology course were the use of the microscope as an aid in identifying fish diseases, basic aspects of water chemistry (dissolved oxygen, carbon dioxide and pH), and the identification of aquatic plants and their relationship to fish populations. Superintendent Phillips said that the hatchery men taking advantage of the course would not be able to go into the field better qualified to determine the suitability of waters for fish life.

1937 and 1938

B. L. Price was Commission Chairman in 1937 under Governor Roy Ayers. Other members of the Commission were Harry E. Lay, P. G. Gutensohn, Nick Dondelinger and A. C. Baumgartner. J. A. Weaver replaced K. F. MacDonald as State Game Warden and Elmer Phillips continued as Superintendent of Fisheries. Foremen at the state fish hatcheries were: A. G. Stubblefield, Anaconda; Forest Keller, Big Timber; Eli Melton, Hamilton; George Miller, Emigrant; P. G. Botteler, Great Falls; Iver Hoglund, Lewistown; Graham Cadwell, Libby; Leo Gilroy, Polson; Ross Snyder, Red Lodge; Vern Campbell, Ovando; J. P. Sheehan, Somers.

With the operation of seasonal fisheries stations and spawning facilities, fish hatchery personnel were usually at one location for only short periods.

In the spring of 1937, hatchery personnel at the Bozeman station attempted to take golden trout eggs from Hidden Lake but only a small number were secured.

The waters of Yellowstone National Park were well stocked with both cutthroat and rainbow trout. The Gibbon River received 23,500 rainbow trout in August and 140,000 more in September 1937. Nez Perce Creek also received 23,500 rainbow trout in September of that year.

Pilot Burt Walker flew 10 five-gallon cans of cutthroat trout into the Middle Fork of the Judith River from the Lewistown Hatchery in August 1937.

The first report of golden trout production after 1931 was 6,100 eyed golden trout eggs stocked at the head of the West Fork of Beaver Creek in August 1938. On that same date, the Forest Service received 16,200 one-inch golden trout from the Bozeman station for stocking waters of the Gallatin Forest. The 1938 shipment of golden trout eggs from California to the

Bozeman station was apparently a substantial one. That year 12,000 golden trout were planted in Hidden Lake in August; 8,000 in Golden Trout Lake in September; 10,000 in a lake near Anaconda; 3,000 in Sylvan Lake also in September; 2,666 in Sears Lake; 2,666 in Emerald Lake and 2,668 in Lava Lake in October.

1939 to 1942

Governor Ayers made no changes in the Commission or in Department administration during this biennium. However, Melvin Larson was placed in charge of the Great Falls Hatchery, replacing P. G. Botteler.

The National Park Service began building the Glacier National Park Fish Hatchery at Creston on March 1, 1939. Construction of the unit was completed by late summer of that year and operations began with a shipment of brook trout eggs from Colorado and rainbow trout eggs purchased from a private fish hatchery on Post Creek near St. Ignatius.

At the request of the National Park Service, the Big Timber Hatchery planted rainbow trout in the Gibbon River and Slough Creek in Yellowstone National Park.

Operations proceeded quite routinely during this time and little was reported other than the statistics for the period. Samuel Ford was Governor of Montana in 1941. Serving on the Fish and Game Commission were J. W. Severy, Chairman; William Carpenter, Elmer Johnson, A. C. Grande and E. G. Vendova. J. S. McFarland was State Game Warden and Elmer Phillips, Superintendent of Fisheries.

With the entry of the U.S. into World War II, many Department personnel were serving in various branches of the armed forces. Therefore, some of the expansions planned in the rearing pond and fish hatchery programs were delayed until the war was over. The foremen and assistants at the hatcheries are listed in the following table.

HATCHERY	FOREMAN	ASSISTANT
Anaconda	A. G. Stubblefield	Fred Beal
Big Timber	Leo Gilroy	Ross Snyder
Great Falls	Melvin Larson	J. M. Colley
Hamilton	Eli Melton	S. A. Hamann
Lewistown	Iver Hoglund	Leo LaTray
Libby	George Ripley	J. R. Jorgenson
Polson	A. E. Tangen	J. P. Campbell
Somers	J. P. Sheehan	Frank Marcoe
West Yellowstone	Sam Drew	

There were noticeable changes in fish management from practices that had been common for 40 years. Fish culturists were exploring more efficient methods of operation and there was much greater concern about effects of planting on the quality of fishing. One of the major accomplishments at this time was the development of the Five-Year Distribution Plan, a project that involved an enormous amount of time and effort for its developers. This plan was designed to eliminate discrepancies and prevent problems in the fish stocking program. The plan was based on the best information from fisheries personnel, wardens, the Forest Service and local residents. Under the plan, the state was divided into 14 major drainage districts with Yellowstone Park forming the 15th. A detailed map of each district was prepared, along with the fish stocking proposals for the area. The fish distribution schedules took into consideration the optimum production for each fish hatchery. This intensive review of the fish planting program gave the Department a much improved operation. Because of this plan, a number of waters considered unsuitable for fish were removed from the stocking program.

Recommendations for greater efficiency in fisheries management included: (1) the establishment of a fisheries research division, (2) improved

fish distribution tanks and trucks, (3) installation of large refrigeration units for food storage at the fish hatcheries, (4) expansion of the rearing pond program, and (5) fertilization of mountain lakes.

Qualified fish hatchery employees were needed, but it was difficult to attract such people because of the low pay. Also, much of the equipment at the fish hatcheries was in poor condition and couldn't be replaced because of wartime restrictions.

Fish losses to irrigation ditches and canals continued to be a problem. An investigation by the Department in 1942 showed there were 450 diversions on the Yellowstone River alone, with an estimated 2,000 in the state. Screens had been installed on only 29 major ditches and, by this time, only three of these were still in operation and being maintained. The average cost of a screen was $800 and the annual maintenance cost was about $150. The Department was not financially able to screen all the ditches and diversions in the state and decided the most logical solution was to curtail fish planting in streams which were heavily diverted.

Seining and trapping programs had done little to reduce the numbers of carp and suckers in state waters and the Department was encouraged by reports that a fish toxicant (rotenone) might effectively control rough fish populations.

Stockwater and irrigation reservoirs were being built at an increasing rate, particularly in the eastern part of the state. Federal assistance in the construction of small dams stimulated participation by landowners. Some of the new reservoirs provided good fishing. The recently completed Fort Peck Dam on the Missouri River near Glasgow was expected to create a fine sport fishery in both the reservoir and the river below the dam.

The federal fish hatchery at Creston, operated by Superintendent John Pelnar, was holding two million cutthroat trout eggs from Yellowstone National Park operations, an unspecified number of brook trout eggs from the Libby Hatchery and eyed Ashley Lake cutthroat trout eggs shipped from the Somers

station. All fish reared at the Creston Hatchery were distributed in Glacier National Park.

The number of brown trout eggs taken by the Federal Fish Hatchery at Ennis continued to decline. Hatchery records show the following numbers of brown trout eggs taken from 1933 through 1941:

YEAR	NO. OF BROWN TROUT EGGS
1933	22,010,300
1934	28,424,020
1935	25,511,635
1936	14,372,451
1937	10,566,415
1938	376,730
1939	?
1940	1,370,650
1941	627,500

1943 to 1946

Department administration and the Commission members remained unchanged under Governor Ford in 1943.

Fisheries Superintendent Elmer Phillips developed a holding pen for fish. The pen was four feet square, twelve feet deep, and covered with metal screen. On June 15, the pen was suspended in a small lake near Lincoln and 1,000 rainbow trout fry introduced. By October, the fish in the pen averaged three inches in length, with the largest up to four inches. No further use of the holding pen system was reported, despite the apparent success of the unit.

After five years of operation by the Park Service, the fish hatchery at Creston was turned over to the U.S. Fish and Wildlife Service. Park Service officials announced that henceforth only cutthroat trout would be stocked in the waters of Glacier National Park.

The Department took mature rainbow trout in early February 1944 from the Madison River traps near West Yellowstone and transferred them to the traps on the South Fork of the Madison River for spawning. About three million eggs were taken from these fish by mid-February.

A. G. Stubblefield replaced Elmer Phillips as Superintendent of Fisheries in 1944. Foremen at the state fish hatcheries in 1944 were: Fred Beal, Anaconda; Clarence Ripley, Arlee; Forest Keller, Big Timber; George Miller, Emigrant; Iver Hoglund, Great Falls; Eli Melton, Hamilton; Leo Gilroy, Lewistown; George Ripley, Libby; Virgil Harper, Ovando; A. E. Tangen, Polson; J. P. Sheehan, Somers; Sam Drew, West Yellowstone.

The McNeil Pike Hatchery was built at Nelson Reservoir in 1944 through the cooperation of the Phillips County Wildlife Association and the Department. At the same time, water level control structures were installed on McNeil

Slough, an oxbow of the Milk River, to create a brood pond and fishing area. The project was initiated and developed through the efforts of warden Herb Friede who was stationed at Malta. He got materials and equipment for the pike hatchery and worked hard to keep it in operation. When the part-time employees weren't busy at the hatchery, Friede kept them busy seining and transplanting bass, bluegills and crappies from well-stocked ponds to new or unplanted ponds in Phillips and surrounding counties. The crappie and bluegill populations became too numerous in some ponds and became stunted. Bass reproduction rarely occurred because of the cold water.

Most of the trout eggs needed for the state fish hatchery system were provided by Department-owned spawning stations. Ashley Lake near Kalispell was a dependable source of cutthroat trout eggs. Brook trout eggs were obtained from Alvord Lake near Troy. Rainbow trout eggs were secured from Bitterroot Lake, Lake Ronan, Madison River, South Fork of the Madison River, Duck Creek and Willow Creek. The Madison River stations also provided large numbers of brown trout eggs.

In 1945, Governor Ford appointed A. A. O'Claire, recently returned from Army service, to replace J. S. McFarland as State Game Warden. The crew from the Lewistown Hatchery seined over 20 tons of suckers from Ackley Lake, near Hobson, during the summer of 1945 in an effort to reduce the population. The reduction was only temporary, as the reservoir provided good habitat for the suckers which entered regularly through the inlet canal.

Brush Lake, in Sheridan County, received an experimental plant of rainbow trout from the Lewistown Hatchery in June 1945. The plant was unsuccessful, as were several subsequent plants. Recent analyses showed that this pot-hole lake had an extremely high concentration of dissolved salts and the water was incapable of retaining sufficient dissolved oxygen to support fish life.

With the return to peacetime economy, the Department reviewed and rescheduled a number of projects which had been postponed. The Arlee Fish

Hatchery, which had been leased for several years from Clarence Ripley, a private trout grower, was purchased in March 1945. Ripley continued to manage the station for the state. New construction at this station included a 32- by 45-foot hatchery building with a large refrigeration unit, 10 concrete tanks, each 32-feet-long, and two new residences and ponds for broodstock, all at a total cost of $85,000.

Sixteen concrete raceways, 104-feet-long, 10-feet-wide and 3½-feet-deep, and two circular concrete ponds 40 feet in diameter were completed at the Anaconda Hatchery. The Lewistown station received a new hatchery building, 41 feet by 84 feet, with 18 concrete tanks, 32-feet-long, 28-inches-wide and 28-inches-deep. Four large concrete raceways were also built at Lewistown and a new pipeline laid from the spring to the hatchery. At the Emigrant Hatchery, the old wooden troughs were replaced with 10 concrete tanks. Four new concrete raceways were also built at Emigrant. A natural gas-fired heating device was installed at the McNeil Pike Hatchery to raise the water temperature and thus reduce the incubation period of the pike eggs.

1947 to 1950

The Commission and Department administration was unchanged in 1947. The Commission did, however, approve the establishment of a biology section in the Fisheries Division. C. K. Phenicie was hired to supervise the new section and reported to the Department on July 1, 1947. The fish hatcheries were recognized as the keystone of the Fisheries Division and the biology section was established to assist the hatchery system. Objectives of the biology section included assisting the fish hatcheries in developing improved methods of fish distribution and planting, fish tagging and tag return studies, examination of growth rates and condition of fish and development of a creel census program. Office and laboratory space for the new fishery section were offered by Montana State College at Bozeman. The Department accepted the laboratory facility but decided that the office of the biologist would be maintained in Helena.

Two four-man crews of fishery students were hired in the summer of 1948 to work in the western part of the state doing stream and lake fisheries surveys using the plans from Michigan. The productivity of the waters was estimated by evaluation of the surveys and a study of the growth rates. In many of the streams, the crew members had to collect fish specimens for study by use of sport fishing gear, since no other means were available at the time. In response to the many comments about getting paid to go fishing, the crew members welcomed any and all to try their hand at fly fishing on a full-time basis, and then see if it was still such an attractive job.

Clinton Bishop and Raymond Hayes were sent to Hebgen Lake in the spring of 1948 to gather information on tag returns and to study methods of Utah chub control. No effective method of reducing the number of chubs was found.

The large number of projects that involved some type of construction prompted the Department to hire C. K. Dalton as Department Engineer. His responsibility was to prepare plans for the various projects and then to make the necessary inspections to see that the plans were properly completed. One of his first assignments was to visit the West Coast states and observe the installation and operation of fish screens. Unfortunately, the information obtained at that time accomplished little.

A fish hatchery to be constructed at Bluewater Springs near Bridger and Fromberg was authorized by the Commission in May 1948. Bids for construction of the unit were opened in July.

Heavy rains, combined with spring run-off, caused the Jocko River to overflow in June 1948. The Arlee Hatchery grounds were flooded but damage to the facility was kept at a minimum.

The Department received numerous requests or proposals from various groups and individuals to construct rearing ponds or fish hatcheries on waters in their particular localities. While some of the requests were obvious attempts to help the local economy, most were based on a sincere desire to improve sport fishing. A group of Hill County sportsmen, concerned about the fishing in their area, were convinced that the installation of rearing ponds below Fresno Dam on the Milk River would do much to improve the quantity and quality of trout stocked. Approval for the ponds was granted by the Department and some preliminary work was done at the site. Further investigations made several years later, however, showed summer water temperatures in the Milk River to be too warm for rearing trout and the project was dropped.

Small, internal, plastic fish tags were tested on 255 nine-inch rainbow trout at the Federal Fish Hatchery at Ennis. The tests showed such tags could be used without damage to the fish, but since the tags were inserted into the body cavity, they were easily overlooked and so were not used extensively.

The McNeil Pike Hatchery received over one million walleye eggs from Minnesota in the spring of 1948. The walleye produced were scheduled for northeastern Montana waters. The Anaconda Hatchery received 50,000 silver salmon eggs from the state of Washington. The Montana spawning facilities produced three million brown trout eggs from the Madison River traps and over two million grayling eggs from Flint Creek.

In the fall of 1948, a crew made up of Fisheries Division personnel and wardens, under the direction of C. K. Phenicie, applied fish toxicant to Savage and Spoon lakes near Troy. While large numbers of rough fish were killed, the project was not 100 percent effective and enough rough fish remained to re-infest the lakes.

Walter Allen succeeded A. G. Stubblefield as Chief of the Fisheries Division in 1948. In December of that year, the Commission hired Dr. Ira Gabrielson to make a thorough examination of Department operations and report his findings and recommendations. His report suggested a number of changes that could be made to improve the Department, but these were largely ignored and the Department continued to operate pretty much as it had in the past.

Elmer Johnson continued as Commission Chairman under Governor John Bonner in 1949. New Commission members Tom Morgan and Ed Boyes joined A. C. Grande and William Carpenter. Robert Lambeth replaced A. A. O'Claire as State Game Warden.

Georgetown Lake contributed much to sport fishing in the state. Many millions of trout and grayling eggs had been taken at the traps on the lake and anglers were enthusiastic about the quality of fishing that the lake continued to furnish. Historically, Georgetown Lake was originally a small impoundment on Flint Creek created by a dam built in 1894 by the Bi-Metallic Mining Company of Philipsburg. The site was purchased from Bi-Metallic by the Anaconda Company in 1900 to provide water for winter smelting operations. The

Anaconda Company built a power house below the dam in 1901, increased the height of the dam five feet in 1919, and added another three feet in 1940.

Relatively shallow, the lake is very productive, with dense growths of aquatic vegetation occurring in late summer. This situation, coupled with lower than usual water levels, resulted in a heavy winterkill in 1936. Populations of desirable fish were almost entirely eliminated while many suckers and redside shiners survived. Dr. C. J. D. Brown of Montana State College was asked to determine the cause of the winterkill. He reported it was due to a lack of dissolved oxygen. Another winterkill, less severe than that in 1937, occurred in 1948.

Over the years, fish plants in Georgetown Lake included just about every coldwater species available. A number of years after the original Yellowstone cutthroat trout introductions, rainbow trout were stocked for a time, resulting in a number of large rainbows. The plants were changed to cutthroat again prior to 1948 and that species again dominated the population. Since then, large numbers of rainbow have been stocked and are predominant.

Spawning operations at Georgetown Lake in 1949 yielded over two million rainbow trout eggs; almost five million cutthroat trout eggs; three and one-half million grayling eggs and about one million brook trout eggs. The Willow Creek station produced more than four million rainbow trout eggs; Lake Ronan 270,000 rainbow eggs and Ashley Lake 980,000 cutthroat trout eggs. Approximately 600,000 Dolly Varden trout eggs were taken in the Clark Fork drainage in the Thompson Falls area. The McNeil Pike Hatchery on Nelson Reservoir took over six million walleye eggs. The Flathead Lake area continued to provide the hatchery system with about three million kokanee eggs annually. The traps on the South Fork of the Madison River produced more than three million brown trout eggs.

At the recently purchased Bluewater Fish Hatchery site near Fromberg and Bridger, a residence, storage building and 10 raceways were completed. Vern Campbell was appointed the first foreman.

Since the federal fish hatcheries were not operating at full capacity because of limited budgets, the Department gave financial aid and assistance to these stations. In 1948, the hatchery at Creston received $5,000 and two men to help with operations. In 1949 and 1950, $5,000 was received each year.

Ten concrete raceways were constructed at the Arlee station and five at Libby. Experiments were still being carried out using cooked carp as a fish food supplement, but the results were still poor. Through the cooperation of the Department shop and fisheries personnel, two new fish distribution tanks were built. These units worked exceptionally well and construction plans were published in the Progressive Fish Culturist. Plants of rainbow trout were made by airplane in the North Fork and South Fork of the Flathead River in July of 1949.

C. K. Phenicie reported that the new biology section had a number of studies in progress. Information obtained on fish distribution in the state would enable the Department to discontinue planting fish in waters where the stocked species did not appear in the catch. The introduction of incompatible species could be avoided in the future. The quality of fishing and the effects of various fisheries management measures were being investigated. Age and growth determinations and food analyses were being carried out at the fisheries laboratory at Montana State College. A comprehensive stream study project, headed by Frank Stefanich, was initiated in July of 1949 on Prickley Pear Creek, a tributary of the Missouri River and continued over a three-year period providing information on creel statistics, fish movements and distribution. Age and growth determinations were made by Clinton Bishop. The age and growth rates of rainbow trout, brown trout, longnose suckers and western white suckers from the Missouri River in the Cascade area were studied and reported by Joseph Kathrein. The distribution and growth rates of sculpins were investigated by Jack Bailey.

Opening day creel census on Georgetown Lake in 1949 showed silver salmon constituted 50 percent of the catch.

1951 to 1954

This year, 1951, marked the Department's 50th year in operation. Ed Boyes was Chairman of the Commission, along with Tom Morgan, Walter Banks, William Sweet and Manson Bailey. The State Game Warden and Fisheries Division administration saw no changes.

No record was found as to when the first plantings of fish were made from the Department airplane but they were reported to be increasingly successful. Precise maneuvering by the pilot, with special tanks installed in the plane made it possible to stock fish in remote, inaccessible waters within a matter of a few hours, in contrast to the usual week or more involved with pack animals.

Improvements at the state fish hatcheries included construction of a duplex apartment building at Anaconda, new water supply pipelines at both Arlee and Big Timber, concrete tanks in the hatchery building at Hamilton, additional dirt ponds at Bluewater and installation of a freezer unit at Great Falls.

The Big Timber Hatchery distributed 243,760 kokanee fry into Deadman's Basin, Dailey Lake, Lower Glass Lake and Cooney Reservoir in 1952. Ackley Lake was stocked with kokanee fry reared at the Lewistown Hatchery. Fort Peck Reservoir received 33,600 kokanee and 2,240 lake trout fry from the Somers station. The Anaconda Hatchery received a shipment of silver salmon eggs from the Washington State Fish Commission.

Vern Campbell was transferred to Arlee as manager of the hatchery in 1951. The brood fish were Donaldson stock that had been purchased and maintained by Ripley, the previous manager.

Until this time, the Department had no rainbow broodstock. Eggs were procured from the wild and also purchased from the state of Missouri. These eggs were hatched and distributed from the various state hatcheries. Arlee eggs were hatched and planted from Arlee.

Vern Campbell checked with the Missouri Fish and Game Department to determine if their stock was a pure strain. It was assumed they were as pure a strain of rainbow as could be found in any hatchery in the United States. In order to expand the gene pool, in 1955, a broodstock was created by crossing Missouri strain female with Donaldson strain males. All original stock was then disposed of. The Department now had a rainbow trout broodstock that would provide a reliable source of quality eggs for the state hatchery system. Brood fish were selected on the basis of resistance to disease, growth rate, coloration and condition.

A number of fisheries studies were carried out this year. Dr. C. J. D. Brown and Nels Thoreson completed a comprehensive study of ranch fish ponds in 1951 and published their findings in Montana State College Agriculture Experiment Bulletin No. 480. Over 10,000 copies of this bulletin were distributed free for the next 10 years to ranchers and others interested in pond construction and management.

William Clothier investigated fisheries problems associated with irrigation diversions. He found that losses of fish to canals and ditches could be significantly reduced through the removal of attractive pools and bank cover in and along the channels and by a gradual decrease in canal flows rather than a sharp cut-off of water. Studies of the habits and habitat of grayling in Montana were made by Perry Nelson. The unique and beautiful grayling has been a source of interest to state anglers and researchers for many years. As early as 1874, an article on Montana grayling appeared in the outdoor magazine Forest and Stream. James Blair made note of the grayling population in the Centennial Valley in 1897. Dr. M. J. Elrod of the University of Montana wrote a brief history of the Montana grayling in 1931 and Dr. C. J. D. Brown of Montana State University conducted a number of research projects and reported on

numerous aspects of their life history in the period from 1938 through 1955. William Alvord conducted a study of scales from known-age fish that confirmed the scale method of determining trout age and growth. Most of the trout scales used in this study were obtained from fish tagged in conjunction with fish population and movement studies on Prickley Pear Creek.

Dingell-Johnson funds became available to the state July 1, 1951. These were funds derived from a federal tax levied on sport fishing equipment. The money was apportioned to the states based on population and license sales. The funds were to be used for fisheries management programs and were obtained by the states on a matching basis of 75 percent federal and 25 percent state funds.

District fishery biologists had now been selected for three of the six Department districts: District 1, Flathead area, headquarters at Kalispell, Frank Stefanich; District 4, northcentral Montana, headquarters at Great Falls, Nels Thoreson; District 6 (now District 7), headquarters at Miles City, Arthur Whitney, who also covered portions of Districts 5 (Billings) and 6 (Glasgow). In 1953, William Alvord became district fishery biologist in Glasgow for Districts 6 and 7 and Boyd Opheim was assigned to Bozeman for Districts 3 and 5. Arthur Whitney left the Miles City district in 1953 and was assigned to District 2 in Missoula in 1954. Perry Nelson became district biologist for District 5 in Billings in 1956. Primarily, because of low fishing pressure, the fisheries management responsibilities for District 7 were shared by biologists from Glasgow and Billings from 1955 to 1964. District biologists were responsible for management of the fishery resources in the areas assigned.

The Commission approved the hiring of Jack Bailey as hatchery biologist in 1951. His duties included surveillance of the fish hatchery system, helping the hatcheries prevent outbreaks of fish diseases, assistance in coordinating fish distribution and distribution methods and the development of satisfactory fish diets. Bailey spent two months at the University of Washington in 1952 working on the development of a research library. The position of hatchery biologist fulfilled a real need and operated for nearly 10 years. Bailey left the

Department in 1961 to accept a position with the U.S. Fish and Wildlife Service in Alaska.

On the basis of a recommendation submitted by biologist William Alvord, preliminary planning for a dam on Beaver Creek in the Bear Paw Mountains near Havre was authorized by the Commission in 1952. The dam would create a controlled and scenic sport fisheries reservoir in an area where sport fishing was limited. Construction of the dam was approved but the bids received for the project exceeded available funds and the project was postponed until 1959.

Looking forward to the long-range benefits derived from an informed public, the Department adopted the Adult Education Program. It was developed by the Education Committee of the Montana Wildlife Federation, a committee composed of Dr. J. W. Severy, Stuart Brandenborg and Dr. C. J. D. Brown. Two wildlife specialists were later hired to carry out the program -- Eldon Smith was stationed at Montana State College at Bozeman and Leslie Pengelly at the Montana State University at Missoula. Lectures on the various aspects of wildlife were presented to groups of interested people throughout the state during the fall and winter. The programs were excellent and generated considerable support for resource management projects.

In 1953, under Governor Hugo Aronson, Walter Banka was Chairman of the Commission with members William Sweet, Manson Bailey, H. W. Black and Ralph Shipley. Robert Lambeth returned to warden duty and A. A. O'Claire was again named to fill the position of State Game Warden. Walter Allen continued to supervise the Fisheries Division with C. K. Phenicie as chief biologist.

In 1953, the Commission adopted an extensive new fish stocking policy based on both a scientific and an economic approach. Items included in the new policy were:

1. No fish would be planted closer than a quarter-mile from portions of streams closed to public access.

2. Except for experimental plants or reestablishment of a species, only grayling, rainbow or cutthroat trout would be planted in Montana streams.

3. Rainbow and cutthroat trout planted in streams would not be less than six inches long.

4. Lakes should be planted only where spawning was non-existent or inadequate.

5. Fish should be liberated only where a reasonable return to the creel was assured.

6. Fry and fingerling trout would only be used where practical.

7. Fish of all sizes should be liberated at such times and in such manner as to insure the greatest possible return to the creel.

8. Fish should be planted where fishing pressure warranted and where fish populations were being reestablished.

The Department was very much concerned about the destruction of fish habitat through pollution, channel alteration, trampling by livestock and dewatering for irrigation. Balanced planning in resource development and adequate pollution laws were badly needed. Experiments carried out by Marvin Boussu on Trout Creek in the Gallatin Valley in 1954 showed that the removal of brush cover alone reduced the pounds of trout by 40.5 percent, while there was a 6.5 percent increase in pounds in unaltered areas of the stream. Removal of undercut banks reduced the pounds of trout by one-third while in the unaltered section pounds increased by one-fifth.

In addition to being fish hatchery managers, Forest Keller, Iver Hoglund and Fred Beal were designated hatchery field supervisors, each overseeing all the hatcheries in his area of the state. Art Tangen replaced Fred Beal when

Fred left the state in 1954 and Tom Schurr replaced Tangen at Polson. The Ovando Hatchery was shut down as a production station. It was used intermittently as a biologist's field station for several years and then eventually sold.

Spawning stations were located at Willow Creek Reservoir, Georgetown Lake, Lake Mary Ronan, Little Bitterroot Lake, Rogers Lake, Flathead Lake and the South Fork of the Madison River near Hebgen Reservoir.

Planned future expansion of the Lewistown Hatchery required additional water and the Department purchased Lehman Spring, located a short distance below the hatchery on Big Spring Creek. The spring had an excellent flow of water and an ideal temperature. It was assumed that the water from Lehman Spring would support trout, but problems with blind fish persisted and eight years later, trout placed in live cages below the spring failed to survive overnight due to the extremely high concentration of nitrogen.

Silver salmon eggs were taken from fish that had been held to maturity at the Anaconda Hatchery. This was a first for the state and was considered quite an accomplishment as viable eggs had never before been produced by silver salmon that had lived entirely in fresh water. Unfortunately, the new foreman at Anaconda did not continue the project.

The Big Timber station was rearing more rainbow trout, some golden trout and fewer brown trout than formerly. Studies showed that once brown trout became established, further stocking was unnecessary. The last annually scheduled plant of brown trout was made in 1954 into the Blackfoot River. Subsequently, brown trout have been planted occasionally but usually only to establish new populations.

The federal fish hatchery at Creston received a large number of rainbow trout eggs from the station at Winthrop, Washington. Fish from these eggs were widely distributed in waters of northwestern Montana.

In 1954, a study was begun on Pinkham Creek in northwestern Montana. The study was designed to determine the effects of logging on a stream.

The boundaries of the fisheries districts were changed in 1954 which reduced the number of districts to five. The remaining districts were all staffed with fisheries managers.

1955 to 1958

In 1955, Chairman of the Commission under Governor Aronson was Ralph Shipley. Other members were H. W. Black, William Sweet, Ed Skibby and John Hanson. The Department standardized the district boundaries and established consolidated district offices for its enforcement, wildlife and fisheries divisions. Prior to that time, these divisions had not only maintained separate offices in some towns, but, in some cases, did not even have the same district boundaries or the same towns as headquarters.

District headquarters buildings were rented, purchased or constructed at Kalispell, Missoula, Bozeman, Great Falls, Glasgow and Miles City, At Billings, the game farm buildings were utilized for headquarters. These offices were staffed with a district fisheries biologist (except for Miles City), a district game biologist, a district warden supervisor and a district secretary.

Construction of Tiber Dam on the Marias River in Liberty County was well under way in 1955. The dam was expected to provide an effective barrier to the upstream movement of carp and goldeye which inhabited approximately 600 miles of river and tributaries above the dam site. While the removal of fish from such a large drainage with toxicant would be difficult and costly, the opportunity to remove the rough fish and replace them with trout was considered worth the effort. Under the general direction of district fishery biologist, Nels Thoreson, and chief fishery biologist C. K. Phenicle, most of the Fisheries Division and many other Department personnel spent the major part of the 1955 field season spreading fish toxicants throughout the drainage. Carp have been found in the waters above Tiber Dam since the operation. These may have been missed in the rehabilitation or possibly were introduced since that time. No goldeye have been reported in the treated area.

Seeking ways to test the qualities of both hatchery-reared and wild trout under natural conditions, a trout stream was selected where control structures could be installed. This was a one-mile section of Flint Creek below Georgetown Lake. Barrier grates were erected to prevent the movement of fish in or out of the study section -- one at each end and one in the middle. Enclosures were built over these barriers and heat was provided in the winter to prevent icing. Project leaders were hatchery biologist Jack Bailey and John Spindler. Results at Flint Creek included determination of desirable numbers of trout to be stocked in streams and an evaluation of the various fish diets through observation of the effects of transportation of the fish for varying times in different types of distribution trucks.

The hatchery biologist reported that the fish hatchery operations in 1955 cost $324,000. A total of 15 million fish, weighing 142,830 pounds, were distributed. This averaged $2.27 per pound or 2.1 cents per fish.

In 1956, there were 22.6 million fish planted, weighing 132,000 pounds. The cost this year was $1.77 per pound or 1.5 cents per fish. The increased numbers of fish planted in 1955 and 1956 were due to requirements of the Marias River restocking program.

Canyon Ferry Dam was closed in 1953 and the reservoir started filling up. It was not full until 1955. During each of the first three years, 700,000 to 850,000 fingerling rainbow trout were planted which provided a high quality fishery.

Many other management projects in progress were a study of cutthroat and Dolly Varden trout in the North Fork of the Flathead River; a survey of the Clark Fork River below Thompson Falls in relation to the proposed construction of Noxon Dam; rehabilitation of Spencer and Skyles Lakes near Whitefish; a fishery survey of Canyon Ferry Reservoir; rehabilitation of Elk Springs Creek drainage in the Red Rock Refuge and Yellow Water Reservoir near Winnett; repair work on Johnson Dam in Dawson County and a survey of the dam and impoundment site on Beaver Creek south of Havre.

Tongue River Reservoir was drawn down in late summer of 1957 so that repairs could be made to the dam. Since the river below the dam was heavily populated with undesirable fish, toxicant was introduced on several miles of the river while the reservoir was refilling and flows were very low. Following the rehabilitation, walleye fry from the Miles City National Fish Hatchery were planted in the stream. Tongue River had a history of good sauger fishing prior to the construction of numerous diversion dams. It was hoped that the walleye would become established while the rough fish numbers were reduced.

An experimental rough fish seining operation was carried out on Fort Peck Reservoir for two seasons. Carp, buffalo, and catfish were taken to Chicago, Missouri and west coast markets and it was found that while buffalo and catfish could be transported and sold profitably, it did not pay to haul the carp to distant markets. The price was low and there were many sources of carp nearby.

The Big Timber Hatchery received a shipment of kamloops trout eggs from Canada in 1956. These eggs hatched well and 310,464 kamloops fry were transferred to the Bluewater station for rearing. The fish were held at Bluewater until they reached an average length of two and one-half inches, at which time they were moved to the Great Falls Hatchery for subsequent liberation in the newly-filled Tiber Reservoir. No large kamloops trout have been reported caught in the reservoir since the introduction.

Commission members were the same, with Ed Skibby as Commission Chairman. In the division's administration, C. K. Phenicie resigned his position as Chief Fisheries Biologist in 1957 and George Holton was hired to replace him. Later that year, the three field hatchery supervisor positions were discontinued and Forest Keller was placed in charge of Department fish hatcheries statewide.

The position of Pollution Control Biologist was created in 1957 as a means of combatting the growing number of problems associated with water pollution. John Spindler was assigned to this position and was responsible for

handling all pollution violations observed and reported by Department field personnel. Enforcement was carried out by the state Board of Health.

The Forest Service was concerned about spruce budworm infestations in forests throughout the state and was trying to control the outbreaks through an intensive DDT spraying program. Fisheries management personnel were monitoring the spraying activities closely to determine the effects on fish and fish habitat. Large numbers of dead fish found along the Yellowstone River in the late fall and early winter of 1955 were thought by some observers to be delayed mortalities related to the July aerial application of DDT to control spruce budworm infestations. Since no pre-spray information was available, 11 streams were studied in 1956 to obtain data on the effects of DDT spray on fish, fish food organisms and wildlife. In 1957, follow-up studies were conducted on five of the 11 streams. Drift samples and bottom collections showed aquatic insect numbers were materially reduced by DDT spray. While no dead trout were found in the spray area, they were observed below. Tissues of all fish collected (dead or alive) contained DDT.

Plans for a new lower unit at the Lewistown Hatchery were approved by the Commission in June 1958. Considerable difficulty had been experienced in producing enough fish for restocking rehabilitated waters and the new unit would have the capacity to provide the fish needed. Construction began in 1958 and was competed in 1959. Because the water supply came down the stream channel from the city's overflow, it was expected that the lower hatchery unit would receive quite turbid water during some periods of spring run-off, so Lehman Spring water was piped to the inlet canal to provide silt-free water when the stream was turbid. However, as mentioned previously, Lehman Spring water was saturated with nitrogen and fish could not survive in it. It was, therefore, necessary to use the stream water which during many spring run-offs carried tons of silt that was deposited in the raceways. This caused injuries to the fish and resulted in heavy losses.

All of the state fish hatcheries were reporting good results from pelleted commercial fish foods. After a rather slow beginning, feed companies were

providing a complete and satisfactory fish food at a reasonable price. Fish hatcheries would no longer be faced with the problem of locating, storing and processing fresh meats. This made for a much more efficient operation and left time to improve the overall hatchery management program. Complete, pelleted, dry diets for fish revolutionized fish hatchery operations.

A committee composed of Joe Halterman from the Missouri River Basin Studies of the U.S. Bureau of Sport Fisheries and Wildlife, Dr. C. J. D. Brown from Montana State University, George Holton and Perry Nelson from the Department, cooperated in completion of the state's first stream classification map. The idea for such a stream rating system had begun about five years earlier in discussions between C. K. Phenicie and Joe Halterman over how best to communicate the comparative worth of Montana's trout streams to the construction agencies that periodically proposed the construction of dams that would inundate various stream sections. The map was color coded, showing 436 major fishing streams or parts of the streams, a total of 8,923 miles in four categories or classifications. These were as follows:

1. Streams of national, as well as statewide, value (blue)

2. Streams of statewide value (red)

3. Streams of value to large districts of the state (yellow)

4. Streams of value to smaller districts of the state, such as counties (grey)

All remaining streams, including those not classified, were placed in Class Five. Class One had only 410 miles of "blue-ribbon" streams; Class Two had 1,072 miles. The figures were considerably less than the "thousands of miles" of top quality trout streams often publicized in Montana. The map had a definitely beneficial effect on water-use planning in the state by all agencies. It provided a measurement that is still being used whenever water development is discussed.

Rehabilitation of the upper portion of the Clearwater Lakes was started in the fall of 1958 with the hope that the large numbers of undesirable fish could be removed and replaced with trout. The entire chain of lakes was too extensive for a single operation, so the project was accomplished in two stages. Rainy Lake was rehabilitated first after a fish barrier had been constructed at its outlet. Several years later, the second stage included treatment of Lakes Alva and Inez, after a fish barrier had been built below Lake Inez.

The construction of Branum Lake at Miles City was completed in 1958. This 20-acre, excavated and diked pond was built to provide trout fishing for residents of that area. Water for Branum Lake was pumped from nearby Tongue River through the adjacent Miles City National Fish Hatchery. Periodic trout stocking maintained good fishing in the pond for a while, however, undesirable fish introduced through the water supply system, heavy aquatic weed growth and muskrats burrowing through the dike eventually forced the Department to abandon it as a fishing pond.

Fish population studies on Flint Creek near Philipsburg showed a 94 percent decline in catchable-sized trout, where the stream was straightened and meanders were eliminated during highway construction.

OBSERVATIONS

The biennial reports submitted by the State Game Warden were, for many years, lengthy, informative and detailed accounts of Department activities and future plans. The Department, at that time, was quite closely knit, and the hopes and frustrations were reported much as they would have been in a personal letter. As the activities have expanded in number, scope and complexity, many of the projects are written and submitted as technical reports which, by their very nature, have a limited distribution. The biennial reports have gradually tended to become more brief and more impersonal. Basically, they contain a factual narrative report from the various divisions, the statistics of licenses, numbers of fish planted, the numbers harvested commercially and the overall financial status of the Department.

Over perhaps the past 25 years, sportsmen and sportsmen's organizations have become less and less involved in Department activities. While they still often assist in planting fish, they no longer determine where the fish will be planted or how many will be stocked. Sportsmen no longer operate fish hatcheries, as the Butte Anglers Club once did at Columbia Gardens and Divide. Rearing ponds, which were a popular activity for sportsmen for a number of years, have been found to be generally ineffective in improving sport fishing. Sportsmen's organizations are informed of proposed fishing regulations and their recommendations and opinions are solicited, but they are not the only factor in the final determination. Fisheries management has evolved to where it is based on scientific information and technology not usually available to the average sportsman.

Accepted fisheries management practices changed considerably with the establishment of the biology section in 1948. Before the beginning of the state fish hatchery system in 1908, fish transported to Montana in railroad fish cars from federal fish hatcheries were stocked wherever the sportsmen wanted to plant them. And even as the state fish culture program developed and the hatchery managers assumed much of the responsibility for the fish stocking program within their particular districts, they worked closely with the sportsmen. The fisheries biologists began to accumulate scientific information on state waters and to use this information in the development of fish stocking programs. The fish hatchery managers, less involved in arranging planting programs, have been able to devote more time and effort into the improvement of hatchery facilities and operations. The quality of the fish produced improved steadily. Not everyone automatically accepted the changes in the Fisheries Division. Fish hatcheries had made up the total division for 40 years prior to the hiring of the first fisheries biologists. It was understandable that, for a time, there was considerable resentment by many of the hatchery personnel against what was felt to be an intrusion into established fisheries management practices by the biologists, fresh out of college and eager to institute changes.

As is true for any growing organization, the gradual increase in the number of employees making up the Department and the wider range of Department activities had resulted in a more business-like and impersonal operation. No longer did every employee in the Department know everyone else, where they were stationed or what they did. The same situation applied to the Commission. For many years, they were involved in every detail of Department operation. Individual commissioners regularly visited Department installations and personnel in their districts to discuss day-to-day operations and problems. While Commissioners are still familiar with most Department matters, both statewide and in their respective districts, the growing complexity of operations had made it practically impossible for them to consider the many minor details involved. These were delegated to the Director and his staff.

In recent years, there had been a marked increase in public awareness of fish and wildlife habitat and the vital role it plays. Much has been said about our environment and about the ecological imbalances that exist. While this

publicity may have served to slow down somewhat the destruction of habitat, losses are still alarming. The Department has been in the forefront of efforts to inform the public and help prevent needless habitat loss.

The fisheries program in Montana continues to be realistic and progressive and ranks among the best in the nation. Fact finding and action programs are generally well balanced. It appears that Montana fishermen can look forward to enjoying a desirable sport fishery for many generations to come.

Planting Fish by Airplane in 1938

A Report by Herman Henrickson

In the early fall of 1938, B. L. Price, Chairman of the Montana Fish and Game Commission and John Schofield, Superintendent of Fisheries, accompanied by their wives, paid my wife and me a social call at our cabin at Cooke City. During their visit, the question of planting fish was brought up. The fact was mentioned as to the impossibility of reaching some of our mountain lakes with pack horses to stock some of the lakes which are inaccessible except to the fisherman on foot.

Being a pilot, I had heard of fish being planted by airplane in Canada. I asked John Schofield if he had any information as to what success might be expected. He replied that he did not know of any information available through our state or federal Fish and Game Departments. I asked Price and Schofield if they would be interested in making an official test on the possibility of planting fish from the air. They both agreed they would.

It was decided that on October 12, 1938, we would conduct this official test at Billings. I agreed to furnish the airplane and my service as a pilot if they would ship in the fish and be present. The Billings Rod and Gun Club members were notified and asked to have a committee present. The application for waiver for dropping objects and flying at less than 500 feet was made to the Civil Aeronautics Authority for that date. The test was to be made in an artificial lake which lies one mile northeast of the Billings Municipal Airport.

There were many ideas brought up as to just how would be the best way to drop these fish into the lake. The first and most natural was the idea of

dropping the fish in a container supported by a parachute. This idea wasquickly discarded as impractical because of the equipment that would be necessary and only a few fish could be carried in such a container. If fish of any quantity were to be planted, too great a number would have to be crowded into the small container and time required before the fish would ascend into the lake would have been too great and they would have suffered too much from suffocation.

One of the methods we tried was dropping the fish in specially constructed steel tubes which had a sharp point on one end to penetrate the water, thereby relieving the shock. This method necessitated leaving one end open. When the experiment was tried, we found that when released from the airplane, the water and fish appeared to be nearly all drawn from the tube, but upon examining the lake where the tubes fell, we found no dead fish. These fish were dropped at an altitude of about 200 feet. Finding no dead fish, we were prompted to try dumping fish and water together into the air.

For this test, we asked the members of the Montana Fish and Game Commission, Federal Bureau of Fisheries and Billings Rod and Gun Club to bring boats to the lake where we would be dropping the fish from altitudes of 50 feet to 400 feet. The boats would then be in a good position for them to check the fish as they fell from the air to see them strike the water and either swim away or be killed.

When all was set, we loaded a can of fish in the plane. Dick Logan sat in the rear seat filling a gallon pail with fish from the can. The fish were dumped directly over the lake where the judges in the boats were stationed. When these fish were dumped (about 300 at a time), we could see them leave the plane in a mist made by the water in the propeller blast. The fish were fluttering in all directions. The report from members in the boats on the lake was that the fish seemed to come down fluttering, striking the water and swimming away as though they had fluttered down only a few feet. This was true of all plantings, even at 400 feet above the lake.

The unanimous opinion by all members was that fish could be dropped from any height without injury as long as the fish could hit the water before being exhausted. The fish were dropped into the air which caused them to flutter down similar to a falling leaf, at which speed they could hit the water without injury. Thus, successfully ended the official experiment of the aerial fish planting.

ADDENDUM

A Review of Fish Planting
by Arthur Whitney
1991

Most of the first 50 years of this century, planting and fishing regulations were the only tools used in fisheries management. Planting was widespread and could best be described as somewhat haphazard. It was based on two theories: (1) if you're going to catch fish out of a body of water, you have to put some back in, and (2) the capacity of a water is unlimited. It was assumed you could plant anything, anywhere, and if you added more species, you would surely increase fishing opportunities. The results of those 50 years of efforta were: some plants were very good, such as rainbow and brown trout; but, some were quite ineffective, such as planting Pacific salmon everywhere; and some disastrous, such as carp everywhere and brook trout in headwaters that contained only cutthroat and bull trout. So, therefore, in the early 1940s, a five-year fish distribution plan was developed. It was designed to eliminate stocking in unsuitable waters and prevent overlaps between hatcheries in the stocking program. Input was received from hatchery personnel, wardens, forest service personnel and local residents. However, this plan considered primarily the ability of a water to support the species being stocked, not whether the water needed stocking. It was designed primarily to distribute the optimum production of each hatchery to all waters where trout could survive. It was motivated by the same incorrect theories -- that you have to plant fish where you are catching fish and adding a new species is always likely to produce better fishing.

In the late 1940s and early 1950s, fisheries biologists appeared on the scene. Using scientific investigations, they disproved both of those theories and began to organize and direct planting. In Montana, we first required the

planting program be approved by both the Superintendent of Fisheries and the chief fisheries biologist. No hatchery manager was allowed to make any plant without their approval. That requirement is still in effect although the titles have been changed to Fisheries Division Administrator and Management Bureau Chief. Then, in the late 1950s, after all the regions were staffed with biologists, a requirement was added that any new planting request had to be accompanied by a special form describing the water and the need for the plant. Also, this form had to have the approval of the regional fisheries manager. These requirements are still in effect so that any plant today requires the approval of the Division Administrator and the Management Bureau Chief, and any new introduction requires written justification and the approval of the regional fisheries manager as well. This arrangement has been formalized by the Commission's general policy for fish planting which states in part, "The annual fish distribution plan shall be reviewed and approved by the Administrator and the Management Bureau Chief of the Fisheries Division, Department of Fish, Wildlife and Parks. Changes during the year can only be made with their written approval. Introduction of fish not indigenous to a particular drainage may be made only after careful study to ensure these fish will be beneficial to that area."

The stocking described above covers only the planting done by our Department and by the U.S. Fish and Wildlife Service when planting waters at the Department's request.

Another type of planting that occurs in Montana is done by commercial hatcheries either in waters covered by a private pond license or in privately controlled waters which do not qualify for a license but which have authorization from the Director of our Department. When requests come in for authorization to stock private waters, enforcement personnel determine if the water meets the legal requirements for a private license and fisheries personnel determine the species that should be approved. If the pond is licensable, the warden captain and the regional fisheries manager both have to sign the license to validate it and the fisheries manager designates the species that may be planted. If a privately controlled water does not meet the requirements for a

private pond license, the Director can authorize the owner to introduce approved species of fish on a year-to-year basis. The difference in the effect of the two methods of authorization is that with a private pond license, a person may take the fish in any manner without regard to our seasons, limits and license requirements. With only a letter of authorization, a person must (even though he purchased the fish himself) abide by Montana's seasons, limits and license requirements, if fishing for them.

DIRECTORS AND COMMISSIONERS FROM 1884 TO 1958

YEARS IN OFFICE	GOVERNORS OF MONTANA	F&G DIRECTORS	F&G COMMISSION MEMBERS
1884 - 1897	John E. Rickards	R. A. Wagner	Morton Elrod, Missoula
1897 - 1901	Robert W. Smith	R. A. Wagner	Morton Elrod
1901 - 1902	Joseph K. Toole	W. F. Scott	Morton Elrod
1902 - 1908	Joseph K. Toole	W. F. Scott	E. P. Mathewson, Anaconda
1908 - 1910	Edwin L. Norris	Henry Avare	E. P. Mathewson
1910 - 1912	Edwin L. Norris	Henry Avare	E. P. Mathewson, Chairman G. E. Doll M. D. Baldwin, Kalispell W. M. Bickford, Missoula

YEARS IN OFFICE	GOVERNORS OF MONTANA	F&G DIRECTORS	F&G COMMISSION MEMBERS
1912 - 1914	Samuel V. Stewart	J. L. DeHart	E. P. Mathewson, Chairman G. E. Doll M. D. Baldwin W. M. Bickford, Missoula
1914 - 1916	Samuel V. Stewart	J. L. DeHart	J. L. Kelly, Chairman, Anaconda M. D. Baldwin Nelson Storey, Jr, Bozeman W. M. Bickford
1916 - 1918	Samuel V. Stewart	J. L. DeHart	J. L. Kelly, Chairman M. D. Baldwin Nelson Storey, Jr W. M. Bickford
1918 - 1920	Joseph M. Dixon	J. L. DeHart	J. L. Kelly, Chairman M. D. Baldwin Nelson Storey, Jr T. N. Marlowe, Missoula
1920 - 1922	Joseph M. Dixon	C. A. Jakways	T. N. Marlowe, Chairman J. L. Kelly E. A. Wilson, Livingston H. C. Crippen, Billings John Tressler, Malta
1922 - 1924	John E. Erickson	C. A. Jakways	T. N. Marlowe, Chairman J. L. Kelly E. A. Wilson H. C. Crippen E. T. Richards, Kalispell

YEARS IN OFFICE	GOVERNORS OF MONTANA	F&G DIRECTORS	F&G COMMISSION MEMBERS
1924 - 1926	John E. Erickson	Robert H. Hill	T. N. Marlowe, Chairman J. L. Kelly E. A. Wilson W. K. Moore, Billings E. C. Carruth, Havre
1926 - 1928	John E. Erickson	Robert H. Hill	T. N. Marlowe, Chairman J. L. Kelly E. A. Wilson W. K. Moore G. T. Boyd, Great Falls
1928 - 1930	John E. Erickson	Robert H. Hill	T. N. Marlowe, Chairman J. L. Kelly E. A. Wilson W. K. Moore G. T. Boyd
1930 - 1932	John E. Erickson	Charles Marrs	W. P. Sullivan, Chairman B. L. Price, Laurel William Steinbrenner, Missoula W. F. Flynn, Anaconda H. Stanford, Kalispell
1932 - 1934	Frank Cooney	J. W. Carney	W. P. Sullivan, Chairman R. G. Lowe, Glendive William Steinbrenner W. F. Flynn W. C. Keil, Billings
1934 - 1936	W. Elmer Holt	Kenneth F. MacDonald	Ray Lowe, Chairman P. G. Gutensohn, Whitefish A. C. Baumgartner, Great Falls W. C. Keil J. Harper, Anaconda

YEARS IN OFFICE	GOVERNORS OF MONTANA	F&G DIRECTORS	F&G COMMISSION MEMBERS
1936 - 1938	Roy E. Ayers	J. A. Weaver	B. L. Price, Chairman, Laurel P. G. Gutensohn A. C. Baumgartner Nick Dondelinger, Anaconda Harry Lay, Lewistown
1938 - 1940	Roy E. Ayers	J. A. Weaver	B. L. Price, Chairman, Laurel P. G. Gutensohn A. C. Baumgartner Nick Dondelinger Harry Lay
1940 - 1942	Samuel C. Ford	J. S. McFarland	J. W. Severy, Chairman, Missoula William Carpenter, Butte A. C. Grande, Lennep E. G. Vedova, Roundup Elmer Johnson, Glasgow
1942 - 1944	Samuel C. Ford	J. S. McFarland	Elmer Johnson, Chairman William Carpenter A. C. Grande E. G. Vedova J. W. Severy
1944 - 1946	Samuel C. Ford	Archie A. O'Claire	Elmer Johnson, Chairman William Carpenter A. C. Grande E. G. Vedova J. W. Severy
1946 - 1948	Samuel C. Ford	Archie A. O'Claire	Elmer Johnson, Chairman William Carpenter A. C. Grande E. G. Vedova J. W. Severy

YEARS IN OFFICE	GOVERNORS OF MONTANA	F&G DIRECTORS	F&G COMMISSION MEMBERS
1948 - 1950	John W. Bonner	Robert H. Lambeth	Elmer Johnson, Chairman William Carpenter A. C. Grande Tom Morgan, Miles City Ed Boyes, Libby
1950 - 1952	John W. Bonner	Robert H. Lambeth	Ed Boyes, Chairman William Sweet, Butte Manson Bailey, Glasgow Tom Morgan Walter Banka, Conrad
1952 - 1954	J. Hugo Aronson	Archie A. O'Claire	Walter Banka, Chairman William Sweet Manson Bailey H. W. Black, Polson Ralph Shipley, Miles City
1954 - 1956	J. Hugo Aronson	Archie A. O'Claire	Ralph Shipley, Chairman William Sweet H. W. Black Ed J. Skibby, Lewistown John Hanson, Malta
1956 - 1958	J. Hugo Aronson	Archie A. O'Claire	Ed Skibby, Chairman William Sweet H. W. Black Ralph Shipley John Hanson