A BRIEF HISTORY OF FISH MANAGEMENT IN GLACIER NATIONAL PARK

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On February 22, 1897, the area of what is now Glacier National Park was set aside as part of the Lewis and Clark Forest Reserve under authority of the Congressional Act of 1891, authorizing the President to set aside forest reserves in the forested lands of the nation. The portion east of the Continental Divide including what is now the eastern half of Glacier National Park, was obtained by the United States Government from the Blackfeet Indian Tribe. The cost was 1.5 million dollars. The area north of the Great Northern Railway was designated the North Division and that south as the South Division. In 1905 the Lewis and Clark Forest Reserve was removed from the Department of Interior and set up under the Department of Agriculture.

Glacier National Park was established in 1910, and the 1,500 square miles comprising the Park were turned back to the Department of Interior. No records are available to show any form of fish management during the thirteen years existence of the Lewis and Clark Forest Reserve. Very probably some fish were stocked by private citizens.

At the time the Park was established in 1910, native sport fish believed present in waters below barriers in the Columbia River watershed were the native Pacific cutthroat trout Salmo clarki clarki, the Dolly Varden charr Salvelinus malma, and Rocky Mountain whitefish Coregonus williamsoni. In waters below barriers in the Hudson Bay Drainage, native sport fish were the Mackinaw or lake charr Salvelimus namaycush in St. Mary and Waterton Lakes, Montana blackspotted cutthroat Salmo clarki lewisi, the northern pike Esox lucius, Rocky Mountain whitefish, and the Dolly Varden. The Rocky

Mountain whitefish, lake charr and Montana blackspotted cutthroat were believed native to waters below impassible barriers in the southeastern portion of the Park in the Missouri River drainage.

The presence of native species prior to 1900 has been recorded by such early explorer-biologists as Lewis and Clark, various naturalists with the Pacific Railroad Survey Parties, Cope (1879), Dr. Elliot Coues (1874), Carl H. Eigenmann (1892), Evermann (1893) and Evermann and Cox (1896).

During the summers of 1909 thru 1911, Morton J. Elrod of the University of Montana spent considerable time in the Park making studies of the lakes. His work was aimed at determining which lakes now barren would be suitable fish habitat. Elrod's work, which consisted of depth determinations and collections of fish food samples, is the first known aquatic research done in Glacier National Park. His findings were published in 1921.

In May, 1913, the Glacier Park Hotel Company was given permission to seine 35 pounds of whitefish daily from St. Mary Lake for purposes of serving their guests at Going-to-the-Sun Camp and the St. Mary Camp. This permit was revoked in August of the same year when ex-Secretary of War, Stimson, while visiting the Going-to-the-Sun Camp, discovered two unattended net sets at the mouth of Baring Creek containing some dead mackinaw.

In 1917, the Hotel Company was again permitted to take whitefish from St. Mary Lake and Sherburne Lake under more stringent restrictions such as prohibition of use of the gill net and supervision by the district ranger. Netting by the Hotel Company was allowed into the thirties. Incomplete records do not indicate just exactly when this practice ceased.

During the years 1910 thru 1913, fish planting was carried out principally by individuals. Fish could be obtained by application to the U. S. Bureau of Fisheries with endorsement of a U. S. Senator. The number and species planted during these early years was never recorded except for a

few fragmentary records.

From 1912 to 1917, the Great Northern Railway was quite active in stocking waters on the east side of the Park. The fish were secured from the State of Montana and the U. S. Bureau of Fisheries. The improved fishing was presumably to attract more customers to their chalets, hotels and trains.

In 1915, for the first time, the Superintendent received a small number of fish from the U. S. Bureau of Fisheries.

The first record fish were planted in 1912 when 96,000 brook and cutthroat were placed in four lakes. This included brook in Harrison Lake and Upper Two Medicine Lake and cutthroat in Swiftcurrent Lake. Also in 1912, an unrecorded number of rainbow were planted in Swiftcurrent Lake by the Great Northern Railway.

In 1913, 140,000 grayling were obtained by the Railroad from the State and planted in Two Medicine Lake. In 1915, 17,000 brook and rainbow were planted. In 1916, the total jumped to 675,000 cutthroat, brook, grayling, rainbow and salmon-trout (chinook). Salmon-trout eggs probably containing some Kokanee eggs by mistake, were released in Swiftcurrent and Josephine Lakes. Well-established populations of Kokanee are present today in these waters.

By 1919, the number of fish stocked by the Park rose to 921,000, all of which were cutthroat, brook and rainbow. Also in 1919, the Glacier Park Fish Hatchery located at East Glacier Park went into operation. Most of the cutthroat fry stocked in the Park for the next twenty years were propagated from eggs supplied by the State of Montana and the Yellowstone Hatchery. This hatchery was abandoned about 1940 when the new hatchery at Creston began operation.

In 1920, 1,473,000 fry were stocked, including 278,000 rainbow and 415,000 grayling. In 1921, Chief Park Ranger J. P. Brooks did survey work

on some fifty Park waters, his data being still valuable to this day.

In 1921, 1,891,400 rainbow, grayling, brook and cutthroat were planted. In 1922, 1,867,700 rainbow, salmon-trout (chinook), steelhead, grayling, brook and cutthroat were released. In 1923, the number was 1,783,600 rainbow, salmon-trout (chinook), mackinaw, brook and cutthroat plus 329,000 cutthroat eggs. By 1926, 3,226,000 fry and eggs were planted.

In the summer of 1925, R. A. Muttowski of the University of Detroit assisted by Ike N. Carter of the University of Idaho made fish food investigations of several of the larger heavily-fished waters. Generally, they found considerably less plankton but more insect life in the east side waters as compared with Lake McDonald. He specifically recommended that no fish fry be planted in any of the lakes and streams until after mid August in order to give the insect food and plankton a chance to develop.

In August, 1924, 100 fish cans of aquatic vegetation were removed from Lower Two Medicine Lake with smaller amounts from other sources and placed in all lakes in the Two Medicine and Cut Bank Drainages as well as in some of the lakes in the St. Mary and Swiftcurrent Drainages. The purpose was to stimulate greater fish growth and survival in these more barren waters. This practice is no longer followed in Glacier as we stress that only natural aquatic conditions exist to support sport fish populations.

Well over one million fry and eggs of various sport fishes were planted annually between 1927 and the initial years of World War II. Many years saw over two million planted and in 1932, 4,545,000 were introduced, most of which were Montana blackspotted cutthroat fry.

In 1935, A. S. Hazard, Associate Aquatic Biologist of the U. S. Bureau of Fisheries submitted a comprehensive report of his earlier fishery investigations in the Park in 1932 and 1933. He made many recommendations

pertaining to fishing regulations, management and a detailed stocking plan. He advised:

1. A ten fish catch limit
2. A minimum size limit of 7"
3. Continued prohibition of use of live bait
4. Closing certain waters on September 15 to protect spawning brook charr
5. Keeping inaccessable waters in their natural state - no stocking
6. No introduction of warm water fish species
7. Experimental plantings of cutthroat should be marked by tagging or fin removal to determine value of stocking

Between 1932 and 1934, survey parties of the U. S. Bureau of Fisheries under the direction of A. S. Hazard, J. E. Hancey and Leonard P. Schultz made detailed studies of the physical and biological features of most Park waters. Most of the results of these studies have never been published, and therefore are unavailable for management purposes.

In 1935, a few kokanee began showing up in fisherman creels in McDonald Lake. At that time the species was unknown to anglers as fishing methods had not been devised to properly harvest it during summer months. It was therefore, considered by Park authorities a very undesirable exotic. Those kokanee became established from either the salmon-trout plants in Lake McDonald in 1921 and 1922 or from gradual upstream extension of the kokanee's range from Flathead Lake where it was first introduced in 1916.

During the period 1912 thru 1944, the following number of the different species were stocked in Glacier National Park.

29,754,000 blackspotted fry	7,600,000 rainbow trout fry
2,363,000 " eggs	5,000,000 grayling fry
3,363,000 brook charr fry	350,000 salmon-trout (chinook) fry

58,000 steelhead fry

51,000 mackinaw fry

13,000 landlocked salmon Salmo sebago
(St. Mary Lake in 1931)

500,000 Lake Superior whitefish fry

66,000 Golden trout eggs

On December 18, 1939, the National Park Service and the U. S. Bureau of Fisheries reached an agreement of cooperation. Several Park Service employees engaged in fishery activities were transferred to the Bureau of Fisheries. In this agreement, many of the National Park Services' current fish management policies were first presented.

In February, 1940, the Glacier National Park Fish Hatchery at Creston, Montana went into limited operation under the management of the Fish Culture Division of the U. S. Fish and Wildlife Service. The Fish and Wildlife Service came into being earlier that year as the U. S. Bureau of Fisheries and the U. S. Biological Survey were united. By an act of Congress, the land and development was a part of Glacier National Park and by the same act, the product of the hatchery was to be used solely for the restocking of the waters of the Park. Actual stocking operations were to be carried out by Glacier National Park personnel. Only cutthroat trout, brook charr and rainbow trout were to be raised.

In December, 1944, the hatchery was taken from National Park Service administration and transferred to the U. S. Fish and Wildlife Service. It is now known as the Creston National Fish Hatchery. It was stated at this time "and that such fish propogated at this hatchery, as may be in excess of the number to restock and maintain an optimum fish population in the waters of Glacier National Park at all times, may be utilized for restocking other waters."

Conservation Bulletin No. 22, "Fishes of Glacier National Park" by Leonard P. Schultz was published by the U. S. Government Printing Office in

1941. This publication is now out of print.

Ancil D. Holloway, Division of Game Fish and Hatcheries of the U. S. Fish and Wildlife Service was in the Park during the summer of 1944 conducting biological surveys of lakes and streams. In January, 1945, he submitted a detailed report which included management and stocking recommendations.

In 1946, the National Park Service and the U. S. Fish and Wildlife Service entered into a new memorandum of agreement. In this up-dated agreement, the Fish and Wildlife Service agreed to furnish technical assistance when requested and when funds were available. Assistance rendered was to keep within National Park Service policies regarding fish and wildlife management.

Fish stocking activities during immediate post war years were curtailed as compared with the pre-war period. In 1945, 148,000 cutthroat and brook were planted. In 1946, 159,000 cutthroat, brook and mackinaw were planted. The number in 1947 was 137,000 cutthroat and brook and 189,000 brook, mackinaw and rainbow in 1948. In 1949 the number jumped to over one million when 1,403,000 blackspotted cutthroat fry were released along with 200,000 rainbow, mackinaw and brook.

In 1949, Lewis R. Garlick, Fishery Management Biologist spent three weeks studying several "problem" lakes on the west slope of the Park. These lakes included Quartz, McDonald, Bowman and Kintla. A detailed report was submitted.

The high stocking intensity of 1949 continued thru 1952, after which less than 100,000 fingerlings per year have gone into Glacier's waters with the exception of 1959 and 1962 when 130,000 and 337,500 respectively were stocked. Only fingerling-size fish were stocked after 1952. Blackspotted cutthroat, rainbow and brook made up the bulk of these plants. In 1962, 160,000 grayling were obtained from the State of Montana and placed

in Elizabeth Lake. The same year, the State furnished 5,200 native cutthroat which went into Stoney Indian Lake. No brook charr have been planted since 1957. Both the Elizabeth Lake and Stoney Indian Lake plants were made with Montana Fish and Game Department aircraft.

A meeting was held at Park Headquarters on July 15, 1958 which was attended by officials of Glacier National Park and the Bureau of Sport Fisheries and Wildlife. It was felt by those attending that many years of heavy stocking of fish had failed to produce any notable sport fishery in the Park, and that a different approach to fishery management was needed.

The Superintendent emphasized two goals he would like to see attained. These were:

1. That angler's catches would one day be composed only of native wild fish uncontaminated by introduced species or races.
2. That Glacier National Park waters be studied to ascertain, (a) what fish are present; (b) what and where are the problem waters; and (c) what can be done to enhance the values of fishable waters in the best interests of both preservation and angler use.

Biologists O. L. Wallis of the National Park Service and W. M. Morton of the Bureau of Sport Fisheries and Wildlife agreed that the first goal would have to be a long range aim which would be difficult to attain in view of the fact that practically all Park waters had been stocked in the past and that most of the east slope waters in their native state had no known native species of fishes inhabiting them in the first place. However, the second goal could be attained if funds could be provided to support a resident fishery biologist, or temporary summer workers, who could conduct active fishery research and management work in the Park.

Although this has been the plea of Park Superintendent's for over forty years, the only time funds that have ever been alloted for such work

were for Dr. A. S. Hazzard's studies in the early 1930's. These studies sponsored by funds provided by the U. S. Bureau of Fisheries resulted in a recommended stocking program for all waters, several fishery articles by Hazzard and the basic publication, "Fishes of Glacier National Park" by Schultz (1941). As usual, funds were not forthcoming in recent years so very little field work was accomplished at Glacier National Park from 1959 through 1963.

On January 16, 1959 Aquatic Biologist O. L. Wallis put out a report on "Evaluation of the Fishery Resources of Glacier National Park and the Needs for Interpretation, Research, and Management" which contained many helpful suggestions which have been used in ensuing work.

Fishery Management Biologist W. M. Morton made brief physical and biological studies of most of the major fishing waters in the Park during each summer from 1958 through 1961. Early in 1959 he prepared, "An Inventory Outline of Trout Streams and Lakes in Glacier National Park, Montana" as a preliminary index for the preparation of a filing system for individual Park streams and lakes for ready reference in evolving future fishery management plans. He and Assistant Park Ranger A. D. Cannavina decided to concentrate on developing 1) a volunteer creel census system and 2) a detailed historical fishery inventory of all streams and lakes in the Park as a means of obtaining some of the answers called for in the Superintendent's second goal.

On July 14, 1961 in a memo to The Director, Morton presented a system of natural geographic drainages in the Park which would serve well as unit fishery management areas and proposed a series of review reports for each area reviewing all published information; stocking and creel census records available; and recommendations to be considered in managing the fisheries on each body of water in that area - for use by future fishery workers.

The first of this report series "Fishery Management Review Report No. 3, Section I, The Waterton Management Area" was completed on August 15, 1961. Similarly "Section II, The Belly River Management Area" was submitted on August 31, 1961 and "Section III, The Many Glacier Management Area" on November 15, 1961. On June 26, 1964, "Fishery Management Review Report No. 4, Section I, The St. Mary Management Area" was completed. Section II, The Two Medicine Management Area is in the process of completion. When finished, all the Park east of the Continental Divide comprising the Hudson Bay and Missouri River Drainages will be completed. Review Report No. 5, Sections I (Middle Fork Flathead River Drainage), II (McDonald Drainage) and III (North Fork Flathead River Drainage) when finished will complete these basic reports for the Park.

At the request of Morton, a voluntary creel census was started in 1959 and has continued since. Angler interviews are often made by rangers to supplement the voluntary information. Creel forms are made available in conveniently located creel boxes as well as at ranger stations. Rangers collect the completed forms which are then forwarded to the Bureau of Sport Fisheries and Wildlife for compilation. Creel information, even of the voluntary type, has provided extremely valuable data necessary for proper management.

A new Memorandum of Understanding between the National Park Service and U. S. Fish and Wildlife Service dated June 15, 1960 made possible continued cooperation between these two agencies.

In October of 1962, Walter Allen then Asst. Hatchery Manager at the Creston National Fish Hatchery was appointed as Fishery Management Specialist for the Bureau of Sport Fisheries and Wildlife to cover the State of Montana. Shortly after, a full-time position of Fish and Wildlife Management Ranger

was created in the Park. With such increased attention, fishery management investigations are progressing at a more rapid pace.

In 1963, nine of the heavily fished and accessible large lakes were studied to obtain physical and biological data relating to sport fish populations. This basic investigative work was done on a cooperative basis by the Bureau of Sport Fisheries and Wildlife and the National Park Service. Also in 1963, 66,793 rainbow trout were planted in St. Mary Lake as part of a three-year plan to improve recreational angling.

In 1963, a virus disease called Infectious Pancreatic Necrosis (I.P.N.) developed in the cutthroat trout in the Creston National Fish Hatchery and the State of Montana hatcheries at Libby and Somers. The disease caused unpredictable mortality in the eggs and one to two inch size fingerlings. A cooperative program between the Bureau of Sport Fisheries and Wildlife and the State of Montana Fish and Game Department was initiated in the spring of 1964, to develop a disease resistant strain of cutthroat suitable for hatchery propagation. Such a program was expected to take at least five years to complete. For this reason, no cutthroat were available for introduction into west side waters in 1963 and 1964. If successful, a vigorous native fish more biologically adapted to cold, clear waters will be available for supplementing existing cutthroat populations.

In 1964, an early June flood (the first major flood in the 54-year history of the Park) occurred significantly altering most of the waters, and associated aquatic life, in the Park. Streams were scoured, stream courses were changed and lakes received large quantities of silt and gravel, much of which being of a colloidal nature, remained in suspension imparting abnormal brown tones to the waters for many months.

Field work in 1964 involved investigation of four backcountry lakes

(Fish, Snyder, Trout and Arrow) and six of the larger more accessible lakes (Kintla, Bowman, McDonald, Two Medicine, St. Mary and Swiftcurrent).

The fish stocking program of 1964 consisted of planting 89,000 rainbow trout fingerlings (4 to 8 inches) in six lakes east of the Continental Divide. All plants were by hatchery truck except 10,000 four inch fish moved to the backcountry Bullhead Lakes by pack string.

An interagency meeting was held in Kalispell on August 4, 1964 to plan a report on flood water alterations to the fishery resource. The purpose was to present the report to Congress in anticipation of receiving funds with which to make immediate stream habitat restoration and conduct extensive flood alteration surveys. Glacier National Park participated in this endeavor as did the Lolo National Forest, Flathead National Forest, Montana Fish and Game Department and Blackfeet Indian Agency. The Bureau of Sport Fisheries and Wildlife coordinated the effort and submitted their report to Public Works Committee of the House of Representatives in early September. No funds were realized, at least by the end of 1964.

A two day interagency fishery management meeting was attended by sixteen administrators and field level management people at Glacier National Park in mid-March, 1964. The Blackfeet Indian Agency, Blackfeet Tribal Council, Waterton Lakes National Park, Bureau of Sport Fisheries and Wildlife and Glacier National Park were represented. This was the first such meeting ever held and did much to aquaint the different agencies with each other's fishery management programs and problems. All agencies concerned with fishery management of the upper Flathead River System agreed upon the need of cooperative efforts to perpetuate the native cutthroat trout fishery.

The Montana Fish and Game Department asked for and were granted permission to collect kokanee salmon spawn in lower McDonald Creek. Five collecting trips by personnel of the Somers Fish Hatchery yielded 1,329,000

eggs which were propagated at the Somers Hatchery with the fry being planted in numerous state waters in late spring, 1965. Similar kokanee spawn collections were made in 1963 and also during the late autumn of several years in the early nineteen-fifties.

Present cooperative efforts of the Bureau of Sport Fisheries and Wildlife and the National Park Service are directed toward formulation of a workable management plan for all Park waters. A management classification system for Park waters has been devised. All waters will be initially classified as to "current status" and the ultimate "desired status." An "interim" classification category will be assigned those waters to be changed, through management, to another more desired category. After classification, a management plan will be devised to attain the classification goal. Historical research and data taken from field biological surveys and the creel census program provide the basic information upon which management plans will depend. Administrative determinations may be necessary to identify those waters to be managed for intensive recreational angling. In all classifications and management plans, primary emphasis will be placed (1) on maintaining or returning most waters to their natural condition and (2) making quality recreational angling available to the Park visitor. An "Interim Fishery Management Plan" as follows was formulated in 1963 and revised in 1964.

FISHERY MANAGEMENT PLAN (INTERIM)

Glacier National Park

The following fishery management guidelines will serve until a final fishery management plan is evolved. These guidelines will be subject to annual review and revision in accordance with newly developed biological data, the availability of native fish for restocking, creel census data, and changes in fishing pressure on the various waters in the Park.

1. Only fish which are native to the North and Middle Forks of the Flathead River and its tributaries will be introduced into Park waters west of the Continental Divide.

2. Eastern brook charr Salvelinus fontinalis will not be stocked.

3. Until such time as it is practical to effectively stock waters east of the Continental Divide with native cutthroat trout Salmo clarki; periodic stocking of rainbow trout Salmo gairdneri will be made under the following conditions:

   a. To maintain a reasonable fish population to meet the need for recreational angling in those lakes presently occupied by rainbow trout and then only when the continued stocking of this species will not threaten native fish species or other aquatic resources.

   b. Creel census data must indicate declining fishing success and/or test nettings must indicate below-optimum fish numbers.

   c. Biological investigations must indicate the existance of an adequate food supply and other favorable survival and growth conditions.

4. The Arctic grayling Thymallus arcticus is not native to Glacier National Park. However, it is indigenous to similar mountain front waters east of the Continental Divide both north and south of the Park, and for this reason may continue to be stocked under the following conditions:

   a. To maintain a reasonable level of fishing success.

   b. Only in Elizabeth Lake and other lakes east of the Continental Divide which now contain Arctic grayling.

5. The Lake charr or Mackinaw Salvelinus namaycush is native only to Waterton Lake and St. Mary Lake and may be stocked, when available, under the following conditions:

a. When necessary to maintain a reasonable degree of recreational angling and only when such stocking will not threaten the existence of other native aquatic organisms.

b. Only in Waterton Lake and St. Mary Lake.

6. Fishing pressure may be regulated by altering creel limits, changing open seasons and/or opening or closing certain waters if necessary.

7. All fish management activities will conform to Service-wide policies for the protection and management of fish and wildlife resources as set forth in the Administrative Manual, Volume VI, Part 2, Chapter 5, pages 1 through 8.

Approved: /s/ Jack B. Dodd Date: March 5, 1964

Acting Superintendent