FGHISTORY1945-2000workcopy1.wpd **DRAFT 2/17/01**

Note: This document replaces FGhist1943-85workcopy3.wpd and FGhist1986-2000workcopy2.wpd which have been combined into this document and expanded.

A HISTORY MONTANA'S FISHERIES DIVISION FROM 1945 TO 2000

"A River is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it."

– Justice Oliver Wendell Holmes, Jr.

"Only an idle little stream,
Whose amber waters softly gleam,
Where I may wade through woodland shade,
And cast a fly, and loaf, and dream.

"Only a trout or two, to dart,
From foaming pools, and try my art:
'Tis all I'm wishing -- old fashioned fishing,
And just a day in Nature's heart."

- - - Van Dyke

In: Biennial Report of the
Montana Fish and Game Commission, 1925-1926.

Note: Information that has yet to be included in this history:

1. Additional Fisheries issue papers listed below:

Habitat

Clark Fork River reclamation, recovery, lawsuit w/ARCO - Glenn Phillips
Future Fisheries Improvement Program - Glenn Phillips
River Restoration Program - Glenn Phillips
Pallid Sturgeon - Bill Gardner

Fish Management (Hatcheries):

Hatchery renovation and reconstruction - Tim Gallagher & Gary Bertellotti

Fish Management:

Fisherman Log program - Bob McFarland
Angler Surveys - Bob McFarland

Bitterroot River efforts - Chris Clancy
Canyon Ferry fishery - Ron Spoon
Electro fishing development - Dick Vincent
Fish population estimates methods development & use - Dick Vincent
Madison River - Dick Vincent
Whirling disease - Dick Vincent
Flathead Lake fishery - Mark Deleray
Fort Peck fishery - Bill Wiedenheft
Hauser/Holter reservoirs - Steve Leathe
Montana Fish Records program - Margie Peterson
Mysis shrimp/Kokanee in Flathead Lake - Mark Deleray
Paddlefish program - Jim Liebelt (Yellowstone)/ Kent Gilge (Missouri)
Pallid sturgeon program - Bill Gardner
Scale mounting lab in Bozeman - Wayne Black
Fishing regulations historical trend, special regs, etc. - Karen Zacheim
Public Involvement (Angler forums, conflict resolution) - ?
Cisco introductions - Bill Wiedenheft (Fort Peck)/ Bill Hill (Tiber)
Database management (GIS & MRIS) - Janet Hess-Herbert

Fishing Access:

Crossing the barriers program for persons with disabilities - Tim Gallagher

Aquatic Education:

Con Ed is supposed to complete the chronological part of the Aquatic Education element of the history based on the draft left with him in September 2000. There were no Issue Papers planned for this element of the history. Dave Hagengruber is the contact person in Con Ed.

2. Additional chronological history, as appropriate, to be extracted from the above issue papers once they are completed.

3. Questions remaining that are shown in bold type throughout the Word Perfect document on pages 10,14, 15, 17, 18, 28, 49, 69, 72, 74, 77, 79, 80, 82, 85, 87, 89, 135, 150, 151, 153, 156, 157, 164, 167, 173, 180, 232, 237, 247, 248, 249, 250, 251.

4. Missing names of personnel and/or their employment dates in the ORGANIZATION section at the back of the document.

5. Additional oral histories.

Note: Sibb Melee-Ligas makes reference in the Hatchery section to photos she found to use in the hatchery history (Photos referenced in bold type in the text). She indicates they were included on a diskette. I did not find any photos on the diskette I had to work with. Liter Spence

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FORWARD

As it moves from the mountains to the hills to the plains to the sea, a river sings. It is a siren song, falling softly on the ear and heard gently in the heart of those fortunate few who are attuned to hear it. These are the anglers and to them is given not only the ability to hear the voice of the river in their hearts but knowledge of the tongues with which it speaks . . . There are many who love rivers but do not hear its voice, but anglers have it always in their sound; it is for them the river sings, for them it is never silent.

---- Charles R. Brooks, *The Living River*.

In 1991, Montana Fish, Wildlife and Parks published *A History of Montana's Fisheries Division from 1890 to 1958* written by Bill Alvord, a long-time employee of the Department's Fisheries Division. In this publication, an attempt was made to report the highlights of fisheries management in Montana in a general chronological order. The Forward of the document states "Important information has no doubt been overlooked and some details of minor importance have been excluded in the interest of brevity. Its primary value will be as a reference."

Alvord's history primarily chronicles the principal fisheries "management" method in use during the period -- the use of hatchery fish to provide fishing in the state's waters. Although there were early investigations of some state waters, those investigations were mainly for the purpose of determining locations for hatcheries and finding sources of fish and eggs for use in hatchery operations and the subsequent planting of fish. In the 1940's, it was realized that biological factors should be a bigger consideration in fisheries management. Serious investigations of streams and lakes for purposes other than fish planting began in 1947, when the state's first fisheries biologist was hired. This was followed by the hiring of other biologists to assist in gathering management information on waters in the state.

In this current history, some of the information from 1959 through 1985 is taken from a draft of the division history from 1958-1985 also written by Bill Alvord that was not previously published. Some of Alvord's information was used as he wrote it and some of it was expanded to more fully discuss the activities conducted by the division during those years. Because 1945 was considered a reasonable transition period between emphasis on hatchery production and the advent of biological investigations in fisheries management, the Fisheries Division decided to have this current history begin in 1945, even though it overlaps part of the previous Alvord history.

Primary sources of information were the Department's biennial and annual reports. The early-day biennial reports were written in great detail, discussing the Department's philosophies and activities during the reporting periods. Beginning in the late 1970's, these reports began to contain less information, making history compilation more difficult.

The Department's official publications, *Montana Outdoors* and its predecessors *Sporting Montana* and *Montana Wildlife*, were also information sources. Additional sources were Department correspondence files and activity reports, hatchery records and oral interviews with hatchery personnel, oral interviews of some fisheries biologists and managers, and papers written on specific subjects by division personnel specifically for the history.

In 1999, as part of the Department's strategic planning process, the Fisheries Division published its own strategic planning document entitled "Fisheries Beyond 2000", to cover the period 1999-2010. This document discusses the planning process in four elements: Habitat, Fish Management, Fishing Access and Aquatic Education. It was decided that the 1945-2000 history would be outlined to cover these same

four elements. Fish hatcheries are included under the Fish Management element in the planning document and, therefore, here also.

In addition to the chronological history, issue papers were written by Department personnel covering the principal programs, actions and events that occurred during the period. These are contained in the back of the document. Where appropriate, Information was extracted from these papers and added to the chronological history under the appropriate elements.

PREFACE

Specific activities of the Fisheries Division are included in this history in a chronological order beginning in 1945 and ending at the turn of the 20th century. As part of its centennial celebration, the Department published in its bimonthly, full color publication, *Montana Outdoors*, a Special Centennial Issue entitled “A Century of Conservation”. Written by Dave Books, magazine editor, it was carried in the November/December 1999 issue of the magazine. Books compiled the Department’s history in 10-year periods from 1900 to 2000. In this history, he summarized important events which occurred in the Fisheries Division and the Division felt it appropriate to include as the Preface to its own history what Books wrote about the Division during the period of time covered in this document.

1941-1950

In December of 1941, in the aftermath of Pearl Harbor, the United States entered World War II. Many young Montanans, Department employees included, went off to war, prompting this pledge in the foreword to the Commission's 1941-1942 Biennial Report: "No matter how curtailed the personnel of the Department or its facilities, there is an obligation that will not be broken. Wildlife must be so managed that when the boys who are fighting for us return, they will be able to again enjoy the pleasures and the solace of the out-of-doors and the wild things that are so much a part of it. We can certainly do no less."

Fisheries work, too, gained impetus as wartime restrictions were lifted; several hatcheries were expanded and improved, including those at Anaconda, Arlee, Emigrant, and Lewistown. In 1947 the Department established a biology section in the Fisheries Division to "conduct experiments and gather information .... and on the basis of these findings, to develop and test new fish management measures." Under the direction of Charles K. Phenicie, biologists began studies on growth, food habits, and distribution of various species, and developed a creel census program. Bluewater Springs Hatchery was constructed at Bridger in 1949.

Hunting and fishing license sales had risen from about 154,000 in 1941 to more than 285,000 by 1950. The post- war economy was humming, Montanans had more leisure time, and they were spending it in the great outdoors.

1951-1960

The decade began with an important new funding source for fisheries projects. In 1950, Congress passed the Federal Aid in Fish Restoration (Dingell-Johnson) Act, and these funds first became available to Montana in 1951. Like Pittman-Robertson, Dingell-Johnson (D-J) revenues are derived from a federal excise tax, in this case on fishing tackle. Montana has received more than $73 million in D-J funding since the program's inception in 1951.

In 1953, construction of Canyon Ferry Dam on the Missouri River near Helena created an exciting new fishery. Stocked with rainbow trout by Department hatcheries, Canyon Ferry quickly became one of the most popular fishing waters in the state.

Trout streams, too, came in for their share of attention. As retired fisheries biologist George Holton tells it, the Department had no reliable data on trout streams and rivers in the early 1950s. "We claimed to have 20,000 or 30,000 miles of 'well-stocked' streams, but no one could say with authority just how good the fishing was, which streams were best, and which offered the most future promise. We needed an inventory." In cooperation with Joe Halterman of the federal Bureau of Sport Fisheries and Wildlife, Department biologists came up with a classification system and map on which the best waters were colored blue-hence the term "blue ribbon trout streams" and birth of a powerful tool for stream protection.

In the early 1950s, Montana's fisheries management was at a crossroads. "A stand must be taken soon on the place recreation is to have in our future economy," said State Fish and Game Warden R.H. Lambeth in the 1950-51 Biennial Report. "Problems of pollution, big dams, and other factors disturbing Montana streams must be faced squarely." Before the decade was out the Department would create a pollution control biologist position to address issues like irrigation, dredging, mine wastes, oil spills, pesticides, highway construction, unwise grazing, and effects of timber harvest.

Due partly to conflicts over management issues and partly to the economic and recreational importance of fish and wildlife in Montana, the Department stepped up educational efforts in the 1950s. Information specialists published Montana Wildlife, disseminated news releases and bulletins, produced documentary films, made radio and television appearances, and gave talks at schools, sportsmen's clubs, and civic organizations.

The Department also funded extension specialist positions at the universities in Bozeman and Missoula to assist in public outreach. "In those days," recalls Dr. Picton, "Eldon Smith in Bozeman, Les Pengelly in Missoula, and other biologists gave hundreds of talks about wildlife management around the state. There weren't enough Department I&E specialists to go around, so Eldon and Les made media contacts and often set up contacts for other Department people."

1961-1970

Director W.J. Everin's introduction to the Department's 1961-62 Biennial Report set the tone for the decade: "No other period of American history has witnessed as keen an interest in outdoor recreation as we are now experiencing. Outdoor activities are no longer considered as mere luxury; rather, they are gaining acceptance as an integral part of the nation's health and well-being."

Tourists were coming to Montana to see the wildlife and scenery, but they were also coming to fish. Nonresident fishing license sales increased from 27,000 to 47,000 between 1950 and 1960, but that was just the beginning -- by 1970, nonresidents would purchase 110,000 one-day fishing licenses, 23,500 six-day licenses, and almost 7,000 season licenses.

Early in the decade, the Fish and Game Commission recognized the need to protect Montana's streams. "Fishing is an important part of tourism, which is of great economic importance to the state," declared the 1961-62 Biennial Report, and "the Montana Fish and Game Commission recommends the enactment of legislation designed to protect stream fishing habitat." With the help of the Billings Jaycees and the Montana Wildlife Federation, the Department launched a campaign to inform the public about the dangers of stream channel alteration. This led to passage by a narrow vote in the 1963 Legislature of the Stream Conservation Act, the first such law in the nation. Because the act was scheduled to expire in two years, the Department redoubled its educational efforts; in 1965 a permanent law, renamed the Stream Preservation Act, passed by an over-whelming margin.

In 1963 the Montana Cooperative Fisheries Research Unit was established at Montana State College in Bozeman under the leadership of Dr. Richard Graham. Supported jointly by the Montana Fish and Game Department, Montana State College, and the U.S. Bureau of Sport Fisheries and Wildlife, the unit trained professional fisheries workers and for many years served as the Department's fisheries research section. Pollution problems continued to be a major concern, prompting an investigation of mine wastes in the Clark Fork River above Garrison and pulp mill wastes in the river below Missoula. Another study evaluated the effects of DDT from spruce budworm spraying on fish, amphibians, and aquatic organisms in the Boulder River. This and other research led the Montana Fish and Game Commission to draft a policy in 1964 opposing mass aerial spraying of public lands in Montana with chlorinated hydrocarbon chemicals (including DDT).

Dam construction, too, posed a threat to Montana's trout fisheries. A previously proposed dam on the Yellowstone at Allenspur, a few miles from Livingston, gained new momentum in the early 1960s. This dam would have created a 31 - mile-long reservoir and destroyed more than 56 miles of blue-ribbon trout water in the mainstem Yellowstone and its tributaries, as well as altering the river's downstream flow patterns. The specter of a dam on the free-flowing Yellowstone alerted the Department to the need for better water planning and led to creation of a Water Resources Development Section in the Fisheries Division in 1966. Jim Posewitz, who headed this section and later the Environmental Resources Division, proved to be an innovative and eloquent advocate for preserving the Yellowstone. His efforts on behalf of the river and his other environmental accomplishments earned an American Motors Conservation Award in 1974.

Despite the advances in wildlife restoration, fisheries management, and land acquisition made possible by federal funding and booming license sales, dark clouds loomed on the horizon. Resource development was changing the face of Montana. To cope with the accelerating pace of road construction, clear cutting, pesticide use, water pollution, and strip mining, the Department created an Environmental Resources Division in 1969. "The purpose of this division," said Director Frank Dunkle, "will be to make resource development as compatible as possible with the environmental needs of Montana's fish and wildlife, and thus preserve a quality environment for man."

1971-1980

The Executive Reorganization Act of 1971, signed into law by Governor Forrest H. Anderson, shifted responsibility for hiring and budgets from the Montana Fish and Game Commission to the Department Director. From this point on, the director would be appointed by the governor and serve at his discretion. The Department also reorganized, adding a Centralized Services Division and combining the Information and Education Division with the Environmental Resources Division to form an Environment and Information Division. The new E&I Division was to continue the activities of both former divisions. James Posewitz, former chief of the Environmental Resources Division was named Administrator of the new division.

The Environment and Information Division was charged with addressing habitat issues, administering the Stream Preservation Act, and "offering technical assistance to other agencies and organizations involved with the environment."

With the national energy crisis in full swing, Montana was at a resource development crossroads. The new Environment and Information Division, under Jim Posewitz, was destined to play a major role in Montana's environmental future. Staffed with a cadre of young, dedicated biologists and information specialists, the division had an effective media outreach program, including a documentary film unit and a bimonthly magazine now called *Montana Outdoors*.

Strip-mining of coal in southeastern Montana was the dominant environmental issue in the early 1970s. Nationwide energy shortages coupled with dire predictions about future needs spurred interest in exploiting domestic oil, gas, and coal reserves. Montana's rich, readily accessible coal deposits were ripe for the picking. Since most of the coal deposits were on private land and could legally be developed, much of the argument revolved around reclamation. Proposed construction of electricity-generating facilities-a closely related issue-raised concerns over water use and air quality.

The 1973 Legislature tackled these environmental issues head-on and passed several measures to protect Montana's natural resources. One of the new laws, the Montana Strip Mining and Reclamation Act, gave the state wide permitting and regulatory authority over strip mining and reclamation and allowed private citizens to sue for damages in the event of ground water or surface water contamination. Another law, the Montana Utility Siting Act, gave the Department of Natural Resources and Conservation authority

to approve energy generation and conversion plant sites and specified that other state agencies, including Fish and Game, render an opinion on proposed plants' desirability. A third law, the Montana Water Use Act, specifically defined fish and wildlife as a beneficial use of water and authorized appropriation of water for instream purposes under the concept of water "reservations."

The latter act was to have profound implications for protecting the Yellowstone River, the potential water source needed by the developing energy industry. Due to strong public concern, the legislature in 1974 enacted a moratorium prohibiting large diversions or impoundments on the Yellowstone for three years. The Environment and Information Division went to work researching the Yellowstone Basin's wildlife, fisheries, and aquatic resources. In late 1976, shortly before the moratorium was due to expire, Liter Spence, the Department's water resources supervisor, hand-carried to the Department of Natural Resources and Conservation a 300-page instream flow reservation application for the Yellowstone supported by an array of scientific data. A few months later, the division released a special "Yellowstone" issue of *Montana Outdoors* and a documentary film entitled *Yellowstone Concerto*.

In December of 1978, after legislative amendments and a Montana Supreme Court decision had extended the moratorium, the seven citizens comprising the Board of Natural Resources and Conservation signed an order granting the Montana Department of Fish and Game 5.5 million acre-feet of instream flows at Sidney plus flows on tributaries throughout the Yellowstone Basin -- a major victory for wildlife and for the ecological integrity of the Yellowstone. Board member Wilson F. Clark later commented, "The board fully agreed with the legitimacy and necessity of assuring that adequate water remains in the streams to maintain fish, wildlife, water quality and recreational values. The problem was in balancing those requests against the equally legitimate requests for diversion of the water by cities and irrigation applicants."

In 1978**(?)**, the Division of Environment and Information became the Ecological Services Division. **CHECK THE DATE – SEE NOTE ON PAGE 16** Information functions were split off and eventually reassigned to another bureau. In a sense, the division had been a victim of its own success -- the powerful media campaign had rankled some Montanans, but the Yellowstone still ran free. In a memo to his employees announcing the breakup, Jim Posewitz said, "We had our years in the sun and wasted none of them. I am content to let history judge us; let there be not one sour note in our concerto."

While environmental issues overshadowed other Department activities in the seventies, a number of important events took place, including creation in 1975 of a program to perpetuate the state's nearly 700 nongame wildlife species. Another involved a philosophical and tactical shift in management of Montana's trout resources. Since the early 1900s, Department hatcheries had provided trout for stocking Montana's rivers, streams, and lakes. According to former regional fisheries manager Jerry Wells, who chronicled the history of the Department's wild trout management program for *Montana Outdoors* in 1985, "The Madison River alone was planted with over 100,000 catchables annually by the early 1960s.... Human nature being what it is, fishermen were accustomed to seeing hatchery trucks plant the Madison and naturally associated catching trout with the hatchery."

But biologists were having second thoughts. Through sampling by electro fishing they were getting a better picture of trout populations, and what they found surprised them: Most of Montana's rivers and streams supported wild trout, not necessarily native trout, but descendants of planted rainbow, brown, and brook trout that had established naturally reproducing populations.

Art Whitney, Chief of the Fisheries Division, decided a research project was needed to answer a fundamental question: Were planted fish having an adverse effect on wild trout populations? Given the fact that the public had been conditioned to equate good trout fishing with hatchery trout, the project was not greeted enthusiastically in all quarters.

But, with the support of Whitney and Bud Gaffney, the regional fisheries manager in Bozeman, a young fisheries biologist named Dick Vincent forged ahead. The results of his Madison River study, published in 1972, showed that river sections left unstocked had wild trout populations vastly superior to those of

stocked sections, as well as larger trout. Vincent found that planting hatchery trout on top of wild trout results in territorial chaos; wild trout must either expend energy to maintain their positions or give them up entirely, adversely affecting their survival.

According to Wells, a subsequent proposal to cease planting on the Madison River created a huge controversy. "Public meetings conducted in Ennis turned into personal attacks on Vincent and other department personnel. Anglers were polarized, with one side supporting Vincent's conclusions and the other side arguing that fishing would collapse if the catchable program ceased." Vincent's data ultimately prevailed and, in 1974, the Department stopped planting all rivers and streams capable of supporting wild trout populations.

Initial concerns about how this might impact the Department's fish hatchery system proved unfounded. With the change in emphasis from planting rivers and streams to planting lakes and reservoirs, and a shift from stocking "catchable" fish to smaller fish that grow to catchable size, hatchery output is greater than ever. Today, more than 50 million fish are planted annually from eight cold-water hatcheries and one warm-water hatchery around the state.

In 1979, to better reflect its responsibility for the state park system and its broader mandate to manage all wildlife species, the Department of Fish and Game officially became the Department of Fish, Wildlife & Parks.

Thus concluded a tumultuous decade that began with reorganization, ended with another reorganization, and saw a handful of directors come and go. Through it all, the Department's proponents lauded its accomplishments while critics complained it had overstepped its authority. Perhaps more than anything, with the dawning of the eighties, the Department needed to take a deep breath.

1981-1990

Beginning in 1981, increased fishing pressure on Montana's blue-ribbon trout waters made it clear that special regulations were needed to protect fisheries and increase the number of large fish in some waters. These included reduced limits, catch-and-release, minimum size restrictions, "slot limits" that require release of all fish within certain length categories, and artificial lure-only waters. With these regulations, heavily fished rivers like the Bighorn, Madison, and Big Hole have been able to maintain world-class wild trout populations.

To increase fishing opportunities for species other than trout, in 1983 the Department assumed management of the warm-water fish hatchery in Miles City from the federal government. Extensive upgrading and expansion of this hatchery, which produces walleye, northern pike, bass, crappie, and channel catfish, was completed in 1988, a year after the Department released its first warm-water fish management plan. By the end of the decade, thanks largely to the Miles City facility, more than 36 million walleye, northern pike, largemouth bass, and other species were being stocked annually in Montana's lakes and reservoirs.

In 1985 sportsmen and women rallied behind passage of the Stream Access Act, which confirmed the right of Montanans to recreate within the ordinary high water marks of all navigable streams and rivers in the state.

In 1989, the Legislature passed a bill -- the River Restoration Act -- earmarking money from fishing license sales for stream habitat restoration. Together, these habitat measures conserve soil and water, maintain traditional land uses, and benefit a variety of wildlife. While hunters were facing shrinking access to private land in the 1980s, anglers and floaters were encountering problems of their own. Early in the decade, the public's right to float rivers flowing through private property came into question on the

Dearborn and Beaverhead rivers. The matter was partially resolved in 1984 when the Montana Supreme Court declared these waters open to public recreational use.

The Conservation Education Division took on additional work in the 1980s by assuming responsibility for education programs related to hunter safety, boating safety, and snowmobiling. It also expanded youth education efforts by affiliating with Project WILD, a national program that provides kindergarten through high schools teachers with instructional materials and techniques for incorporating information about wildlife into classroom activities. Project WILD was established in Montana largely through the efforts of Vince Yannone, who began developing FWP's youth education programs in 1970 and was nationally honored with the Project WILD "Director's Award" in 1990.

Throughout the 1980s, the Department succeeded in building bridges-to landowners, legislators, recreationists, federal agencies, Indian tribes, and conservation groups -- connections that would foster cooperative approaches to the increasingly complex problems of the 1990s.

1991-2000

Changing times and a growing populace brought not only new attitudes and ideas in the 1990s, but biological problems as well. Whirling disease, a trout malady present in several other western states, was detected in the Madison River in 1994. Since then, it has been found in the Beaverhead, Missouri, Blackfoot, and numerous other Montana rivers.

Another program making outdoor opportunities available to more Montanans began in 1994 when the Department sponsored the state's first "Becoming an Outdoors-woman" (BOW) workshop. These workshops, held annually in outdoor settings, allow women to learn new skills or improve their existing skills at activities like archery, fly-fishing, canoeing, shooting and outdoor survival.

Montana's way of life also includes preserving native species like the bull trout, Arctic grayling, pallid sturgeon, grizzly bear, wolf, and other fish, mammals, and birds that ave suffered in the face of population growth and development. Bull trout are being aided by local "watershed groups" made up of ranchers, conservationists, and business people, as well as by biologists from state and federal agencies and Indian tribes. Westslope and Yellowstone cutthroat trout are being restored to native waters through a combination of habitat work, removal of non-native species, and restocking.
Stream-dwelling Arctic grayling are making progress in the upper Big Hole River as a result of cooperative water conservation efforts and streambank rehabilitation.

Maintaining our outdoor way of life depends on healthy wildlife populations, uncluttered landscapes, public access, and opportunity. With the population shift from rural to urban areas and the increase in single-parent families, it's more difficult today for some young people to get to the woods and waters. To help make fishing more accessible, in 1996 the Department launched "Family Fishing Adventures," a cooperative program involving public schools, conservation groups, and FWP personnel. By developing fishing ponds in towns and cities around the state, introducing the "Hooked on Fishing, Not on Drugs" program to public schools, and helping volunteers host "kids' fishing days," Family Fishing Adventures has given thousands of youngsters exposure to this lifetime activity.

ADMINISTRATION

1945-1950

In 1945, Elmer Johnson was Chairman of the Commission under Governor Samuel Ford. Other commissioners were William Carpenter, A.C. Grande, E.G. Vedova and J.W. Severy. In 1945, Governor Ford appointed A. A. O'Claire, recently returned from Army service, to replace J. S. McFarland as State Game Warden. A. G. Stubblefield was Superintendent of Fisheries, having replaced Elmer Phillips in 1944.

The Commission and Department administration was unchanged in 1946 and 1947 except that, in 1947, the Commission approved the establishment of a biology section in the Fisheries Division. Charles K. Phenicie was hired to supervise the new section and reported to the Department on July 1, 1947. Walter Allen succeeded A. G. Stubblefield as Chief of the Fisheries Division in 1948.

In 1949, Elmer Johnson continued as Commission Chairman under Governor John Bonner. 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.

Fisheries Managers

At the end of the 1940's, District Fisheries Biologists or Managers had not yet been established in the Department.

The 1950's

The year 1951 marked 50 years of operation by the Department. During the period 1951-1954, Ed Boyes was Chairman of the Commission, which included Tom Morgan and new members Walter Banka, William Sweet and Manson Bailey. The State Game Warden and Fisheries Division administration were unchanged.

In 1953, under Governor Hugo Aronson, Walter Banka was Chairman of the Commission. Other members were H. W. Black, William Sweet, Manson Bailey, and R. D. 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 1955, the Chairman of the Commission under Governor Aronson was R. D. Shipley. Other members were H. W. Black, William Sweet, Ed Skibby and John Hanson. The administrative staff of the Fisheries Division remained unchanged. In the Fish Division's administration, C. K. Phenicie resigned his position as Chief Fisheries Biologist in 1957 to accept a position with the Pacific Marine Fisheries Commission. 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.

In 1955, 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.

H. W. Black was Chairman of the Commission in the 1959-1960 biennium. Other members were John Hanson, E. J. Skibby, R. D. Shipley and E. G. Leipheimer. W. J. Everin replaced A. A. O'Claire as State Game Warden and William Alvord succeeded Walter Allen as Superintendent of Fisheries.

Fisheries Managers

Frank Stephanich was the fourth fisheries biologist hired by the Department and he became the first District Fisheries Biologist in Kalispell in 1951.

Boyd Opheim was appointed District Fisheries Biologist in Bozeman in 1952. He was followed by William Alvord in 1959 when Opheim was transferred to the same position in Kalispell, succeeding Frank Stephanich, who moved to Alaska.

Nels Thoreson was the third fisheries biologist the Department hired and he became the first District Fisheries Biologist in Great Falls, taking that job in 1951.

Art Whitney became the first fisheries biologist in Miles City in 1951. The position was terminated in 1953 on Whitney's recommendation. After leaving Montana to work in Minnesota, he returned to Montana to become the first District Fisheries Biologist in Missoula, assuming that job in 1954.

Whitney recalls his first job in Miles City (From oral interview October 21, 1997):

> They had a job in eastern Montana. I applied for it and they wrote back and said one other person was under consideration. They wrote back again and said I had the job. No interview. Just report to Miles City on July 1, 1951. Someone will be there to meet you. I went to the federal hatchery, called the local game warden. He said Walt Allen was in town and gave me the number. I called and they said he's down town. It was the range riders reunion going on then on Main Street. He's playing clarinet in the Elks band. I went downtown with my dad (he came out with me for the trip). There were two clarinet players and I picked the wrong one at first, but when I introduced myself to the real Walt Allen he said, "Well, Art Whitney how are you? Let's go and get a beer at the Elks Club." That was the start of my career in Montana..... I was hired as of that date. He (Walt) said, "The boys will be down with your equipment sometime after the fourth." This was the first of July. I said, "well, my family is out here too and they've got a family reunion over the fourth, would it be all right if I went to that?" "Sure, go ahead. Just come back after the fourth." I left the family reunion and got there the night of the fourth. The fifth, sixth, seventh came by. Finally Chuck Phenicie and Nels Thoreson came down. They had an old Ford panel with a three-speed transmission and a high speed rear end, a used surplus life raft that didn't have a valve to keep the air in, nets, etc. Nels lived in Belt, Montana, and I didn't know there was such a place as Belt. Here was this guy whose belt buckle said "Belt." I wondered what kind of outfit I'd gotten into.

William Alvord was the first District Fisheries Biologist in Glasgow, assuming that position in 1952. He was followed by Cliff Hill in 1959, who held the position for two years.

Perry Nelson was the first District Fisheries Biologist in Billings, being appointed in 1956.

From 1954 to 1959, the Miles City district was covered by fisheries personnel from Region 6 in Glasgow.

The 1960's

In 1961, under Governor Tim Babcock, E. G. Leipheimer was Commission Chairman with members Lyle Tauck, W. E. Staves, E. J. Skibby and John Hanson. The title of State Game Warden was changed to Department Director.

In the 1963-1964 biennium, under Governor Babcock, W. E. Staves was Commission Chairman. Other members were John Hanson, E. G. Leipheimer, Lyle Tauck and Robert Weintz. Frank Dunkle replaced W. J. Everin as Director of the Department and Arthur Whitney replaced William Alvord as head of the Fisheries Division. Alvord was placed in charge of fish hatcheries, replacing Forest Keller, who retired.

E. G. Leipheimer was Chairman of the Commission in 1965-1966.

Members of the Commission in the 1967-1968 biennium remained the same as in 1966. Lyle Tauck was Commission Chairman. There were no changes in Department or Fisheries administration. There was an almost complete change of Commission members under Governor Forrest Anderson during the 1969-1970 biennium. Hugh King was Commission Chairman and the other members were J. J. McCaffery, Pete Clausen, J. J. Klabunde and P. J. McDonough. No Department administrative changes were made.

Fisheries Managers

From 1959 to 1964 the Miles City district was covered by Region 5 personnel in Billings.

Jim Posewitz succeeded Cliff Hill as fisheries manager in Glasgow in 1961. When Posewitz transferred to Helena, he was replaced by Robert Needham in 1966.

Clint Bishop, the Department's second fisheries biologist, succeeded Perry Nelson as District Fisheries Manager in Billings in 1962. Bishop was manager for nearly 20 years.

In 1964, Richard Johnson was appointed District Fisheries Manager in Miles City. He was followed by Don Bianchi in 1966 when Johnson moved to the same position in Great Falls.

In 1964, Delano Hanzel, fisheries biologist in Kalispell, became District Fisheries Manager in Kalispell following the transfer of Boyd Opheim to Missoula. Hanzel held the position for only a year, electing, instead, to take over the newly established Flathead Lake fisheries study. Robert Schumacher, a fishery scientist from Minnesota, assumed the manager's position in 1965.

Boyd Opheim held the fisheries manager position in Missoula from 1964 to **1969 CHECK THIS** when he retired from the Department. Dennis Workman was appointed to fill the position in **1969 CHECK THIS** and held the position until his retirement in **(1999?)**. He was succeeded by Don Peters who held the position for less than a year when he decided to retire **CHECK THIS**. At the turn of the century, the Department had not permanently filled the position.

John J. "Bud" Gaffney, a fisheries biologist with the Department, became Regional Fisheries Manager in Bozeman in 1960 following William Alvord's transfer to Helena. Gaffney was manager for 14 years.

The 1970's

In 1971, the Commission membership again changed under Governor Forrest Anderson. Jack Cohn and Carl Harbaugh, Sr. were appointed, joining Willis Jones, Chairman, Arnold Reider and R. J. Emmons. Don Brown was named to succeed Frank Dunkle, who resigned as Director of the Department. Changes were made within the Fisheries Division. Executive reorganization changed Arthur Whitney's title from the Fisheries Division Chief to Fisheries Division Administrator. The title Superintendent of Fisheries was eliminated and the position of Fish Hatchery Specialist, later changed to Superintendent of Hatcheries, was created. Robert Mitchell was named to fill this position. William Alvord was Chief of the new Bureau of Fisheries Services, created to handle division budgets and assist with other division paper work.

Montana's Governor in 1973 was Thomas Judge. Willis Jones continued as Commission Chairman, with members Arnold Reider, J. J. Klabunde, Art Hagenston and W. L. Pengelly. Wesley Woodgerd, Administrator of the Recreation and Parks Division, was appointed Department Director, succeeding Don Brown. There were no changes made in the Fisheries Division administration.

Fletcher Newby, Executive Director of the Environmental Quality Council and former Fish and Game Department employee and supervisor, was appointed Deputy Director of the Department in 1974, replacing Keith Freseman who retired after 11 years in that position.

Spencer Hegstad was appointed to the Fish and Game Commission by Governor Thomas Judge. His term began April 11, 1976 and was slated to continue through January 1, 1979. In December 1976, Governor Judge appointed Dr. Robert F. Wambach to replace Wesley Woodgerd as Department director. Wambach was formerly Dean of the University of Montana School of Forestry.

In 1977, Al Bishop of Billings and Land Lindbergh of Greenough were appointed by Governor Thomas Judge to replace Willis Jones, former commission chairman, and Dr. Leslie Pengelly, respectively.

Effective July 1, 1979, the 46th Montana Legislature enacted a law changing the name of the Montana Department of Fish and Game to the Montana Department of Fish, Wildlife and Parks. The law did a better job of describing the Department's mission in two important ways: First, the state parks system had been administered by the Department since 1965 and, second, the 1973 Legislature gave explicit responsibility to the Department for nongame animals and endangered species. Thus, for those past six years, the Department had concerned itself with all wildlife, not just game animals.

In 1979, The Environment and Information Division was split into two divisions – Ecological Services and Conservation Education. Jim Posewitz, E & I Division Administrator, was appointed Administrator of the Ecological Services Division and Steve Bayless became Conservation Education Division Administrator. **CHECK BAYLESS POSITION FOR ACCURACY. ALSO CHECK THE 1979 DATE; ON PAGE 10, THE DATE GIVEN IS 1978.**

Fisheries Managers

During the 1970's, only three fisheries managers positions changed. Ron Marcoux replaced Bud Gaffney in Bozeman in 1974; Al Wipperman succeeded Richard Johnson in Great Falls in 1974 when Johnson became Regional Supervisor in Glasgow, and Al Elser replaced Don Bianchi in Miles City when Bianchi moved to Bozeman as the Regional Information Officer. **CHECK IF BIANCHI MOVE IS CORRECT**

The 1980's

Robert Wambach resigned as Director in 1980. Governor Judge appointed Keith Colbo to fill his position. In 1981,Ted Schwinden succeeded Governor Thomas Judge. He appointed Jim Flynn as Department Director to Keith Colbo. **CHECK THIS SUCCESSION**. **DID WAMBACH RESIGN? DID GOV. JUDGE APPOINT COLBO TO REPLACE WAMBACH?**

The March/April 1982 issue of *Montana Outdoors* reported that Joseph J. Klabunde, 64, long-time Fish and Game Commissioner, died of a heart attack at his home in Havre. His 12 years and five months on the Fish and game Commission was the longest anyone had served on that board since it was established in 1895. He was appointed commission chairman on January 3, 1977 and served in that capacity until March 1981.

Department director Jim Flynn selected Ron Aasheim as administrator of the Conservation Education Division. Aasheim, formerly with the Parks Division, assumed his new duties on July 6, 1982, replacing Steve Bayless, who resigned in February to accept a position as Montana Director for Ducks Unlimited.

In 1983, Governor Ted Schwinden appointed Robert A. Jensen, sheriff of McCone County, to the Fish and Game Commission to replace Paul Tihista, whose term expired.

Another reorganization of the Fisheries Division took effect on July 1, 1983. Arthur Whitney and Emmett Colley continued as Division Administrator and Hatchery Bureau Chief, respectively. George Holton became Assistant Division Administrator. Holton's prior responsibilities and some additional ones received from the disbanded Ecological Services Division, were split into two new bureaus - a Management Bureau and a Research/Special Projects Bureau. Al Elser was named Chief of the Management Bureau and Patrick Graham Chief of the Research/Special Projects Bureau. **CHECK CORRECTNESS OF LAST SENTENCE**

Governor Ted Schwinden appointed Dr. James Olson, a Hamilton dentist, to the Fish and Game Commission. Reappointed were Don Bailey, Forsyth, and Dan Oakland, Great Falls. Holdover members were chairman Spencer Hegstad, Dillon, and Bob Jensen, Circle

Former Fish and Game Commissioner Arnold Rieder died in a Great Falls hospital on September 3, 1985. Mr. Rieder, 79, was recognized statewide for his work with legislation to benefit wildlife.

Emmett Colley, Hatchery Bureau Chief, retired on December 31, 1985 after 44 years and 11 months with the Department. Colley earned the distinction of being not only the longest term employee in the Department's history, but also the employee with the most years of continuous service in the history of Montana state government.

Spencer Hegstad resigned as chairman of the fish and Game commission in January 1987 after 11 years on the commission, seven as chairman. He was the last chairman to serve as head of the Department after the 1979 Legislature changed the law and made the governor-appointed director the agency's chief. F.W. "Bill" Howell was appointed to the commission by Governor Ted Schwinden.

Jim Flynn, who had been director since 1981, stepped down as Department director at the end of 1988 after serving an eight-year term. Flynn was replaced by K. L. Cool, who was appointed by newly elected governor Stan Stevens in 1989. Cool came to the Department from Ducks Unlimited in South Dakota, where he was regional director.

Also, in 1989, Governor Stevens appointed three new Fish and Game commissioners: Errol Galt, Martinsdale, Greg Barkus, Kalispell, and William Stratton, Billings. Barkus replaced James Olsen of Hamilton. Stratton replaced Don Bailey of Colstrip. Galt took over the commission chairmanship from Bob Jensen, who remained on the commission. Also remaining on the commission was F.W. Howell, West Yellowstone.

Dick Johnson, fisheries biologist, regional fisheries manager and supervisor, who spent 27 years with the Department, retired as its deputy director on March 30, 1989.

In 1989, Patrick Graham, a 12-year veteran of the Department, was named its associate director, replacing Ron Marcoux, who was promoted to deputy director. Graham was formerly the Fisheries Division Administrator.

<u>Fisheries Managers</u>

Following the retirement of Robert Schumacher in 1982, Jim Vashro assumed the fisheries manager position in Kalispell in 1983. He still held that position at the turn of the century.

Jerry Wells became Regional Fisheries Manager in Bozeman in 1981 when Ron Marcoux moved to a position in Helena. When Wells was appointed Regional Supervisor in Missoula, Dick Vincent, a long-time fisheries biologist in the Bozeman region assumed the manager's position in **(198?)**.

In **198?**, Steve Leathe became the Great Falls Regional Fisheries Manager when Al Wipperman moved to the Habitat Bureau Chief's position in Helena. Leathe was still the manager at the turn of the century.

During the 1980's, the Billings region had four different Regional Fisheries Managers. Pat Marcuson, biologist in Red Lodge, succeeded Clint Bishop in 1982 after Bishop retired. After about a year, Marcuson took a private fisheries job in Alaska and was replaced by Al Elser in 1983. Steve McMullin replaced Elser in 1984 when Elser moved to a Helena position and Jim Darling replaced McMullin in **198?** when McMullin moved to Helena to assume the Fish Management Bureau Chief's position. Jim Darling was still manager at the end of 1999.

When Al Elser left Miles City, he was replaced as fisheries manager by Phil Stewart, a Department fisheries biologist who was working in the Glasgow region.

The 1990's

In 1990, Larry Peterman, an 18-year veteran of the Department, was named Fisheries Division Administrator, replacing Pat Graham.

In 1990, Jerry Wells, after 14 years as a fisheries biologist, Region 3 fisheries manager and Region 2 supervisor, was selected to head the Department's Field Services Division, replacing Arnold Olsen, who was named administrator of the Parks Division.

A number of other changes were made in the Department in 1990. Ron Marcoux resigned as Deputy Director to work for the Rocky Mountain Elk Foundation in Missoula. Pat Graham was promoted from Associate Director to Deputy Director for staff operations. Al Elser, a 21-year fisheries biologist, fisheries manager and then Region 1 supervisor, came to Helena to fill Marcoux's position.

In January 1991, Governor Stan Stevens appointed two new Fish and Game commissioners – Jim Rector, Glasgow attorney, and Elaine Allestad, Big Timber rancher and Sweetgrass County Commissioner. Allestad was the commission's first female member and replaced Bill Howell of West Yellowstone. Rector replaced Bob Jensen of Circle.

A change in state government administration in 1993 saw newly elected Governor Marc Racicot appointing Pat Graham, Deputy Director, as the new Department Director, replacing K.L. Cool.

In January 1993 Governor Racicot appointed three new Fish and Game commissioners. Stan Meyer, Great Falls advertising executive, was appointed chairman. Also assuming places on the commission were David W. Simpson of Hardin, vice president of operations for Westmoreland Resources, Inc., and Charles R. Decker, owner of CRD Timber and Logging Company of Libby. Elaine Allestad and Jim Rector continued in their positions on the five-member commission.

Jim Posewitz retired in August 1993 after 32 years with the Department, serving under seven governors and nine directors. He administered three different divisions: Environmental resources, Environment and Information and Ecological Services. He ended his career as special assistant to director Pat Graham to become director of the Helena-based "Orion, The Hunter's Institute," founded by Posewitz to sustain hunting and the land and resources it depends on.

Two new persons were named to the Fish and Game commission by Governor Racicot in April 1995. Dale Tash, Dillon, retired professor at Western Montana State College, replaced Elaine Allestad of Big Timber. Darlyne Dascher from Fort Peck replaced James Rector of Glasgow.

The Fish, Wildlife and Parks Commission was the recipient of the 1996 Commission of the Year Award from the Western Association of Fish and Wildlife Agencies. Members of the winning commission were Stan Meyer, chairman, Dave Simpson, Darlyne Dasher, Charles Decker and Dale Tash.

Jerry Wells, administrator of the Department's Field Services Division, retired at the end of 1997 after 22 years of service. Bob Martinka, associate director, also retired after 27 years with the Department.

Commissioner Dale Tash, 72, died on June 25, 1998 at his home in Dillon while still serving on the commission. In late 1998, Governor Racicot appointed private businessman Tim Mulligan of Whitehall to the FWP commission to fill the seat of Dale Tash, whose term would expire on January 1, 1999.

Art Whitney, FWP fisheries biologist and administrator for 34 years died in Helena in November 1998 of colon cancer. Whitney was Fisheries Division administrator for 23 years.

At the turn of the century, Marc Racicot was governor. Fish, Wildlife and Parks commissioners were Stan Meyer, Chairman; Dave Simpson; Darlyne Dascher, Charles Decker and Tim Mulligan **(VERIFY NAMES)**. Pat Graham was director, and Larry Peterman was Fisheries Division Administrator.

Fisheries Managers

Robert Needham retired from the Glasgow fish manager's position in 1992. William Wiedenheft, fisheries biologist in the region, became fisheries manager and was still in that position at the turn of the century.

Phil Stewart retired from his Miles City manager's position in 1998. He was replaced by Brad Schmitz, a fisheries biologist with the Idaho Fish and Game Department **CHECK THIS**. Schmitz was still manager at the end of 1999.

Dick Vincent became the Department's Whirling Disease Coordinator in **(1995?)**, after discovery of the disease in the Madison River in 1994. He was replaced by Bruce Rich, an Idaho Fish and Game Department employee, in **(198?)**. Rich was still manager by the year 2000. Dick Vincent retired from the Department in 1998 but, under contract with the Department, continued the job of Whirling Disease Coordinator. **CHECK THESE DATES.**

Dennis Workman retired from the Missoula fisheries manager's position in 1998. He was succeeded by Don Peters who held the position for less than a year when he decided to retire in 1999. At the turn of the century, the Department had not permanently filled the manager's position. **CHECK LAST SENTENCE**

HABITAT

"Rivers are marvelous spirits. Perpetually singing and dancing, they amble merrily toward the ocean, where they rejoin their cradle and their grave, lose their identities, and are mystically transported to the tops of the mountains to begin new lives."

--Constance Elizabeth Hunt, "Down by the River"

1945-1950

As early as 1893, the State Legislature showed concern in their legislative enactments over the loss of fish in irrigation diversions. In 1942, after many experimental installations were tested by the Fisheries Division, it was concluded that annual maintenance alone for a statewide screening program would cost three times as much money as was available for the operation of the entire division.

Planting hatchery fish was the state's fish management program from before the turn of the 20th century up to about the 1940's. Although there were some earlier thoughts about fish habitat being a factor in providing fishing, the mid-1940's seems to be the period of transition between management of the state's waters with hatchery fish and the ideas that other factors, such as fish habitat, are necessary in fisheries management. However, it was not until the first fisheries biologist was hired by the Department in 1947 that habitat preservation began to be looked at as a real issue.

Since the first testing of fish screens, various statements of fish loss had appeared in the Department's biennial reports. This problem was, and historically had been, a real one, but, by the early 1950's, no clear cut answer had been provided for the problem. In Montana, fish screens of varying types had been placed in the canals. None, from Montana's viewpoint, had been completely satisfactory and all were expensive, not only to install, but especially to maintain.

The 1950's

At the beginning of the 1950's, Department activity reporting noted that Montana was, in a sense, at the crossroads of its fisheries management. Gone was the period where isolation and vast untouched areas assured sportsmen of adequate fishing regions. The state was entering the period now passed through so tragically by eastern states. A stand had to be taken soon on the place recreation was to have in the state's future economy. Problems of pollution, big dams, and other factors disturbing Montana streams had to be squarely faced. The industry of fish and game was one of Montana's largest – only sincere, unbiased thinking and planning could keep it so.

However, it was noted that the returns that people enjoy from recreation could not be measured in dollars and cents. These same enjoyments and some fishing at one time or another were enjoyed by the eastern states. But their economic development was so fast and without regard to the protection of the natural resources that their recreational resources suffered and were exploited by private interests and closed to the use of the public. It was very nearly a thing of the past. The Department felt that, in our management in Montana, we had to consider that we had a natural resource that was not being utilized to its capacity and we must plan to conserve the streams and lakes so they may be retained as long as possible for future use. In doing so, adequate control of pollution both from a public health standpoint and from an industrial standpoint had to be provided for.

The Department believed that In order for Montana to develop industrially and take advantage of the natural resources that were available, adequate legislation was needed by concerns interested in locating in Montana, and for the protection of the fish and wildlife of the state. Industries and fish and wildlife interests could work together, with proper safeguards formulated for their management. In order to protect

the income to the state from the traveling public and by Montanans, these things should be recognized as a must, to be met by honest, sincere, unbiased thinking, and should be forthcoming for the use by industry and fish and game management in the interest of the people of Montana.

Montana's sport fishing resources were looked upon as a national recreational asset. Because of increased numbers of fishermen, the supply of natural, or wild, trout had dwindled. Present day management practices were to supplement natural spawning in streams with hatchery-raised trout. Cooperation from all those interested in wildlife recreation was necessary to assure success of the program.

During the 1950-52 biennium, the Fish and Game Commission took a forward step in authorizing a complete evaluation of the irrigation diversion problem. The study was undertaken cooperatively with the Montana State College Agricultural Experiment Station. In order to limit activities for the initial phase of the work so that real results might be had, the study was confined to the irrigation diversions of the Gallatin Valley.

In the early 1950's, Montana was also facing new challenges to fish and wildlife habitat destruction. An article in a 1952 issue of the Department's magazine, *Montana Wildlife,* presented the feelings of the Department between forthcoming new industry and the protection of fish and wildlife habitat:

> "How often in industry have projects been pushed with only one goal in mind? How often has lack of 'whole-sightedness' obscured the effect of certain types of industrial development upon our natural resources?
>
> "Dams, drainage, dredging, unwise grazing, improper timber cutting – all these with neither foresight nor hindsight have left thousands of acres desolate with eroding soil, destroyed natural habitat for wildlife and gained for men nothing – often not even experience.
>
> "Now in Montana we have a question on pulp mills, an industry which is easily adapted to Montana's timber resources.
>
> "But hand in glove with such a plant goes stream pollution. In a state like ours, where there are practically no polluted streams, it is difficult to imagine the filthy, contaminated waters of some eastern states which support no aquatic life and are poisonous to humans and game alike.
>
> "Those who favor establishment of paper pulp mills in this state protest that 'Montana needs industry' in order to move forward and they gloss over the problem of stream pollution with varying versions of a chemical treatment which removes most of the harmful wastes of pulp.
>
> "Their arguments are fundamentally correct. But, before we seek this or any other kind of industry, let us first take stock of the overall picture. Let us not progress at the cost of losing our crystal clear waters, scenery and wildlife.
>
> "First let us pass laws to make mandatory the use of manufacturing methods which will guarantee elimination of harmful waste. When this first step is taken, when we are assured that our lands and waters will have legal protection from industrial poison, then will we, whose job it is to protect our natural resources, fall in step with industry in the development of business in Montana.
>
> "But, business cannot and must not be allowed to develop at the expense of leaving a stagnant, slimy mess which is the mark of industry in other states."

An editorial in a 1953 issue of *Montana Wildlife* (Vol. III, No. 3) was directed at habitat loss from road construction:

> "Much of what we call progress has been made at the expense of our natural resources. Some of this has been inevitable, but a great deal of the waste and damage, particularly to wildlife habitat could have been avoided by thoughtful planning.
>
> "In this respect, it should be most encouraging to conservationists to learn of the action taken by the Montana State Highway Commission in response to a letter from the Montana Fish and Game Commission concerning the problems of destruction of fish and game habitat during highway construction.
>
> "The text of this resolution is reprinted in its entirety since this expression of cooperation in protecting wildlife might well be a pattern for other agencies and organizations to follow when their activities might endanger Montana's valuable wildlife resources.
>
> Resolution:
>
> WHEREAS, the aims, objectives and undertakings of the State Fish and Game Commission of the state of Montana are of a nature and designed to add to the pleasure and well-being of all Montana people, and
>
> WHEREAS, controlled abundance of fish and game adds materially to the economic wealth of our State, and
>
> WHEREAS, the GREAT-OUT-OF-DOORS of which Montana so proudly boasts would lose its savor were her mountains, streams and valleys to become bare of their native inhabitants;
>
> NOW, THEREFORE, BE IT RESOLVED, that the STATE HIGHWAY COMMISSION, incidental to its pre-construction, construction and maintenance activities, shall cooperate to the full in every practical way to assist the said STATE FISH AND GAME COMMISSION in carrying out its objectives.
>
> BE IT FURTHER RESOLVED, that pre-construction, construction and maintenance Department heads be given copies of this Resolution.

In 1954, the second issue of *Montana Wildlife* contained a discussion about fishing pressure versus other factors that controlled fish populations. The article was titled "What's Robbing Us of Our Fishing Pressure?":

> "Although still good by modern standards, it must be admitted that fishing in Montana is not like it once was in the 'good old days.' What has happened to this fishing of yesteryear? Can we blame the fisherman himself for all of the decline in today's angling success?
>
> "The latter question can be answered with a resounding NO – although in most states, Montana included, the major part, if not all, of the fisheries program has been developed upon the theory that fishing pressure is the chief factor in fish reduction.
>
> "Unfortunately, fewer fish in the creel is not a result of a simple, easily remedied cause such as fishing pressure but rather has been caused by at least three very complex, deep-seated reasons.

> "When Lewis and Clark came to Montana, they found good fishing and not many fishermen. But, they found something else far more important: waters were clear, productive and ran from a steady source of well-vegetated drainages; fish were native to the area, adapted to existing conditions without competition from introduced species; and finally the water habitat was undisturbed by roadways, dams and other structural changes.
>
> "In other words, the main difference between the fishing present and past can be summarized as: 1) introduction of new and undesirable species of fish, 2) improper land use in watersheds, and 3) destruction of the aquatic habitat itself. Taking these points separately fishermen will get a clear picture of what is meant."

The article went on to expound on each of those three reasons for the decline in fishing. Most emphasis was on stream habitat destruction, including dam construction (past and proposed) and use of the state's waters for irrigation. The conclusion was that fishing pressure was not responsible for poor fishing but that changes in the environment that altered fish habitat were the major factors.

During the 1953-54 biennium, William Clothier completed the irrigation diversion study discussed in the 1950-52 biennial report. He published two reports in the Journal of Wildlife Management and a pamphlet was printed by the Fish and Game Commission giving a brief discussion of fish losses in irrigation diversions and giving practical methods of reducing these losses. The Montana State Agricultural College Experiment Station played a major role in this cooperative project. Briefly the findings and recommendations were as follows:

1. It has been demonstrated, conclusively, that fish losses to any single canal in the Gallatin Valley are small enough so that conventional type fish screens cannot be installed and maintained economically;

2. If water flows into canals are shut off by a pre-designed method, a large proportion of the fish in the canals can be brought back to the river;

3. By altering the picture of cover, such as overhanging brush, cut banks, and pools in the canals, fish may be brought back into the river much more readily;

4. The greater proportion of fish enter canals with the initial flush of water into these canals in the spring. It is recommended that, where possible, irrigation headgate structures should be flushed each spring prior to running water down the canal proper by diverting water from the canal through a bypass structure and bypass canal back to the river. This will shift the fish population from the headgate structure to a point in the river further downstream;

5. It is clear that unless the problem of providing or insuring adequate stream flows is faced objectively, no amount of effort to keep fish out of irrigation canals will succeed.

Fish salvage was equally impractical because the high cost of crews and equipment did not permit the wide application necessary to effect an appreciable reduction of the overall fish loss.

This study demonstrated that proper headgate manipulation could be expected to save as much as 35 percent or more of the pounds of trout lost to individual ditches. Reductions in water flow exposed fish and stimulated movement. Most of the fish so stimulated traveled in an up-canal direction until they reached the river or found cover in the canals in the form of pools, undercut banks, or heavy overhanging brush. Fish traveled greater distances whenever a uniformly smooth canal bottom and a minimum of cover existed. Clothier 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.

By the mid-1950's, 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.

The winter 1955 issue (Vol. V, No. 1) of the Department's magazine, *Montana Wildlife*, contained an editorial about habitat destruction's effect on fish and wildlife habitat and the problem of getting people concerned about this problem:

> "Unfortunately, it usually takes a real crisis to get public opinion aroused over any type of humanitarian movement. This is true whether the response is directed toward crime in the city, corruption in government or dwindling natural resources.
>
> "When things are going well, or moderately well, most people prefer to ride along rather than investigate to see if conditions are the very best they could be.
>
> "This passiveness exists in Montana with reference to habitat destruction for fish and game. There is at present an abundance of game and it is not too difficult to catch a mess of fish – so everyone is happy. That is, nearly everyone. Those that aren't happy gripe about relatively unimportant things like closing a few acres to hunting, shooting doe deer, size limits on fish and other items of limited importance.
>
> "Actually, deep concern should be expressed about some of the things that are happening to the wildlife habitat in this state and the reason nothing much is being done is because the destruction is so gradual.
>
> "A mile of stream diverted in one area, fifty miles of stream changed forever to a lake by a dam, a few more miles destroyed for fish life by pollution in another or a section dried up through irrigation - individually the loss seems insignificant. But add them up. The loss to fish production is staggering.
>
> "Each drained marsh lowers forever the number of ducks and fur bearers that could be produced unless a substitute habitat is constructed.
>
> "Each acre of plowed rangeland reduces the number of native sharp-tailed grouse that the area can produce.
>
> "True, only the dreamers would say 'stop' to the progress of civilization, but any realistic citizen can see many ways that civilization can go forward without marking the end to wildlife.
>
> "So, why not get a little more concerned about pollution, indiscriminate and ungoverned destruction of streams, clear cut logging and other wasteful and unnecessary practices. In the long range view of things, these are the really important matters."
>
> "Also, in the same 1955 winter issue of *Montana Wildlife*, a further, more specific article discussed the problem of water use and its effects on fisheries:
>
> "Montana is favored with thousands of miles of good fishing streams. From their headwaters, they tumble down mountains to become meandering streams and rivers. In these slow-moving waterways are found some of the state's best fisheries, for here trout and other cold water species can find plenty of water of the proper temperature and

chemical composition, deep pools for resting or hiding, riffles, undercut banks and brush cover which are invaluable food sources and all the other requirements for proper production.

"But Montana is steadily losing its best waters. Yes, Montana's best waters are gradually disappearing.

"Pollution is taking its toll . . . whole channels are being changed by the road builders, through agricultural practices and flood control . . . streams are being completely dewatered for irrigation purposes . . . or flooded by impoundments . . . their vital cover is being destroyed through brush clearing for cultivation, grazing or logging.

"As long as Montana can preserve its aquatic habitat, the state will enjoy excellent fishing. When the habitat is gone, there will be no more fishing."

The 1950's found the U.S. Forest Service concerned about spruce budworm infestations in forests throughout the state and was trying to control the outbreaks through an intensive DDT spraying program. Except for limited grasshopper control observations, the Montana Fish and Game Department had not become directly concerned with aerial spraying of insecticides until adverse effects to fish were associated with the spruce budworm control program. Spruce budworm epidemics in Montana were reported as early as 1923 but most of these outbreaks were of short duration and subsided from natural causes. The infestation in the 1950's, first reported in Montana in 1948, continued to spread, so that, by 1951, the U.S. Forest Service decided to attempt chemical control. During 1952 and 1953, "hot spot" spray programs were conducted on several forests in Montana and in Yellowstone National Park. These were followed by more extensive programs amounting to approximately 300,000 acres in 1955, 900,000 acres in 1956 and 800,000 acres in 1957.

The Department was skeptical about the effectiveness of the spray program. Control of budworm on large areas from 1953 to 1955 was unsuccessful and many of these areas were scheduled for re-spraying in 1959.

There was concern about repeated spraying, which would prevent recovery of fish and aquatic insects, and that the poisons could accumulate on stream and lake bottoms.

The chief concern was for native cutthroat trout and grayling. It was felt they might be more susceptible to DDT poisoning than other game fish. Stream cutthroat were yet to be domesticated so they could be easily raised in hatcheries. The grayling sanctuary in the Red Rocks area was the last stronghold of stream inhabiting grayling in the U.S. If lost, neither of these fishes could be replaced. The Red Rocks area was the site of a heavy infestation of spruce budworms. The Forest Service postponed spraying there while an attempt was made to determine the extent of danger and care to be taken to protect the grayling

During October 1955, four months following spraying in the Yellowstone River drainage, the Department received reports of fish dying along about 90 miles of the Yellowstone River within and below the spray area. Dead fish were primarily whitefish, brown trout and suckers and densities of about 600 fish in less than 300 yards were noted.

In attempting to explain this unusual mortality, fishery biologists looked to the spruce budworm control program carried out in July as it was the only apparent activity in the area that was different from other years. Considerable controversy ensued as to the danger of DDT to aquatic organisms at applications of less than two pounds per acre and the time lapse between spraying and the observations of fish mortality.

The spruce budworm epidemic was not a simple problem either from the viewpoint of the U.S. Forest Service or the Montana Fish and Game Department. Forest Service personnel felt DDT spraying was the best control method they had. Since occasionally serious fish kills were associated with DDT spraying, the Fish and Game Department cooperated with the Forest Service and other agencies in studying the effects of forest spraying in Montana. The information gained would be used to adjust the spray program to minimize the damage to fish and other aquatic life.

Because of the DDT controversy, a cooperative study was initiated in 1956 to determine the effects of future spray operations on fish and wildlife. Cooperators with the Fish and Game Department were the Forest Service, U.S. Fish and Wildlife Service and Montana State College. The general design of the study was to sample stream bottom organisms and fish populations prior to and following spraying. The immediate objective was to determine the effect of the aerial application of one pound of DDT per acre on fish resources and ways of minimizing any possible detrimental effect. The study was conducted on 13 streams within three national forests where spraying had been done in 1956. Six of the streams were later dropped because the expected amount of spray did not reach the stream or the data collected were insufficient for significant results.

Considering all the aspects of DDT spraying, the Fish and Game Department was not willing to compromise the sport fishery resource for programs of questionable necessity and doubtful success. Department biologists were definitely opposed to spraying where valuable fish resources were endangered. It was felt that investigations on side effects had lagged far behind research on chemicals to kill pests and the Department strongly advocated more research on chemical controls and their effects on fish and wildlife resources and public health.

It was the Department's feeling, based on the best information available, that forest spraying with DDT at the present rate of one pound per acre lead to fish kills under some circumstances. It was suggested that there would be recovery in a few years. Even if all the young-of-the-year fish were killed for one year, it might not be worse than natural disasters which sometimes occur. Rainbow, brook and brown trout populations could be rebuilt with hatchery fish, If necessary.

According to D-J reports covering the period from 1960 to 1966, the Forest Service continued to spray the national forests for spruce budworm in the East and West forks of the Bitterroot, the Yellowstone and Gallatin rivers, the Boulder River near Boulder and Rock Creek near Missoula. The Department conducted a number of monitoring studies to determine the effects of the spraying on aquatic resources.

During the fall of 1956, new highway construction was begun near the junction of US Highway 10-A and Montana Highway 38. During construction, 350 feet of Flint Creek were channelized.

A comparison of fish in the channeled areas of Flint Creek before and after construction provided some very conclusive figures. In a 300-foot-area where 69 catchable trout were counted in 1956, only six catchable fish were found after it had been improved by a bulldozer. This was a 94 percent reduction in both numbers and weight of catchable game fish. There was also a heavy, though probably temporary, loss of fish downstream from the construction site.

Flint Creek was only an example. Such stream channeling was common along highways of mountainous Montana. Legislation to cover such losses was badly needed. Such legislation would result in a greater cost for roads along trout streams, but, over the years, the cost would be repaid many fold by the preservation of one of Montana's priceless resources.

In 1958, through a joint agreement between the Montana Fish and Game Commission, the State Water Conservation Board, the Western Montana Fish and Game Association, and the Ravalli County Fish and Game Association, 5,000 acre feet of water became available annually to the Fish and Game Department from the West Fork Dam in Ravalli County. The water, purchased in early 1958, was in excess of agricultural needs. It was to be released into the Bitterroot River during summer months when heavy

irrigation draws the stream to a dangerous low for fish. This was the first time in Montana that water was specifically reserved for fishing. The need arose because there was no provision in the state law for minimum stream flows to preserve fish life.

During the winter of 1957-58, the U.S. Soil Conservation Service, through its Agricultural Conservation Program (ACP), initiated a program on Rock Creek near Red Lodge to remove trees and debris from the stream channel as well to make minor channel realignments because of “unusual flood conditions” that occurred in 1957. The project was funded 70 percent by federal funds and the remainder by private landowners on whose lands the work was done. Under this practice, snags and fallen trees were removed, pools were filled with rubble, rubble was piled against undercut banks and rubble dikes were built to divert the stream away from the outside of meanders. In some cases, meanders were cut off. Where the work was done, the stream was made wider, shallower and faster and the quality and quantity of fish habitat were severely reduced.

During the 1958-60 biennium, a preliminary investigation was made by the Department on loss of fish habitat due to an Agricultural Conservation Program on Rock Creek, near Red Lodge for flood control and repair. A more detailed investigation on the relationships between floodplain grazing intensity and the quality of the stream for fish production was also in progress on Rock Creek.

The Montana Fish and Game Department was seriously disturbed by this habitat destruction that was federally financed and supervised under a so-called “conservation” project. The action ignored the real reason for the erosion on Rock Creek, namely the loss of streambank vegetation due to grazing of the flood plain by livestock and other man-made alterations. In 1959, the Department decided to begin an investigation of the relationship between livestock grazing and erosion on Rock Creek. To monitor fish populations, four electro fishing sections were established to add to the two sections that had already been established in 1957. However, personnel were not hired for the project until the early 1960’s due to budget limitations.

In the late 1950’s, a handful of fisheries biologists from the Montana Fish and Game Department and the Missouri River Basin Studies office of the U.S. Fish and Wildlife Service in Billings, Montana embarked upon a program to raise the awareness of the importance of Montana's trout streams and to try and slow down the destruction of trout streams in the state. Over the course of nearly a century, many miles of once natural streams had been straightened, polluted and dewatered, causing dramatic and disastrous consequences for fish habitat and the capacity of these streams to produce wild fish.

Biologists could have begun a program of attempting to repair some of this past abuse. Instead, they decided their efforts could be better spent trying to prevent further damage because there were immediate threats from construction projects being planned by dam and highway builders. Both the Bureau of Reclamation and the U.S. Army Corps of Engineers were proposing and building large water development projects on major rivers throughout the nation. Several large projects were proposed or underway in Montana -- Allenspur, Reichle, Paradise, High Cow Creek, Clark Canyon, Canyon Ferry, Tiber, Nine Mile Prairie, Hungry Horse, Spruce Park, and Glacier View. Also, about this time, President Eisenhower gave priority to completion of the nationwide Interstate Highway System.

Biologists' and anglers' attempts to defend some of the better river sections from destruction by these development projects were severely hampered by the general notion that Montana's stream resource was so large that it could be considered practically inexhaustible. The 1950 official Montana highway map proclaimed there were 32,000 miles of good fishing streams in the state. The source of that figure was never determined but, whatever the origin, no consideration was given to the quality of the stream channels or the quality and quantity of the waters they contained. So, the popular conception that there were thousands of miles of “well stocked streams” in the state was dangerously misleading in that it had given rise to a false sense of security or complacency in conservation of stream fisheries.

One of the most serious obstacles to the preservation of Montana's fishing streams was the lack of a satisfactory method for measuring and presenting their total fishery value – both economic and social. Unlike most other water uses, recreational fishing did not readily lend itself to conventional means of measurement and, as a result, was usually undersold at the bargaining table of comprehensive resource planning. Therefore, an attempt was made to evaluate and classify the streams of Montana on the basis of their worth for recreational fishing. The major difficulties encountered were devising a system which would be simple enough for practical application, broad enough to include all-important factors influencing fisheries values and, at the same time, capable of being portrayed in an understandable manner.

In 1959, 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 completed 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.

In preparing the classification map, Halterman tabulated the material for consideration by the committee. Department district fisheries managers furnished most of the basic information on the streams of their respective districts and contributed much to the success of this project. Many other individuals concerned with Montana fisheries were freely consulted regarding waters on which they had special knowledge.

In 1959, the U. S. Fish and Wildlife Service published "A Classification of Montana Fishing Streams - 1959". The map was color coded, showing 436 major fishing streams or parts of the streams, with a total of 8,923 miles in four categories or classifications. The concept of the rating map was to use county fair prize ribbon colors to identify the stream classifications. The concept of "Blue Ribbon" fishing streams probably started with this map. The color categories were as follows:

Class 1 (blue). Streams of national, as well as statewide, value
Class 2 (red). Streams of statewide value
Class 3 (yellow). Streams of value to large districts of the state
Class 4 (gray). Streams of value to smaller districts of the state, such as counties
Class 5 (no color) Streams of restricted local value or not yet classified

In Class One there were only 410 miles of "Blue Ribbon" streams; Class Two had 1,072 miles, Class 3 had 2,437 miles and Class 4 had 5,004 miles. There was no mileage figure for Class 5 streams.

There were four rating factors – Availability, Aesthetics, Use and Productivity. The highest rating a stream could receive in each factor was an A; the lowest a D. There was not firm data on all the streams so Halterman took the information from the fish managers and balanced them all out with his statewide knowledge of the stream resource.

The classification provided an inventory, appraisal and location of Montana's fishing streams, a base for calculating material measurements of the fishery resource and a guide for long range policy, administration and management of the fishery resource. Broad considerations such as these were necessary if fishing was to have a place in comprehensive planning somewhat commensurate with its social and economic worth to Montana and the nation. The classification clearly emphasized that Montana fishing streams were limited in both quantity and quality.

It was believed that the stream classification map portrayed in a realistic fashion, the relative value of Montana's fishing streams as they were then known. However, it was also recognized that values are dynamic and periodic revisions would be necessary. Some of the smaller tributary streams were unclassified primarily because their relative values were unknown.

Art Whitney, Chief of the Fisheries Division for 23 years, recalled some of the beginnings of the map. He remembers Halterman had the idea of a need for a stream rating system and because he had traveled all over the whole state and had a personal knowledge of many streams. Chuck Phenicie had the state responsibility but he didn't have the wherewithal to travel around and see things. Halterman would make a tour of the Department districts and try to get each fish manager to rate streams in his region into the four different categories. It was Halterman's job to put the regional information together to make sure that what one manager would, for example, call an "A" for "Productivity" was the same as another manager would call an "A" for 'Productivity" for a similar type stream.

George Holton also remembered those times. He remembered meeting with Halterman in Helena one afternoon in the Mitchell Building, where the Department was located in those days. Holton said Halterman convinced him that he should persuade the Department Director to insist that the U. S. Fish and Wildlife Service join with the Department in a stream rating map. Halterman knew the streams of the state, was an expert trout fisherman and felt very strongly of the need for what he referred to as an inventory. Joe said a grocery store can't work without knowing what it's got and fisheries can't work without knowing what it's got.

The map had a definite beneficial effect on water-use planning in the state by all agencies. It provided a measurement that was used for many years whenever water development was discussed. The term *"Blue Ribbon trout stream"* became a designation of excellence familiar to anglers, conservationists, and developers.

During the 1958-60 biennium, the Department pollution biologist **WHO WAS HE?**, working under a cooperative agreement with the State Board of Health, participated in the classification of waters in the Columbia River drainage. This classification was in relation to water use by aquatic life. A comprehensive report on the bacteriological, biological, chemical, and physical aspects of the Columbia River drainage was written during the biennium. Under the same cooperative agreement, biological data needed for classification of the Missouri River drainage was also gathered.

During the 1958-1960 biennium, a multimillion dollar highway construction program was in progress in Montana. Road construction that resulted in stream straightening removed the meanders which are so very important in providing cover and resting areas for fish. Population studies on Flint Creek, near Philipsburg, Montana showed a 94% reduction in catchable size trout when the stream was straightened during highway construction. During the 1958-60 biennium, about 20 plan-in-hand (on-the-ground) inspections were made with construction agencies in an effort to minimize this damage.

Also during the 1958-1960 biennium, reports were reviewed, recommendations made and negotiations entered into on proposed dams to be built with federal funds. Where necessary, field inspections were conducted. Included were reviews of the comprehensive Bureau of Reclamation plans for the Three Forks Division (Upper Missouri Drainage), the Bureau of Reclamation's preliminary plans for the Yellowstone River and comprehensive plans of the Corps of Engineers for the Clark Fork Drainage. Individual projects reviewed included Yellowtail Dam on the Big Horn River and Spruce Park Dam on the Middle Fork of the Flathead River. Such review of federal water development projects was made possible through the federal Fish and Wildlife Coordination Act. State conservation agencies did not have a veto but made recommendations in an effort to mitigate damage to fish and wildlife and, where possible, to enhance fish and wildlife. Much of this work was done in cooperation with the Branch of River Basin Studies of the Bureau of Sport Fisheries and Wildlife located in Billings. Of these proposed federal projects, none were constructed except Yellowtail Dam, completed in 1965.

In 1959, the U.S. Forest Service sprayed DDT over portions of the national forests on the East and West forks of the Bitterroot River to control spruce budworm infestations. A fisheries study was conducted coincident with the spray program and insect and fish mortalities that occurred during the spraying were closely monitored.

As the 1950's ended, the Department and many Montana sportsmen were concerned about the harmful effects of sediment from agricultural pollution on trout streams. We knew that heavily silted streams were not good fishing streams. We also knew that the vast majority of trout caught from streams was wild trout – fish that grew from eggs incubated in the clean stream gravel.

During the 1958-60 biennium, five creeks were investigated as possible sites for study of the effects of sediment on wild trout.

Bluewater Creek near Bridger was selected for the study, which was undertaken in 1959.

Bluewater Creek was a chemically fertile spring creek with optimum water temperatures for wild brown trout . . . Egg mortality was low in clean headwaters and progressively increased as sediment concentration increased.

The Bluewater Creek study was initiated to demonstrate how agricultural pollution – stream silt accompanied by low flows and high water temperatures – reduced the capacity of a stream to produce trout. By comparing the fish populations with silt concentrations, stream flow and water temperatures in two areas, we could see that agricultural pollution changed Bluewater Creek from a trout stream in the clean water areas to a rough fish stream in the silty areas. Above the silty irrigation returns, trout and trout food organisms were numerous, while below these areas the water was warmer and turbid and the streambed was covered with silt, resulting in very few aquatic insects and a fish population consisting of nearly 100 percent suckers.

The 1960's

As the 1960's began, the Montana Fish and Game Department continued to cooperate in the pollution control program by its assignment of a biologist to the Board of Health. The statewide classification of waters was completed under the direction of the State Board of Health, which administers the Water Pollution Control Act. This was a classification of Montana streams as to use so adequate pollution control standards could be established and maintained.

Several investigations were made by the Pollution Biologist during the 1960-62 biennium. An extensive investigation was made on the Clark Fork of the Columbia River during the summer of 1960, following a mine-mill waste pollution and fish kill in late winter of that year. The upper 30 miles of the Clark Fork (below the Anaconda Company settling ponds at Warm Springs down to Garrison, Montana) was found to be in poor biological condition. Some improvement was shown in the river from Garrison to Bonner in late summer. Some of the increase in pollution sensitive organisms (those organisms unable to survive in polluted conditions) in this section of the river was undoubtedly due to natural population fluctuations, but it was a definite indication that clean water conditions existed. It was believed that if present pollution abatement practices were maintained, the condition of the upper river would undoubtedly continue to improve.

The effect of sewage from the city of Missoula on the Clark Fork River was still apparent below Missoula, but the stream was expected to improve with the advent of sewage treatment from that city. A treatment plant was under construction by 1962.

Stream sampling in 1960 reflected clean water conditions in the Clark Fork River below the Bitterroot River in the vicinity of the Waldorf-Hoerner Pulp and Paper Mill. A severe kill of whitefish occurred in a stretch of river (approximately 10 miles long) below the Waldorf-Hoerner Mill during late September of 1961. The cause of the kill could not be definitely established; however, fish sampling indicated the source of the pollutant to be the Waldorf-Hoerner Mill. The area of the kill was very similar to a 1958 kill which was attributed to wastes from that mill.

The section of the Clark Fork River most severely affected by the 1960 pollution problem was closed to angling in 1960 and 1961. The river was sampled both years to check its damage and recovery. Game fish, which were very scarce in 1960, had increased more than five times by 1961 and the river was opened to fishing with the general season in 1962.

During the 1960-1962 biennium, an investigation was begun on the water temperatures of the Madison River and the influence of Hebgen Lake, Earthquake Lake and Meadow Lake on the river's temperature regime. Due to the thermal waters of the Firehole River from Yellowstone Park, the upper Madison River is unusually warm for a headwater stream. It appeared that Hebgen and Earthquake lakes cool the stream during the critical early summer weeks while Meadow Lake warmed the stream during the same period. Summer stream temperatures reached highs of 80°F above Hebgen and 83°F below Meadow Lake. These temperatures approached critical levels for trout. Any further developments of reservoirs or diversions which would increase water temperatures could seriously affect trout production in the Madison River.

A proposed dam on the Yellowstone at Allenspur, just upstream from Livingston, had been touted at various times for many years. The proposal became active again in the early 1960's. It was the position of the Department that if an instream flow reservation could be obtained on the Yellowstone River, the necessity of creating a mainstem impoundment on the river would be diminished.

In 1960, the U.S. Forest Service sprayed DDT in a portion of the Gallatin River drainage in an effort to control spruce budworms. Observations were made in the area to determine the effect of this spraying on trout streams. Spray concentrations were reduced along the streams but sampling with fine-mesh nets indicated that stream insects were killed in all of the tributaries and throughout the Gallatin River within and below the spray area. The only trout mortality was in Rat Lake, where the spray caused an extensive kill.

By 1960, there were no provisions for reviewing plans of state agencies engaged in water development. However, the Fish and Game Department reviewed the water development projects planned by private power companies, with recommendations being presented to the Federal Power Commission for consideration.

By 1962, one 300-foot section of Flint Creek, near Philipsburg, had been sampled five times since 1955. This section was straightened and cleared by highway construction in late 1956 and early 1957. The 1955 and 1956 samplings were done before, and all subsequent samplings were done after the construction job. Numbers of trout six inches and over which were sampled from the section each year were: 1955, 75; 1956, 69; 1957, 6; 1961, 23 and 1962, 23. This information showed that, while the initial effect of severe stream damage partially diminished with time, the damaged section would have fewer trout for a long time and sometimes indefinitely. An attempt was to be made to improve the existing habitat in this section by placing boulders in the cleared channel. The section would be sampled periodically in the future to test the effectiveness of the boulders in improving fish habitat.

By 1962, the accumulative effects of dam building, stream straightening, pollution of all kinds (including silt), removing excessive amounts of water from streams for irrigation, stream bank trampling by livestock, and other abuses were reducing trout stream habitat at an alarming rate. Compared to these factors, fishing pressure was a minor cause of the decline of fishing in Montana.

The introduction to the Fisheries section of the 1960-62 biennial report remarked on the importance of trout stream fishing in Montana, that trout stream fishing was primarily supported by wild fish and that stream habitat must be maintained to continue producing trout of a size desired by anglers. It proposed legislation for the upcoming Legislature to protect trout stream habitat to ensure the perpetuation of the state's trout streams and fisheries.

The major public relations effort of the 1959-1962 period was to let the sportsmen know the seriousness of the fish habitat destruction problem in Montana. The Department began seeking a means to preserve stream habitat through an overall conservation program that would protect the physical stream channel, water quality and water quantity. At the beginning of the 1960's, not one of these three necessities was protected under Montana law. Out of necessity, the first priority was protection of the physical stream channel. Working for clean water and instream flows was meaningless without a protected stream channel. If channels were kept intact, water could be cleaned up or instream water rights secured. But, once the channels were destroyed, restoring a river became a remote possibility. And, out of the three goals, this one seemed achievable at the time.

In 1962, the Department published a little booklet called *Montana Trout Streams – Will We Have Tomorrow What We Have Today?* The booklet summarized the studies on the 13 streams, showing how altering natural stream channels greatly reduced a stream's ability to produce fish. The booklet also reported that Montana had no laws to control stream alterations and encouraged its citizens to support legislation to protect trout streams.

The Billings Jaycees succeeded in getting their state organization to adopt the project as a common goal. Soon, the youthful service organization had the entire state aware of the problem and its solution: a Stream Protection Act. The Montana Wildlife Federation also pitched in, with the Western Association of that federation providing noteworthy leadership. Together, these groups, supported by the data, convinced a rather reluctant Legislature that Montana needed such a law.

The nation's first Stream Protection Act (SPA) was passed by the 1963 Legislature as SB45 and became effective on July 1, 1963. The act narrowly passed. The house voted 53-33 and the Senate 32-21 after the bill was killed twice in committee, only to be pulled out after some interesting political maneuvering.

However, the law was only good for a two-year trial period which expired June 30, 1965. Thus, the Department had to repeat its previous efforts. So, during the two years following passage of the temporary law, the Department continued to educate the public about stream protection. It published a revised version of the 1962 booklet and again enlisted the support of several groups during the 1965 Legislature. These efforts were successful because a permanent law was passed in 1965, this time with only one dissenting vote cast by a road contractor. The passage of this bill gave stream preservation overwhelming approval.

However, as with the 1963 law, the permanent law continued to exclude projects by private landowners, district irrigation projects or irrigation systems. This problem was to be addressed 10 years later.

The flood plain study on Rock Creek near Red Lodge finally got off the ground in 1963 when graduate students Kenneth Tuinstra, working on plant ecology and Donald Gunderson, working on the physical aspects of the stream channel on fish populations, began work on D-J Project F-20-R-8, Job II.

The objective of the Rock Creek study was to learn more about the relationship of riparian vegetation and trout habitat, specifically to compare bank cover, stream morphology and fish populations in a grazed area with those in a relatively unaltered area. The study area was located about 10 miles north of Red Lodge and was composed of two adjacent stream sections, each about 4,000 feet in length. The two areas came under intensive study: 1) an 80-acre ungrazed area owned by the Department and 2) a similarly-sized grazed area owned by a rancher, where most of the deciduous vegetation that could be reached by livestock had been eliminated. Only tall cottonwoods and thorny shrubs remained.

The project continued with various types of investigations for many years. In 1967, another flood occurred which gave investigators a chance to measure the effects of the high water on channel erosion. These measurements were made in 1968 and compared with previous measurements. In the overgrazed area, 77 percent of the stream channel was altered from its previous position whereas, in the ungrazed area, only 18 percent was altered.

By 1966, it became clear that the Fish and Game Department was not being informed, as required by law, of highway maintenance projects affecting streams. Measures were sought to correct this problem. The Department obtained an additional written agreement with the state Highway Department maintenance section spelling out a workable procedure for reviewing this type of project. Since maintenance projects were initiated in state highway district offices, initial contact was made with the Fish and Game district office by district highway personnel.

In implementing the SPA, two important procedures were worked out with the preconstruction section of the state Highway Department. First, the Fish and Game Department was allowed to attend and participate in preliminary route inspections. These "P-line" inspections were made before any costly design had been initiated or right-of-way purchased. At this time, line or route changes could be made with great facility. Secondly, a special provision was incorporated in construction methods used by all road contractors. It specified that when channel changes or alterations were being undertaken, the contractor would confine his work and equipment within staked limits of such construction. Removal of existing vegetation and ground cover would not be permitted adjacent to construction limits.

Ravalli County questioned whether or not it was legally necessary for counties to notify the Fish and Game Commission of projects around county bridges because of a previous law. The Attorney General ruled that "the Stream Preservation Law does place upon the county commissioners the additional obligation to notify the state Fish and Game Commission of any plans for construction of any projects." Since this ruling, the commission was being notified of county projects throughout the state as a matter of routine.

During the 1962-64 biennium, a study on the effect of silt on trout streams was completed on Bluewater Creek in Carbon County. It showed that large sediment concentrations in a stream are disastrous to trout production. Study results showed that large sediment concentrations practically eliminated insects important as trout food, eliminated trout reproduction and in turn the trout population. Grayling eggs and kokanee eggs fared no better than rainbow, cutthroat and brown trout eggs; however, sucker eggs were able to withstand sediment with little loss.

Bluewater Creek was a focal point of aquatic study for years because of accessibility, climate, proximity to two colleges and a university, a self-sustaining trout fishery, land ownership and use patterns, a substantial spring source and chemical fertility.

Since 1957, the Department had assigned a fisheries biologist to the position of Pollution Control Biologist. During the 1962-64 biennium, he investigated water quality and pollution problems on various streams of the state. One of these included a study of the effects of aerial application of DDT near Boulder, Montana by the U.S. Forest Service. Dead fish, mostly trout, were recovered from waters in this area and dead frogs were reported in a pond. Large numbers of aquatic insects (fish food) were killed in the streams and complete insect kills occurred in some stream sections. Sampling one year after the spraying indicated that the aquatic insect population had substantially recovered, with the exception of caddis flies, at some stations.

A Department-supported doctoral thesis, *The Effect of DDT on Cold Water Fish and Fish Food Organisms*, was completed during the 1962-64 biennium. Among the findings was that delayed mortality occurred during a six-month observation period in all species of fish treated with DDT. Aquatic insects in a test stream were reduced 99 percent following applications of DDT at one pound per acre (the rate then used in Montana forests against spruce budworm) and required 18 months to regain pre-treatment numbers.

Review of other agencies' proposed water development construction projects and determination of their effect on Montana's fishery resources was an important Fish Division activity during the 1964-66 biennium. Activities included negotiations to insure the best possible water conditions for fish in reservoirs and in the streams below reservoirs. The work was largely connected with projects of the Bureau of Reclamation and

U.S. Army Corps of Engineers. In addition, some work was related to Federal Power Commission licenses and with projects of the Soil Conservation Service, Bureau of Land Management, and U.S. Forest Service.

In 1959, the Bureau of Sport Fisheries and Wildlife had printed 2,000 copies of the 1959 stream rating map. By 1964, the supply of maps was exhausted. A new committee was formed, with Dr. C.J.D. Brown and Joe Halterman continuing as chairman and coordinator, respectively. Art Whitney replaced Perry Nelson as one of the Department members and George Holton remained the other member. Using the most current resource information available, the 1959 map was updated. In 1965, the Bureau of Sport Fisheries and Wildlife printed 3,000 copies of the new map.

The effects of land use practices on a stream floodplain continued to be studied on Rock Creek in Carbon County in 1966.

During 1964, the year of Montana's Territorial Centennial, a June flood devastated the state from Northern Lewis and Clark County to Glacier Park on both sides of the Continental Divide. This flood, the largest ever recorded for the area, resulted from rainfall which approached the theoretical amount possible for a given period. It came at a time when the streams were already full with water from melting snow. Sixteen inches of rain fell in 36 hours in one area. Water swept down the Flathead, Marias, Teton, Sun, Dearborn and other rivers, taking 34 lives, leaving thousands homeless and causing damage in excess of $60 million.

Destruction of stream channels by the 1964 flood was a real cause for concern to the Department because if basic fish habitat was destroyed or partly destroyed, the carrying capacity for fish was lost. Some streams were hit much harder than others. The Middle Fork of the Flathead River and its tributaries, the Sun River and its tributaries, and the Dearborn and Teton rivers were badly damaged, as were Cut Bank, Two Medicine, Badger and Birch creeks – tributaries of the Marias River.

Fish Division personnel gave technical advice to the Forest Service doing repair work on streams following the flood. Lakes were less affected than streams with the exception of the washing out of Swift Dam on Birch Creek and Two Medicine Dam on Two Medicine Creek.

A State Recreational Waterway System was approved by the Montana Fish and Game Commission on August 18, 1965. This provided the framework to protect an entire river, but has never been authorized through legislation. The objectives of this system were threefold:

1) The maintenance and improvement of Montana's prime streams as free-flowing productive waters.

2) The improvement of potentially important streams to prime condition so that they may eventually be considered for this system.

3) To encourage and obtain multiple recreational use through the development and maintenance of the recreational features of waterways in the system. High quality fishing as well as outstanding scenic historic and scientific values are features to be especially considered in this regard.

Portions of three major river systems in Montana were included in the system: 1) Yellowstone River from Yellowstone Park to Pompey's Pillar; 2) Missouri River from Fort Benton to Fort Peck Reservoir - a 180-mile section recognized as the "wild" reach of the river and, 3) Flathead River above Flathead Lake, including the North and Middle forks and the South Fork above Hungry Horse reservoir.

The June 1966 issue of *Montana Outdoors* carried an article by Department director Frank Dunkle about water use. In part, it said:

> "Montana's use of water has always been considered in regard to agricultural benefits, or the water has been thought of as something to control for power or to prevent floods. Let's not forget the impact that water can have on recreational development. A free-flowing stream in Montana in a few years may be as important to the state as any other given resource we can now consider.
>
> "When a water discussion arises, you should look at both sides and give serious consideration to the impacts of any so-called development or lack of development as well as what it can mean to us in Montana, before you make up your mind."

Another article in the same issue stated:

> "The most common phrase floating around Montana lately is 'we must use our water or we'll lose it'. It's usually received with a nod of the head and "that's right."
>
> "Most of the people passing the saying along don't have the vaguest idea what it means or what started it; it just sounds right. Somewhere in the back of their minds is a picture of millions of suntanned Arizonans and Californians with a thirsty gleam in their eyes, figuring out schemes to steal our water, every last drop of it. So it doesn't sound good and something has to be done to keep our water here.
>
> "With this kind of thinking, or lack of thinking, the vested interest groups have a pretty fertile atmosphere to foster their own plans – provided these plans look like they will "keep Montana water for Montana."
>
> "There is no disputing the fact that the water short parts of the country look with envy on the water-a-plenty-places. The people that use this threat to their own vested advantage are doing Montana grave harm. The general public, if it gets duped into short-sighted solutions or, worse yet, if it does nothing, is guilty of worse harm.
>
> "The responsibility of Montana citizens is to find out what tune is being played by the band before they jump onto the wagon and also who is the conductor."

The article went on to discuss the "use it or lose it" concept, criticizing those who would further their own agenda and emphasizing that recreational use of water may be as legitimate a use as irrigation, power production, dam construction, etc.

By 1966, Montana was entering a new era of water resources planning and development as exemplified by the proposed Water Conservancy Law. It was obvious that if the Department did not intensify its own planning in the water resources field, fish and game interests would continue to be on the outside of planning groups and their decisions. Without a voice in planning, the Department's position too often became a position of opposition after the planning was done. In order to meet the challenge, the Fish and Game Commission authorized the establishment of a Water Resources Development Section in the Fisheries Division. Starting in September 1966, programming and project review responsibilities were assigned to this section. Jim Posewitz was appointed Chief of the new section.

The August 1967 issue of *Montana Outdoors* contained an article by Jim Posewitz titled "Lakes Like Cakes". It explained what happens to water temperatures in artificial impoundments, why fisheries workers were concerned about them and how multiple level outlets might be a solution to fisheries problems:

> "Water taken from one level of a lake will, if the lake is layered, differ from that taken from other levels. Keeping in mind that both water temperature and chemistry affect fish

> production, should water be drawn off reservoirs from the surface, from the bottom, or from somewhere in between? This is one of the many questions plaguing fisheries workers who have to develop the best possible fishing in Montana's growing number of impoundments.
>
> "In the maze of questions which reservoir management poses, one thing is becoming obvious – the construction of dams with outlet gates at various levels are essential to uncovering answers and applying solutions to fisheries problems just now being recognized.
>
> "Makers of dams in the future must somehow be convinced of the necessity for applying new found knowledge to the construction of major impoundments."

By 1968, the Montana Fish and Game Department and Highway Department had been working together on planning some fishing reservoirs (termed "Interstate Lakes") along new interstate highways being constructed in Montana. In 1968, eight lakes were in the planning stage for Interstate 94 between Billings and Glendive. Some of the lakes would be 30 acres or larger in size. It was expected that the sites would become popular for fishing as well as other kinds of outdoor recreation.

There were, however, some problems to be ironed out. A large part of the land which would be flooded by highway dams did not lie within the highway right of way. This meant that the land would either have to be purchased or easements granted for its use. Access roads would also have to be provided.

The problem of where to get additional revenue to complete these areas reared its ugly head. The program would be fairly expensive. The Highway Department could go only so far before coming to the end of legal strings that limit the use of their funds. The Fish and Game Department was in no position to meet the costs. A possibility would be a special appropriation for enough money to tie up the loose ends.

An article in the September 1968 issue of *Montana Outdoors* discussed the U.S. Army Corps of Engineers' interest in building High Cow Creek Dam on the last free-flowing stretch of the Missouri River to produce power, flood control and recreational benefits:

> "The $375,000 annual replacement flood control benefit credited to High Cow Creek Dam should interest Montana irrigators. It appears that this benefit comes from replacing flood control storage in a downstream reservoir. Such replaced downstream flood control storage certainly could make room for more storage of irrigation water in North Dakota. Wouldn't it be a Montana tragedy if we lost both our free flowing river and our right to use water originating in Montana?"

The article alluded to the Corps' sneaky way of flying certain Montana persons in their big airplane to show Corps projects and how many benefits they produced without really coming out and telling everyone about the proposed project. It further said there are already enough Missouri River dams and we need to preserve this last free-flowing segment of the river.

The fishery management program was characterized during the 1966-68 biennium by efforts to preserve, protect and restore fish habitat, resulting in improving the quality and quantity of Montana's overall fishery. Application of research, intensified coordination with construction agencies under the Stream Preservation Act and initiating closer coordination with agencies and individuals not covered by the Act were among techniques used to improve Montana's position as the number one trout fishing state in the nation.

The 1966-1968 biennial report stated that, although the Stream Protection Act doesn't require private individuals to comply, some private individuals sought advice on stream construction projects. It was suggested that more inclusive legislation would be beneficial to stream fishery resources.

The Bluewater Creek and Rock Creek (Carbon County) Pollution studies were continued during the 1966-1968 biennium to analyze sources and control of soil erosion and stream bank breakdown. Study results were believed valuable to property owners in terms of channel stability and soil retention. Pat Marcuson, Department fisheries biologist in Red Lodge, reported sediment reductions in Bluewater Creek of 10 to 52% resulted from three stream improvement projects.

During the 1966-68 biennium, the Water Resource Development Section participated in the development of two comprehensive river basin plans, one for the Missouri and one for the Columbia. It worked with construction agencies and the Fish and Wildlife Service on specific water development projects.

The Department took the position that since these development projects were federally financed, the financial responsibility for determining the effect on existing resources and ways to replace the fish and wildlife habitat sacrificed lay with each individual project and should not be the responsibility of Montana's sportsmen. In order to accomplish the needed work, the Water Resource Development Section prepared detailed study outlines and budgets for several projects and offered to perform the necessary work on a contract basis. These proposals were under study by various construction agencies. Should this concept and the proposals be accepted, it would be a first step toward constructing "multipurpose" projects in fact, rather than just in name.

The most significant accomplishment of the Water Resource Development Section during FY1968 was the understanding developed between water development agencies and the Department that research required to assure a suitable environment for fish and wildlife was a legitimate cost of water development projects and not the sole responsibility of the angling public.

Participation by the Department in water resource development improved considerably in FY1969 with constructing agencies providing several research contracts to the Department to obtain essential ecological data. Unfortunately, planning activities supported by sound data were still not a reality. In an effort to solve this problem, final preparations were made for establishing Montana's first Ecological Planning Unit, with field work scheduled to begin July 1, 1969.

In the 1960's, several attempts were made by conservationists to have fish, wildlife and recreation become a "beneficial use" of water under Montana water law by changing the law to allow beneficial water use without having to divert the water out of the stream. These early attempts failed in a predominately agricultural Legislature because, traditionally, beneficial use only applied to uses of water taken out of a stream. There was concern that beneficial use of water for instream flows (without diversion) would open the door to non-traditional water uses. The habitat protection goal of ensuring our streams have sufficient streamflows would take the longest to achieve.

In the late 1960's and early 1970's, problems and opportunities for the Department changed rapidly as public sensitivities and laws became more responsive to fish and wildlife needs. It was part of a substantive environmental movement. To respond effectively, problems had to be addressed with virtually all disciplines working as a single unit. Reichle Dam, Libby Dam, Pacific Northwest Comprehensive Planning, Missouri River Basin comprehensive planning, stream preservation and other issues repeatedly demonstrated that the old Department organization and way of doing things would not accommodate the new necessity. The Fisheries Division, in an attempt to react to the new challenges, even hired a wildlife biologist.

That arrangement lasted only briefly and, in 1969, the Fish and Game Commission created within the Department an Environmental Resources Division. The division was to be concerned with the environmental aspects of the fish and wildlife program. Fish and Game Commission minutes stated:

> "This division would assume the authority for special planning projects such as the Smith River, pollution, the administration of the stream preservation law, review of water projects within the state, pesticides, and other environmental problems as they arise."

The new division was to use a multi-disciplined team approach to solving resource problems which could not be handled by a single division. The new division's leader was Jim Posewitz, former Chief of the Water Resource Development Section established in the Fisheries Division in 1966.

As with all other new programs, the new division, created out of the Fisheries and Wildlife divisions, had its detractors within the Department. Fish and Game Commission member Willis Jones finally brought the question to the commission, apparently after being prodded by some district managers. There was extensive discussion but the final result was that the new division survived.

Jim Posewitz remembers that:

> "The spark that actually created the new division was the controversy over the Heddleston Mining District near Lincoln. It was, in many respects, a historical event; it was a confrontation between the state government, the Anaconda Company, and the brand new environmental movement that still had not celebrated its first birthday. The year was 1969.
>
> "....We were confronted with a project that involved both fish and wildlife and enough money to support only one biologist. We solved the problem by assigning Liter Spence to the project, and, in that same year, created the Environmental Resources Division to deal with problems requiring a multi-disciplined approach and to add biological emphasis to places coming under the added stress of development.
>
> "We held our first division meeting in a log cabin in Deep Creek Canyon. We had enough people present to play a game of poker that evening - one table was all we needed."

The first advancement to protect instream flows occurred in 1969. The Montana Fish and Game Commission was given the authority by the 1969 Legislature to file for water rights on the unappropriated waters of 12 streams to maintain stream flows necessary for the preservation of fish and wildlife habitat (Section 89-801 (2), RCM 1947). The appropriated "Murphy Rights" (named after the principal sponsor of the bill, Rep. James Murphy of Kalispell), have a priority only until a district court determines that such waters are needed for a more beneficial use. No future instream values can be protected by the "Murphy Rights" authorization because the law's statutory authority is no longer available. However, no challenges to the existing appropriations had occurred through 1999.

The 1970's

In 1970, six years after its enactment, John Peters summarized the results of implementing the Stream Protection Act[1]:

[1] Peters, John C. 1970. Operations since 1963 under Montana's stream preservation law. Transactions of the 35th North American Wildlife and Natural Resources Conference, March 7-10, 1970.

"....Proposed road alignments were moved to avoid encroaching upon the Madison, Big Hole, Missouri and Blackfoot rivers. Meanders were designed and built in Prickly Pear Creek, the St. Regis River and the Clark Fork River so that the channel was as long after construction as before. Extra bridges to preserve natural meanders were built in the Beaverhead and Missouri rivers and are planned for the Blackfoot River. Brushy floodplain vegetation, removed to facilitate construction, has been replaced. Channel excavation has been limited to those times of the year when trout are not spawning and eggs are not in redds. An elevated and independent alignment has been proposed and been designed to preserve the St. Regis River and its scenic canyon. All of these fishery-saving accomplishments have been made by working with the State Highway Department with the concurrence of the Bureau of Public roads, through the effective medium of a good law which established the framework."

However, the SPA did not protect streams from private individuals or the federal government. By asking them to follow the intent of the SPA, the Department obtained written agreements with the Forest Service, Bureau of Public Roads, Bureau of Reclamation, Fish and Wildlife Service, Soil Conservation Service and the Bureau of Indian Affairs.

The agreement with the SCS stated that the Department would be consulted on projects affecting streams prior to approval of federal cost sharing under the Agricultural Conservation Program (ACP). The Soil Conservation Service agreement was important because it allowed the Department to review projects under the Agricultural Conservation Program that involved work in streams. No federal cost-sharing was allowed on channel work under ACP unless approved by the Department. Channel stabilization work was the fifth largest expenditure of ACP funds, so this agreement was important to the stream preservation program. By working with the SCS, it was expected that many miles of fish habitat could be saved by suggesting permanent and practical alternatives to projects which could otherwise be very detrimental to fishing streams. The agreements with the Forest Service and Bureau of Public Roads were important because they designed, located and built many miles of road each year on federal lands in Montana.

In December 1970, the Governor's Council on Natural Resources and Development transmitted to Governor Forest Anderson a report entitled *"The Smith River - An Opportunity for Quality"*. The report was the result of a study requested by the 1969 Legislature under House Joint Resolution 12. The Smith River was beginning to undergo the threat of development activities and the study was authorized to determine the best use of the Smith River and its immediate environs.

The study concluded that a state park was not appropriate for the area and that it should be maintained essentially in its present primitive state. It was also apparent from the study that to do nothing to preserve the area would result in continued deterioration of the values that landowners and recreationists were seeking to maintain. It would be inappropriate to either commit to a program of extensive development or to ignore the area and leave its fate to chance. The Council recommended, among several recommendations, that the Legislature pass an act designating the Smith River a State Recreational Waterway; provide that fish and wildlife are legal beneficial users of water; and declaring it a navigable stream for the purpose of recreation.

In the early 1970's, the Department was again concerned about the indication that impoundment of waters of the Yellowstone River and some of its tributaries could be a future threat to the river. As a result, the Department's Environmental Resources Division assigned a planning unit to the upper Yellowstone River. This unit began work on July 1, 1972 and continued its inventory work through September 30, 1975.

In a similar activity, a fish and game planning unit was assigned to the upper Stillwater and Boulder river drainages in response to mineral exploration activity. Field work was conducted between 1970 and 1976. During the 1970-1972 biennium, Department biologists continued to augment the staff of engineers and sanitarians in the State Department of Health to round out the pollution control team in Montana. This

working arrangement between the two departments enabled Montana to approach the pollution control problem with a well-rounded team of technicians.

By 1971, each District Fisheries Manager who had one or more of the 12 “Murphy Right” streams in his district had filed instream flow rights under this law. According to the water law in effect at that time, filings had to be made in the county courthouse in the county through which each stream section was located.

“Murphy Rights” were filed on the following stream reaches:

1) Big Spring Creek (31 miles)
2) Blackfoot River up to N. Fk. (54.1 miles)
3) Flathead River up to M. Fk. (55.3 miles)
4) Gallatin River - mouth to E. Gallatin (12.4 miles)
   - from Beck & Border Ditch to Yellowstone Park (55.0 miles)
5) Madison River - mouth to Hebgen Dam (99.4 miles)
6) Middle Fork Flathead River - mouth to Cox Creek (78.9 miles)
7) Missouri River - from Smith R. to Holter Dam (61.5 miles)
   - from Canyon Ferry Reservoir to Toston Dam (21.5 miles)
8) North Fork Flathead River - Middle Fork to Canadian border (58.3 miles)
9) Rock Creek near Missoula - mouth to headwaters (51.3 miles)
10) Smith River - mouth to Fort Logan Bridge (74.0 miles)
11) South Fork Flathead River - from Hungry Horse Reservoir to Powell/Flathead county line (59.0 miles)
12) Yellowstone River - from Carbon/Stillwater County line to Yellowstone Park (155.0 miles)

The Big Hole River was not included in the legislation because it was believed that acquiring water for instream flows would jeopardize the construction of the proposed Reichle Dam on the river.

SB100, introduced in the 1971 Legislature by Senator Harry Mitchell, would have given the Department authority to file for minimum flows from the presently unappropriated remainder of the flow of all streams in a manner that Section 89-801 currently provided on the 12 blue ribbon stream sections (the Murphy Right streams authorized by the 1969 Legislature). For example, if a stream’s average flow was 50,000 cubic feet per second and 45,000 cfs was already appropriated, the Department could file for use of the remaining 5,000 cfs for fish and fishermen. The bill failed to pass.

What did pass in the 1971 Legislature was SB 45, also sponsored by Sen. Harry Mitchell, which enlarged the scope of Montana’s stream alteration bill. Under the act, the Fish and Game Commission can make formal objections to appropriate federal agencies regarding acts or omissions by federal agencies which may adversely affect the fish and wildlife resource. Irrigation district projects and irrigation systems are exempt from the bill’s provisions.

In February 1972, the Montana Constitutional Convention’s Natural Resources Committee unanimously adopted a water rights provision that protected Montana’s water for agriculture, industry and trout. During the previous 20 years, most legislative sessions saw bills introduced to give fish and recreation a legal right to use Montana water without diversion or development. Strongly supported by the Department, they were periodically defeated. The committee’s provision confirmed all existing water rights and protected industrial and agricultural users. But, for the first time, recreation, scenic waterways and wildlife habitat were listed as “beneficial uses” of water. However, later that month, the provision fell under heavy fire from water development interests and was dropped from the constitutional provisions.
In April 1972, as a part of executive reorganization, the Department’s Environmental Resources and Information divisions were combined into a single Environment and Information Division. The division was separated into two bureaus – Environmental Services and Public Information. The new division’s responsibilities were a combination of duties previously performed by the two separate divisions. These

were to assist in the protection of Montana's natural environment, with emphasis on fish and wildlife habitat. It would do so through administration of the Stream Protection Act, through special planning projects and by reviewing projects occurring within the state. The division would also offer technical assistance to other agencies and organizations involved with the environment and provide programs of public information through such media as newspapers, radio, television, magazines, youth and school programs, correspondence, a film library and personal contacts. Movie films were in continuous production and a full-color magazine, *Montana Outdoors*, was published bimonthly.

Now that the public had become environmentally conscious, concerned citizens rightfully expected a cooperative effort on the part of state agencies and developing industries to maintain a quality environment. Interagency work on environmental problems was largely coordinated through the Environment and Information Division.

The requirement that Environmental Impact Statements be written for any significant state or federal action provided additional opportunities for factual input concerning the environment or habitat needs of fish and wildlife. The division assisted in the preparation of many of these reports and also reviewed and commented on others.

By 1972, laws directed toward maintaining and improving environmental quality in Montana included: the Environmental Quality Council, the Floodway Management Act, two litter laws, several mined-land reclamation acts, a new pesticide act, an improved stream preservation act, an act to keep car bodies out of streams and a vastly improved water pollution control act. It was believed all of these laws could be made to work if all agencies of state government did their share in an organized manner.

The State Recreational Waterway System Policy and Program was established by rulemaking by the Department in 1972 (Section 12.8.401). The program had three stated purposes: 1) to maintain and improve Montana's prime streams as free-flowing, productive waters; 2) to improve certain potential streams so they may be added to the system; and 3) to encourage and obtain multiple recreational attributes of streams in the system, with special emphasis on fishing. Public use of the designated streams was considered the major tool that would be used to maintain the streams in the system.

The program extended the "Blue-Ribbon" fisheries concept to other forms of recreation, attempting to create "blue-ribbon recreation drainages". Ten criteria to select streams for their inclusion in the system included blue-ribbon fisheries, recreational potential, historic and scenic qualities, recreational economic opportunities, hunting areas, waterfowl habitat, freedom from pollution, adequate public access, stream protection potential, and popular request and interest.

Rivers designated part of the system at the time of the rulemaking included portions of the Flathead River system above Flathead Lake and above Hungry Horse Reservoir, the Missouri River from Fort Benton to Fort Peck, Rock Creek near Missoula, the Smith River, and the Yellowstone River from Yellowstone National Park to Pompey's Pillar east of Billings. Although designated, these rivers received no formal recognition nor compensation as a result of the designation. The Flathead and the Missouri portions were subsequently designated under the National Wild and Scenic River System.

By 1972, the long-predicted discovery of Montana had arrived. On one hand, Montana was fortunate that the public was presently environmentally oriented. The massive and potentially destructive impact of land and resource development would not go unheralded or unnoticed. On the other hand, the proportion of changes to come were likely to be underestimated. Initial impacts on Montana's environment were being felt most from the standpoint of land speculation, especially recreational lands, and mineral development, notably stripping of coal in eastern Montana.
The Department's traditional role in administering the Stream Protection Act was expanded slightly by the 42nd Legislature. Attention now had to be given not only to state agencies and subdivisions of state government but also to federal agencies proposing changes in Montana's stream courses. Cooperative working arrangements were being worked out with federal agencies as well as the traditional

arrangements with the state agencies. Extension of the provisions of this act to all persons was still considered a necessity.

Several major research programs were underway in the Environment and Information Division during FY73. Most involved a comprehensive inventory and appraisal of fish, wildlife and related resources:

Upper Blackfoot River Study - Liter Spence, Planning Ecologist

This research involved a pre-mining investigation of fish and wildlife resources of the Heddleston Mining District in the headwaters of the Blackfoot River near Lincoln. It was funded in cooperation with the Anaconda Company which was proposing development of an open pit copper mine. Basically, it was both a fish and wildlife investigation, although the Anaconda Company requested a fisheries man. Much of the work involved investigation of water quality in streams in the Lincoln area.

Coal and Energy Studies – Robert Martinka, Project Leader

This program was funded by the Power Plant Siting Authority of the Department of Natural Resources, the Fish and Game Department and contributions from industry. Two biologists were concentrating on fish and game studies around Birney and on the Yellowstone River. A third was doing research on the game populations of the Bull Mountains near Roundup. The latter project was funded 50 percent by the Consolidated Coal Company and 50 percent by the Department.

Statewide Fish Habitat Study - Ralph Boland, Assistant Administrator, Administration of the Stream Preservation Act

This program was in its ninth year. The project was funded by federal aid and Department funds. This program included review of all notices of construction of hydraulic projects or highway construction by agencies of government – state, county or municipal.

Stillwater-Boulder River Drainage Study – Phillip Stewart and Ronald Stoneberg, Planning Ecologists, Funded with Federal Aid

These were pre-mining investigations in the Beartooth Mountains in the Stillwater River drainage, an especially fragile area near Columbus. The study consisted of both aquatic and terrestrial investigations and was planned for three years, with one year already completed.

Upper Yellowstone River Planning Study – Kerry Constan, Larry Peterman and Daniel Hook, Planning Ecologists

The project was funded by federal aid. It consisted of both aquatic and terrestrial investigations of the upper Yellowstone and Shields River drainages. The study was planned for three years, with one year completed.

Water Pollution Control – Al Wipperman, Pollution Control Biologist

This program was carried on cooperatively with the Department of Health. The Health Department furnished office space and some secretarial help. The Department paid salaries and other expenses. The program included investigations of water pollution complaints over the state, checking on fish kills, commenting on discharge permits made by the Corps of Engineers and enforcement of water quality standards. The Pollution

Control Biologist also represented the Department on pesticide, geothermal research and saline seep problems.

The early 1970's were a time of apprehension and concern in the lower Yellowstone basin. Energy-related reports such as the north-central Power Study (1971) and the Montana-Wyoming Aqueduct Study (1972) took a national "boiler room" approach to energy development in southeastern Montana. Public sentiment ran heavily against the uncontrolled development of eastern Montana's coal resources and accompanying water depletions in the semiarid plains.

In 1973, the Montana Legislature passed the Water Use Act. This was an historic event in that, for the first time, instream flows for fish, wildlife and recreation were considered to be beneficial uses of water. In addition, a reservation process was put into place to allow for allocating and protecting water for future uses including agriculture, municipal and instream uses such as fisheries and recreation.

Susan Higgins, writing in the January 1992 issue of the *Montana Farmer-Stockman*, related some of the early history of the Water Use Act:

> "Gary Wicks was head of the Montana Department of Natural Resources in 1972 when the big push came from energy companies to use water in the Yellowstone Basin to produce energy from coal development. Energy companies had filed for large quantities of water from the Yellowstone River and its tributaries. This kind of large-scale water development could have put a real constraint on other future water uses. So, Wicks appointed a five-member Water Law Advisory Council to review the status of water law and make a final report to the Legislature. Ted Doney, then Chief Legal Counsel and later Director of the DNRC, helped draft a bill, and the Council adopted its recommendation that a water use permit systems become law**,** similar to laws already adopted in other western states.
>
> "This recommendation was all well and good, but it left to question the effects of the large water use filings by the energy companies in the Yellowstone Basin. So, Wicks asked Doney to draft a bill allowing individuals to acquire permits for instream flows. This was an unconventional concept and the Council turned it down.
>
> "Doney went back to the drawing board and discovered a bill that had been introduced in the Legislature in the late 1950s by state representative George Darrow from Billings. This bill contained a provision for instream flow "water reservations" by public entities but did not pass the Legislature.
>
> "Doney injected this idea into a revised bill which allowed public entities to get a water reservation for future consumptive uses. The Council liked the concept because it gave only public entities - agencies, conservation districts, municipalities - and not individuals, the right to instream and consumptive use reservations."

The 1973 Legislature also agreed with the idea and the water reservation concept became part of the 1973 Montana Water Use Act.

The impetus for the Water Use Act was the energy crisis of the early 1970's. While the 1973 Legislature hammered out the specifics of the Montana Water Use Act, energy related events were occurring in the Mideast which would profoundly influence the fate of the country itself. The Arab oil embargo emphasized our dependence on foreign crude oil while, at the same time, highlighted our reliance on all forms of energy. Energy self-sufficiency became a national goal and attention focused on domestic sources of fuel, including the rich coal deposits of eastern Montana.

The Yellowstone River also figured into this plan. The conversion of coal to more usable forms of energy requires significant quantities of water. Flowing through the Fort Union Coal Formation was the 650-mile-long, free-flowing, Yellowstone River, expected to supply much of the water for the developing energy industry. With new opportunity under the 1973 Water Use Act, it became apparent to the Department that substantial inventory work in the Yellowstone River basin would be required. To accomplish this work, money was obtained from numerous sources to study various aspects of the river's ecology.

The Legislature passed the Yellowstone Moratorium in 1974. This law suspended all large applications for water use in the Yellowstone basin until March 10, 1977. Legislative amendments and a Montana Supreme Court decision extended the moratorium until December 31, 1978.

Because of passage of the Yellowstone moratorium, the Department decided to put together an instream flow reservation application on the Yellowstone River. Industry had threatened a challenge to the moratorium and the Department decided to put in a reservation request in case the courts overturned the moratorium. It was put together in a few months using available information rather than detailed facts, which the Department did not have.

This application requested flows in the Yellowstone mainstem from the Clark's Fork of the Yellowstone near Billings to the North Dakota border. The "Murphy Right" above Big Timber was relied upon for that part of the river and there was no protection requested for the reach from Big Timber to the Clark's Fork. Seven Million acre-feet of water were requested. The application was dated March 1974 and was 10 pages long.

Industry did not proceed with its threat to overturn the moratorium so the Department never pursued this application. Instead, it got to work on the river trying to find out how it all worked.

The Department of Natural Resources established a deadline of November 1, 1976 for filing all applications for reservations of water in the Yellowstone basin. So, the Department had about three years to conduct studies sufficient to justify a new water application for the fish, wildlife and recreational resources of the Yellowstone basin.

The Yellowstone drainage covers about one-third the state with a length of more than 650 miles and containing seven major tributary systems. The Department was faced with an unprecedented opportunity and an enormous challenge. Baseline data was either inadequate or, in some cases, completely lacking and instream flow methodologies were in their infancy. Even sampling techniques for large rivers had to be developed or modified. During a five-year period in the 1970's, sampling techniques and instream flow methods were developed and baseline data were gathered.

The Legislature met in annual sessions in 1973 and 1974. During the 1974 Legislature, HB474, the "Stream Alteration Act", held over from the 1973 legislative session, was again considered. Introduced by Representative Swanberg and others, the bill, to be administered by the Department, would have amended the Stream Preservation Act to include private persons and would have imposed a misdemeanor penalty for violation of the act. The bill passed the House (62-34), but was killed in the Senate (15-33) after coming out of the Senate Natural Resources Committee with a "do not pass" recommendation.

In apparent preparation for the 1974 session, the January/February 1974 issue of *Montana Outdoors* carried two articles about stream habitat alteration. One, by Ralph Boland, Assistant Administrator of the Environment and Information Division and administrator of the Stream Protection Act (that covers stream alterations only by government agencies), discussed the various ways that streams can be altered, stated that Montana streams were in trouble and that there was no law to protect streams from alterations by private individuals or organizations. He stated that an amendment to the existing Stream Preservation Act had been introduced in the 1974 session to make private stream alterations subject to this act. The second article, by Department fisheries biologists Bill Miller and Norm Peterson, discussed the results of a

1973 fish population study on the Ruby River that again showed that fish populations were adversely affected by stream bulldozing and riprapping compared to populations in unaltered habitat. They suggested private landowners should be subject to the Stream Preservation Act to avoid indiscriminate stream destruction.

The 1974 Legislature also passed HB949, designating the Department as the state agency authorized to represent the public in stream adjudications under the Montana Water Use Act (HB 949 was later codified as Sec. 85-2-223, MCA and used by the Department in the Bitterroot and Beaverhead river drainages adjudication proceedings).

Prior to the 1975 Legislature, ranchers of the Big Hole River area, working with Trout Unlimited, Skyline Sportsmen's Club and personnel from the Department proposed a stream preservation law they felt would be more acceptable and workable than the failed HB474. Using the basic language of the failed bill, administration of the law was changed from the Department to the local conservation districts. In the 1975 session, Senator Mike Greeley and others sponsored the Natural Streambed and Land Preservation Act, which was approved by the Legislature. This law became known as the “310 law”.

The law was the culmination of studies started in 1973 of man-caused stream alterations on portions of the Jefferson, Big Hole and Ruby rivers. The Act gave authority for approval of these projects to the conservation districts. The landowners and the Department serve on a team making recommendations on projects. The Act stated that:

> “... natural rivers and streams and the lands and property immediately adjacent to them within the state are to be protected and preserved to be available in their natural or existing state and to prohibit unauthorized projects and in so doing to keep soil erosion and sedimentation to a minimum, except as may be necessary and appropriate after due consideration of all factors involved" (Section 75-7-102, MCA).

The law requires private (non governmental) individuals and organizations to obtain a '310 permit' before undertaking a project that would alter or modify a perennial stream.

In working with SB310, fisheries biologists met with conservation districts and attended on-site inspections of proposed projects in evaluating streambed or bank disturbances. Recommendations were made that minimized instream activities and led to better and long-lasting solutions. When all sides agreed to the project proposal, original or revised, the district issued an 310 permit. Should there be a dispute that was unresolved, arbitration could be called for.

In October 1975, the Ecological Services Division initiated a fisheries inventory and planning study in the Wild and Scenic portion of the Missouri River. Proposals for new federal and private dams were being discussed which would alter the river. In 1976, Congress designated the reach of river from Fort Benton to the Fred Robinson Bridge as part of the National Wild and Scenic Rivers System. This inclusion afforded considerable protection for the last major free-flowing portion of the Missouri River. The Bureau of Land Management (BLM) was assigned the responsibility for managing the river.

In 1974, coal and energy development continued to be the major environmental problem confronting Montana. In response, the Department increased its active technical participation in problem-solving as well as its efforts to inform Montana people of the nature and magnitude of this problem. Technically, the staff of ecologists in the Environment & Information Division dedicated primarily to this problem had expanded to ten individuals supported by private and government grants, with Department monies making up a small part of total expenditures.

HB352 in the 1975 Legislature made it unlawful to place a junked motor vehicle, or the body portion of a junked motor vehicle, between high water channel banks of any stream or to reinforce banks of a stream. Violations carry a fine of not more than $250, imprisonment of not more than 30 days or both.

SB 395 in the 1975 Legislature amended the Montana Water Use Act, clarifying a number of provisions. However, amendments to improve fish and wildlife's claim on water were defeated.

The Poplar River Power Project in Canada became a concern in Montana in the mid-1970's. In 1971, the Saskatchewan Power Corporation, a Canadian agency and Saskatchewan's energy monopoly, had initiated a feasibility and engineering study of the East Poplar River in Canada for possible construction of a coal-fired power facility. A cooling pond for the generation units would be formed by damming the East Poplar River two miles north of the Montana border. Montana became concerned with problems of water quality and loss of fish and wildlife habitat in Montana. The East Poplar joins the West Fork and Middle Fork of the Poplar to form the Poplar River in Montana, which supports a healthy self-sustaining walleye population and offers fair catfish, northern pike and sauger fishing. Contamination from acid mine waste and loss of streamflow due to evaporative cooling at the plant were of concern to the Department. The initial phase of the project was expected to be completed in 1979.

The mid-1970's also found the future of the Flathead River becoming more tenuous with each passing day due to possible coal development in Canada and oil and gas leasing within the drainage in the U.S. In an attempt to demonstrate the desire of both Montana and the nation to keep the Flathead River free of pollution, Rep. Max Baucus (D-Mont.) Introduced a bill in November 1975 to include portions of the Flathead River in the National Wild and Scenic Rivers System. While the bill would not stop coal mining or oil and gas leasing in the Flathead, it emphasized U.S. interest in keeping the Flathead drainage unpolluted. It would stop damming and reckless development along the shorelines within 1/4 mile on each side of the river and mandated federal agencies to help insure the water quality in the drainage.

Stream fish habitat preservation, always a top priority activity for the Department, required increased effort in 1975. The Natural Streambed and Land Preservation Act became effective following one of the wettest years in Montana history, when flooding caused widespread streambank damage. Department biologists spent the equivalent of about two full-time persons working with conservation district supervisors and landowners to implement the act and find the best solutions for the protection of streambanks and fish habitat and minimization of soil erosion. From January 1, 1976 through October 3, 1976, the Department received 905 notices of these projects, most of which required field inspections.

In 1975, the Department's instream flow program became more formalized when the position of Water Resources Supervisor was established in the Environment and Information Division. Liter Spence was appointed to the position to concentrate on the instream flow reservation application in the Yellowstone basin. This is not to say that there were not instream flow activities ongoing before that time. "Murphy Rights" had been established, there were studies going on in the Yellowstone basin to determine instream flows for fish, wildlife and recreation and the relationship between flows and fish populations in the Madison River were being studied by Department biologists. Preliminary instream flow recommendations were also being determined for selected streams in the Kootenai and Clark Fork River basins.

By 1975, a number of fisheries and aquatic studies were being conducted in the lower Yellowstone basin that were funded by various agencies and companies that had a stake in energy development in the basin. The main purpose of all these studies was to assess the impact of reduced streamflows on the ecosystem being studied with the ultimate aim of determining instream flow regimes that would be recommended to the Montana Board of Natural Resources and Conservation in a Yellowstone basin water reservation application

A study was undertaken in FY75 of the water temperature problem on the Madison River resulting from silting of Ennis Lake. As a result of the study, the federally funded 208 Blue Ribbon Area-wide Planning Organization formed a Madison River Thermal Steering Committee to explore potential corrective measures.

During FY75, fisheries personnel developed a detailed study proposal for the Flathead drainage above Flathead Lake covering fish populations, fish habitat and water quality. The proposal was divided into

eight or more segments which could be funded by interested federal agencies and contracted to the Department. The necessity for the study was emphasized by the developing coal strip-mining operation on the North Fork of the Flathead River in Canada and recent applications for gas and oil leases on the North Fork and Middle Fork of the river.

During 1976, a new contract to participate in the allocation of Yellowstone River water was negotiated with the U.S. Fish and Wildlife Service. All work would be done by the Department. In the Environmental Bureau, coal and energy development continued to pose the most serious problems being dealt with. Major emphasis during the 1976 fiscal year was in obtaining sufficient background information to participate in the allocation of Yellowstone River water. The Department's objective was to preserve a free-flowing Yellowstone River while meeting the legitimate needs of a variety of water users.

The Environmental Bureau within the Environment and Information Division was particularly successful in continuing to fund key habitat studies through grants and contracts with a variety of funding sources. As in the past, these funding sources included agencies of the federal government, various state agencies and some corporations. It was the feeling that these cooperative programs were building understanding among all the various factions involved in development and utilization of Montana's resources.

By the end of 1976, the numerous studies in the Yellowstone basin resulted in a Department water reservation application being submitted to the state Board of Natural Resources and Conservation. On November 1, 1976, Liter Spence, Water Resources Supervisor for the Department, hand-carried *Application for Reservation of Water in the Yellowstone River Basin* to the Department of Natural Resources and Conservation. It was 300 pages long.

The application requested 8.2 million acre-feet of water for instream flows on the Yellowstone mainstem at Sidney plus individual flows on 65 tributaries throughout the basin. The average annual flow at the U.S. Geological Survey stream gage at Sidney at that time was 8.8 million acre-feet**.** This fact alone was to be cause for great consternation among other water user interests in the basin and, in fact, was cause for some concern by some Department personnel. Some doubted that the Department should ask for the full amount because of the political process it would have to go through for approval. But, the internal debate was actually quite short. How could the biologists defend an application based on political pragmatism rather than biological facts?

The Department's request was substantial and the public needed to know why, because the politically - appointed Board of Natural Resources and Conservation would be making the decision and would not be oblivious to public opinion. The Environment and Information Division proceeded with a major public information effort. The Department had a well-distributed magazine, *Montana Outdoors,* a film production unit and seven regional information officers around the state. Everyone was mobilized. A documentary film, *Yellowstone Concerto*, was produced in 1976 and a special issue of *Montana Outdoors* devoted entirely to the Yellowstone was produced the same year. The film provided an emotional appeal while the magazine provided the factual information. A first ever news conference was held by the Department in Billings on February 1, 1977 to release and promote the film and magazine. Both media forms were extremely successful in getting out the message of the river to the public.

In 1977, a contested case hearing was held on reservation applications under both the Montana Water Use Act and the Montana Administrative Procedures Act. The adversary hearings began in Billings at Eastern Montana College on August 8, 1977. After a month in Billings, the hearing was moved to the Capitol Building in Helena and continued through September 27, 1977.

After the hearing ended, the Department continued its fast-paced information campaign promoting the river's assets and the need for a significant reservation of instream flows.

On December 15, 1978, the Board of Natural Resources signed an order establishing water reservations in the Yellowstone basin. The Department was granted 5.5 million acre-feet of instream flows at Sidney plus individual flows on 65 tributaries throughout the basin.

The results of the entire reservation process were a major success for the Department and for the future of the 650-mile free flowing river. It was the result of years of hard work by many people in the Department. Although directed by the Environment and Information Division, the effort had active support and participation by the Fisheries Division.

Protection for the last major free-flowing segment of the Missouri River, the 149-mile stretch in Montana from Fort Benton to the Fred Robinson Bridge, was made a reality when congress approved Senator Lee Metcalf's S1506 on September 28, 1976, to include the Missouri as part of the national Wild and Scenic Rivers System. President Gerald Ford signed it into law on October 13, 1976. After several past failures to enact such a law and considerable delay of S1506 over the past year or so, the law was the culmination of many years of hard work by numerous individuals and organizations and guaranteed the free-flowing status of the river for present and future generations.

In 1977, the Department purchased the Ashley Irrigation District stored water right in Ashley Lake near Kalispell. Historical use of the right was for agricultural irrigation and stock water in the Ashley Irrigation District. The intent of the Department's purchase was to release the stored water into Ashley Creek to improve instream flows in the lower end of the stream prior to its entry into the Flathead River. It was expected the improved flows would improve spawning conditions for cutthroat trout migrating from Flathead Lake. Another benefit would be to improve water quality that was degraded by the sewage outfall from the Kalispell sewage treatment plant on lower Ashley Creek. The water right purchase included 11,448 acre feet of storage water plus the dam and appurtenant facilities.

In later years, this purchase was to prove doubtful in its original intended use. Too many water right holders on Ashley Creek (about 240) made delivery of sufficient water to lower Ashley Creek difficult and there were conflicts with a few water users on upper Ashley Creek over flooding by the released water at certain times of the year. Much time and effort were put into dam maintenance and reservoir management. It was finally concluded by the Region 1 fisheries staff that the water right was not useful and should be disposed of. However, the Department still owned the right at the end of the 1990's.

In a 1977 Special Report for the Rock Creek flood plain project begun in 1963, Pat Marcuson, fisheries biologist for the Red Lodge area, summarized some of the main results. The natural, or ungrazed, section with densely vegetated banks showed better fish population structure than a contiguous section flowing through a heavily grazed area. The natural area supported more than three times the number of brown trout per acre than the ungrazed area. The natural area had 82 percent more cover and better soil and root structure than the ungrazed area. The combination of too many cattle, reduced vegetation and poor soils led to 80 percent more stream channel alteration in the grazed area. In addition, the stream channel was wider, shallower and continually migrated within the grazed area.

In 1978, the BLM drafted a management plan for the Wild and Scenic Missouri River which included as an objective the determination of instream flows required to maintain the river, commensurate with the act. Since the Department studies in progress paralleled, to some extent, the BLM effort, a cooperative arrangement was made for determining a suitable methodology to determine the instream flow requirements. A study was designed whereby the BLM funded the work, which was conducted by the Department. The study began April 1, 1979 and concluded in 1982. Using several different instream flow methods, the Department recommended flows on a year-round basis to support the various life stages of the fishes studied. These recommendations were the basis for flow recommendations presented in a BLM report issued in 1984 entitled *Instream Flow Requirements for the Wild and Scenic Missouri River*. These same recommendations were to be used by the BLM and the Department in a water reservation process in the Missouri River basin in the late 1980's.

In 1978, the Madison-Gallatin Chapter of Trout Unlimited contributed $500 toward a U.S. Geological Survey/Fish and Game Department cooperative study of Madison River water temperatures. During the summer of 1978, the USGS conducted a study to predict future temperatures at different flow levels and run-off patterns in the Ennis Lake-Madison River system. The study was an essential first step in planning solutions to the thermal problem in the river below Ennis Lake.

In the late 1970's, the Missouri River Basin Commission was actively coordinating a Level B study of the upper Missouri River basin. The purpose of the study, which was a combined effort of federal and state agencies, was to prepare a framework plan that could be used for the orderly development of the area's land and water resources. Ad Hoc work Groups were formed to analyze the water and related land resources and problems. One such work group was the Surface Water Resources Work Group, whose objective was to describe the surface water resources of the study area. This report presented streamflow records for the Missouri River basin from its headwaters to the Montana-North Dakota line.

After a long series of negotiations and on-site inspections relative to the destruction of fish habitat caused by the construction of Libby Dam and Lake Koocanusa, the U.S. Army Corps of Engineers agreed to build and fund a trout hatchery to be located at Murray Springs near the town of Eureka. The hatchery was completed in October 1979 and is operated with Corps funding by the Department. Most of the westslope cutthroat reared at the hatchery are released in the Libby project area to supplement the natural populations.

In 1979, George Holton, then Assistant Fisheries Division Administrator, developed a listing of Montana "fishes of special concern". Holton defined such fish as "a native Montana fish with limited habitats and/or limited numbers in the state". The list, unlike that under the federal Endangered species Act (ESA) had no force of law. It was simply a watch list to alert agencies and the public as to the status of these native fish. It included fishes that conceivably could become threatened or endangered if their situation worsened. There were no federally listed threatened or endangered fish species on the list.

In 1979, the state initiated its first statewide water adjudication process in the passage of SB76. The Water Adjudication Act required that all water rights established prior to July 1, 1973 be refiled with the DNRC. Failure to refile would result in the presumption that the right or claimed right had been abandoned. The filing deadline was April 30, 1982. Meeting this deadline became a major effort in the Fisheries Division in the following three years.

Some of the most important water rights held by the Department are the so-called "Murphy Rights" on 12 high quality trout streams. These rights were upheld in a court case on the Smith River but the court said that the rights had to be quantified. The Department subsequently did quantify those rights and submitted them to the water court in the adjudication proceedings.

Following the completion of the Yellowstone reservation process in 1978, the Fisheries Division produced an instream flow action plan, first dated March 1979 (*Long Range Plan for Instream Flows*) and then later updated in December 1979 *(Determination of Instream Flows in Montana: An Action Plan*, by Larry Peterman and Fred Nelson). The plan outlined where the Department should be headed in its instream flow program in the future. It laid out a future program for developing new instream flow methods, setting priorities for acquiring instream flows, quantifying some of the instream flows granted in the Yellowstone basin (as required by the Order of the Board of Natural Resources and Conservation), participating in the adjudication process and estimating the costs of these actions. It discussed what needed to be done to protect the Department water rights (Including "Murphy Rights") under SB76 passed by the 1969 Legislature that established a water right adjudication system for the state.

The Public Utilities Regulatory Policy Act (PURPA) of 1978 was the first major amendment to the Federal Power Act in many years. The PURPA, passed in a time of national energy paranoia, was designed to promote and encourage development of small renewable energy technologies and co-generation. It was the first step in recognizing the importance of promoting renewable energy developments. Power

produced by many small entities scattered throughout an area was felt by many to be more desirable then a single, large generating facility. The PURPA was designed to encourage the little guy, the renewable energy entrepreneur. In theory, the PURPA appeared reasonable.

In 1979, The Environment and Information Division was split into two divisions – Ecological Services and Conservation Education. Jim Posewitz, E & I Division Administrator, was appointed Administrator of the Ecological Services Division and Steve Bayless became Conservation Education Division Administrator. **CHECK FOR ACCURACY**

The 1980's

In 1980, through a cooperative effort, the Department and the U.S. Fish and Wildlife Service completed the third revision of the Stream Rating Map. The 1970's had brought a new urgency for stream rating: the energy crisis. Aware of this need, the U.S. Fish and Wildlife Service initiated a new stream rating effort, the most comprehensive to date. Montana was one of 11 western states that contracted with the Service to furnish data and a draft map classifying its streams.

The new map, entitled "1980 Stream Evaluation Map, State of Montana" was designed to assist federal and state agencies and water users in assessing the impact of proposed water development projects on fishery resources in the state. Information on the map was intended to optimize state, local and federal decisions about how and where development would be carried out and to place fishery resource agencies in a positive planning mode whereby the most important resources are identified in advance of specific developments. Information would also be helpful in identifying highly valued fishery resources and establishing priorities for instream flow requirements to maintain existing fisheries and other instream water uses.

In the 1980 evaluation, there was no longer an emphasis on trout waters. Sport fishes would still be important but so would be other "fishes of special concern". Stream classifications were still highlighted in colors. However, blue and red were not used because they were traditional colors for sport fishing streams. The new map rated the total fishery value. Due to increased knowledge of the state's streams, twice as many stream miles were rated in 1980 (17,696) as in 1965 (8,813).

Many federal and state agencies, including fish and wildlife agencies in other states, contributed to the map, including funding. The classification criteria for the 1980 map were broadened considerably from earlier maps. Fish habitat evaluated included permanent streams, their tributaries, and those streams protected by or proposed for protection under the Wild and Scenic Rivers Act. Intermittent streams that were deemed necessary for sustenance of highly valued fisheries were also evaluated. Streams in National Parks were not rated. Criteria for ratings included the occurrence of state or federal endangered species, threatened species, species of high interest to the state and habitat restoration, reclamation or mitigation potential.

Through a detailed set of rating criteria, fish habitats were assigned to one of six value classes:

Class I - Highest value fishery resource
Class 2- High priority fishery resource
Class 3- Substantial fishery resource
Class 4- Moderate fishery resource
Class 5- Limited fishery resource
Class 6- Not yet classified

Two large hydrologic maps were produced - one for the western part of the state and another for the eastern part. The maps display an appraisal of the relative value of stream fishery resources within the

state based on information and professional opinion available as of the spring of 1980. Again, the rated streams were color-coded to represent the six classifications.

On the 1980 map revision, reaches of the Blackfoot, Beaverhead, Kootenai, Gallatin, Bighorn, Flathead, and North Fork of the Flathead rivers were added, bringing the total “Blue “Ribbon streams to 542 miles.

Although no statute or rule gave legal protection or recognition to the “Blue Ribbon” streams, the stream classification maps have been helpful in protecting instream values. The maps were the basis for the 12 streams identified for instream allocation in 1969 by the “Murphy Rights”. The Department also utilized the system in developing the stream list for the Northwest Power Planning Council's Protected Areas Program in 1988.

In 1980, Congress passed the Northwest Power Planning Act. This landmark legislation provided for a regional council (Northwest Power Planning Council) made up of members appointed by each of the four Northwest states. The Council was given the power to plan the energy future of the region. Also, due to the severe impacts hydroelectric development had on fish and wildlife resources, particularly salmon and steelhead, Congress mandated that the council develop a fish and wildlife program to mitigate, protect and enhance fish and wildlife in the Columbia River Basin. The Department, the U.S. Fish and Wildlife Service and the Confederated Salish and Kootenai Tribes provided the council with specific recommendations, coordinated by Patrick Graham, all of which were adopted. One recommendation was to improve discharges from Hungry Horse Dam. Improved flows would provide better hatching and rearing success for kokanee in the Flathead River where they had been nearly eliminated by changes in operations at Hungry Horse Dam during the 1970’s.

The Council also addressed future hydroelectric development, calling for certain stream reaches to be protected from all future hydroelectric development because of unique fish and wildlife values. A region-wide river assessment was initiated in the fall of 1984 and was scheduled to be completed in 18 months. The Pacific Northwest Rivers Study (PNWRS), which assessed and rated the significance of river related natural resource values in Montana, Idaho, Washington and Oregon, was used to identify these critical reaches

In Montana, only streams within the Columbia River Basin were included in the Council's program. Protected areas’ criteria for rating the streams included stream reaches containing essential habitats for fish species of special concern, streams with outstanding recreational fisheries, or essential spawning habitats for outstanding recreational fisheries determined by the PNWRS. For wildlife, the criteria included habitats identified as essential to the recovery of federally threatened and endangered species, streams which support Montana riparian species of special concern, or essential big game winter range. A total of 2,056 miles, or 30 percent of the 6,800 stream miles assessed in western Montana, were recommended to the Council for protection of fish and/or wildlife from future hydroelectric development.

On August 10, 1988, the Council adopted a proposal that designated some 44,000 stream miles in the Northwest as areas that should be protected from future hydroelectric development. The 2,056 miles in western Montana recommended by the Department were included in this mileage. The protected areas designation formally amended the Council's Fish and Wildlife Program and the Northwest Conservation and Electric Power Plan. While the Council does not license hydroelectric facilities, the Federal Energy Regulatory Commission (FERC) is required by law to follow the Council's recommendations to “the fullest extent practicable” when licensing non federal hydroelectric projects. In addition to the Council's plans, the BPA concluded that it can deny access to its inertia system to new hydroelectric projects that FERC may license in protected areas identified in the Council's Program.

Approval of protected areas was the first occurrence of a comprehensive plan for stream protection in western Montana that appeared to have specific legal authority.

Filing for water rights, as instructed by SB76, was a demanding highlight of 1982. When the filing deadline came, the Department had refiled a total of 473 claims for fish, wildlife and recreational purposes. Of the total, 106 filings were related to instream claims on Montana's blue-ribbon "Murphy Right" streams. The filings were seasonally and geographically adjusted to ensure the claims conformed to the law and the site-specific seasonal needs of fish and wildlife. Fred Nelson, Department Water Rights Specialist in Bozeman, coordinated the filing of the water right claims. Regional fisheries and wildlife staff assisted in completing the water rights claim forms in their regions and submitting them to Nelson.

Other Department claims included 43 for hatcheries and spawn-taking stations, 99 for parks (wells and irrigation), 153 on wildlife management areas (primarily irrigation), and 70 on ponds, lakes and reservoirs. Two claims were made on rivers where sportsmen's groups asked the Department to represent the public interest by securing existing recreational use rights under Sec. 85-2-223, MCA. This law states that the Department shall exclusively represent the public for the purpose of establishing prior and existing public recreational use in existing right determinations. The Bitterroot Chapter of Trout Unlimited and the Ravalli County Wildlife Association requested the Department to represent them in filing for an existing recreational use right on the Bitterroot River from the mouth to the junction of the East and West forks. The Montana State Council of TU requested similar representation for the "Blue Ribbon" portion of the Beaverhead River from Clark Canyon Dam to Grasshopper Creek, a distance of 12.5 miles.

As complicated as the filings were, the real test was still to come when they came before the Water Court, the new special court authorized to handle all water right adjudication matters.

Recommendations for improving fish and wildlife conditions in connection with hydro-power projects were submitted to the Pacific Northwest Power Planning Council in November 1982. The Council tentatively adopted Department recommendations with little change. From testimony presented at the final hearings, the Department expected final approval of the majority of its recommendations. These included flow releases from Hungry Horse Dam to improve kokanee spawning success in the Flathead River, construction of a spawning channel near Hungry Horse Dam to improve spawning for cutthroat trout from Flathead Lake, purchase of 10,000 acre-feet of water from Painted Rocks Reservoir to be used for improved summer flows in the Bitterroot River and a study in the Swan River drainage to determine the effect of proposed micro-hydro development on fish and wildlife.

The council's adoption and implementation of this fish and wildlife plan was expected to result in not only the correction of, or mitigation for, past damages, but also a greatly expanded research effort on methods to prevent and/or mitigate damage from future hydro projects. Costs were not to be borne by sportsmen alone through their license fees, but by all hydropower users in the Pacific Northwest.

About 1982, the Governor's Council on Management, appointed to make recommendations to Governor Ted Schwinden on the structure and function of state agencies, recommended a reorganization of the Department of Fish, Wildlife and Parks. One recommendation was to restructure the Ecological Services Division into a Research/Planning and Special Projects Division.

On December 16, 1982, Jim Posewitz, administrator of the Ecological Services Division, was informed by Department Director Jim Flynn that the division was to be terminated, probably by June 30, 1983. In a memo to his staff Posewitz said:

> "... Believe me when I say that I am aware of the anger and frustration many of you feel - I share it. We must not let those emotions govern our actions. We have been in existence in one form or another since 1969. In that time we survived numerous challenges to our work, our methods, our existence.
>
> "Through that time and the opportunities it presented, we were propelled by hope, determination and pride. We must not tarnish our record or dim our achievements by finishing our race with either grief or regret.

> "We had our years in the sun and wasted none of them. I am content to let history judge us; let there be not one sour note in our concerto.
>
> "I expect each of you to spend the next six months working with the same vigor and determination you showed on the day you started. Each day is precious - treat it as such. When we hit the end of our chain, let it be at full throttle. Carry that momentum to your new assignments and make it contagious. Above all, be proud of what you have already accomplished. I know of no organization in or out of government that can match your record of achievement.
>
> "Some time in the spring - the season of new - we will gather once more to lift a beer and shed a tear in celebration of one hell of an outfit!"

The proposed termination of the Ecological Services Division was not without controversy, as evidenced by a December 29, 1982 editorial in the Helena Independent Record: " Although she is concerned that Posewitz may lose his state job, (Susan) Cottingham said there is greater concern with the Department Director Jim Flynn's proposal to eliminate the Ecological Services Division. 'We are afraid the services it provides will be diffused and dispersed throughout the agency and eventually be lost', she said . . . Flynn has said the change is intended to meet the recommendations of the Governor's Council on Management, that suggested the division be moved to the fisheries and wildlife divisions . . . the decision to eliminate the division caught environmentalists off guard." (Note: Susan Cottingham was then Director of the Montana Environmental Information Center.)

Also on December 29, 1982, the Livingston Enterprise editorialized that, " . . . Outdoorsmen and environmentalists were outraged to hear the announcement last week that the Department plans to phase out Posewitz' division, and apparently Posewitz as well. Posewitz has worked for the Department for 21 years, and for most of that time has been the chief public spokesman for the Department's policies - particularly regarding environmental and conservation matters."

In 1983, the Ecological Services Division was disbanded after 14 years of existence and its fisheries responsibilities and personnel were transferred to the Fisheries Division.

Although the Ecological Services Division was terminated, Jim Posewitz remained with the Department in another capacity. The Missoulian carried an editorial on Sunday, May 22, 1983:

> "Jim Posewitz, a nationally-known conservationist and head of the Ecological Services Division of the state Department of Fish, Wildlife and Parks, will still have a job with the Department.
>
> "Late last year Department Director Jim Flynn floated the idea of abolishing Posewitz's job altogether. Protests arose . . .
>
> "The Ecological Services Division once had 21 employees. Under Flynn's Department reorganization, it will have two – Posewitz and another person. The other 19 people are being reassigned to the Fisheries and Wildlife divisions . . . "

The passage of the PURPA in 1978 had spurred private interest in small hydro development. Interest increased during the summer of 1981 when two hydropower speculators initiated an avalanche of FERC filings in northwestern Montana. Interest spread like a rampaging cancer to most of the mountainous areas of the state. At one time, there were more than 100 active small hydro applications before FERC for 88 hydropower sites. Of the original applications, better than 80 percent were filed by the original two speculators.

Most proposed small hydro development was located in mountainous areas of the state on the smaller tributary streams. Some of those streams had very little fishery value, while others contained substantial fish populations. Many streams were spawning and rearing areas for downstream lake or river trout populations. Many of the tributaries contained significant resident fishery values and offered important small stream trout fisheries. Still others were located in prime recreation areas, roadless areas, areas that contained wilderness values or had critical wildlife habitat.

If all the projects requiring stream diversions were developed, the people of Montana stood to lose a minimum of 109 miles of streams, based on the length of penstocks proposed. The actual length of stream loss would be greater.

Hugh Zackheim, writing in the Summer 1984 issue of *Western Wildlands*, provided some history about small-scale hydro in Montana (excerpted):

> "The surge of interest in small-scale hydro in Montana began in 1981 as potential developers became aware of federal and state incentives for alternative energy development. By the summer of 1982, more than 100 applications for preliminary permits had been filed with the Federal Regulatory Energy Commission (FERC) on 88 different sites. Most of these applications were submitted to establish priority rights for development and were not based on studies of site characteristics or economic considerations.
>
> "Small-scale hydro has been used to describe projects ranging from simple waterwheel generators on tiny creeks to huge dams on streams or rivers. The wide variation is a result of federal regulations that base licensing procedures and financial incentives on power generating capacity.
>
> "As of November 1983, the Montana Department of Natural Resources and Conservation reported that 73 applications for 70 different small-scale hydro developments remained active under the FERC licensing process. Twenty-six of these proposals were for retrofits of existing dams, while 44 proposals were for new dams or diversions.
>
> "The federal 1978 Public Utilities Regulatory Policies Act (PURPA), the most important law promoting alternative energy development, allows facilities of up to 80 MW to qualify for small power producer benefits. Under PURPA, hydro developers receive energy tax credits and accelerated depreciation allowances as major incentives to encourage hydro development.
>
> "The passage of SB139 by the 1981 Legislature established a statewide "mini PURPA" which, like its federal countrerpart, guarantees that utility companies will purchase electricity from a qualifying facility. The law grants hydro developers access to tax-exempt, industrial development financing for projects less than 50 MW."

Hydro development on a larger scale was also active in the early 1980's. There were two types of large hydro development: Construction of new dams and reservoirs and retrofit of existing dams to add new generating facilities or expand existing facilities. Large hydro is classified by FERC as greater than 5 MW. Projects being proposed in 1983 in the "new" dams, category were: Kootenai Falls Hydroelectric Project by Northern Lights, Inc., Carter Ferry Project on the Missouri River by Montana Power Company (MPC), Fort Benton Dam Site on the Missouri River by the Bureau of Reclamation, Clark Fork Diversion Project near Superior by a private concern, and Buffalo Rapids Project on the Flathead River proposed by MPC.

Projects in the retrofit category included: Ryan Dam on the Missouri River by MPC, Thompson Falls Dam on the Clark Fork River by MPC, Hauser Dam on the Missouri River by MPC, Canyon Ferry Dam on the Missouri River by the Bureau of Reclamation, Tiber Dam on the Marias River by three applicants --- the

City of Chester, Milk River irrigators and the City of Gillette, Yellowtail Afterbay Dam on the Big Horn River by three different applicants, and Fort Peck Dam on the Missouri by the Corps of Engineers. Proposed re-regulating dams below Libby and Hungry Horse dams were also in the mix.

Fisheries biologists were concerned about the cumulative impacts of many small-scale hydro developments in a single drainage. In a BPA-funded study in the Swan River drainage, biologists assessed how development of the 20 proposed small-scale hydro projects would affect the migratory fishery of trophy bull trout. Preliminary analyses indicated that development of many hydro sites, along with the increased sedimentation from anticipated timber harvest, could significantly reduce bull trout populations in the Swan Lake-Swan River complex.

The future of small-scale hydro development in Montana depended on the resolution of three major issues – economic viability, instream flow requirements and state-federal authority. Instream flow was the primary water right concern for the high-head hydro diversion projects in mountainous areas. Instream flows established by the Department served as safeguards for the fishery resources in Montana's free-flowing streams. Hydro developers, however, resisted these requirements, contending that the instream flows were excessive and that they made many small-scale hydro projects infeasible. Because biologists were unwilling to compromise their recommended minimum fishery flows, some hydro developers began to pursue the hydro licensing process in which FERC determined the flow regime.

By June 1985, the number of hydropower applications received by FERC and reviewed by the Department totaled 151.

The Electric Consumers Protection Act (ECPA) was signed by the president on October 16, 1986. This act provided for the protection of fish and wildlife resources associated with applications for hydropower development through recommendations made to FERC by state fish and wildlife agencies.

In the early 1980s, the Department entered into new areas by initiating studies on the net economic value of water-based recreation in the Flathead Basin and the Clark Fork River. One such study was carried out on the potential biological and economic impacts of small hydroelectric developments on the fishery in the Swan River. These projects served to further an understanding of the value of nonmarket goods, such as fishing and hunting. The Department proposed to review the National Hunting and Fishing Survey to improve its usefulness to western states in 1985. The Department received an affirmative recommendation from the International Association of Fish and Wildlife Agencies to evaluate alternative methods for valuing fishing, hunting and other nonconsumptive uses of wildlife. The goal was to improve measures of quality and diversity which are the foundation of our fisheries management program.

Beginning in the early 1980s, increased interest was shown hydro production in the upper Missouri River system from Canyon Ferry to Great Falls. First, the Bureau of Reclamation proposed to change Canyon Ferry Reservoir into a power peaking operation. The Montana Power Company announced two years later that Hauser Reservoir would be converted into a power peaking operation. Both changes were strongly protested by sportsmen's groups and recreational interests. That section of the Missouri River received 15 percent of the total annual fishing use in the state and also considerable boating and other recreational use. The Montana Power Company began testing Holter, the lowermost dam, for power peaking in 1983 and again drew strong protests. The Fisheries Division was conducting studies on the river and also initiated a small-scale study on Canyon Ferry Reservoir in response to declines in the fishery.

During 1984, controversy continued around the operation of reservoirs in the Upper Missouri River, including Canyon Ferry, Hauser, and Holter. Montana Power Company, for the time being, had abandoned plans to turn Hauser and Holter Reservoirs into power-peaking projects. However, the Bureau of Reclamation, which operates Canyon Ferry had to draw down the reservoir to repair dust abatement dikes. Higher than normal inflows resulted in Canyon Ferry discharging nearly double the amount of water considered as optimum for fishing in the Missouri River beginning in late August. Irate fishermen

generated a meeting which resulted in the formation of a steering committee to review reservoir operations. In 1984, the Department, Bureau of Reclamation, Montana Power Company and interested sportsmen from Townsend to Great Falls formed the Upper Missouri River Advisory Committee to coordinate and develop guidelines to maintain or improve operating conditions at the three reservoirs.

The Department of Fish, Wildlife and Parks was assisting by preparing a comprehensive review of the effect of various river and reservoir levels on all forms of recreation from Canyon Ferry to Great Falls.

Through 1984, there had been more than 4,500 SB310 projects statewide and less than 10 had gone to arbitration.

Following the completion of the Yellowstone River basin reservation process in 1978, the Department, in the early 1980's, conducted fisheries studies in the upper Clark Fork from the headwaters at the confluence of Silver Bow and Warm Springs creeks downstream to Milltown Dam that would be used to prepare an application to reserve waters in the upper Clark Fork and several of its major tributaries. The application was to be filed with the Department of Natural Resources and Conservation by summer 1985. It would then be up to the Board to act upon it. The reservation would establish a minimum flow level in the river and selected tributaries to maintain fisheries and recreational opportunities. The reservation would not include Rock Creek near Missoula or the Big Blackfoot River, which already had instream flow protection under the 1969 "Murphy Rights" legislation.

In 1986, the Department had completed its studies and filed an instream flow reservation application with the Board for four reaches of the main Clark Fork River and 17 selected tributaries. The application was part of a more comprehensive plan by the state to reclaim the Clark Fork, which suffered from heavy metal pollution, low summer flows and other pollution problems. The Department viewed instream flow reservations as a basic foundation of future river reclamation efforts.

The Water Policy Act of 1985 called for water reservations for the entire Missouri River system. The reservation applications by all state and federal agencies interested in securing water for domestic, municipal, irrigation, and instream flows were to be submitted to the Board of Natural Resources and Conservation by July 1, 1989. Streams in this basin represent the largest concentration of "Blue Ribbon" trout streams in the state. Sections of the Big Hole, Gallatin and Jefferson rivers went dry in the late 1970s and suffered severe drought in 1985.

During the early 1980's, concern over a proposed open pit coal mine operation across the Canadian border on the North Fork of the Flathead River led to one of the most intense study efforts ever conducted on a river basin in Montana. In 1983, fisheries biologists completed a five-year baseline environmental assessment of the fisheries in the North and Middle forks of the Flathead River and Flathead Lake. The project, funding by the EPA and under the direction of the Flathead Basin Steering Committee was undertaken to gain fisheries information such as timing and routes of migrations, location and attributes of key spawning areas, and flow needs, plus insights into fishermen use. Detailed recommendations for a long-range fish habitat monitoring program were developed. Results of this study were to be the basis for minimizing the impact of proposed Canadian coal development and potential of existing gas, oil and lumber extraction in the upper Flathead drainage. Also, for the first time, the Department was able to determine the limited distribution and size of the native cutthroat and bull trout populations. The studies found that 10 percent of the spawning bull trout in the North Fork of the Flathead River would be directly affected by the mine.

Data collected over the five-year study was influential in the responsiveness of British Columbia to Montana's concerns about the proposed coal mine on Cabin Creek in the North Fork of the Flathead River basin in British Columbia. The British Columbia government gave tentative approval to the mine in 1984 but requested considerably more study information from the developer; heretofore unprecedented at that stage of development. Because of Montana's concern and a depressed coal market, no further action by the developer had occurred at the end of the 20th century.

During 1984, fieldwork was completed on the Swan River Micro-hydro Cumulative Impacts Study, a two and one-half year project funded by the Bonneville Power Administration in response to proposals by private developers to construct small hydro projects on 20 tributaries in the Swan River drainage. This study involved extensive surveys of tributary and river fish populations, trout habitat requirements, instream flow requirements and bull trout spawning. Fishing pressure, harvest, and the economic value of the fisheries in Swan Lake, 53 miles of the Swan River and the 285-mile tributary system were determined. Study results indicated that dewatering of proposed diversion areas would result in the loss of about 27, 18, and 4 percent of the bull trout, cutthroat trout, and brook trout, respectively, in the tributary system. The economic value of a 25 percent loss of the fish available to the recreational fishery in the Swan drainage was estimated to be $788,000 per year using the travel-cost method for this type of economic evaluation.

On December 17, 1982, the Department intervened in the license amendment petition of Montana Power Company (MPC) for its dam at Thompson Falls, Montana. The intervention was intended to address impacts associated with the proposed expansion of the Thompson Falls facility as well as damages caused to the fisheries and wildlife by the construction and operation of the dam pursuant to the Fish and Wildlife Program of the Northwest Power Planning Council.

The MPC had not mitigated the impacts at the time of the original construction and operation of Thompson Falls Dam on resident fish. The opportunities to mitigate fishery losses at the project site were very limited.

Several options for mitigation were investigated but the Department finally recommended that MPC, as operators of the project, provide permanent funding to purchase, in perpetuity 10,000, acre-feet of water from Painted Rocks Reservoir on the West Fork of the Bitterroot River to maintain summer and fall flows for resident fish in the Bitterroot River.

The Council put the measure its program and the Department began negotiations with the BPA and MPC. In 1983, BPA agreed to fund a four-year evaluation of the effectiveness of flow releases and development of a water management plan. Mark Lere was the first biologist to work on the study. He was followed by Ron Spoon.

A draft water management plan for Painted Rocks Reservoir water purchase was written as part of the research project. The Northwest Power Planning Council directed BPA to purchase the needed water, although no action had resulted. The final water management plan was to be completed on April 1, 1985. Water quantity during the irrigation season was seen by the Department as the key to future good trout fishing on the river.

Negotiations were ongoing with MPC from 1981 through 1988 to establish a $250,000 trust fund to pay for the water. The 1987 Legislature passed a law to allow creation of a trust fund by the Department for mitigation of impacts from hydropower. In 1988, MPC finally delivered the check.
However, water purchases from Painted Rocks Reservoir had been made from DNRC on an annual basis. Interest in securing a longer term agreement for water purchases arose from several sources, including the Bitterroot Conservation District. In July 1988, the CD requested assistance of the Department to work with them to develop a long-term solution to the problem and, since local interest in such a solution was higher than it had ever been, now was the time for the Department to begin working with them.

Following the request by Bitterroot CD, the Department and DNRC exchanged correspondence outlining their ideas about a long-term agreement. Between 1988 and 1989 the two agencies came close to an agreement but it was never concluded. Both agencies had differing views about what an agreement should consist of and how funding for the water purchase should be handled. Nothing further happened until Trout Unlimited in Montana wrote a letter dated December 5, 1991 to both DNRC and the Department expressing concern that nothing was happening on a long-term agreement. He outlined the history of

discussions between the agencies up to that time and strongly urged them to get negotiations going again soon while interest was still high in the Bitterroot Valley.

Agreement delays continued by both agencies through most of 1992. Finally, after numerous drafts of an agreement passed between the Department and DNRC, a compromise was reached on December 3, 1992. A 13-year agreement, expiring September, 30, 2004, provided the Department the opportunity to purchase 10,000 acre-feet of water per year at a cost of $15,000 annually plus an additional O&M charge. The Department then proceeded to set up an account to utilize interest from the $250,000 trust fund to pay for the water. Combined with the 5,000 acre-feet of water purchased in 1958, 15,000 acre-feet were available to help the river each year.

Although Arctic grayling were originally native to the Missouri River drainage upstream of the Great Falls, by the mid 1980's the sole remaining population of river dwelling, or fluvial, Arctic grayling inhabited the Big Hole River. An intense spring runoff in 1984 began a serious decline in abundance of grayling in the Big Hole River. A second blow to the grayling population was persistent drought during this period. Dick Oswald, Department regional fisheries management biologist, and Brad Shepard, Department fisheries biologist working in cooperation with the Beaverhead National Forest, were monitoring the grayling populations and studying their spawning ecology. Oswald and Shepard's data enabled them to raise awareness of the crisis facing grayling of the Big Hole River. Rising concern in the fisheries community led to a cooperative effort between the Department, Montana State University, and the U.S. Forest Service to fund a series of short-term research projects aimed at understanding the ecology, origins, and natural history of the grayling in the Big Hole drainage. Researchers Harold Stevenson, Don Skaar, Geoff McMichael, and Jon Streu investigated grayling distribution, movements, habitat selection, and interactions with brook trout from 1987 through 1990.

The grayling studies emphasized the urgency to prevent the extinction of the Big Hole River grayling population. An apparent need to establish a full time recovery program led to an expansion of the recovery group to include the Department, the Bureau of Land Management, the Montana Chapter of the American Fisheries Society, Montana State University, the University of Montana, The Nature Conservancy, Trout Unlimited, the U. S. Fish and Wildlife Service, and the U.S. Forest Service. The Fluvial Arctic Grayling Workgroup, chaired by Chris Hunter, Department Special Projects Bureau Chief, was formed to develop a cooperative funding mechanism and a plan to recover fluvial Arctic grayling throughout its native range. A nonprofit organization, The Arctic Grayling Recovery Program, was developed as a fund-raising and managing group with the purpose of providing for a long-term recovery effort.

During the drought of 1985, the Department met several times with irrigation companies along the Bitterroot River and agreement was reached to jointly petition the District Court to appoint a water commissioner to deliver the instream flows. This was the first time such an action had ever taken place.

Methods to reduce fish losses into irrigation ditches surfaced again in 1985, the beginning of several drought years in Montana. Faced with extremely low flows in the Big Hole River, the Department sent letters to all Big Hole irrigators explaining an incremental method of shutting down irrigation ditches at the end of the irrigation season and asked them to implement it during ditch closure. Many irrigators within the basin were also contacted by phone to further explain the importance of trying the method and to ask them to observe the response of fish in their ditches so the results could be documented. The people in the upper Big Hole were very responsive and most of the irrigators who tried the incremental shutdown technique reported far fewer fish trapped in their ditches.

In May 1985, extremely dry climatic conditions coupled with maximum irrigation withdrawals resulted in the cessation of stream flow in the Ruby River in the vicinity of the Harrington Bridge, near Twin Bridges. The dewatering resulted in excessive loss of brown trout of all ages, loss of invertebrate food organisms and shortages of irrigation water for downstream irrigators. Large quantities of water were withdrawn into canals between Ruby Dam and the town of Alder, resulting in little stream flow at the Alder and Laurin

bridges. In addition, the maximum demand for the water occurred almost instantaneously, with little or no forewarning, and the water was applied to very dry soils, resulting in little or no potential for recharge of stream flow from irrigation returns.

Dam releases of 450 cfs were not enough to maintain flow at the Harrington Bridge since nearly all of these releases were withdrawn into canals between the dam and the Alder Bridge. Some recharge to the river occurred between the Alder Bridge and the Silver Springs Bridge but this flow was essentially withdrawn by two major canals downstream, resulting in dewatering at the Harrington Bridge. It required dam releases of about 600 cfs to restore live flow in the reach after about 18-20 hours. The Department gathered streamflow information throughout the lower Ruby River to try and understand the dynamics of the dewatering problem and what could be done to alleviate it.

Upper Missouri River Reservoir operating guidelines for fish, wildlife and recreation were completed during 1985. This document identified water levels and flow release patterns for Canyon Ferry, Hauser and Holter reservoirs which optimize recreational values and minimize impacts on fish and wildlife.

During 1985, fisheries personnel worked with the Bureau of Reclamation to initiate a study aimed at solving the gas supersaturation problem for fish in the Bighorn River below the Afterbay Dam. A likely solution was the installation of generators in the reregulating dam. Water plunging over the sluiceway entrained gas. Running all water through the generators would eliminate the use of the sluiceway which caused the problem.

Until about the 1980's, the bull trout was considered an undesirable species because it was a large predator that fed on other fish desired by fishermen. Government-sponsored suppression and eradication programs were carried out against bull trout through the 1930's in an effort to rid certain lakes and streams of this fish-eating predator. In addition, bull trout habitat was degraded in many areas, resulting in further declines. Bull trout have very specific habitat requirements that include cold, clean, high quality water, complex in-stream and riparian habitat, and connectivity between spawning and rearing areas. Bull trout are very sensitive to changes in their habitat, and have declined in many areas where habitat conditions have been degraded.

During the 1980s, attitudes toward bull trout began to shift as bull trout ecology became better understood and concerns about declining numbers and distribution became more apparent. By 1986, bull trout were listed as a "Species of Special Concern" by the Department and regulations resulting in their protection were gradually being implemented

In 1986, the Department published "*An Inventory of the Spring Creeks in Montana"* authored by Janet Decker-Hess, Department biologist. The inventory was conducted in1985 and included 68 spring creeks. The inventory of each creek included an analysis of channel and physical characteristics, riparian zone health, species composition and land use practices. All of the creeks except Poindexter Slough in Beaverhead County (owned by the state) are in private ownership. The results of the inventory showed that, in general, Montana's spring creeks were being severely abused and their fishery potential not being met. Recommendations for management were given for each creek.

The 1985 inventory was updated in another publication by the same author in 1989. Since the original inventory, the private sector and public agencies had demonstrated concern for Montana's spring creek resources. Major rehabilitation projects occurred on four spring creeks between 1986 and 1989. Several other rehabilitation projects were also occurring.

The Ruby River was again dewatered in May 1987 under circumstances similar to those that occurred in 1985. Water demand, coupled with dry climatic conditions again caused a fish kill of brown trout in the lower river. As a result of the two fish kills, Dick Oswald, fisheries biologist for the Department stationed in Dillon, drafted a plan in late 1987 to avoid further dewatering of the river. The plan was submitted to the DNRC. Numerous redrafts of the plan were passed between the two agencies. The plan included

procedures for monitoring flows by local water users, communication between the Department, DNRC and the water users when conditions appeared ripe for a dewatering problem and provisions to adjust water use to help alleviate the problem. The plan was presented to the water users association by the DNRC on April 12, 1988. However, the association would not accept the plan as written. They did agree to have their local water users read stream gages along the river to monitor flows and to report conditions that might lead to a severe dewatering problem.

A water reservation proceeding was established in the Missouri River basin by the 1985 Legislature. Water reservations were seen as a means of allocating water for current and future beneficial uses so that Montana would have a solid basis for participating in any future apportionment of water among the 10 Missouri River Basin states. In other words, in any future attempt to divide up Missouri River water, Montana would be able to show it was using, or intended to use, the water allocated by its reservation system. The Legislature recognized the threat of losing Montana's water to downstream states and directed that a basin-wide proceeding be undertaken by DNRC to reserve Missouri River basin water for future uses in Montana. The Legislature decreed that parties seeking reservations must file their applications by July 1, 1989.

However, due to the overwhelming nature of a basin-wide process, the 1989 Legislature divided the process into two parts: 1) that part of the basin above Fort Peck Dam and, 2) that portion of the basin below the dam, including the Little Missouri River basin. Applications for the upper basin had to be submitted by July 1, 1989 and in the lower and Little Missouri basins by July 1, 1991. Any reservations granted would have a priority date of July 1, 1985, the date originally established by the Legislature, except the priority date for the Little Missouri basin is July 1, 1989, because it was not originally included in the 1985 legislation.

The Department's application in the basin above Fort Peck Dam was a major undertaking, consisting of three volumes of data requesting flows on 249 streams. There was a total of 40 reservation applicants, including 18 conservation districts (for 220 irrigation projects), 18 municipalities (for domestic water), the Department and Bureau of Land Management for instream flows, Bureau of Reclamation for the Virgelle irrigation project and the Dept. of Health and Environmental Sciences for instream flows for water quality protection.

A draft EIS was distributed in July 1991, followed by 11 EIS hearings in the basin in August 1991. The final EIS was released in January 1992. It was a contentious process.

The formal hearing began in Helena at the Capitol building on February 3, 1992 and ended February 28, 1992. The hearing examiner submitted a proposal for decision to the Board on May 15, 1992. On June 16 and 17, 1992, the Board heard oral arguments on exceptions to the proposal. The Board issued the Final Order establishing reservations on July 1, 1992. The Department was granted instream flows on all 249 streams in its application.
In December 1986, in preparation for upcoming water reservation processes in the Missouri River basin, Steve Leathe and Fred Nelson, Department fishery biologists, had published a Department publication called *A Literature Evaluation of Montana's Wetted Perimeter Inflection Point Method for Deriving Instream Flow Recommendations*.

Since the inception of the Department's instream flow program in the mid-1970's, the wetted perimeter-inflection point method has been the primary means for deriving instream flow recommendations for the preservation of aquatic resources during the low water periods in the state's streams and rivers. Because the field of instream flows had expanded over the years, the Department felt the need to review this method in light of recent advances in the state-of-the-art. The document provides a synopsis of the history of the wetter perimeter-inflection point method, examines its theoretical and experimental basis and identifies its strengths and weaknesses as compared to other available methods. Guidelines for its use and justification in Montana were also presented. In February 1989, the document was revised so it would be up-to-date for the Missouri River basin water reservation process in the lower Missouri River basin.

Following the completion of the upper Missouri basin reservation process, the Department was working on the application for instream flows in the lower Missouri basin and in the Little Missouri River basin. This was to be a much smaller process than the upper basin. The Department made requests for a total of 18 streams, 14 in the lower basin below Fort Peck Dam and four in the Little Missouri basin. However, the application still generated much controversy between the Department and agricultural and municipal interests in those basins.

Applications for reservations in the lower basin were submitted by July 1, 1991. The hearing was conducted in Glasgow during the two weeks of September 19 and 26. The Board heard summation arguments by the parties on October 26, 1994. The Board issued its Final Order establishing water reservations on December 30, 1994. The Department was granted instream flow reservations on all 18 streams.

With the granting of these reservations, the Department had obtained instream flow reservations, "Murphy Rights" and other rights on 9,013 miles of 340 streams throughout the state as well as on two lakes (Bean Lake in the Dearborn River drainage and Antelope Butte Swamp on the Blackleaf Wildlife Management Area along the Rocky Mountain Front near Bynum). In addition, two streams, Young Creek and the Tobacco River in northwest Montana received instream rights claimed through water court adjudication proceedings and upheld by a July 23, 1986 water court decision. As significant as this appears, instream water rights and reservations were held on only 4.8 percent of the total known miles of streams in the state (189,460 miles).

In 1986, George Holton updated the Montana list of "Species of Special Concern". There were still no federally listed threatened or endangered species in Montana on the list.

In 1986, a study of gas bubble trauma (GBT) in brown and rainbow trout below Yellowtail Afterbay Dam was begun. This study was undertaken because there was no clear understanding of how reservoir operations, flows, and other ambient conditions affected dissolved gas levels and the incidence of GBT in fish.

The afterbay dam serves as a reregulation facility below Yellowtail Dam and power plant to provide uniform daily discharges to the Bighorn River. The afterbay dam had, for many years, produced supersaturated levels of dissolved gases. Water spilling over the dam entrained air and forced it into solution as it plunged into the pool below. Accompanying this supersaturation was a high incidence of external symptoms of GBT in rainbow and brown trout populations downstream of the dam, particularly among brown trout larger than 356 mm (14 in.) total length.

Gas tension changes in the river resulted from variations in dam operational patterns, discharge, river water surface elevation, water temperature and weather conditions. Tests demonstrated that the dissolved gas supersaturation problem was primarily a result of sluiceway discharge and varied with sluicegate openings. Avoiding use of sluicegates at 1,500 to 2,000 cfs would reduce the problem, since this discharge pattern produced the maximum gas levels. It was believed more use of the radial gates would help reduce the gas problem, particularly if they were used at higher flows.

The winter 1986-87 was mild and extremely dry. The normal spring rains did not materialize and runoff into Canyon Ferry Reservoir near Helena was only 37 percent of normal. The Department's Canyon Ferry Advisory Committee held an emergency meeting in May 1987 to assess the drought situation and develop a contingency flow recommendation. As a result, flows below Canyon Ferry Dam were reduced below the Department's recommended minimums to conserve reservoir storage for releases later in the season. A similar advisory committee was being formed for Tiber Reservoir.

In 1987, to protect the Department's instream flow rights during the drought, lists of water users with junior water rights were compiled and updated. Initial letters were sent to those junior water users notifying them

that the Department might make a call on their rights if streamflows dropped below the Department's instream water rights. A reporting system was set up to monitor streamflows on selected waters.

The winter of 1987-88 was also characterized by below normal snowpack. Peak snowpack in most river basins in the state reached only 20-25% of average. Spring temperatures were unusually warm and runoff peaked two to three weeks earlier than normal. By mid-June, snowpacks were exhausted except at a few high-elevation sites which continued to hold some snow.

The upcoming drought in 1988, caused the Canyon Ferry Advisory Committee to meet in April 1988 to determine possible fishery releases into the Missouri River from Canyon Ferry Reservoir. Flows were subsequently reduced from the target flows of 4,100 cubic feet per second (cfs), but maintained at a minimum level of 3,000 cfs below Holter Dam throughout the summer. Stored water in Yellowtail, Tiber, Clark Canyon, and Hungry Horse reservoirs was released to maintain flows less than optimum, but sufficient to maintain fish during a drought situation. A tentative agreement to prevent a fish kill in the Ruby River was reached with the Department of Natural Resources and Conservation (DNRC) and local water users. As a result, no fish kill occurred there during 1988 like occurred in 1985 and 1987.

During the summer of 1988, to protect the Department's instream flow rights on many streams, letters were sent to junior water users requesting them to cease their diversions. Streamflows on these waters were below the Department's instream rights all summer, as reported by the flow monitoring system established with the USGS. Because no summer precipitation occurred in 1988 to relieve low streamflows, as it did in 1985 and 1987, many streams were badly dewatered by summer's end.

The Department is a member of the state Drought Advisory Committee chaired by the Lt. Governor and staffed by DNRC. The committee meets at least twice a year by statute or, in drought times, as frequently as needed to keep abreast of drought conditions and take actions to help alleviate drought effects. The Department's activities become more active during drought years because low flows adversely affect fisheries, create conflicts between river users and irrigators and cause a lot of political and public attention. The committee met many times in 1988.

In 1988, the Department developed its own Drought Contingency Plan which outlined its role and actions it would take during drought.

In 1988, the Yellowstone River basin water reservations granted in 1978 were reviewed by the Board of Natural Resources and Conservation. The water reservation statute requires approved water reservations to be reviewed by the Board periodically, but at least every 10 years. No changes were made to the Department's or anyone else's reservations because there was not an adequate administrative review procedure established. So, the outcome of the first review was the establishment of a review procedure that could be used for the next 10-year review.

During FY1988, administration and coordination of stream preservation activities required considerable time and effort by fisheries personnel. During the period, 172 projects were reviewed and permitted under the state's Stream Preservation Act and about 500 projects were reviewed in cooperation with county conservation districts under the "310 law". A pilot project was initiated to contract with a private individual to conduct inspections of proposed streambank alteration activities in Gallatin County. This move was intended to reduce the workload of regional fisheries managers associated with most "310" field inspections and redirect the time saved to other priority issues in the fisheries program.

New legislation in 1989 provided an opportunity for the Department to take more proactive approaches to managing fish habitat, namely to develop a program for restoring habitat that has been damaged. The River Restoration Act earmarked 50 cents from each resident and one dollar from each nonresident fishing license. It generated about $110,000 per year for habitat restoration. In passing this law, the Legislature recognized that the conservation of rivers and their fisheries was of vital social and economic importance to Montana.

During 1989, another step was taken to protect the water quantity component of stream fish habitat. Probably the most controversial natural resource issue that came before the 1989 Montana Legislature was HB707, a bill to allow leasing of private consumptive water rights for instream flow purposes. The issue arose primarily as a result of the 1988 drought's impact on stream fisheries. The bill was strongly supported by the environmental community and as strongly opposed by the agricultural community. It was, at one point, rejected by the Legislature. However, the bill was revived and, through amendments, approved in the closing days of the session. It was signed into law by Governor Stan Stevens in May 1989.

The 1990's

By 1990, a strategy for protecting a river system as a whole had not been developed in Montana. The State Recreational Waterways System of 1972 provided the framework to protect an entire river, but had not been authorized through legislation. The federal Wild and Scenic Rivers Act provided protection for two river systems in Montana – the three forks of the Flathead River and the central portion of the Missouri -- but had been unused in recent years. Unlike many other states, Montana had no statutory river policy. A state wild and scenic river bill was introduced in the state Legislature in the early 1970s, but fears of land confiscation killed the bill.

To evaluate the various river protection strategies in Montana, the Department, in 1990, published *River Protection in Montana: A Review of State Laws, Policies and Rules.* Authored by Janet Decker-Hess, the report summarizes the existing state laws, programs, and rules that help protect Montana's rivers and their corridors. Included is a discussion of their limitations and the programs and policies other states have developed protecting their rivers. Decker-Hess concluded that, although Montana had developed a strong set of statutes and policies addressing the protection of a river's water quality, instream flows, bed and banks, and recreational resources, it had not, like other Pacific Northwest states, developed strategies for preserving its rivers in perpetuity.

In 1990, the Department published *A Field Guide to Montana Fishes*. Authored by George D. Holton, the book is a concise, easily understood handbook for identifying Montana's fishes. It is a simple, visual key to fish families arranged by type and position of fins on the back. Within families, look-alike fishes are grouped for easy comparison. Holton, now retired, was Chief Fisheries Biologist and Assistant Division Administrator for the Fisheries Division for 30 years.

In the early 1990's, the Department published another pamphlet about methods to reduce trout losses in irrigation ditches. It emphasized that irrigators who gradually shut down their diversions and head gates can save trout by affording them the time they need to return to the river or stream. The Department proposed that irrigators gradually reduce the flow in their ditches in three equal increments at least three days prior to the headgate being completely closed, whether at the end of the irrigation season or temporarily while haying is completed. The pamphlet also emphasized that filling in holes and removing rocks in irrigation ditches, particularly just behind the headgate, will enable trout to continue to move out of the ditches rather than using those locations as hiding places and remain in the ditch. To encourage ranchers to cooperate in this process, the pamphlet also stated that local Trout Unlimited chapters and sportsmen's clubs would be glad to help in assisting the landowner in shutting down head gates if landowners felt it would take too much time.

In September 1991, through a memorandum of understanding between state, federal, and private organizations, a five-year Arctic grayling recovery project in the Big Hole River drainage was initiated when Patrick Byorth was hired by the Department as project biologist. The Arctic Grayling Recovery Program was designed to closely monitor the population, determine which environmental factors were limiting the population and work to mitigate those factors, and develop a reserve grayling brood stock to hedge against extinction while providing a representative source of fluvial grayling for reintroductions.

In October of 1991, private organizations submitted a petition to list the fluvial Arctic grayling as "Endangered" under the Endangered Species Act.

A Fluvial Arctic Grayling Recovery Plan was drafted in 1992 to guide the recovery project and was officially adopted by cooperators in 1993.

In 1994, snowpack was extremely low, midsummer rain was scarce, and the Big Hole River was going dry. Irrigation was over by mid-July, but water was still being withdrawn for stock. To maintain live flow in the river, ranchers were offered an alternative source of water: the Department would buy stock tanks and rent a water truck to provide stock water in exchange for closing diversions. While hauling stock water was a temporary solution, it demonstrated that the Big Hole could run through and the grayling could survive severe drought. Drought also provided impetus for discussions between anglers, ranchers, conservationists and agencies. From these discussions, The Big Hole Watershed Committee was formed. This group spearheaded protecting minimum flows by securing grants to drill stockwater wells and studied characteristics of the watershed. This committee was to become the focal point for future resource management in the Big Hole River drainage.

By 1995, the Big Hole grayling population had returned to pre-decline levels and the restoration program began to turn its sights on expanding its range.

Between 1992 and 1997, from a brood stock developed from Big Hole River grayling, grayling reintroductions were made in the East and West Gallatin rivers, the Ruby River, the North and South forks of the Sun River, the Beaverhead River and Cougar Creek in Yellowstone National Park. Future introductions were planned for the Missouri River headwaters and the upper Madison River.

The Department's Drought Contingency Plan first written in 1988 was revised in 1992 and became part of the state Drought Response Plan, completed by DNRC in November 1995, which includes the drought responsibilities of all state agencies.

During the drought of 1992, the Department purchased 1,000 acre-feet of stored water in Newlan Creek Reservoir, an SCS project completed in 1977 near White Sulphur Springs. The Department paid $5 per acre-foot to augment instream flows in the Smith River. The water was purchased from the Meagher County-Newlan Creek Water District. The reservoir is 9.2 miles upstream from the mouth of Newlan Creek. The intent of the purchase was to see if flow augmentation could be accomplished within the reach of the Smith River downstream to Camp Baker, 29 miles below Newlan Creek. This reach of the river often suffers from low flows during the irrigation season and particularly during drought periods. The Department has a Murphy Right for instream flows beginning at the Fort Logan Bridge, 14 miles downstream from Newlan Creek and continuing to the mouth of the Smith River. The Smith River below Camp Baker is popular for floating and fishing and usually suffers from low flows by July in normal water years and sooner in drought years. Therefore, the floating season is short. The intent of this study was to see if these flows could be augmented by releases from Newlan Creek Reservoir.

Flow releases began on August 28 and ended on October 4, 1992. The results of the study showed that, under minimal irrigation in Newlan Creek, instream flow augmentation is achievable in the Smith River immediately below the mouth of Newlan Creek. However, the distance that augmentation can be sustained is relatively short; far short of reaching Fort Logan and Camp Baker where instream benefits are highest. Purchased water can be protected to the mouth of Newlan Creek because a water commissioner administers water under a decree. However, once the purchased water passes the mouth of Newlan Creek into the Smith River, it is subject to diversion and will likely disappear, particularly in water short years. The lack of a water right decree for the Smith River will hamper the Department's future efforts to augment river flows with purchased water. Without the ability to administer water past Smith River diversions, which could be accomplished with a water commissioner under a decree, purchased water is unlikely to reach those distant points where it is most desired. Therefore, benefits to fish, wildlife and

recreation are limited and the Department elected not to purchase any more water from the water district until such time as it could be protected.

By 1992, all Montana waters were closed to the harvest of bull trout except Swan Lake and Hungry Horse Reservoir. Hungry Horse was later closed. In late 1993, in response to growing concern about the status of bull trout in Montana, Governor Marc Racicot convened the Governor's Roundtable to discuss issues and threats facing bull trout. As a result of the Roundtable, the Governor chartered a nine-person restoration team consisting of members from the Department, Montana Department of Natural Resources and Conservation, U.S. Fish and Wildlife Service, U.S. Forest Service, Confederated Salish and Kootenai Tribes, National Wildlife Federation, Plum Creek Timber Company, Bonneville Power Administration and Montana Chapter of the American Fisheries Society. The Restoration Team was directed to develop a plan that would maintain, protect, and increase bull trout populations.

The Restoration Team appointed a Scientific Group that developed status reports for the 12 major drainages (or portions thereof) where bull trout occur in western Montana, referred to in the plan as Restoration Conservation Areas. These status reports described the current status and distribution, as well as summarizing threats to bull trout within each drainage. They also identified core areas, which are watersheds containing the best remaining spawning and early rearing habitat in each major drainage. More than 120 core area watersheds were identified. These status reports became the foundation around which the restoration plan was written.

In 1994, another incident occurred on the Ruby River. On September 1, Ruby River Reservoir was completely drained, causing reservoir sediments to be flushed downstream. The extremely high turbidity resulted in the death of more than 2,500 fish in 2-1/2 miles of the river below the dam. The majority of fish killed were reservoir fish that were flushed into the river with the sediment from the reservoir.

Dick Oswald, fisheries biologist in Dillon, notified the DNRC of the sediment problem on Friday morning, September 2, 1994. Shortly after noon that day, DNRC employees were on the site to evaluate the situation and meet with the water users and the Department. By 2:30 p.m., the dam gate was closed to allow a pool of water to again build up behind the dam and stop the discharge of sediment into the river.

Typically, the water users do not completely drain the reservoir. Historically, a pool of water of varying volume is carried over into the winter months. The dam tender told DNRC that is was the decision of the water users to drain the reservoir this year. The decision was based on a high demand for irrigation water due to the lack of late season rainfall which created drought conditions in the Ruby Valley. The reservoir was intentionally drained to allow the water users to utilize the entire contents of the reservoir. Following the investigations of the problem, Mark Simonich, DNRC Director, appointed the Ruby River Reservoir Task Force composed of local water users, the Department and DNRC. The goal of the 13-member task force was to see that the disaster was never repeated and to ensure the reservoir was operated in the best possible way for all water users in the valley. The first meeting of the task force was on October 14, 1994. The task force was to be responsible for developing a minimum reservoir pool, reservoir operating guidelines and updating the Ruby River Dewatering Prevention Plan. Dick Oswald represented the Department on the committee.

The DNRC developed an Action Plan that described the steps the DNRC would take to ensure that the reservoir would not be completely emptied again and a strategy for ensuring the sediment deposited in the river would be flushed through the Ruby River system and not redeposited. The plan also called for the development of reservoir guidelines and an update of the plan to prevent dewatering of the Ruby River that was prepared in 1988.

Amendments to the original 1989 water leasing bill in both the 1991 and 1993 legislative sessions extended the four-year study to a 10-year study (ending June 30, 1999) and gradually increased the number of eligible stream reaches from five to 20.

During 1993, 12 river restoration projects that were completed on 11 streams statewide included approximately nine miles of riparian fencing, removal of two stream side feedlots, improved fish passage, willow planting, conversion of a flood irrigation system to sprinklers to preserve instream flows and installation of rock drop structures to reduce erosion. Habitat restoration projects on tributaries of the Missouri River and Canyon Ferry Reservoir included the delivery of surplus water to traditionally dewatered stream sections (three miles), riparian fencing (one mile) and control and reduction of sedimentation (25 miles).

In 1993, in the Blackfoot River and Rock Creek near Missoula, restoration and enhancement efforts were underway through the cooperation of private landowners, federal agencies and private organizations. Projects included riparian vegetation enhancement, fish barrier removal to open spawning streams for cutthroat and bull trout and wetland and rangeland improvements to enhance fisheries habitat on approximately 147 miles of streams.

During 1993, to ensure water necessary for a healthy fishery, water leases were approved and implemented on two streams.

The Department's 1993 Annual Report stated that more than 1,100 individual waters in Montana support 86 species of fish.

By 1993, it was clear that management of fishes of special concern was going to become increasingly important in the work of the Fisheries Division. The division did not have a formal fishes of special concern program. It did have the list of Montana fish species of special concern which had no legal authority. The division had conducted status reviews of Yellowstone and westslope cutthroat trout, bull trout and Arctic grayling and management plans for Yellowstone cutthroat and bull trout were in the initial stages of development on an ad hoc basis.

The Department's strategic plan in use at the time had as one goal the management of fish and wildlife with a focus on ecological systems to reflect the diversity of all wildlife and their habitats, while maintaining commitment to Montana's hunting and fishing heritage. It was with that goal in mind that Chris Hunter, Special Projects Bureau Chief, asked a group of Department fisheries managers and biologists to begin work on developing a native fishes management program.

During 1993, the Department continued to purchase water from Painted Rocks Reservoir to augment flows in the Bitterroot River. Part of the cooperative efforts between the Department and other valley water users, the Department hires a water commissioner to administer the water to assure the purchased water arrives at its intended destination.

In 1994, after several years of planning and negotiations with the Bureau of Reclamation, construction began on a selective withdrawal system for Hungry Horse Dam. The system would correct a long-standing water temperature problem in the Flathead River.

In 1994, in cooperation with the state Department of Transportation, the Department placed boulder structures in the Marias River to provide fish habitat and mitigate effects of bridge construction. The Department also worked with the Marias River Advisory Committee and U.S. Bureau of Reclamation to modify outflow from Tiber Dam to produce a more natural springtime flow pattern in the Marias and to benefit fisheries and aquatic habitat.

Also, during 1994, participation continued in federal licensing of hydropower facilities at Tiber Dam and seven Montana Power Company dams on the Missouri River. Operating guidelines to protect, maintain and enhance aquatic and recreational resources were recommended.

In 1995, the Legislature authorized water leasing for instream flows by private parties and individuals. It also allowed a water right holder to convert existing water rights to instream flow use. The Department is

not allowed to lease water under this law. Also passed in 1995 was a pilot water leasing program in the upper Clark Fork River Basin. This was a provision of the Upper Clark Fork River Basin Management Plan that was approved by the1995 Legislature. The Department is allowed to lease water rights under this law and also to convert its own water rights to instream flow. This was, in fact, done with the Department's water rights on Cottonwood Creek on the Blackfoot-Clearwater Wildlife Management Area, where, in 1997, the Department rewatered a section of the stream to benefit bull and cutthroat trout.

In 1995, the Department was able to secure additional water for improving flows in the Bitterroot River. Somewhat akin to a water purchase, such as that from Painted Rocks Reservoir, was the Department's contribution to raising the height of Como Lake Dam, an irrigation storage project located on Rock Creek, a tributary to the Bitterroot River near Darby. Following project completion in 1995, an additional 3,000 acre-feet of water were made available for augmenting Bitterroot River flows. No fee is paid for the water but an annual fee is paid for O&M costs that may occur. Flow releases are coordinated by the Region 2 Fisheries Manager and the Bitterroot River Irrigation District. The releases are administered by the Bitterroot River water commissioner

Fourteen river restoration projects totaling just over $265,000 were approved for funding In 1995. The Department had initiated 67 stream restoration projects since the inception of the program in 1989. Forty-two projects were completed by 1995. These projects enhanced spawning conditions, improved riparian vegetation and bank cover, reduced loss of fish into irrigation diversions, provided fish passage into spawning grounds, restored essential habitats and naturally functioning stream channels, and protected genetically pure native fish populations.

Because the river restoration program had been extremely popular with anglers, the 1995 Legislature revised and expanded it. The new program, called the Future Fisheries Improvement Program, was initially allocated $2.3 million for wild fish habitat restoration. The new program allowed funds for habitat restoration to be used in lakes and reservoirs in addition to rivers and streams. It also gave priority to projects that restored habitat for native Montana fishes, such as bull trout and cutthroat trout.

The Future Fisheries Improvement Program is assisted by a 10-member citizen review panel that recommends projects suggested by the Department for funding. Final decisions are made by the FWP Commission based on the test of whether the general angling public will benefit from the project.

During 1995, the selective withdrawal system begun in 1994 was completed and began operation at Hungry Horse Dam. The system returns the South Fork Flathead River water temperature regime to natural levels after 40 years of frigid releases in the summer and relatively warm releases in the winter. The improvement in water temperature will lead to better growth rates for fish, better angling and a more natural environment for aquatic insects in the South Fork and the main stem Flathead River.

In 1995, the Department completed water leases on two tributaries of the Yellowstone River for the benefit of Yellowstone cutthroat trout and a tributary of the Jefferson River to aid spawning and survival of brown and rainbow trout. Another lease on Tin Cup Creek in the Bitterroot River drainage was acquired to help maintain rainbow trout spawning habitat.

Jim Posewitz retired from the Department in August 1993 after 32 years with the Department. He ended his career as special assistant to Director Pat Graham to become director of the Helena-based "Orion, The Hunter's Institute", an organization created to sustain hunting and the land and resources it depends on. Early in his career, Posewitz set out to prove that development of Montana's resources – from strip mines to highways – could be accomplished with environmental sensitivity. Although times were often turbulent, many believe Posewitz helped to prove common ground could be found in making environmental decisions. In commending Posewitz, Governor Marc Racicot said " Advocacy can be a courageous pursuit in a bureaucracy because the test of right or wrong is determined by time alone. Over the past 32 years, I think time has proven that Jim Posewitz -- Montana's most tenacious and thoughtful wildlife advocate -- was often right on target".

Montana's Future Fisheries Improvement Program was expanded in 1996. Forty-eight restoration projects were approved for funding. Program cost was approximately $830,000 in 1996 and generated more than $1.8 million in matching funds. Projects enhanced spawning and rearing habitats, improved riparian vegetation and bank cover, reduced loss of fish into irrigation diversions, enhanced stream flows and restored fish passage. Projects were approved for all regions of the state, aiding both cold and warm water fish species.

In 1997, the Department completed a water lease agreement with a water right owner on Mol Heron Creek in the upper Yellowstone River basin to provide instream flows to improve spawning conditions for Yellowstone cutthroat trout in the creek and, ultimately, to increase cutthroat numbers in the Yellowstone River. By 1997, the Department had obtained nine water leases through voluntary agreements with water right owners under the water leasing statute approved by the 1989 Legislature.

Forty-five fisheries habitat improvement projects were approved for funding through Montana's Future Fisheries Improvement Program in 1997. These projects included more than $2 million in habitat improvements at a cost of $685,600 in license dollars, the rest in matching funds. Projects funded through the program will enhance spawning and rearing habitats, improve riparian vegetation and bank cover, reduce loss of fish into irrigation diversions, enhance stream flows, and restore fish passage.

Habitat restoration efforts in the Blackfoot River drainage, primarily for bull trout and westslope cutthroat trout, continued to gain national attention based on accomplishments to date and the landowner/ Department alliances that were being built for the benefit of fish and wildlife. These efforts have restored habitat in 23 streams and affected more than 200 miles of stream and wetland habitat.

The year 1998 marked the settlement of a major portion of a Natural Resources Damage Lawsuit with ARCO on the upper Clark Fork River near Butte. The $215 million settlement is part of a major program to restore a watershed damaged from nearly a century of mining. Many had written the river off. The lawsuit was filed by the state, with the Department as the lead, nearly two decades ago.

Forty-eight fisheries habitat improvement projects were approved for funding through Montana's Future Fisheries Improvement Program in 1998. These projects funded nearly $1.7 million in habitat improvements at a program cost of $770,000.

The Yellowstone River instream flow reservations were again reviewed in 1998, this time by DNRC since the Board of Natural Resources and Conservation was no longer in existence. The review had not been completed by the turn of the century.

On June 10, 1998, bull trout throughout the Columbia River basin, including Montana, were listed as threatened under the federal Endangered Species Act. With listing came federal oversight of bull trout management, as well as the requirement to develop a federal recovery plan for the species. Montana recovery planning began in January 1999 and a draft plan was completed that same year. A final recovery plan is expected in late 2000.

At the end of 1999, the Future Fisheries Improvement Program had funded 191 habitat improvement projects for wild and native fish for a total of $3.8 million, including 49 projects recommended in 1999 by the program's citizen review panel. By improving water quality, restoring river or stream channels and making diversion dams more fish-friendly, fish populations had increased in about 75 percent of projects that had been monitored so far.

By the end of 1999 the Department had obtained water leases on 13 streams, including two renewals. All of the leases are on tributary streams to larger rivers so that improvement in fish spawning and reproduction in the larger rivers can be achieved. The leases are on Mill Creek (where three leases have been approved), Big Creek (two leases), Cedar Creek and Mol Heron Creek, all in the Yellowstone basin,

Tin Cup Creek (Bitterroot), Hells Canyon Creek (Jefferson), Chamberlain, Pearson and Blanchard creeks (Blackfoot) and Rock Creek in the upper Clark Fork River basin near Garrison. The Department also converted its own water rights to instream flow in Cottonwood Creek on the Blackfoot-Clearwater Wildlife Management Area.

During the 1990's, the Department was involved in state water right negotiations with federal agencies and Indian tribes through the Reserved Water Rights Compact Commission. The commission was established by SB76, the law establishing the water rights adjudication system in Montana. The commission negotiates with federal agencies and Indian tribes claiming water rights prior to 1973. Often these negotiations involve waters where the Department has water rights or water reservations. As a potentially affected water right holder, the Department has a Memorandum of Understanding with the commission to be an official observer to the activities of the commission. The Department's role is to advise the commission and its staff when fisheries and instream flow issues are involved in negotiations and to protect any instream rights we may have on the waters involved in those negotiations. Compacts have been completed with several federal agencies and Indian tribes and the Department's water rights were recognized and respected in the final agreements.

> *"...if you had it to do over again, can you think of anything you'd rather done professionally than what you did?"*
>
> *"Absolutely not. It was a wonderful experience, with wonderful people, in what used to be the last best place. And we never ran out of beer."*
>
> ------ Bruce May -- fishery biologist -- following retirement in 1990 after 21 years with Montana Fish, Wildlife and Parks.

FISH MANAGEMENT (HATCHERIES)

"Doubt not but angling will prove to be so pleasant that it will prove to be, like virtue, a reward to itself."

Izaak Walton, 1593-1683

1945 - 1950

WWII was raging in Europe and the Pacific from 1940 to 1945. The Department had several employees serving in the armed forces. It is an honor to list those men here at the beginning of the history of Montana's fish hatcheries:

J.P Campbell	Bob Brink	A.A. O'Claire
Robert Casebeer	C.N. Lindsay	R.H. Lambeth
Lester Newman	J. Thomson	Waldo Vangsness
C.E. Willey	Don Brown	Donald Wright
Ben Whale	Leo LaTray	Emmett Colley
Wm E. Schultz	Forest Keller	Julius K. Stinson
Burke Thompson	Ed Furnish	Bill Thompson
Ken Thompson	Gene Sherman	Ralph Shields
Ralph Snyder	Vern Campbell	Harold Fletcher

WHAT ABOUT KOREAN AND VIET NAM VETS ETC.?

During WW II, the Department experienced difficult times due to shortages of fuel, supplies and men. But, despite these hardships, the Fisheries Division persevered on the strength of their hatchery personnel and maintained the highest quality of hatchery raised fish. Personnel were using old, outdated equipment which required additional time for repairs. Hatchery personnel had to be inventive to keep operations functioning effectively. These men were dedicated to their profession and the goals set by the Department to keep fish production high and distribute them to designated waters. The greater portion of the output of fish from the hatcheries was of a size larger than previous years. Fewer fish in numbers were planted, but the increase in number of pounds offset any numerical reduction.

With the return to peacetime economy after WW II ended in 1945, the Department reviewed and rescheduled a number of projects which had been postponed. The Fisheries Division succeeded in accomplishing all of these goals during the first five years after inception.

Right after the end of WW II, two fish hatcheries were purchased; the Arlee Hatchery and the Bluewater Hatchery, and, right away, construction started at these two facilities to ensure a greater output of fish.

Experiments in planting trout by air were occurring during the early 1940's. The Sunday Star newspaper out of Washington, D.C. printed a photo essay on October 20, 1940 of the Montana Fish and Game Department dropping trout from the air. **(Photos and article included on disc)**

During the 1943-46 biennium, after five years of operation by the Park Service, the fish hatchery at Creston was turned over to the Fish and Wildlife Service. Park Service officials announced that, henceforth, only cutthroat trout would be stocked in the waters of Glacier National Park.

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 on June 13, 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.

It was during the 1944-1946 biennium that a fisheries improvement program began which was to be enlarged as funds, material and trained personnel became available. This program recognized that habitat improvement should go hand in hand with fish propagation and distribution. This program was divided into four fields of endeavor:

1. The building of concrete rearing ponds of the raceway type at those hatcheries which have a sufficient flow of water will make it possible to rear more fish to yearling size, give a better control of fish at all times and allow grading of fish for size, thereby cutting to a minimum the loss by cannibalism and disease.

2. A program of stream and lake improvement which will increase natural food production and provide better game fish habitat in many waters.

3. The development of a rough fish control program. Unless this control is made a major part of our fish program, many of the waters of the state may become less productive of game fish. In the minds of a great many people, the solution of our fishing problems is simply the introduction into the waters of more fish. It is now realized that it is necessary to improve the fish food conditions in the waters themselves and also to reduce or remove the rough fish which are contaminating so many waters. It is necessary to reduce as much as possible rough fish populations in many waters where rough fish compete with game fish in such numbers that a reduction in game fish results.

4. The Department is in the process of acquiring new sources of suitable water for development of new hatcheries and rearing ponds. Whenever possible, the raceway type rearing pond will be installed because of its greater efficiency in fish production. The adoption of better feed formulas, especially in the more heavily oxygenated waters of the raceway type pond, should materially increase the weight of planted fish.

The program was intended to increase facilities for production at the hatcheries and contribute toward greater productivity of game fish habitat in lakes and streams throughout the state.

At the conclusion of WW II in 1945, the Department was in a position to purchase the Arlee Hatchery, later to be called the Jocko River Trout Hatchery, from Clarence Ripley in March 1945. This hatchery had been leased for several years from Ripley, a private

hatchery owner. Ripley became its first foreman and he operated the station from 1945 to 1948.

The Commission approved 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.

Bluewater Springs' Hatchery history begins February 1, 1939, when Senate Bill S1171 in the 76th U.S. Congress was referred to the Committee of Commerce to appropriate $50,000 to construct a federal fish hatchery eight miles east of Bridger, Montana. No further Federal action was taken until June 1943 when the U.S. Fish and Wildlife Service hatched 30,000 cutthroat eggs in the overflow of the spring. It was again recommended that the site be purchased for a federal hatchery. On June 10, 1947, the Montana Fish and Game Commission authorized $3,000 for the purchase of Bluewater Spring. In 1948, construction began on a residence, a two-stall garage, a food storage unit, a small shop, and 10 outside rearing raceways. The first state eggs arrived there from the Big Timber Hatchery in September 1949. Vern Campbell was appointed the first foreman. [It was later noted in the 1960 annual report from the Bluewater Fisheries Station that the Fish and Game Commission was criticized for considering Bluewater Hatchery at all . . . "That it is out in the sagebrush among cactus and rattlesnakes and that the money spent at other hatcheries would produce better than Bluewater". However, since 1950, dedicated hatchery personnel continued upgrading facilities to create an oasis of fish culture in the cactus.]

In the mid-1940's, a live car was successfully designed and tried for holding and feeding fish naturally in streams as an alternative food source. Alternative methods for obtaining early rainbow eggs by transporting early spawners from the Madison to the South Fork to hold in higher degree water kept hatchery personnel and the newly assigned fisheries biologist working to improve the states hatchery system.

A new, larger distribution unit was designed by hatchery personnel during the 1946-47 biennium. This unit was mounted on a two-ton truck bed. Construction plans were published in *Progressive Fish Culturist*. This unit was capable of hauling 600 pounds of fish for greater distances with good results. The tank utilized the LaFevve aerating system which used auxiliary circulation pumps to pump water continuously through the tank or compartments.

Heavy rains, combined with spring runoff, caused the Jocko River to overflow in June of 1948. The Arlee Hatchery grounds were flooded but damage to the facility was kept at a minimum. During this time, local residents and hatchery personnel channelized the

Jocko River using construction equipment. The river was straightened from above the hatchery grounds to a point below the discharge unit to alleviate any further damage in the future from flooding. In 1997, the river reclaimed its original course, taking with it downstream more than 75 feet of earth. **(photo)**?

Between 1947 and 1950, 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 between 1947 and 1950. 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, built at Nelson Reservoir in 1944, received 1¼ 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.

Spawning operations at Georgetown Lake in 1949 yielded 2,737,668 rainbow trout eggs; 4,768,314 cutthroat trout eggs; 3,664,386 grayling eggs and 943,721 brook trout eggs. The Willow Creek station produced 4,738,972 rainbow trout eggs; Lake Ronan 270,536 rainbow eggs and Ashley Lake 983,680 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 3.5 million kokanee eggs annually. The traps on the South Fork of the Madison River produced 3,632,656 brown trout eggs.

Several construction projects dominated the years between 1947 and 1949. New construction at the Arlee Hatchery consisted of a 41-x 84-foot hatchery building complete with a large refrigeration unit, storage, shop and office. Timbers to build this hatchery were brought into the area by railroad and hauled to the existing hatchery site. These timbers were arranged in a unique construction design of the hatchery building. Ten inside concrete tanks measuring 45 inches wide by 32 feet long and a 600-foot-

long by 200-foot-wide brood pond were also built. Additional improvements at the hatchery site consisted of two homes and a four-stall garage with a workshop, all at a cost of $85,000. In 1949, ten 10-feet-wide by 100-feet-long outside concrete raceways were constructed. Wilbur Morin, a hatchery worker from 1951 to 1956, helped to build these raceways while working for the local construction company. Concrete was mixed on-site using a small operated mixer and hauled by hand in wheel barrows to construct the raceways. These raceways are still in use today.

Sixteen concrete raceways, 104 feet long, 10 feet wide and 3 ½-feet-deep, and two circular concrete ponds 40 feet in diameter were completed at the Anaconda Hatchery. A larger pipeline was installed to carry additional water from two springs. An innovative concrete mixing chamber was developed to mix the warm water from one spring with the cold water from another spring to insure a flow of water with a more uniform temperature.

Also, during the 1947-1950 period, 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.

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. In 1949 and 1950, $5,000 was received each year.

Plants of rainbow trout were made by airplane in the North Fork and South Fork of the Flathead River in July of 1949. We don't know if it was a Department or private airplane.

During the 1946-1948 biennium, the Department entered into another cooperative agreement with the U.S. Fish and Wildlife Service. The first agreement between the two services affected the Warm Water Fish Cultural Station at Miles City. Through this agreement trout were planted by our agency into the increasing number of reservoirs being built in eastern Montana by farmers and ranchers to give the public in eastern Montana a trout sports-fishing experience. In this later agreement the Fish and Game Department would be furnishing funds to the U.S. Fish and Wildlife Service hatcheries at Ennis and Creston to purchase excess trout after they had completed their obligations to the National Park Service.

The late 1940's saw 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*.

Photos to include with the 1940's history;
Flood photo of Arlee Hatchery
First Distribution vehicles (1st distribution vehicle and 1st largest vehicle)(Biennial report 1950-52)

Fish Distribution by Hatcheries between 1945 and 1950 (In millions of fish)

July 1944 to June 1945 - 12.6M
July 1945 to June 1946 - 16.1M
July 1946 to June 1947 - 16.2M
July 1947 to June 1948 - 12.7M
July 1948 to June 1949 - 18.3M
July 1949 to June 1950 - 12.4M

Eggs taken at state spawning stations and acquired through cooperative agreements between 1945 and 1950 (In millions of eggs)

July 1944 to June 1945 - 22.3M
July 1945 to June 1946 - 25.6M
July 1946 to June 1947 - 22.7M
July 1947 to June 1948 - 21.3M
July 1948 to June 1949 - 19.9M
July 1949 to June 1950 - 18.8M

The 1950's

The year 1951 marked 50 years of operation by the Fish and Game Department.

No record was found as to when the first plants 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. **(Biennial report 1956-58, photo of plane distribution tank)**

Vern Campbell was transferred to Arlee as manager of the hatchery in 1951. At that time, the brood fish were Donaldson stock that had been purchased and maintained by Clarence 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 1955, in order to expand the gene pool, a brood stock was created by crossing Missouri strain females with Donaldson strain males. All original stock was then disposed of. The Department now had a rainbow trout brood stock 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.

In 1951, the Commission approved the hiring of Jack Bailey as the first Hatchery Biologist. 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.

In 1953, the Commission adopted an extensive new fish stocking and management 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 ¼ mile from portions of streams closed to public access

2. Except for experimental plants or reestablishment of a species, only grayling, rainbow and 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 nonexistent 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.

A program to maintain optimum fish populations was incorporated into the management of the spawning stations in the 1953-1954 biennium. These 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. Eggs taken at these stations were rainbow trout, cutthroat trout, brown trout, kokanee (sockeye salmon) and grayling eggs. The 1953-54 biennial report stated "Eggs furnished to different fish hatcheries in Montana from wild stock and stock that are living under natural conditions make them most desirable for use in Montana because the resulting offspring are adapted to life and reproduction in Montana lakes."

The state's first cutthroat broodstock was established sometime in the mid-1950's according to Robert Mitchell, long-time hatchery man with the Department. The process of obtaining the broodstock was related by Mitchell in an oral interview he had with Art Whitney on November 11, 1993:

RM: Well, Tommy Schurr and myself was detailed with the job of finding some Montana cutthroat trout to start a broodstock in the hatchery system. And they flew us into the South Fork of the Flathead, the Bob Marshall wilderness area, and put us off in there and we tried to find the source of spawn. But it was a big country and we was afoot and we couldn't do anything. It kinda washed out and fell apart at the time, but Walt Allen didn't believe it would die there and the next year he called me in and wanted me to go back in and try to find some good spawning cutthroat. I told him, I said we can't do anything there afoot, it's too big a country. We got to have some horses in there. So, he said take in horses. I said the only way to get horses in there at the time we need them was to teach them to snowshoe or to fly. Well, we'll fly them in, he said.

AW: Is this because it was early in the year and the passes were full of snow and the horses wouldn't make it over?

RM: That's right. There was no way to get in. So he called up Johnson Flying Service in Missoula and wanted to know if they could do it and they said they could. We got a hold of a veterinary in Drummond to go up to the Boyd Ranch where they had a small airstrip. We had three horses we flew in -- two the first trip in and then one. We anesthetized the horses and hog-tied them and moved them by hand into the airplane and flew them in asleep. Drug them out at the airport and let them come to out there (in the South Fork).

AW: How many people does it take to lift a horse into an airplane?

RM: About eight. All lifting hard.

AW: I'll bet. And then when the horses came to after you unloaded them, did it take a long time, were they all right when they came to?

RM: It was very interesting. Two of the horses had been into that country. One of them belonged to a game warden and the other one belonged to Tommy Schurr . . . We unloaded the horses at Big Prairie Ranger Station . . . the third horse had been bought by the Department from over east of the mountains and didn't know what a mountain was. So, when the first two horses we took in begin to come out of it, the veterinary who was there supervising that end of the project said just rest them for a couple days, just turn them loose and don't use them for a couple days. Well, the two old horses that had been in that country, they walked around the edge of the fence for two days . . . Just as much as to say we know where we are but how the hell did we get here. And the other horse paid no attention, just went off to grazing.

. . .anyhow, we worked on that and that wasn't successful. And then the next project was to go in there and fish through the ice in the winter time with a plane and fly the fish out. Well, we didn't have planes big enough to haul the fish out with water so I started experimenting there at the Anaconda Hatchery with some adult fish we had there for display. Anesthetized them to see how long I could keep them packed in ice and then bring them back to life by putting them back in water. We worked out a deal with, we could do it, we could . . .

AW: How long . . .

RM: Oh, I kept them out for 12 hours.

AW: Packed in ice?

RM: Anesthetized with Seconal and they came out of it all right. So that's what we did. We went in there, a crew of us with a couple of airplanes and stayed at the Big Prairie station for a couple of weeks and fished through the ice on Salmon Lake. Made a holding pen for them (the fish that they caught) and cut a bigger hole in the ice and we had a cage we put down there to hold them. And then the pilot . . . we'd pack them in ice and he'd fly them out to the Arlee Hatchery. Vern Campbell (foreman) at the hatchery was bringing them back to life and kept them there at his hatchery. And that's how we got our first cutthroat.

AW: That was the basis of the hatchery's cutthroat broodstock?

RM: Yes.

AW: And about what year was that? I'm pretty sure it was before I went to work in '51 and I remember hearing about it as something that occurred before then.

RM: No, it was in the about middle '50s I think.

Improvements at the state fish hatcheries during the early1950's 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, nine additional dirt ponds at Bluewater and installation of a freezer unit at Great Falls.

The federal fish hatchery at Creston received a large number of rainbow trout eggs from the station at Winthrop, Washington in the early 1950's. Fish from these eggs were widely distributed in waters of northwestern Montana.

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.

Planned future expansion of the Lewistown Hatchery between 1951-1954 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.

During the early 1950's, 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, Art Tangen, at Anaconda did not continue the project.

The Big Timber station was rearing more rainbow trout, some golden trout but fewer brown trout than formerly raised. 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 were planted occasionally but usually only to establish new populations.

During his tenure as a Fish Culturist at the Jocko River Trout Hatchery, Carl Swartz died as a result of processing liver to feed to the trout at the station. It was confirmed that Swartz had a small cut on his hand while he was processing liver through the meat grinder at the hatchery. At this small wound, botulism entered his blood stream and, after three days of medical treatment in Missoula, he died. **WHEN?**

In the early 1950's, 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 Beal 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.

The hatchery biologist reported that the fish hatchery operations in 1955 cost $323,929.88. A total of 15,153,516 fish, weighing 142,830.9 pounds, were distributed. This averaged $2.27 per pound or 2.1 cents per fish.

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 2½ 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 were reported caught in the reservoir since the introduction.

In 1956, there were 22,606,786 fish planted, weighing 131,444.4 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 following its chemical rehabilitation.

Plans for a new lower unit at the Lewistown Hatchery were approved by the Commission on June 22, 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 completed 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 runoff. 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 runoffs, carried tons of silt that was deposited in the raceways. This caused injuries to the fish and resulted in heavy losses.

The Department purchased 10 new, stainless steel fish distribution tanks in 1959 and discarded the worn out and inefficient units. The new tanks were 200 - and 300 -gallon capacity and used bottled oxygen for aeration. The hatcheries also acquired a number of new fish troughs constructed of fiberglass. The troughs were easily cleaned, light in weight and didn't require painting.

All of the state fish hatcheries were reporting good results from pelleted commercial fish foods during the late 1950's. 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.

Fish Distribution by Hatcheries during the 1950's (In millions of fish)

1950 - 24.3M
1951 - 30.0M
1952 - 17.8M
1953 - 17.2M
1954 - 15.1M
1955 - 22.6M
1956 - 25.4M
1957 - 18.4M
1958 - 14.9M
1959 - 17.5M

The 1960's

By 1960, a modern, efficient fish distribution tank had been constructed for the Lewistown station. The unit consisted of a 2,000-gallon, double-walled, aluminum tank that incorporated a number of drainage and aeration features suggested by hatchery personnel. These features included oxygen supplementation through tubing into the water and agitators to remove toxic gases that accumulate from metabolic waste. The Big Springs Hatchery also purchased a mechanical fish loader and pond sprayer. These two items saved the hatchery personnel considerable time.

Jack Bailey, Hatchery Biologist since 1951, left the Department in 1961 to accept a position with the U.S. Fish and Wildlife Service in Alaska. The Hatchery Biologist had fulfilled a real need for nearly 10 years.

Fish rearing operations were discontinued at the Hamilton Fish Hatchery in 1961. The cold water temperatures at the Hamilton station were not suitable for proper growth of the larger trout needed for stocking waters in the area. The hatchery at Anaconda was able to produce and distribute all the fish needed in the Hamilton region. After being utilized for several years as a field station for the Game Division, the Hamilton site was sold to a private buyer in January 1967.

A new water line from a nearby spring provided additional water of good quality for the Bluewater Hatchery in 1961. The hatchery at Somers also acquired additional water (to supplement the supply from the springs) through installation of an auxiliary pump that brought water from Flathead Lake. A concrete pipeline was constructed from Lehman Spring to the lower hatchery unit at Lewistown. At the Giant Springs Hatchery, a new chain link fence was constructed around the ponds to prevent vandalism and keep debris from entering the ponds .

The Department acquired a helicopter in 1962 for fish management projects, particularly for surveying mountain lakes. Equipped with pontoons, the helicopter could land on high, inaccessible mountain lakes to make surveys in a matter of hours. These surveys formerly took days or weeks using pack animals for transportation. The helicopter also provided an excellent means of transporting and planting fish in the high mountain lakes. **(Include photos)**

During the 1960-1962 biennium, the state operated nine hatchery facilities. Brood facilities were located at Arlee, Libby, Emigrant and Big Timber for contained stock. Somers remained the only wild stock facility. Beginning in 1962, personnel at the Libby station started to develop a westslope cutthroat brood stock. Progress continued with the brood stock through 1966.

A review of Department properties by the Commission indicated there were several fisheries installations not being utilized. The Polson Fish Hatchery, located at Station Creek on Flathead Lake, was leased to a group of cherry growers in 1963. Two years later, the unit was exchanged for a fishing access site on the lake. The stations at Ovando and Emigrant were sold to private buyers in 1964 and 1965, respectively. Areas previously stocked by these stations were included in distribution schedules for the hatcheries at Lewistown, Anaconda, Arlee and Big Timber. The lease on the fish hatchery at Red Lodge was officially terminated by the Commission in 1964. Fish had not been reared at that station since the late 1940s. The Department had given a supplemental lease to the City of Red Lodge to use the site as a public museum and city park. The buildings at the McNeil Pike Hatchery near Nelson Reservoir occupied a site leased from the U.S. Bureau of Reclamation. The buildings were sold in 1964. Pike and other warmwater fish were supplied to the area by the Miles City National Fish Hatchery.

Between 1964 and 1966, expansion of facilities at the Arlee Hatchery was necessary to handle enough rainbow trout brood stock to furnish eggs for all of the state fish hatcheries. An engineer incorporated ideas of the hatchery employees into a blueprint and the Commission authorized construction. The completed unit incorporated electrically operated crowder gates and a heated spawning house where egg takers could stand beside the inside raceway, pick up the fish from an elevating lift grate, spawn them and send them to the proper outside pond through return pipes. Later, fisheries' personnel from other states visited the unit and subsequently utilized our plans to improve their own facilities. **(64-66; include photo of Vern at station)**

Vern Campbell, manager of the Arlee Hatchery, developed a unique type of box for hatching fish eggs in 1965. Water was brought into the bottom of the box through a flexible hose attached to a fixed, plastic pipe manifold. The hatching box operated efficiently, used less space and water and required less labor than the old system of baskets suspended in hatchery troughs. Almost all of the state hatcheries now used this box. After various modifications, this hatching box was used by fish culturists throughout the country. Work also started on developing a disposable egg shipping box. Currently, personnel used heavy wooden boxes that, even after disinfection and can harbor disease microorganisms.

At the Anaconda hatchery, outdated, hazardous wiring was replaced and a new pipeline was constructed during the 1964-66 biennium to bring water from the spring to the hatchery. Also, during the period, hatchery personnel at Lewistown constructed several fish distribution tanks and hatchery troughs of fiberglass. The items were built to fit specific needs and work was arranged so as to fit the hatchery schedule. Other state fish hatcheries were working on plans for tanks to be built of fiberglass.

By the mid-1960's special use permits issued by the U.S. Forest Service in 1935 for the spawning stations located on Duck Creek, the Madison River and the South Fork of the Madison River were discontinued. The stations had not been used since about 1945. The buildings were hauled away, the traps removed and the sites returned to as natural a condition as possible. During the operation, these stations provided the Department with many millions of brown trout and rainbow trout eggs. As the stocking of brown trout was discontinued other than for reintroductions, and as rainbow trout broodstock supplied the Department requirements, there was little need to maintain the old spawning stations.

Between 1964 and 1966, at the Bluewater Hatchery, the Department traded surplus hatchery lands for a fishing access site on Bluewater Creek. This hatchery also received a new 1,800 gallon distribution tank for the transportation of fish. The Giant Spring Hatchery received a new fish loader.

During the 1966-68 biennium, sixteen concrete tanks, 40-feet-long, 40-inches-high and 40-inches-wide, were constructed in the hatchery building at the Anaconda station. The old concrete troughs were removed and discarded. The new tanks increased the efficiency of the hatchery in that newly hatched fry could be held in the warmer water inside the hatchery for a longer period. This achieved better growth before the fish were moved to the colder water of the outside raceways.

A small hatchery building was constructed at the Bluewater Hatchery during the 1966-68 biennium. Previously, eggs had been hatched in hatching boxes set up in the large outside raceways, which was very inconvenient. Improvements also included replacement of old wooden tanks at Anaconda with concrete tanks inside the hatchery.

The Bozeman Hatchery, completed in 1897, had assisted in disease investigations and treatments. During the 1960's, personnel trained in fish pathology checked on any problems that developed at state facilities. Overall improvement in fish diet, treatments and distribution marked the decade of the 1950's.

Negotiations with the U.S. Army Corps of Engineers for a hatchery to be provided by the Corps for fishery losses due to the construction of the Libby Dam were proceeding at the end of the decade.

Fish Production during the 1960's - SIBB'S NOTE Check with Bob McFarland on accuracy.

1960 - 13,142,385
1961 - 15,311,481
1962 - 8,973,279
1963 - 11,935,242
????

Egg Production during the 1960's

1960-1961 - 19,800,187
1961-1962 - 18,565,971
1962-1963 - 19,781,556
1963-1964 - 18,126,334
??
1965 - 9,826,389
1966 - 11,730,922
1967 - 10,259,224
1968 - 14,003,881
1969 - 9,254,427
1970 - 9,926,534

The 1970's

By 1970, brood stock improvement had made great leaps. At the Arlee station, the breeding program represented 18 years of selective breeding, which included monitoring growth rate, survival, coloration, body form and resistance to disease.

Anticipating some future needs for expanded fish rearing facilities and replacement of some of the older, more unproductive units, the Department investigated some of the flowing springs throughout the state. An artesian well with an excellent flow of good quality water, situated near Creston in the northwestern part of the state, was purchased in 1970.

A century of fish culture was marked in the U.S. in 1971. The first fisheries commissioner, Spencer Fullerton Baird, was appointed to his position by President U.S. Grant in February 1871. He held his post on the U.S. Fish Commission from 1871 until his death in 1889.

The recurring problems associated with silt deposits and injuries to fish in the raceways of the lower unit of the Lewistown Hatchery each spring from annual high water flooding were eliminated through construction of a canal and pipeline system in 1970. This system brought water directly from Big Springs to the lower hatchery, picking up the water from Lehman Spring on the way. Only spring water can be taken into the hatchery. Runoff from the drainage above the hatchery was entirely bypassed but creek water could still be used as needed.

Fish hatchery operations during FY73 were maintained at relatively the same level, with production capable of meeting the management requirements for Montana waters. An additional residence was constructed at the Bluewater Springs Trout Hatchery near Bridger and old residences were replaced at the Jocko River Trout Hatchery at Arlee and Big Springs Trout Hatchery at Lewistown. Negotiations were continuing with the Corps of Engineers for construction of a fish hatchery near Lake Koocanusa to provide trout for the reservoir and its tributaries in mitigation for the loss of the river fishery.

Libby Dam, constructed by the Corps of Engineers on the Kootenai River, was completed and water was stored early in 1972. The sport fishery that existed on the river was flooded by the impoundment, Lake Koocanusa. After a long series of negotiations and on-site inspections relative to the destruction of fish habitat caused by the construction of the dam, the Corps agreed to build and fund a trout hatchery to be located at Murray Springs near the town of Eureka to mitigate the loss of the river fishery and to maintain a desirable sport fishery in the reservoir.

In 1973, two hatcheries received improvements. At the Arlee hatchery, the manager's old log home built in the 1940's was replaced with a modular residence. At the Bluewater hatchery, an additional residence was built to house personnel. **(photo of log home at Arlee)**
Studies made by Region 3 fisheries personnel on the Madison River drainage indicated that the stocking of catchable trout in a stream with good natural reproduction resulted in poorer quality fishing than when the stream was not stocked. Based on the Madison River study, the Commission approved revision of the fish planting policy to include a prohibition against planting catchable size trout in streams with a thriving wild trout population. The first application of this policy was in 1974. Compared to previous years, there was a 70 percent reduction in the number of catchables planted in streams and a 40 percent reduction in the number of stream areas planted.

Robert Mitchell, Anaconda Hatchery Manager stated in March 1975 that the reduction in number of catchables planted in streams resulted in a 20 percent reduction in fish food needs statewide. As fish food comprises 15 percent of the hatchery budget, this meant a 3 percent savings in the overall hatchery budget.

By March 1976, Jim Vashro, fish culturist at the Arlee Station, had transcribed all available pre-1953 fish planting records onto forms so they could be keypunched for computer data retrieval.

The Murray Springs Hatchery was completed in October 1979 and is operated by the Department of with Corps of Engineers funding. Most of the westslope cutthroat reared at the hatchery were released in the Libby project area to supplement the natural populations.

By the mid-1970's, hatchery personnel were beginning to use computer-based data sheets for record keeping. Preliminary efforts were made to start incorporating specific hatchery record keeping values into a computer-based program. Not until the mid-1980's would hatchery personnel receive their first computers on station and begin using the first of several hatchery computer programs.

Fish Planted during the 1970's

1970 - 9,356,460
1971 - 7,179,004
1972 - 10,264,288
1973 - 9,104,766
1974 - 8,462,577
1975 - 9,456,460

SIBB'S NOTE - Obtain additional information from Bob McFarland. Records found are contradicting.

The 1980's

In the early 1980's, new strains of wild rainbow trout had been introduced into Montana waters, one from Wyoming -- Lake DeSmet -- and one from California --Eagle Lake. The addition of these two strains of rainbow trout could improve the quality of some lake and reservoir fisheries. The Lake DeSmet rainbow was first introduced into Willow Creek Reservoir near Harrison in 1977 and had produced rainbow averaging 2-3 pounds within 3-4 years after introduction. As a result of the introduction, Harrison Lake had yielded nearly two million eggs for hatchery propagation and planting in state waters since 1983.

The use of computers for fisheries data increased over the years as data processing equipment became more sophisticated. By 1980, the computer files contained a catalogue of lake and stream names and locations, survey information, fish planting records, data from fisherman logs (diaries kept by cooperating fishermen) and data from fishing pressure surveys.

The 1980's found the first women working in the hatchery system. Teresa Perkins was employed as a hatchery worker at the Yellowstone Trout Hatchery at Big Timber from 1980-1982. From 1985-1998 Sibley A. Malee-Ligas worked at the Arlee Hatchery, as a fish hatchery worker, Assistant Hatchery Manager and Fish Culturist. She was the first woman to achieve a management level position (Assistant Manager) in the hatchery system (However, Assistant Manager positions were eliminated from all hatcheries in 1987 and persons in those positions became Fish Culturists). From 1987-88, Kate Walker-Smith worked as a Fish Culturist at the Yellowstone Trout Hatchery in Big Timber.

For many years, the U.S. Fish and Wildlife Service provided all of Montana's needs for cool water fishes (walleye and northern pike) and warmwater fishes (largemouth and smallmouth bass) through the National Fish Hatchery at Miles City. However, as an economic measure, the USFWS discontinued operation of the hatchery on March 31, 1983. Since April 1, 1983, the Miles City Hatchery has been operated by the Department under a 30-year lease agreement. The Department began renovation and expansion at the hatchery in 1987 using federal and state funds.

In December 1983, at the Jocko River Trout Hatchery, Redmouth (*Yersinia rukeri*) Serotype 2 was discovered in the Arlee rainbow broodstock. Captured brown trout and Eastern brook trout in the water supply ditches tested positive for IPNV (Infectious Pancreatic Necrosis Virus). The water supply ditches and springs were disinfected and all trout removed. The Arlee strain of rainbow has never tested positive to the IPNV.

The 1983 Legislature approved funding for improvements at the Giant Springs Hatchery. Construction began in June 1984 and was mostly completed by August 1985. The old hatchery building was demolished and a new one constructed, as was a new shop building. Outside improvements included replacement of nine old round ponds and six rectangular raceways with twenty-four new rectangular raceways. The new hatchery building now had 20 small fiberglass troughs and 20 larger fiberglass troughs. A pac-column was added to treat all water entering the hatchery building but not the outside water. A visitor center was added to the building, allowing visitors to observe all phases of hatchery production. Housing was updated with the construction of a new residence. The addition of a waste settling pond allowed water to be treated before leaving the hatchery grounds.

In California, the Eagle Lake rainbow had been very successful in lakes and reservoirs where large populations of lake chub existed, as this was their primary food source. Under these ideal conditions, they averaged 3-7 pounds, with some exceptional individuals achieving weights up to 15 pounds. They were first introduced in Montana into Hebgen Reservoir in 1983 in an attempt to utilize the existing large Utah chub population. As of 1984, the success of this introduction had not been determined.

Murray Springs started out as a brood station for westslope cutthroat trout. The original stock of cutthroat was moved up in 1979 from the Jocko River Trout Hatchery in Arlee. In 1983, a new westslope cutthroat stock was started at the Washo Park Hatchery to replace the stock at the Murray Springs hatchery. During the summers of 1983 and 1984, 6,400 fish were collected from 17 drainages containing genetically pure westslope cutthroat. These drainages were tributaries to Hungry Horse Reservoir and the lower Clark Fork River. Both fluvial and adfluvial fish were collected. These fish were taken to Murray Springs Hatchery where they were acclimated to a hatchery environment and commercial feed. One half of the surviving fish were transferred to Washoe Park Hatchery in the fall of 1984.

By 1984, the DeSmet rainbow was introduced into Clark Canyon and Canyon Ferry reservoirs.

In 1984, a new well was drilled at Rose Creek near Creston, producing 2,000 gallons/minute artesian water for a proposed new hatchery site.

Work began in 1984 at the Jocko River Trout Hatchery near Arlee. The springs providing the hatchery water supply were enclosed so the rainbow trout broodstock would be more adequately protected from possible contamination from outside sources.
Surface water spring No. 2 at the Jocko River Trout Hatchery was buried in 1984 to capture more water at the low flow levels.

In 1984, high mountain lake surveys for the westslope cutthroat trout program were conducted by hatchery personnel. Hatchery personnel were to plant westslope cutthroat into the Bob Marshall Wilderness Area by horse back for the next ten years. This was done by S. Kienow of the Flathead Lake Hatchery.

In 1984 and 1985 major reconstruction took place at the Yellowstone River Hatchery. The old hatchery building was torn down and replaced with a new building, utilizing the existing hatchery slab and raceways. Other improvements included a laboratory, office, feed room and crew room. A new water collection system was buried in the spring area, allowing the water to be collected sub-surface to prevent contamination from above ground collection systems. Unfortunately, the flows didn't increase. Four new outside raceways were also built along with a new residence at a total cost of $510,320. The old green hatchery residence was sold in 1987. Until it was sold, this residence had been rented out to the public.

During 1985, a new drain system and upper raceways were built to improve the isolation and reuse capabilities at the Jocko River Trout Hatchery.

The last year kokanee were collected from Flathead lake spawning sites by the Flathead Lake hatchery was 1985. In 1986, a major kokanee stocking program for Flathead Lake was installed for a period of six years with no results. Pen-rearing of kokanee was done during this period in Flathead Lake and proved to be unsuccessful.

Poor spawning success at Murray Springs for westslope cutthroat facilitated these fish being moved to the Washo Park Trout Hatchery at Anaconda in 1986. Murray Springs has 52 degree F year-round water temperatures which had adverse effects on maturation, fertilization and eye-up of cutthroat sperm and eggs.

Kamloops rainbow had been suggested as a possible brood fish for Murray Springs in 1987. However, Ennis National Fish Hatchery had a Kamloops brood stock so Murray Springs continued to raise fish as a production station into the 1990's for northwest Montana and the Koocanusa drainage. Murray Springs continued to raise over 500,000 westslope cutthroat, Kamloops or Gerrard rainbow, Eagle Lake rainbow and Kokanee salmon each year. Murray Springs filled the fish culture needs for Northwest Montana and the surrounding waters.

Washoe Park's mission was changed from that of a multi-species production station to a brood hatchery in 1987 and that year was the last year for rainbow trout production. After 1987, only westslope cutthroat were produced in any significant numbers.

During 1987, the entire complex at the Miles City Hatchery was expanded. The hatchery is located 1.5 miles southwest of Miles City, just off the west exit (135) if Interstate 90. There are 45 rearing ponds varying from ½ to 3 acres in size, providing more than 50 water surface acres for fish production. The Yellowstone River provides water to the new facility. Once inside the hatchery building, the water is filtered, aerated and can be heated to feed 65 rearing and holding tanks of various sizes and 320 incubation jars. Also, the building contains a visitor center and aquarium with an informative display.

In 1988, at the Jocko River Trout Hatchery, intake spring No. 1 was covered. A new pipeline was installed 10 feet below the existing pipe to collect more water and a new pipeline was built to the old junction box. Because of low water levels at the hatchery due to drought, the governor signed an emergency declaration to save the Arlee rainbow brood stock.

A major renovation of the eighty-year-old Washo Park facility began in 1988 with the replacement of eight raceways and the construction of a round display pond.
Construction projects and improvements at the Big Springs Hatchery in Lewistown in the 1980's included replacing the inefficient and aged "rockwall" ponds and raceways with cleaner, production-friendly concrete raceways. The indoor egg- and fry-rearing space also received a facelift as troughs were added and old troughs were sealed. An addition to the main hatchery building was added late in the decade which increased upper hatchery production space significantly. Siding and roofs were replaced on several structures

At the Miles City Hatchery, up to 12 different species of fish can be reared, with production occurring throughout the year. In the spring, cool water fish eggs (walleye and northern pike) are collected and fertilized from wild populations. Most come from Fort Peck Reservoir and some are received from other states, if available. Eggs are then transferred to the hatchery and measured into hatching jars. After a 10-12 day incubation period, hatched fry (1 to 3-day-old fish) are either stocked directly into public waters or into rearing ponds to be raised to fingerling (2-4 inch) size. During the summer, warm water species (large and small mouth bass) are raised. Brood stock (spawning gametes) are released in June into ponds where they will build nests and release eggs. After eggs hatch (3-5 days), fry are seined off and

transferred into a rearing pond to become fingerlings. **(Where are brood stock held before you release them? Sibb's question)**

At Miles City, rearing ponds are fertilized with organic and inorganic fertilizer to maintain nitrogen and phosphate ratios and levels for maximum food base (zooplankton production). Before fingerlings depleted the food supply, usually 5-6 weeks after being stocked into rearing ponds, ponds are then drained, the fish are collected and distributed. Some ponds are refilled, stocked with fingerlings and drained 6-8 weeks later, producing advance fingerlings (4-6 inch fish).

In the fall of each year, with lower water temperatures, more than 100,000 rainbow trout are transferred to the Miles City Hatchery from one of the cold water hatcheries and the crew distributes them to 65 different reservoirs in southwest Montana.

Miles City production shifts to chinook salmon and lake trout (if requested) in the fall and winter. Different year classes of bass brood stock are held year round, fed throughout the off-season for growth and maintenance. Crappie, tiger muskie, sturgeon, and various species of forage fish have been raised as requested.

However, much of the hatchery's efforts are concentrated on raising walleye. As many as 130 million eggs have been collected from Ft. Peck Reservoir (Nelson Creek spawning station) and 60 million fry and two million fingerlings were stocked into Montana's public waters.

A manager, two fish culturists, and three seasonal employees at the Miles City Hatchery use various cultural practices to increase production, maintain facilities, and distribute fish, making as many as 150 plants across the state.

The original brood stock of McBride cutthroat at the Yellowstone River Hatchery came from 15 pairs of fish in 1969. More eggs were taken from McBride Lake in 1980,1982,1985,1986 and 1987 to supplement the original egg take. A new spawning scheme was written by Daryl Hodges, hatchery manager, and approved by Robb Leary, the geneticist contracted by the Department, so these fish could be used effectively to gain their genetic input to the brood stock. The scheme minimizes the loss of genetic variation due to inbreeding or selection. Genetic testing over the last 15 years has shown that the change in genetic variation has been comparable to the change that would take place in a wild population.

In December 1987, zero water was available to the Jocko River Hatchery due to low flows. All fish were moved in an emergency hauling to Murray Springs Trout Hatchery 10 miles northwest of Eureka. Winter driving conditions and long days gave all fish culturists a new appreciation of hauling fish. Fish culturists from Giant Springs Hatchery in Great Falls, Murray Springs Hatchery in Eureka, and the Jocko River crew hauled fish for four days to complete the transfer. Fish were hauled back in May of 1988 when the water returned and flows were determined suitable to sustain fish.

In 1987, Daryl Hodges, manager at the Yellowstone River Hatchery, invented a low water level switch using a simple push button and a plastic bottle. When the bottle of water drains due to low flow, the weight is taken off of the switch which trips an automatic phone dialer to call the homes of the employees. It is now used at several hatcheries in the state.

During the 1970's and early 1980's, the Yellowstone cutthroat trout brood stock at the Yellowstone River Hatchery was occurring losses due to *Nephrocalcinosis* and fungus infections after spawning. This prevented the proper numbers of 3-year-old fish to be held over to 4-year-olds. This decreased the number of 3-year-old males crossing with 4-year-old females to prevent inbreeding. The problem was solved by decreasing feed levels given the brood stock. This decreased their fat level, enabling them to better handle the stress of spawning. This allowed them to produce the mucus they need to keep off the parasites that kill tissue that fungus attack. Restripping of any remaining eggs out of the fish one week after spawning was started. This stopped the absorption of the protein in the eggs by the female.

Overloading a fish with protein can be a factor in protein. By doing this, and decreasing the feed levels, *Nephrocalcinosis* was virtually eliminated. This allowed 250 females to be held to 4-year-old fish. Crossing these with 3-year-old males created a large population contributing to the future brood with no inbreeding. This was a definite help in preserving genetic variability. It also increased egg production from around 900,000 eggs per year to 1.4 million eggs per year.

Until the mid-1980s, the Big Springs Hatchery remained primarily an Arlee rainbow production facility. Some DeSmet production occurred, but it wasn't until later that decade that Big Springs fell into a "strain evaluation" mode. Production then moved toward Eagle Lake, DeSmet, McConaughy, and Kamloops rainbow trout along with the ubiquitous Arlee rainbow.

Electrical problems had plagued the Jocko River Trout Hatchery for a number of years. For many years, the condition of the fish was blamed on poor nutrition or improper balanced nutrition. A triple dose of vitamin C was added to food to try and alleviate the crooked-back syndrome. It wasn't until the mid-1980's, while employees Jim Crepeau, Jack Boyce and Howard Erickson were sorting fish in the water, that they discovered that it was electrical current hitting the fish and injuring their spinal cords that gave them the crooked back. Since this time, the hatchery had lost hundreds of 3-and 4-year-old brood fish to the electrical current. Working with the Mission Valley Power Company and using funds from the Department, the spawning station was completely rewired, new boxes placed at the hatchery and spawning house, new ground wire around the fence enclosing the brood fish. But, the hatchery was still plagued with electrical problems killing the fish. Luckily no personnel have been injured. But the loss of fish had cost the Department hundreds of thousands of rainbow eggs, not to mention the loss of fishing opportunity for the retired brood fish when they were stocked each fall and winter in state waters.

In 1987, the new Bluewater Hatchery manager, Gary Shaver, (previously at the Lewistown Hatchery), proved all historical fish health problems at the hatchery were environmental in nature. Since that time, fish culture techniques have been established, providing pathogen-free operation of the hatchery. One million fish (50,000 pounds) are produced annually and planted from Ekalaka to Eureka, quelling all past criticism of the hatchery.

From 1989-1991 in a cooperative effort with the U.S. Fish and Wildlife Service, the Bluewater Hatchery raised an endangered species of cutthroat trout. **(WHICH ONE?)** In 1989, 9,200 fish were planted, providing several times more fish than were known to exist in the wild in 1973. These fish are now off the endangered species list. **(WHERE WERE THE FISH PLANTED?)**

Since 1988, Bluewater Trout Hatchery has overwintered the Department's large- and small-mouth bass brood stocks (six year classes) from the Miles City hatchery.

Computers arrived at the Hatcheries by the mid-eighties. Preliminary hatchery computer programs were being written for use at each station. The first of these programs resulted in failure to communicate what the hatchery system needed in terms of their record keeping. Stuart Brittain, a computer technician at the Bozeman Regional Headquarters designed and wrote the first useable hatchery computer program titled HATCH (and later HATCH2). These programs enabled hatchery personnel to keep fish production and brood records, fish disease and treatment records, fish food accounting, egg production and sale of surplus eggs and other hatchery records.

In the 1980's, Murray Springs continued to produce 500,000 to 700,000 fish a year comprised of westslope cutthroat, several species of rainbow, and kokanee salmon. Up-welling cylinders were used for hatching eyed as well as green eggs.

A U.S. Fish and Wildlife Service-sponsored cold water fish culture training course was offered to all hatchery employees in the 1980's and continues to be available to new and interested employees.

The 1990's

Low flows in the early spring of 1990 at the Jocko River Hatchery resulted in the release of production fish in March into Foys Lake for a 100% loss due to low oxygen levels. Personnel transported half of the brood stock to Murray Springs once again and kept the production fish alive reusing available water.

In 1991, low water at Lake Mary Ronan caused low kokanee eggs takes. In 1992, the first Merlin trap was installed in Lake Mary Ronan for egg collection. Beach seining was not used during this year. The Merwin traps were very successful.

Nine test wells were drilled in May of 1990 to establish the ground water levels at the Jocko River Trout hatchery. This information was used in determining the construction needed to extend the original pipeline from the intake spring to the hatchery.

In 1990, yellow perch were discovered in Rogers Lake and caused a collapse of the grayling population in the lake. The population was restored with Red Rocks lakes grayling. In 1991, Red Meadow Lake provided grayling eggs for the entire state due to the collapse of the Rogers Lake population.

In 1991, a new 24" pipeline was installed at the Jocko River Hatchery, extending the pipeline installed in 1988 to collect more water. This new pipeline extends from No. 2 manhole to the discharge unit at the west end of the hatchery. The bypass water system to the brood, drain system added and reuse system updated.**(CLARIFY LAST SENTENCE)**

In 1991, renovation of the water supply was started at the Washoe Park Hatchery. A system of five wells (44.5 F) replaced an open spring, the warm spring (56.5 F) was enclosed and a new intake structure to remove water from Warm Springs Creek was built. New supply lines carried water into an aeration tower containing pac-columns and a trash rack where debris could be removed from the creek.

Yellow perch showed up in Lake Mary Ronan in 1992. By 1995, Yellow perch were captured in large numbers in the Lake with the use of the Merlin trap.

Each year from 1992 through 1994, the Yellowstone River Hatchery did Erythromycin injectable field trails. It was part of an Investigational New Animal Drug Study through the University of Idaho in Moscow. Our part was to provide samples and information to determine the retention time of the drug in tissue and eggs of fish. Fish would be injected at a certain dosage. Then, samples were taken of tissue and eggs and sent to Moscow. All fish that samples were taken from were necropsied using a standardized system to determine general health. Using the actual weight of each fish, the actual dosage used was calculated. The samples were analyzed by the University of Idaho and, by using the data, they were able to determine retention time and at what levels fish started to show adverse effects. Due to the studies, the U.S. Food and Drug Administration gave this hatchery a 28-day withdrawal period for fish injected with erythromycin. This is the shortest withdrawal period in the country. This hatchery was praised for professional sample collections and data recording. A computer program developed here that calculated actual dosages for each fish was a big help in determining safe levels to use in fish.

The 1993 Legislature approved funding for the Giant Springs Trout Hatchery water quality improvements.

Whirling disease "arrived" in the United States in mid-century. The disease was identified in Montana waters in 1994. This disease is caused by *Myxobolis cerebralis* a parasitic protozoan. It affects salmonid species to varying degrees and can be lethal. It is particularly damaging to hatchery operations which have conditions allowing the complete cycle of the parasite. Also, the inherent crowded conditions found in intensive trout culture allow high infection rates. Discovery of the disease sparked a flurry of protective measures at Big Springs Hatchery. Guidelines were established to eliminate chance facility contamination, including a "no contact with receiving waters" policy at stocking locations and disinfection of any exposed hatchery equipment. Possible vectors of disease transmission were then identified.

By the early 1990's the fifty-year-old Bluewater Hatchery's physical features were aging and required extensive maintenance every year. As part of the statewide hatchery reconstruction program started in 1984, the state Legislature finally approved spending authority of 4.4 million dollars for complete renovation of the facilities by the year 2001. Legislative funding occurred between 1991 and 1997.

A new hatchery building was completed at Washo Park in 1994.

In 1994, it was determined that Washoe Park should be the permanent home for the westslope cutthroat trout and the Murray Springs brood population was planted out.

By 1995, Warm Springs Creek water was no longer used at Washo Park. In order to improve the quality of the water supplying the brood stock raceways, a change of diversion on the creek water right permitted an increase in the water which could be removed through the well system developed in 1991. This eliminated the stressful winter water temperatures and siltation during runoff events, improving the health of the cutthroat trout.

On April 20, 1995, only 120 g.p.m. was flowing into brood raceways at the Jocko River Trout Hatchery. Half of the brood stock was moved to Murray Springs. Remaining fish were kept alive using available water and oxygen supplementation. On May 22, water appeared in the open water supply ditch draining to the brood raceways. Water had disappeared in the early spring. This was the first time to anyone's knowledge that this had happened. On May 31, a flow of 1,413 g.p.m. was measured into the brood raceways.

The winter of 1995-1996 produced a lot of snow in the mountains. Spring runoff from melting snow caused major flooding in the Yellowstone and Boulder rivers. It was called a 100-year flood. Before the water reached the Yellowstone Hatchery in 1996, the broodstock in the outside raceways was moved to the Bluewater Hatchery (Because of its present pathogen free status, Bluewater Hatchery has held the Yellowstone cutthroat brood stock to prevent exposure to disease when Big Timber Hatchery is flooded by the Yellowstone River). Water levels in the raceways nearly reached the top but didn't overflow. All raceways were cleaned and disinfected before the fish were returned to their home.

In 1996, a new spring collection pipe was installed at the Flathead Lake Hatchery in the spring area 4,800 feet west of the station.

In April 1996, whirling disease was found in the Missouri River below the Canyon Ferry/Hauser/Holter reservoir complex. The whirling disease parasite is devastating to native trout populations and had to be kept out of the hatchery. Fisheries Division Administrator Larry Peterman and Department Director Pat Graham decided that it would be best to protect the hatchery's intake water supply. They obtained an emergency redirection of funds from Governor Marc Racicot on September 5, 1996. By the fall/winter of 1997, the project was substantially completed. The alterations intercepted the water before it reached the surface, eliminating the possibility of surface contamination. The old intake structure used surface water piped to the hatchery.

In April of 1996, Dr. Fred Allendorf, at the University of Montana, requested that the Yellowstone River Hatchery send viable sperm from 10 of our Yellowstone cutthroat to a colleague at a major government fish cultural genetics lab in France. French geneticists are looking for genes of major importance in the rainbow and cutthroat trout. Montana will benefit by learning more about the genetics of its state fish.

In 1997, the Yellowstone and Boulder rivers flooded again in what was called a 500-year flood. Again, the fish were moved to Bluewater Hatchery. Flood water completely covered the outside raceways. It was two feet deep in the garage/shop building and up to the top of the front porch of the hatchery. Ducks were swimming in the parking area. The wet ground caused a huge tree to fall down across the county road,

cutting off power for several hours while state, city and county crews, with help of neighbors, removed the tree. This flood required a great deal of clean up.

Another flood threat occurred at the Jocko River Hatchery in May 1997. Half of the 3- and 4-year-old spawners were moved to Murray Springs. They were moved back home again in June 1997.

In 1997, cooperative studies were conducted with the Region 2 fisheries biologists in Missoula. Hatchery personnel kept on station 1-year-old fish to be used in an experiment for studying the results of staples versus sutures to close fish abdomens after inserting a G.P.S. battery signal device.

In 1997, in accordance with the agreement between the U.S. Fish and Wildlife Service and the Department to prevent listing of the species as endangered, Bluewater Trout Hatchery began raising and planting native fluvial Arctic grayling, a species of special concern. This was a five-year restoration project to reintroduce self-sustaining populations into five historic waters. **(WHAT ARE THE FIVE HISTORIC WATERS?)**

In 1997, the rock retaining wall on the lake side of the Flathead Lake Hatchery was replaced due to erosion and high water during the storms of 1995 and 1996. The original wall was layed up by the W.P.A. boys in the early 1930's.

Hatchery mitigation to solve problems with Radon was completed in June 1997 for all Hatcheries.

During 1997, the Fish Health Laboratory at the Giant Springs Hatchery was moved out of the hatchery into the newly renovated old residence and a new hatchery residence was built.
.
At the Flathead Lake Hatchery, a new metal roof was installed on the hatchery building in 1998.

Between April and June 1998, funds were used to increase the water flows at the Jocko River Trout Hatchery during low-flow and drought periods that could occur in early spring. The project covered up hundreds of feet of open water supply ditch that feeds the brood raceways. Benefits of this project included a covered water supply ditch to prevent contamination from several diseases that can be transported by birds, animals and the public.

Initial planning for the Water Treatment Facility at Giant Springs began in 1998. Plans and specifications were drawn up during the winter of 1998-1999 for the facility and bids went out in January 1999. Construction started in April 1999 and the project was completed by September 1999. Pac-columns, new pumps, new piping and the new pump house are now in place.

A live stream display and a visitor center were completed at the Washo Park Hatchery in 1999. Also, replacement of the manager's residence and a residential duplex began in the fall of 1999.

The "Secure Water Supply" project was awarded to Williams Bros. Construction Co. in the spring of 1999 and was completed in November of 1999. The project all but eliminated whirling disease vulnerability by enclosing the hatchery water source in pipes or other structures. Both the upper and lower units of Big Springs Hatchery were secured in this way. The lower unit water supply was contained within a galvanized arch and pipe, and the upper unit's water within a pipe. Nitrogen supersaturation issues at the upper unit were addressed with a single, high volume degassing structure consisting of four large "packed columns". The lower unit's water is degassed through a series of screened weirs within the arch-covered canal and individual packed columns at the head of each raceway. Cost of design and construction of the Secure Water Supply project was 1.6 million dollars.

Prior to the Secure Water Supply project, hatchery upgrades improving water quality and maximizing productivity at Big Springs Hatchery included a new water line and aeration tower to the external hatch

room, new lower raceway gates and walkways, aeration nozzles on indoor raceways and troughs, magic finger aeration in the supply canal, and a quarantine room/egg chiller.

During the 1990's, hatchery production at Big Springs kept pace with the evolving Missouri River reservoirs management scheme. Egg sources were established, growth was manipulated and strains were evaluated to supply these important fisheries with fast growing, longer lived and "wilder" varieties. Desmet and, eventually, Eagle Lake rainbows replaced the Arlee as strains of choice as fishery managers struggled with survivability and catch rates in the Canyon Ferry-Hauser-Holter complex. From the mid-90's until the present, overwintered rainbows have occupied 85% of rearing capacity at Big Springs.

In addition to its production capacity, Big Springs Hatchery continued in the 1990's with various controlled studies. Formulated feeds, aeration devices, tetracycline marking, and disease treatments were evaluated. "Species of Special Concern", such as grayling, were reared for reintroduction projects. "Temperature unit" manipulation was performed with Willow Creek (Desmet) rainbow trout as part of a whirling disease study. These and other studies continue to be an important component of the overall hatchery operation.

By the mid-1990's, kokanee stocking from Giant Springs Hatchery into Flathead Lake ceased and shifted to Kokanee stocking into Hauser Reservoir. In the 1998 stocking year, Steve Leathe, Great Falls Regional Fisheries Manager requested more kokanee for Hauser Lake. Chinook salmon (200,000) were to be stocked from the hatchery into Ft. Peck Reservoir.

At the end of the 20th century, HATCH and HATCH2 computer programs were being used by all state fish hatcheries. All hatcheries were coming of age with the use of cellular phones and fax machines, and many hatcheries were "on-line".

A river is never quite silent; it can never, of its very nature, be quite still; it is never quite the same from one day to the next. It has its own life and its own beauty, and the creatures it nourishes are alive and beautiful also.

---- Roderick Haig-Brown, *A River Never Sleeps*

FISH MANAGEMENT

I fish not because I regard fishing as so terribly important, but because I suspect that so many of the other concerns of men are equally unimportant – and not nearly as much fun.

— Robert Traver, *Anatomy of a Fisherman*

1945-1950

During the 1944-46 biennium, a fish improvement program was underway which was to be enlarged as funds, material and trained personnel became available. It was recognized that habitat improvement should go hand in hand with fish propagation and distribution. The program was divided into fields of endeavor as follows:

1. The building of concrete rearing ponds of the raceway type at those hatcheries which have a sufficient flow of water will make it possible to rear more fish to yearling size, give a better control of fish at all times and allow grading of fish for size, thereby cutting to a minimum the loss by cannibalism and disease.

2. A program of stream and lake improvement which will increase natural food production and provide a better game fish habitat in many waters.

3. The development of a rough fish control program. Unless this control is made a major part of our fish program, many of the waters of the state may become less productive of game fish. In the minds of a great many people, the solution of our fishing problems is simply the introduction into the waters of more fish. It is now realized that it is necessary to improve the fish food conditions in the waters themselves and also to reduce or remove the rough fish which are contaminating so many waters. It is necessary to reduce as much as possible rough fish populations in many waters where rough fish compete with game fish in such numbers that a reduction in game fish results.

4. The Department is in the process of acquiring new sources of suitable water for development of new hatcheries and rearing ponds. Whenever possible, the raceway type rearing pond will be installed because of its greater efficiency in fish production. The adoption of better feed formulas, especially in the more heavily oxygenated waters of the raceway type pond, should materially increase the weight of planted fish.

The program was intended to increase facilities for production at the hatcheries and contribute toward greater productivity of game fish habitat in lakes and streams throughout the state.

With the release of men, materials and equipment following the end of WW II in 1945, the fisheries program assumed new aspects. The fish hatcheries were recognized as the keystone of the Fisheries Division. The Biology Section, under Charles K. Phenicie, the first fisheries biologist hired by the Department in 1947, was established to assist the hatchery system. The new section was to be the technical branch of the Fisheries Division. Its office was located in the capitol Building.

Large amounts of money were being spent on the hatcheries. That this money not be spent in vain, a staff of biologists was added to the fisheries division to aid the hatchery men, who were already over burdened with work, by finding answers to the questions of distribution. As an integral part of the program, biological work began July 1, 1947, complimenting the hatchery system in an effort to solve its problems of distribution to insure the greatest return possible of liberated fish from the hatcheries. 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. This work dealt not only with hatchery fish, but with all phases of fish life. It was believed this would strengthen management by providing scientific data on which decisions could be made. The biologists' problems were to begin when the hatchery truck reached the stream and terminated with the fish safely nestled in the fisherman's creel. It was believed their work would result in a greater percentage of fish in the creel and fewer dying before they were caught.

However, just prior to hiring its own fisheries biologist, the Department was lent a biologist from the U.S. Forest Service. Robert Mitchell was working as a hatchery man at the time and recalled this time in an oral interview with Art Whitney on November 11, 1993:

> AW: The first biologist you had anything to do with in 1947 was this one from the forest service, Ray West, who had been loaned to the Department. The Department didn't have a fish biologist then.
>
> RM: Ray West had a planting program that was a huge thing. They planted every water; they went by the map, any body of water they could see with a name they put a planting program on it. The hatcheries raised billions of fry and planted them in all directions. Anytime they could get a sportsman's club or outfitter or anything to plant them then. They made a lot of mistakes.
>
> AW: I remember looking at those five year plans when I first started out and it seems to be the only criteria was that the water had to have trout in it. If it had trout in it, it got planted with trout. That's what they went by and some of them didn't even know if they had trout in them or not.
>
> RM: No, they had no way of knowing what trout was where, they wouldn't do it. I went to Ovando – we had a small fish hatchery in Ovando that just run part time. I went up there with a couple of truck loads of fish and got outfitters in the valley there to plant where they took their guests fishing. So, that was the way the planting was done. It went from no science on it at all to a good program that is workable and making a good fisheries for the people of Montana.

Art Whitney further described Ray West's planting program in his own oral interview of November 3, 1997:

> Prior to that time, before Chuck Phenicie was hired in 1948, the Department had no fisheries biologists at all. A biologist, Ray West, who worked for the forest service, had developed a five-year stocking program for the Montana Department. Prior to Ray West's time, it was just a question of each hatchery took what eggs they could and planted the fish they had where the local people wanted them and where they thought they should be. (The) main criteria was just the quantity of fish. Ray West's program was an improvement. It set out what they should raise. It said you wouldn't plant any species if that species wasn't already there. But it had nothing to do with whether they needed stocking or not. When Chuck (Phenicie) became the first biologist, he thought that was the first thing he had to improve. The 1954 biennial report, probably the very best one ever put out, designed by Vern Craig and the fisheries section, was written by Phenicie. It laid out a definite stocking program.

Office and laboratory space for the new 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.

Clinton Bishop was the second fisheries biologist to work for the Department. Charles Phenicie hired him to begin work in September 1947. In an oral interview held with Clint by Art Whitney on April 19, 1994, Clint recalled his first assignment:

> One of the first assignments Chuck gave me when we started was to prepare a file of the streams and lakes ....of the waters in Montana. ...the first thing I did was I got the best maps I could. And then I started up at the headwaters and listed them and worked my way, township, range and section. Did that by drainage. After we had completed that, then we wanted to get the information .... there was no accumulation even of the planting records. One of the big jobs I had at the early stages was to go down to the basement of the capitol building where the fish and game had storage and locate the plantings that had been made by the hatcheries. Introduce those into the files that had been set up on the various waters. Then they decided .... to get some creel census information on the waters and so we set up creel census records for the wardens to keep and also for fisherman logs, individuals would keep logs on the various waters. We also, at the same time to make this easier to handle, we made arrangements to put it on computers. I entered the file numbers in the file we had for these waters in our master file. Then, we prepared and mailed these fisherman logs and the warden's creel census and then those were sent into me and I coded them for the computers. They were sent in and became part of our master file.

Tagging work was anticipated for the Madison River and Hebgen Lake to determine the best methods of planting. Two four-man crews of fishery students were hired in the summer of 1948 to operate in various sectors of the state to gather data from which the waters' productivity could be ascertained. The nature of this study was to be the calculation of growth rates and the fishes' condition for the various lakes and streams. The theory of this study was that a body of water, whether it be a lake or stream, can support only a certain poundage of fish – the same as a range can support only so many head of cattle. Where the growth rate is found to be low and the fishes' condition poor, stocking trout would be a waste of fish. When such lakes and streams were found, improvement efforts could be made to increase their productivity.

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.

To supplement productivity data, creel census data was needed. A creel census measures production, and was believed to be more valuable than any single item of data. A program of creel censuses was begun during the 1946-1948 biennium and was designed to continue indefinitely. Catch data was gathered by cooperation from three sources: 1) Game wardens in the course of their regular duties recorded the fishermen's catch data. 2) Dude ranches, resorts, boathouses and guides were contacted and asked to keep records for those fishing under their supervision. 3) "Fishermen's Log Books" were distributed to cooperative sportsmen that they might have a convenient place to record their individual catches. The information desired was the water fished, the date, the number and kind of fish caught, the average size of fish caught and the hours spent fishing. The information was to be analyzed in many ways, but chiefly to discover the percentage of each species of fish taken to aid in knowing where work should be done so as to provide a measure of the success of initiated improvement measures.

By the end of the 1946-48 biennium, eighteen ranches, resorts, boathouses and guides were cooperating, and 350 "Fishermen's Logs" had been distributed. At the opening of the fishing season, all the game wardens were to record the catch data. Whether the general public would contribute to the creel census in a manner making the data usable remained to be seen.

By 1948, it was believed one of the greatest detriments to Montana's fishing was the unwise introduction of various species of fish. Some of these, like the introduction of sunfish into Lake Mary Ronan, were done deliberately by individuals. A large majority of these introductions, however, such as the chub in Hebgen Lake, probably were made by using minnows to fish. Philosophically, it was believed that, where an overwhelming poundage of the fish in a lake or stream are rough fish, additional stocking of trout may aid but little. This condition should be rectified before further stocking would produce satisfactory results. In certain cases, stocking of large fish may control the rough fish. In other cases, it was believed this would not work. Game fish other than trout might also fail under many conditions to produce the optimum in recreational value in the face of concentrations of rough fish.

Therefore, it was thought that complete eradication of rough fish in waters where this was possible was most desirable. By doing so, it was possible to restore lakes, ruined by the introduction of undesirable species, to their former ability as trout producers. In accordance with this philosophy, it was suggested that complete eradication of fish be made in 1948 in Spoon Lake near Whitefish and Savage Lake near Troy. 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. While large numbers of rough fish were killed, the project was not 100 percent effective and enough rough fish remained to reinfest the lakes.

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 accomplished little.

The Commission hired Dr. Ira Gabrielson in December 1948, 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.

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, Georgetown 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 the winter of 1936-1937. 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 had 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.

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

During the 1948-1950 biennium, the Biology Section was conducting work on thirteen different projects in addition to a variety of emergency, or “trouble-shooting”, investigations. The section’s function was to conduct experiments and gather information on problems of, and related to, the sport fishery, and on the basis of these findings, to develop and test new fish management measures.

In a report to the 1948 Fish and Game Commission, Charles Phenicie related that Fort Peck Dam was closed in 1937, forming the world’s largest earth-filled barrier. Pool formation began in 1938 and would, eventually, create a great inland sea of 245,000 acres. With this new water body came a responsibility of the state to manage its fish resources. By 1945, fishermen were catching perch, crappie, bullhead, walleye, goldeye, rainbow trout, largemouth bass, freshwater drum, channel catfish, suckers, burbot and some other species.

Phenicie further said that one phase of management of the fisheries seemed regrettable. From the histories of many large reservoirs like Fort Peck, it was known that tremendous fish production can be expected through the first few years of its life when previously unflooded vegetation creates a “rich” lake. However, later, as the fertility is leached from the vegetation, the lake production will level off before a final drop to normal production. This meant that, with or without heavy fishing, the fisheries would rise and fall whether or not it was utilized. He predicted that 1948 or 1949 would be the peak productive years.

Phenicie went on to say how little of the lake can actually be fished by sport fishermen because of its size and accessibility. Only a few areas are fished, leaving many other lake areas with no fishing pressure. Only 25 miles of an approximate 1,500-mile shore line were being fished and this pressure made little impact on fish abundance. He went on to say that some fish species, like perch for example, have a large egg producing capability with a high ability to survive and when the perch has filled its biological niche, a stunted population will result that would be unattractive to sport fishermen. Only one thing could prevent this and that is an adequate harvest. The sport fishermen cannot do this, so why not allow commercial fishing. This example could also apply to many of the other species in the lake. Allowing large scale commercial harvesting of the fish populations would establish a balance that could be maintained by selective fishing. This would benefit both the sport angler and the commercial fishermen.

Phenicie continued that fish by the thousands are naturally dying of old age each year that could be harvested, just like a farmer harvests a crop. The Department could conduct an expensive study to determine population sizes, migrations, growth and mortality rates, etc. but it would be attacking a problem of first magnitude. It would be much less expensive to allow commercial fishing and work with the fishermen to collect scientific data and establish management measures.

There was however, a quandary about allowing commercial fishing. The state Legislature would have to authorize it. However, because a slump in the fish populations in the lake was expected to occur naturally, the commission feared the sport fishermen would blame the commercial fishermen and they were reluctant to recommend it. At the same time, without commercial fishing, the sport fisherman would eventually suffer from poor fishing. There were, however, sportsmen in the Glasgow, Scobey and Glendive areas that signified support for commercial fishing. It was believed commercial fishing could be carried on away from areas frequented by sport fishermen so there would be no detrimental effects.

The report carried no recommendations on the matter.

Two years later, in a 1950 report entitled “The Fort Peck Reservoir Fishery Survey”, Bulletin No. 3, Phenicie described the participation by the Department in a cooperative program for the investigation of the fishery of Fort Peck Reservoir. The program consisted of management studies by the Department and the Department of Zoology and Entomology of Montana State College as well as creel census and economic surveys by the Missouri River Basin Studies of the U.S. Fish and Wildlife Service. The survey

was designed to make the best possible use of personnel and equipment of each agency in order to accelerate the study of the biological and other conditions required for development of a management plan for the reservoir. The work began June 9, 1949 and ended September 2, 1949. Bulletin No. 3 was a general progress report brought to the attention of the Fish and Game Commission. Future reports were anticipated to provide additional data.

Through the examination of thousands of fish scales, tables showing the average sizes of game fishes of Montana at various ages were being constructed to provide a sound basis for evaluating growth of fishes in individual waters and areas of the state. Complete or partial evaluation was made during the 1948-50 biennium of fifteen streams and twenty-one lakes in addition to numerous stock water reservoirs. Studies made in south central Montana were used by the management section in revising the hatchery-trout planting programs for the Fromberg and Big Timber hatchery districts. Age and growth determinations and food analyses were being carried out at the fisheries laboratory at Montana State College. The scale reading was done at the division's laboratory by one permanent laboratory technician and part-time student help. Studies were also in progress on the fluctuation in condition of fishes. To aid in this study, alinement charts to facilitate calculating condition factors, a figure that indicates a fish's robustness, were constructed and a report published.

During the 1948-1950 biennium, 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.

The creel census program outlined in the 1946-1948 Biennial Report was continued and expanded during the 1948-1950 biennium. The general creel census taken by the deputy game wardens while on regular patrol constituted the bulk of the catch data. While records obtained from individual fishermen were thought to always be very inadequate, they would be of great value in supplying information on angling trends and species composition of the catch for certain waters. Response from this source improved during the 1948-50 biennium. Pocket-sized booklets, "Fishermen's Logs" were prepared for distribution to cooperative sportsmen. These were mailed to persons requesting them and became their own personal, permanent records. The Department asked for the temporary return of the logs to Helena at the end of the fishing season for transcription of the records. They were then returned to the fishermen for the next season. During 1947 and 1948, 408 logs were distributed. By the end of 1948 there was response from 40 percent of the log holders. Of the 336 logs out in 1949, response was received from 72 percent of the log holders.

During the 1948-50 biennium, a report was prepared and published summarizing the creel census findings to date. It was noted that the case of the eastern brook trout was most spectacular. There were 56 streams in the census where eastern brook trout constituted more than 50 percent of the catch and yet, in 27 of these streams, no eastern brook were planted in 1946, 1947, or 1948. Of these 27 streams, 19 of them received plantings of other trout. Of the entire 56 streams where eastern brook trout made up more than 50 percent of the catch, 16 of them had one or more species of fish planted which constituted less than 5 percent of the catch.

The creel census demonstrated that the species of fish planted from hatcheries did not always correspond to the species appearing most often in the catch and that many streams, particularly those in which eastern brook trout were dominant, were receiving little benefit from hatchery releases. Creel census would, therefore, enable the Department to:

1) discontinue planting species of fish that do not appear materially or do not appear at all in the catch;

2) plant the species of fish that will give the anglers the greatest return;

3) prohibit the introduction of new species of fish that prior knowledge shows are incompatible with resident fish;

4) maintain a constant check on the quality of fishing in individual waters; and,

5) check the effectiveness of old and new management measures.

The Prickly Pear Creek Project was begun in July 1949. It was to be a three-year, detailed study of the fish populations of this creek near the town of Wolf Creek. The study was conducted by a five-man crew headed by Frank Stefanich, who was a Prickly Pear researcher in the summer and a graduate student at Montana State College in the winter. The other crew members, also students, were Vern Craig, graduate, and Jack Bailey, Jim Ready and Bill Alvord. That portion of the creek from the Missouri River to Sieben was designated as the study area. Six 600-foot sections were selected at random for sampling. A census of each section was made four times during 1949 with an electric shocker in an effort to collect all of the fish from each section. The trout, whitefish, suckers, and carp were caught, placed in urethane to put them to sleep, after which they were weighed, measured, tagged, and released unharmed back into the stream section. Scale samples were also taken. Records were made of all fish caught that had been tagged on previous shockings. Age and growth determinations were made by Clinton Bishop.

This program, after a few more seasons, was expected to show how to approach other streams. Knowledge of trout streams was low as was knowledge of the behavior of the fish themselves. Until some of these problems were answered, the Department was lacking the basic information needed for proper management. Therefore, the results of the Prickly Pear project were expected:

1. To establish the sample size needed to measure the abundance of trout and the fluctuation of abundance in medium-sized streams;

2. To learn the size of the Prickly Pear Creek trout population along with the fishes' length, weight, age and species composition;

3. To learn the sample size needed in streams to measure adequately the growth rate of fishes and to measure the mortality rates, both of which are extremely important in fishery management;

4. To study the angler's catch as it relates to the estimated size and composition of the trout population;

5. To measure the movement or dispersion of trout;

6. To study under conditions that can be controlled, the relation between trout and the other stream fishes, such as Cottus, ling, suckers, whitefish, and carp;

7. To study under conditions that can be controlled, the relations between the various species of trout;

8. To establish the reality of sucker migration and to measure its magnitude and direction;

9. To study the survival of hatchery-reared trout in a stream where the size of the wild population can be estimated and controlled;

10. To find and study the portions of the stream where trout are most numerous;
11. To learn the types of stream improvement that may be used in Montana waters; and,

12. To test the effectiveness of stream improvement.

In a 1950 article about the Prickley Pear Creek project, C.K. Phenicie wrote that "It's hard enough to write a history of human beings but to follow the life of a fish and record it is a big job any way you look at it. But it's being done and the fish history is becoming more accurate each year". He went on to say that migration, food habits, growth and age have to be determined some way and the Fish and Game Department thinks the shocking method is the best. Further, probably the best example of stream sampling by this method was the Prickly Pear Creek Project.

The importance of environment to maximum production was demonstrated early on in the study. During the 1949 season, an average of 13.5 pounds of trout per 150 feet of stream was removed with the electric shocker from sections with one or more medium sized pools. On the other hand, only an average of 3.4 pounds of trout per 150 feet of stream was found in those sections with 100 percent riffles or small pools and riffles. Approximately three-quarters of this stream was in the low production category. Experiments were underway to determine the feasibility of increasing production by artificial stream improvement.

Between 1948 and 1950, 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.

The 1950's

A milestone for the Fish and Game Department, as well as for Departments in all the other states, occurred in 1950 when the U.S. Congress passed a bill creating the Federal Aid in Sport Fish Restoration Program. The Act (16 USC 777, et. seq., enacted August 9, 1950), became effective on July 1, 1950. The legislation, supported by conservationists, anglers, tackle manufacturers and many others throughout the nation, was modeled after the highly successful Federal Aid in Wildlife Restoration Act of 1939.

Montana's first step under the Dingell-Johnson act was state legislative assent to the provisions of the act. However, until the final adjournment of the first legislative session (1951) held after passage of the act, the bill could be put into effect by order of Governor John W. Bonner. This was highly desirable, for it would take that much time to perfect an organization, considering the current status of well-trained personnel.

The Sport Fish Restoration Act created a 10 percent federal excise tax on certain fishing equipment, with proceeds to be used at the state level to improve sport fisheries. The main Congressional sponsors of the bill were Senator Dingell from Michigan and Representative Johnson from Colorado, hence the program came to be known as the "Dingell-Johnson" or "D-J" Act. The excise tax is included in the price of fishing products bought by sportsmen and women. The tax is paid by the manufacturer and the cost is ultimately passed along to the consumer. Each year the excise tax is collected by the U.S. Treasury and turned over to the U.S. Fish and Wildlife Service. Funds are then turned over to the states on the basis of a formula. Forty percent (40%) of the funds received are based on the land and water area of the state and 60% are based on the number of people who have purchased one or more fishing licenses. 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. Thus, for every dollar of Montana fishing license revenues directed toward sport fish restoration efforts in the state, three federal dollars became available to enhance their scope and subsequent benefits.

On July 1, 1951, Montana received its first share of this federal appropriation in the amount of $61,820. Prior to July 1,1951, Montana fishery restoration projects operated on a small scale. Finned freedom was only occasionally disturbed except by fortunate fishermen. The Dingell-Johnson Act allowed the states to step up fisheries conservation programs. Montana's federal share was supplemented by $20,607 from the state for a total of $82,427 in fiscal year 1951-52. Initial expenditures were to be used primarily for investigations, with three objectives: 1) a general survey to determine problems of the entire state and

restoration steps to be taken; 2) individual problems of immediate urgency; and 3) investigation into fish cultural methods.

Walter M. Allen, state Superintendent of Fisheries, was named coordinator of Montana's D-J program and under his direction the state was divided into six units or districts. As of 1952, three districts were in operation: District 1 at Somers (later Kalispell) under Frank Stefanich; District 4 at Belt (later Great Falls), supervised by Nels Thoreson; and District 6 (Now District 7) at Miles City headed by Arthur Whitney, who also covered portions of present Districts 5 (Billings) and 6 (Glasgow). Vacancies in Districts Two, Three and Five were expected to be filled in the 1952-53 fiscal year.

At the beginning of the 1950's, many landowners as well as sportsmen had been indicating an interest in the management of small ponds for production of sport fish. Therefore, in cooperation with the Montana State College Agricultural Experiment Station, Dr. C.J.D. Brown, fisheries professor at Montana State College, and Nels Thoreson, Department District Biologist, completed the first phase of a ranch fish pond study. This study, completed in 1951, had the widest state interest of any of the Department's fishery studies since it concerned the larger portion of the state's land area. This initial phase dealt mainly with the physical aspects of a pond suited for sport fish. A bulletin[2] was prepared and printed, dealing with the construction and management of Montana's ranch fish ponds, and was available free of charge from the Fish and Game Department or the Montana State College Experiment Station. More than 10,000 copies of this bulletin were distributed for the next 10 years to ranchers and others interested in pond construction and management.

The early 1950's saw studies of the habits and habitat of grayling in Montana made by Perry Nelson. The unique and beautiful grayling had 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.

During the early 1950's, 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.

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

[2] Brown, C.J.D., and Nels A. Thoreson. 1951. Ranch fish ponds in Montana, their construction and management. Mont. State College Ag. Exp. Sta., Bull. No. 480, 30 pp.

limited. Construction of the dam was approved but the bids received for the project exceeded available funds and the project was postponed until 1959.

The Montana Fish and Game Commission Biennial Report of 1941-42 had made note of the disastrous consequences of many poorly planned fish introductions such as a loss of recreational fishing, stunted rough fish populations and a loss of native trout fisheries. A Fish and Game Commission report in 1953 repeated the warning and included a cartoon of a character dumping a bucket full of fish—hence the term "bucket biologist" for anglers that take matters into their own hands.

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 ¼ mile from portions of streams closed to public access;

2. Except for experimental plants or reestablishment of a species, only grayling, rainbow and 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 nonexistent 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; and,

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

The 1950's also saw an emphasis by the Department on lake and stream surveys. The data from these surveys formed a large portion of the basis for fishery management. It was obvious that Montana, with its limited fishery investigation personnel and large expanse of land and waters, could not enjoy as complete a survey of its waters as had been made by many other states. The beginning of this survey found Montana without even the most rudimentary knowledge of what waters it had. It was deemed advisable and necessary, therefore, that a complete file of the fishing waters of the state be made as quickly as possible with such pertinent information included as could be obtained with a minimum of effort. Following the completion of this survey, and even during the survey as opportunities presented themselves, more detailed information would be obtained on the more important waters and on such other waters as the opportunity afforded.

It was of the utmost importance that the investigator not lose sight of the primary objective of the survey: to determine what may be done to improve fishing. He had seen and examined the waters; he had been trained in his work; he was in a fine position to recommend management.

Before the days of computer databases, the Department entered its lake and stream survey data onto 6" by 9" cardboard survey cards. The cards were color-coded to reflect the type of data they contained, e.g., lake data, stream data, fish inventory, water quality, etc. The cards were kept in the fisheries files in each of the Department's district offices as well as in the Helena office. Keeping up with entries onto the cards was often difficult and time consuming and the files were not always current. Use of computers in later years did away with the card files.

In 1953, William Alvord became District Fisheries 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 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.

The ten years preceding the 1950's saw some of Montana's best fishing waters turn from excellent to mediocre to poor because of an influx into their waters of small nongame fish. Too late to remedy present conditions caused by the introduction of carp, for example, into trout streams, the Montana Fish and Game Commissioners decided to do something in 1951 to stop the malady from spreading to other Treasure State fishing havens. They passed a regulation prohibiting the use of carp and goldfish minnows for bait in all the state's waters except some waters where these fish were presently found. This meant that, except for the Missouri and its mainstem impoundments from the North Dakota line to Three Forks, the Milk River from Chinook to the Missouri, the Musselshell River from Roundup to Fort Peck and the Yellowstone River from Laurel and its tributaries from Forsyth to North Dakota, fishing with carp and goldfish minnows was a thing of the past, at least for the time being. But why take it out on the fishermen?

For a long time, game wardens and fisheries biologists had been working on stream census-taking and had noticed the almost miraculous appearance of fish hitherto foreign to certain waters, not only in the streams, but also in lakes. Then, gradually, they realized that the phenomenon had been taking place right before their eyes, every time they regarded a minnow fisherman unloading his bait pail into the water after he had caught his limit of game fish.

So that was it. Unwittingly the anglers had contributed markedly to the decline of Montana's trout fishing. Many lakes and streams had already been ruined but, luckily, many of the best were still free of carp and goldfish and could be saved for the sportsmen. The minnow law was hitting the nail on the head by putting to use the adage that "an ounce of prevention is worth a pound of cure." Sportsmen who understood what carp were doing to the fishing waters were vigorously endorsing the new regulation. Those who did not understand such a drastic measure by the commission demanded to know why, and rightly so.

The Prickley Pear Creek Study begun in 1949 was completed in 1951. It was realized that the zeal of Montana's fishermen to see ever increasing numbers of fish harvested from the state's waters was similar to the zeal of ranchers throughout the state to crop from their lands as large a yield of wheat, hay, or cattle as was possible. It was realized too, however, that the ability of water to produce its crop of fish was limited just as was the ability of land to produce its agricultural crops. Little was known in Montana of the size of its fish populations, of the yields that could be expected from its fish crops, or of the need for "seeding" the streams with hatchery trout.

It was of fundamental importance to Montana fishery managers to learn that Prickly Pear Creek, considered a "fished-out" stream by most anglers, actually contained a fine resident fish population. During the fishing season for all three years of the study, the natural increase in both numbers and weight of fish was either equal to or greater than the catch by the fishermen, so that the trout population either increased in size during the fishing season or remained relatively stable.

Marked, hatchery-reared rainbow trout fingerlings were planted in the stream in the fall and marked legal-size, hatchery-reared rainbow trout were planted in the stream in the spring. Creel census showed that 38 percent of the legal plant of rainbows was caught by anglers while only 2 percent of the fingerling plant was caught. However, 93 percent of the fish caught were wild fish from natural reproduction. Considering the hatchery-reared fish returned to the creel on a monetary basis, each fingerling trout caught cost the Fish and Game Department $1.43 per fish while each legal-size planted trout cost $0.35. About 3,000

fingerling and 1,000 legal-size rainbow trout were planted in the 15.5 miles of stream each year. By noting that these planted fish, at considerable cost to the Department, contributed only 7 percent to the catch, it was seen that wise management pointed to more concentrated efforts on the stream environment itself to insure high, natural production of fish.

Concern for Montana's grayling populations was of concern in the early 1950's. The grayling, once abundant in Montana and Michigan and other portions of North America, suffered more from the encroachment of man than any other fresh water game fish. As man extended himself and his cultural and economic system throughout the nation, the grayling retired from its indigenous haunts. While the Arctic subspecies were common in Canada and Alaska, the subspecies found in the United States receded until Montana had the only stocks in the nation with any degree of magnitude and stability.

But, even in Montana, the grayling was not secure. Michigan, while realizing that its grayling stocks were receding in abundance, felt a few years back that it could maintain the species in certain areas. However, the species is now extinct in Michigan. History tells us that the grayling was once found in great abundance throughout most all of the Missouri River drainage in Montana above the Great Falls. Only rare reports were currently received of grayling occurrences in this area, save from certain headwater streams in Beaverhead County, particularly in Red Rock Creek and the upper part of the Big Hole River. The grayling was still found in certain lakes of Beaverhead, Madison, and Gallatin Counties, and this fish was introduced successfully into other Montana lakes outside its original range.

During the 1950-1952 biennium, the Montana Fish and Game Commission, realizing the need for prompt action to insure the perpetuation of this Montana native fish, authorized an investigation of the status of the grayling, with special effort to be given to the upper Beaverhead River system. As a result of the initial work, the Commission designated the Red Rock Creek Drainage above Lima Dam as a grayling sanctuary. It was planned that harvest of the grayling in this area by anglers would continue, and that special effort would be made to discourage all exotic fishes in this area and give all possible encouragement to the grayling. Work was done cooperatively with the Montana State College Agricultural Experiment Station and with the U.S. Fish and Wildlife Service, which extended much help in the work through the Red Rock National Migratory Waterfowl Refuge.

By 1952, from the results of several fisheries studies of eastern brook trout populations, the Department was looking to removing the seven-inch size limit on brook trout to improve the stunted populations and allow more harvest by fishermen. A minimum size limit of seven inches, designed to allow trout to spawn at least once, had been a part of the Montana fishing regulations for some time. However, in regard to brook trout, this regulation was especially fallacious and could be considered detrimental to the best interests of many Montana sportsmen.

This was not a biased picture. Studies conducted from Red Lodge to Troy showed that, as a rule, the few bodies of water wherein good sized eastern brook trout were found were those where natural spawning was limited. The seven-inch legal size limit was, indeed, serving its purpose in allowing the brooks to spawn once before dying. However, it was doing even more – allowing the greater majority to spawn and die without ever reaching the legal possession size. Since good fish management should be directed toward complete utilization of harvestable fish without endangering supplies of the breeding stock, the obvious solution to this problem was to remove the seven-inch size limit even though the change might be met with a storm of protest from sincere sportsmen who feel such action would be detrimental to the trout population. However, evidence indicated that this would be a wise move in that the fishermen would be permitted to catch many hundreds of fish that otherwise died from natural causes.

During the 1950-52 biennium, as in the past one, a program of fisheries census continued in an effort to catalogue the state's waters for fishery management purposes. The program had two parts -- creel census and direct stream and lake census. The latter census was done largely by the district biologists, but every opportunity for gathering such information was accepted by all members of the Fish Restoration Section. The Department was significantly aided in this program by the Zoology and Entomology

Department at Montana State College. Without the provision they had made for allowing the Department office and laboratory space, specialized equipment, and consultation with staff members, the continuing fisheries censuses, particularly as related to age and growth of fishes, could not have advanced to the stage of high value it had reached.

During the 1953-54 biennium, the grayling study was completed and a report of the findings was published[3].

The program of fisheries census was continued during the 1953-54 biennium in an effort to catalog the state's waters for fishery management purposes. The greater part of the census information was gathered by the Department's game wardens as they went about their regular duties of enforcement. Information was also furnished by cooperative sportsmen who entered their catch records in Fishermen's Logs and by a few guides and outfitters who were interested enough in the well being of the fisheries resource to keep catch records.

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 of trout increased by one-fifth.

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.

By 1954, the Fisheries Division was taking a new look at fisheries management. The 1953-54 biennial report contained an article called "A New Look at Fisheries Management" which stated in part:

> "It is undoubtedly true that every sportsman and interested person desires the assurance that fisheries management in the state of Montana is based on sound principles that will be productive of results. Undoubtedly the greatest single contribution to fisheries management made this biennium by the Commission and its staff of fisheries men, with the support of the sportsmen, is the "new look" they have taken at the program and the selection they have made of "sound principles" for guiding the program.
>
> "This "new look" at fisheries management has been made for just one purpose: to determine the causes for declined fishing success so that a sound program may develop to meet the changing needs. A great deal has been learned about the decline in fishing success and a program is being developed to hold the quality of fishing at as high a level as possible. The Fish and Game Commission has jurisdiction over very few of the factors which affect fishing; therefore this program can be developed and can proceed no faster than it is understood and accepted by the public, by other state agencies, by federal agencies, and by various private and public organizations."

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[3] Nelson, Perry H. 1954. *The American Grayling in Montana.* Journal of Wildlife Management, Vol. 18, No 3; pages 324-342

Another philosophical discussion about the “new look” also appeared in the 1953-54 biennial report:

> “No fisheries management measure has been so completely accepted by the public as the liberation of artificially propagated fishes into the waters. No argument is more heated than that which arises every year among sportsmen, the Department, and influential persons concerning allocations of fishes. Each area of the state endeavors to extract from the hatcheries its proportionate share of more hatchery fish, regardless of the needs, regardless of the results. To many, planting is the cure-all, the panacea to every fishing ill.
>
> “There has been a great deal of inconsistency in the thinking relating to the liberation of hatchery fish, particularly trout. On the one hand, some fishermen believe that the natural productivity of the waters is almost zero, and, if there is to be any fishing in a body of water, that body of water must be stocked. On the other hand, however, when these same fishermen are considering how many fish should be planted in a body of water, its productivity is believed to be unlimited; that is, the number of fish available at the hatchery is the only limit that should be set on the number planted. Many sportsmen feel there is food and space enough in that stream or lake to support any number of fish which may be planted. Research has shown both of these common concepts to be wrong.”

During the 1953-54 biennium, the Fisheries Division took a new look at the hatchery planting program in the light of great quantities of scientific data that had been accumulating from Montana and elsewhere. It drafted a policy statement governing the use of hatchery-raised fish and to address unwise fish introductions. The *Fish Stocking and Management Policy of the Fish and Game Department, State of Montana*, was adopted by the Fish and Game Commission and appeared on pages 52-53 of the 1953-54 biennial report. The policy is reproduced as written in the Appendix to this history.

One of the intentions of the stocking and management policy was that emphasis would be shifted from stream planting to lake planting. Stream planting was expensive and return to the creel was poor. Smaller size fish could be planted in lakes, with higher survival. In the past, lake management was not given adequate attention, with the result that poor lake fishing channeled fishermen to streams where naturally produced fish were more abundant and where fishing was better. It was the desire under this “new look” at the fisheries resource to build up lake fishing to where it shouldered more of the fishing load.

The 1953-1954 biennial report also contained a comprehensive discussion of fisheries management and habitat issues that go into making good fishing. These were: use of appropriate species, use of bait minnows, chemical rehabilitation, stream habitat requirements, pollution, impoundments and lakes, watershed conditions, fishing regulations and the need to consider stream and lake habitat improvement in the future.

In 1954, Perry Nelson wrote an article in *Montana Wildlife* (Vol. IV, No. 3) entitled “This is Fishing Pressure?”, concluding that fishing pressure is not to be blamed for poor fishing. He concluded that “In the future the main factor that will be responsible for a decline in fishing pressure in Montana will not necessarily be more anglers, but a decrease in the amount of fishing water available to the angler”.

A major chemical rehabilitation project for the Department was undertaken during the 1954-56 biennium. Plans for construction of Tiber Dam on the Marias River in Liberty County were begun a number of years ago by the U.S. Department of the Interior, Bureau of Reclamation. The dam was expected to provide an effective barrier to the upstream movement of carp and goldeye which inhabited the river and tributaries above the dam site. During the planning stages, it was not envisioned that the fishery could be benefitted greatly by the dam or harmed by it. As time went on, however, the fisheries men of the Department realized that population pressures from rough fish in Tiber Reservoir would force these rough fish to migrate upstream and ruin presently existing trout fisheries in the headwater streams and in Lake Francis.

This is exactly what had happened after Fort Peck Reservoir was created. Goldeye moved upstream from the reservoir into such tributary drainages as the Judith River, Spring Creek and the Marias. It seemed very obvious that with another reservoir such as Tiber located well in the headwaters of the Marias drainage, fish such as carp and goldeye would be forced even farther upstream and adversely affect remaining productive trout fisheries. The Commission authorized a survey of the Marias River drainage in 1954 to determine the feasibility of removing the carp and goldeye from the drainages above Tiber Dam. If these fish were removed, Tiber Dam would be a barrier to upstream fish movement and would prevent reinfestation of these waters from downstream.

A three-month survey conducted by two men in 1954 disclosed that, while the rehabilitation project would be a large one, nevertheless the project would be well worth the time and money which would be invested in it. In the decision to proceed with the project, it was realized fully that rehabilitation is always a gamble, even in small lakes, which are more easily controlled than a large drainage basin of lakes, ponds, sloughs, and streams. If a complete kill of carp and goldeye could be realized, there would be no doubt about the value of the project. If a complete kill were not made, it was determined that excellent fishing would be provided in Tiber Reservoir and its tributary streams for a long enough period of time to justify the project.

Following the survey and, as a result of deliberations by the Commission and fisheries personnel, the Marias rehabilitation project was authorized. Chief Fishery Biologist C. K. Phenicie and Nels Thoreson, District Fisheries Manager in Great Falls, were in charge of the project. Thoreson was general supervisor of the project.

During 1954, Kipp Lake, and most of Willow Creek near Browning were rehabilitated. Kipp Lake, 350 acres in size, was heavily infested with carp. This lake was poisoned by the use of a Ford tri-motor airplane. During the summer and fall of 1955, the balance of the Marias drainage was completed. The project included the poisoning of rough fish in nearly 1,000 miles of streams in the drainage. Most of the Fisheries Division and many other Department personnel spent the major part of the 1955 field season spreading fish toxicant throughout the drainage. After the carp, goldeye, suckers and other fish life were destroyed, they were replaced with rainbow trout.

During the 1955 rehabilitation of the Marias River, the airplane proved its worth in fisheries management. Though there were many hours of ground work pumping and slugging rotenone into small backwaters and streams, the bulk of toxicant was aerially sprayed.

The job of restocking the poisoned areas was also a tremendous one. It went without saying that planting 6,000,000 rainbow trout with the nearest hatchery 100 miles away was a big distribution order. Also, it was realized that stocked fish could not all be liberated in one spot at the end of the road. Access roads to many miles of stream and shoreline were not present, so again, the airplane was called to the rescue and the area was rapidly and efficiently planted by air.

Carp were found in the waters above Tiber Dam after the operation. These may have been missed during the rehabilitation or possibly were introduced after the project was completed. No goldeye were reported in the treated area.

Many stories came out of the Marias experience. One often told was related by Art Whitney in an oral interview with Liter Spence and George Holton on October 21, 1997:

LS. There was a story I remember, but not the whole thing. It was about the Two Medicine River and secondary falls.

AW. I remember that story because I was in it. Before we ever started we wanted to get some idea how fast a slug of toxicant would go down. In any stream flow, the center is going faster than the edges. You put in a high concentration of what you need and it stretches out. Finally gets to where it's no longer toxic. How long would that be or how far would that go? They decided to float a boat down from

the beginning in the park just below Two Medicine Falls and see how far it would get in a day. They picked (Boyd) Opheim and me. It was a rubber boat, some type of surplus. Nels (Thoreson) had some truck inner tubes in the bottom with plywood that gave it a real nice floor but about a foot higher in the air than a regular rubber boat. We had a box of goodies for the day. I was in the front and they shoved us off and said, "Watch out for those secondary falls". We sailed around the corner, the back end hung up on a rock and I cleared the front end of the boat and hit my knee on a rock. I got back in and Opheim was wet too. This was all before we got to the bridge. They were standing on the bridge watching us. Laney Hanzel came by and dropped a can of beer to us. We made a wild battle to get back to the can and it was empty. We spent the day with our wet clothes and paddling. The boat began to leak air. No pump. It got loose and wobbly. We came to a combination of a falls and rapids and a long sloping rock, about 15 to 20 feet at an angle. We stopped and said, if we hit it just right, we'll do fine. (We) couldn't control the boat and went over the falls backwards. The boat was so low on air it formed itself to the rocks and we survived. They kept track of us and pulled us out about 4:00 p.m. We were badly sunburned.

Another time on the Marias project, Art Whitney was involved in an operation to put fish toxicant into a slough:

AW. We had walkie talkies on the river. The car with the radio was perched up above and the bosses sat there. I remember the time the world series came on they could listen to it on the car radio and sometimes ignore the two-way set which picked up our walkie talkie calls. We had a slough that you couldn't wade, so we called for an airplane. We were told from the radio up above, we can't get the plane this time of day. Gonna have to do it with waders. I said you'll never do it with waders, buster. They said, this isn't buster.

Boyd Opheim remembers another experience during the Marias rehabilitation. Opheim piloted a small observation plane for the Department during the distribution of the fish toxicant that killed fish in the Marias system. He related the story to Art Whitney in an oral interview on August 27, 1993:

BO. I had an experience that was kinda cute. We were flying most of this Indian country (Blackfeet Indian Reservation) and I would try to explain this project to people when I landed. I'm landing down in this harvested grain field and here comes a big collie dog and the prop was still going so I cut the motor and rolled up and got to the edge of the field and stopped. I got out and here comes a full-blooded Indian with braids and I was going to explain what we were doing. And he says "white man, you kill all buffalo. Now you kill all fish". That about concluded the conversation. I told him to hold the dog and I left.

Restocking of the Marias with trout began immediately after the waters were nontoxic. However, restocking did not always go as planned. Nels Thoreson and Art Whitney remembered one of those times (Nels Thoreson interview, September 16, 1993):

AW: Didn't you replant some of the Marias that same summer we were poisoning as soon as the slug was out of the area?
NT: That's right.

AW: In fact, I remember, it seems to me, the planting crew got so much ahead of their own schedule, they overran the toxicant crew and we killed off a bunch of the fish we'd just planted.

NT: That's right. Yeah.

AW: I think I remember a statement you made to the sportsmen that time. Someone asked you what all these people were doing up there and you said, well, some of them are planting them and some of them are un-planting them, but they're all keeping busy.

Nels Thoreson received an Award of Merit in 1957 for outstanding achievement in field planning and direction of the Marias River rehabilitation project. Nels mapped the area, prepared field plans and directed the operation which involved daylight to dark work for nearly four months. The award was a parchment certificate stating that "his work in planning and executing the nation's first major stream rehabilitation program warranted special recognition by the Department".

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 during filling, 700,000 to 850,000 fingerling rainbow trout were planted which provided a high quality fishery.

In 1955, a survey was made of Canyon Ferry Reservoir to try and determine what could be expected for the future of the fishery and to gather information concerning trends of fish populations in this newly created impoundment. Considering the tremendous build-up of rough fish, it was unlikely that high quality trout fishing would continue very long. It was believed that when fish populations became more stable, the reservoir would resemble Lake Sewell in all respects except size. Lake Sewell (which was inundated by Canyon Ferry Lake) was known as a rough fish lake. It was thought unfortunate that, at the time Canyon Ferry Dam was closed in 1953, there had been no awareness of the feasibility of removing rough fish by toxicant application from the waters to be flooded by this impoundment. And, had this been done, Canyon Ferry Reservoir would not have had the rapid build up of rough fish it was experiencing.

The year 1955 saw the beginning of Montana's fish health management program. The roots of this program were formed when the American Fisheries Society (AFS) took up the issue. Several papers at the 1955 AFS annual meeting discussed the potential disease risks associated with importing fish and moving them between states. A special committee established by AFS identified specific threats and made specific recommendations that states which do not have import rules to protect against the importation of disease should develop the necessary rules. This committee conducted a survey of states and found that 24 states did have some limited regulations dealing with the importation of fish and fish eggs. Twenty-one states did not have such regulations, including Montana. However, in the survey, Montana and Maryland were singled out as the two states responding that they were most concerned about the danger of introducing diseases and parasites with foreign imports. This was an especially timely concern since we would learn later that the whirling disease parasite was most likely imported to the United States in 1956.

The recommendations of the 1955 AFS committee would be the foundation of current fish import and transport regulations throughout the United States. The committee's report included recommendations that all states adopt importation rules to protect against the importation of disease. Montana's hatchery biologist, Jack Bailey, began working on Montana's first import policy right away. The first policies were fairly limited, but resources were limited. There were few fish health specialists anywhere in the United States that could even conduct an inspection, and even fewer laboratories to conduct the necessary lab work. Biologists were not even sure what diseases to look for. There was very little understanding of fish diseases at that time, and the names of the diseases of concern in 1955 do not much resemble the pathogen lists we have today.

In 1956, writing in the Spring issue of *Montana Wildlife*, Charles Phenicie reviewed the status of the state's fishing regulations. Evolution of the regulations and some of the concerns managers had with over regulation were discussed. In 1955, the regulations filled a 63-page booklet. He said the Commission

was taking a hard look at them in an effort to simplify them and that, in the future, the regulations would be based on drainage basins, not by counties as they were in 1956.

In addition to the Marias River rehabilitation, a number of other lakes around the state were chemically treated during the 1950's and early 1960's. In 1957, 15 lakes were treated, in 1958, 8 lakes, in 1959, 5 lakes, and in 1960, 9 lakes were treated to remove undesirable fish. In 1968, Lake Five, Halfmoon Lake and Mud Lake in northwest Montana were treated for the second time.

In the mid-1950's, 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 biologists 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 on the fish for varying times in different types of distribution trucks.

A number of other management projects were in progress or planned during the mid-1950's, including 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 Rapids Dam; rehabilitation of Spencer and Skyles lakes near Whitefish; rehabilitation of the 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.

In the summer of 1957, through the cooperation of the State Water Conservation Board, Tongue River Reservoir was drawn down so that repairs could be made to the dam. This was the first large Montana reservoir purposely drawn down to a dead storage pool level to make chemical rehabilitation of the fishery economically possible. Pro-Noxfish and Fish-Tox were used as fish toxicants. The bulk of the Pro-Noxfish was aerially applied. The reservoir was to be replanted with rainbow trout in the spring of 1958. Since the river below the dam was heavily populated with undesirable fish, toxicant was also introduced on 20 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 in 1958. 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.

The mid-1950's also saw an experimental rough fish seining operation 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 position of Pollution Control Biologist was created in 1957 as a means of combating the growing number of problems associated with water pollution. John Spindler, who had been working with Jack Bailey on the Flint Creek Project, 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.

In fish management the "proof of the pudding" is in the creel. The statewide creel census had been in operation since 1948. Information gathered by wardens, guides and outfitters and received from sportsmen in Fisherman's Logs was tabulated by electronic business machines. The census showed that, in 1957, the average angler contacted by state Fish and Game wardens caught about one fish per hour, while the average for fishermen voluntarily filling in the Department's Fisherman's Log was three fish every two hours. On the basis that a fish every two hours is good fishing, fishing in Montana was considered excellent.

On February 15, 1957, George D. Holton assumed the position of Chief Fisheries Management Biologist for the Department after Charles Phenicie resigned to take a position with the Pacific Marine Fisheries Commission. Holton was hired by Walt Allen, Chief of Fisheries. Prior to this appointment, Holton was Supervisor of Fisheries Field and Research Operations for the Wyoming Game and Fish Department. Holton remained with the Department until his retirement in 1987.

In his October 1997 written contribution to the Fisheries Division's oral history, Holton remembered coming to Helena: "I arrived in Helena on a mid-February afternoon in 1957. Feeling it was the right thing to do, I phoned Walt from the bus station and had my first encounter with his sense of humor. "Hello Walt, I am calling to let you know I'm in Helena." Instead of the expected, "Good," or "Happy to know you are here," He responded, "ARE YOU DRUNK?"

Holton further described what the fisheries management program was like upon his arrival in Montana:

> "When I 'came on board', Montana already had an unsurpassed fisheries biological program built on the combined talents of Chuck Phenicie, the Department's chief fisheries biologist, and Dr. C. J. D. Brown, fisheries professor at Montana State College. They made a terrific team. Phenicie was an excellent manager as well as a competent biologist. And Dr. Brown, a management-oriented researcher, cooperated with great interest in the Department's fisheries program. With Department-supported graduate student thesis projects, the college served as the fisheries research section.
>
> "Phenicie established the lake and stream survey system. Data were recorded on 6" x 9" cards with a different colored card for each attribute, i.e., physical characteristics of the water, fishes present and abundance, chemical characteristics, etc. He also designed the statewide system for numbering state waters and initiated the fisherman log program.
>
> "Clint Bishop, one of the Department's first fisheries biologists, was particularly valuable in these efforts. A biologist in his own right, he had the knowledge and patience for grinding out the myriad of details involved in assigning a code number to each fish species and to each of the thousands of waters in the state. Then too, he coded the information in each of the fisherman logs so the data could be processed in the primordial IBM data processing system.
>
> "I credit myself for knowing a good thing when I saw it. My approach was to build on the structure Phenicie, Brown and Bishop had established, not change it."

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 the 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.

During the 1958-60 biennium, follow-up surveys were carried out on the Marias River, Kipp Lake, Eureka Reservoir and Tunnel Lake to determine the results of their previous rehabilitation and replanting. All contained good numbers of trout.

A major, long-range rehabilitation project on the Clearwater lakes was started during the Fall of 1958 with the hope that the large numbers of undesirable fish could be removed and replaced with trout. The entire Clearwater lakes chain would constitute a job too large and expensive for the Department to undertake all in one year. Also, it would be good business to evaluate the probable effects of a project of this magnitude before undertaking it in its entirety. Consequently, the overall job was to proceed slowly by

small sections of the drainage. A fish barrier was constructed at the outlet of Rainy Lake to prevent the movement of rough fish into treated upper areas.

The project was accomplished in two stages. From September 10 to November 11, 1958, the upper Clearwater drainage (Rainy, Summit and Clearwater lakes and their connecting streams) was treated with fish toxicants. The main part of the job was done between September 10 and 13. Two hundred and twenty-four surface acres of lake water and nine miles of stream were treated with Fish-tox, Pro-noxfish, Chem Fish Synergized Special and Toxaphene.

Clearwater Lake was treated with 7,720 pounds of Fish-tox on September 10, 1958. Because this lake is inaccessible by road, the toxicant was applied by aircraft. Through the cooperation with the U.S. Forest Service, Fish-tox powder was mixed with water to a thin paste consistency with a borate mixer and pumped aboard converted Navy torpedo bombers (TBM's), normally used to distribute borate on forest fires, at the smokejumper base west of Missoula. Eight loads of toxicant were applied to Clearwater Lake on September 10. Summit and Rainey lakes were treated by boat and the backwater areas by sacks and back pumps. Streams running into and out of the lakes were also treated.

Through preliminary surveys in the summer of 1959, a second possible barrier site below the outlet of Inez Lake was located. During the next biennium, a detailed barrier-engineering survey, the construction of the barrier below Inez Lake, the rehabilitation of Alva and Inez lakes and an evaluation of the fishing provided in the rehabilitated sections were scheduled.

Fisheries investigations carried out by the Hatchery Biologist on Flint Creek confirmed other studies that showed waters have a definite carrying capacity in pounds of fish, regardless of numbers. The test area on Flint Creek, in Granite County, had been used continuously since 1954 to study certain aspects of trout survival. In 1958, tests were concluded. It was learned that the ability of hatchery rainbow trout to survive correlated directly with the quality of the diet fed at the hatchery. This was the most important factor affecting survival of catchable-sized hatchery trout in Flint Creek. Competition with resident wild trout for food and space was also a limiting factor in hatchery trout survival. Typically, about two-thirds of the catchable wild trout survived for a one-year period while about one-half of the planted hatchery trout survived the same period. The introduction of fish into Flint Creek in excess of the normal carrying capacity, resulted in a slower growth rate, a lower survival rate, poor physical condition of the fish and only temporary surpluses.

During the 1958-1959 biennium, several lakes in the Northwest Montana Fisheries District were chemically rehabilitated to remove undesirable fish and restock with trout the following year. During the biennium, 12 streams, 42 lakes and 18 ponds were surveyed. The purpose of these studies was to determine the chemical, physical and biological qualities of the better sport fishing waters. These surveys were the basis for management recommendations and rehabilitation projects. They also provided the basis for amending the hatchery planting program to make better use of hatchery fish.

During the summer of 1958 and the winter of 1958-59, a detailed creel census was conducted on Georgetown Lake. The purpose of the study was to get good estimates of total fish taken and the fishing effort exerted on this popular lake. This census was designed to be repeated at two-year intervals for at least six years. Resulting information would provide the basis for maintaining the highest quality fishing possible in the lake. Estimates from the first year's study showed that 25,000 fishermen caught 47,000 game fish during the summer season. During the winter season, 18,000 anglers took an additional 70,000 game fish. By weight, these fish totaled 41 tons or almost thirty pounds of game fish per acre from this productive mountain lake.

In 1958, a long-term creel census study was begun on Rock Creek, a popular trout stream that is a tributary to the Clark Fork River near Missoula. During the summer of 1958 and winter of 1959, a pilot creel census study was conducted on a 40-mile section of Rock Creek east of Missoula. The study was designed . . . "to obtain the necessary harvest and pressure information for an evaluation of the

catchable-sized trout-stocking program, certainly for Rock Creek itself and likely with considerable application to other western Montana waters as well."

The census study was considered a research project of vital importance, for it would provide valuable information on the use of catchable-size fish for stream planting. The 10-year study was designed to obtain accurate estimates of the fishing pressure and total fish caught from Rock Creek.

Permanent wooden checking stations were set up at each end of an approximate 50-mile study section so that all anglers using the area must pass through on the single access road to the creek. Stations were manned according to a prearranged annual schedule. Estimates of total fish taken and of fishing pressure were to be used to evaluate various planting rates of catchable-size trout in Rock Creek. Final conclusions on stocking rates would not be made until completion of the study.

The success of Montana's quarter million fishermen was of utmost importance to the Department. During the 1958-60 biennium, catch information was gathered by wardens, biologists and hatchery men and was received from sportsmen in Fisherman's Logs and through questionnaires sent to a 10% sample of fishing license holders. This information was tabulated by electronic machines and used by the District Fisheries Managers in managing the state's waters. More than 60% of the fishermen in Montana preferred trout stream fishing to any other type of fishing. Residents fished most in the Flathead River drainage while more nonresidents preferred the Madison River drainage. Anglers' average catch was 4.5 trout and salmon for each day spent fishing.

In the late 1950's, very little information was available regarding the ecology of large reservoirs. The construction of a hydroelectric plant at Noxon Rapids on the Clark Fork River near Noxon Montana offered an opportunity to get detailed information regarding the changes that occur in such waters during the early years of impoundment. It also afforded an opportunity to investigate management techniques that might be applied to these large bodies of water. During this biennium, a long-range study was started on Noxon Reservoir and other reservoirs in the area. The project was financed largely with funds made available by the Washington Water Power Company, the owner of the Noxon Rapids hydroelectric plant.

A preimpoundment survey indicated that the section of the Clark Fork River to be inundated by the Noxon Rapids Dam contained large numbers of squawfish, chubs and suckers. These fish would provide brood stock that would rapidly saturate the new reservoir with undesirable fish. Therefore, in September 1958, toxicants were introduced into this section of the Clark Fork River to reduce rough fish to the lowest possible number.

During this same period, information was also being gathered from Cabinet Gorge Reservoir on the Clark Fork River and from Hungry Horse Reservoir on the South Fork of the Flathead River. These reservoirs were approximately the same age but represented different habitat types that were reflected in their fish populations.

By 1959, the Department was conducting biological surveys on a number of mountain lakes each year. Surveys were designed to evaluate each lake as a present or potential trout fishery. Records were made of the present trout population, depth of water and available spawning areas for each lake. This information was needed so sound biological management could be applied to back country fishing waters.

Surveys showed that Montana's mountain lakes ranged all the way from those with no fish life in them at all to some that were actually overpopulated with trout. Some afforded good living conditions for trout while others were incapable of supporting any fish life. Some had excellent spawning facilities while, in others, the fishery was entirely dependent upon artificial stocking.

It was not the intent of the survey program to merely locate barren lakes so that they could be stocked. Rather, the management plan was to collect essential physical, biological and chemical data on the more important mountain lakes so that the Department could: 1) stock trout only in reasonably accessible lakes

where we could best expect to produce good fishing; 2) refrain from planting waters which could be harmed by stocking or waters where planted fish would be wasted; and 3) retain some remote mountain lakes in their present "fishless" condition so that they could be quickly put into production when they were required by the future fishing needs of an increased number of anglers.

Because of the great number of Montana's back country lakes and the relatively light fishing pressure on them, it was not economically feasible to survey a large number each year. Consequently, lake survey priorities were decided by the District Fisheries Manager in each fisheries district.

Managers had to take into consideration a host of factors when deciding which mountain lakes were to be surveyed in any given year. Among considerations was the importance of individual lakes to the overall fisheries program; the history of a lake as a fishery; relative time required to conduct the survey compared to other duties of the manager; and cost of the survey. The cost of mountain lake surveys was greater per area of water covered than most any other kind of fisheries survey work.

George Holton was interested in the distribution and status of cutthroat trout in Montana and this led to a Master's thesis by Delano "Laney" Hanzel completed at Montana State University, Bozeman in 1959. In his thesis, Hanzel provided photographs showing the differences between "westslope" (WCT) and "Yellowstone" (YCT) forms of the cutthroat trout, but he did not make specific taxonomic recommendations based on the different forms. It wasn't until much later that WCT (*Oncorhynchus clarki lewisi*) and YCT (*O. c. bouvieri*) were formally recognized as subspecies of cutthroat trout. The historical distribution of both WCT and YCT in Montana can never be known with certainty. Hanzel (1959) reported that WCT were distributed in the Missouri River basin down to the mouth of the Musselshell River and throughout the state west of the Continental Divide. Following Hanzel's work, during the 1980's and 1990's, several other researchers also reviewed the status and distribution of both westslope and Yellowstone cutthroat trout and found they had declined considerably and occupied only a fraction of their original ranges in Montana.

A detailed analysis of the cost of rearing and planting hatchery trout was completed during the 1958-60 biennium. The report appeared in the April 1960 issue of the *Progressive Fish Culturist* (published by the U.S. Fish and Wildlife Service). It particularly evaluated cost in relation to size of fish produced. Total costs ranged from only 0.3 cents per fish for one-inch fry up to 64 cents per fish for ten-inch trout. Production costs, which included only those hatchery expenditures directly concerned with feeding and handling the fish, were about one-half of total costs and compared very favorably with cost data from other state and federal hatcheries. Fish managers found this cost data useful in determining the most economical management measures to use wherever hatchery fish were involved.

In 1959, a dam was constructed on Beaver Creek in the Bear Paw Mountains, south of Havre, to impound a 40-acre fishing lake. The dam was completed in the fall of 1959 and the water reached spillway level in April 1960. Construction of the dam was first recommended by the district fishery manager and approved by the Commission in 1952. The new lake contributed to both the fishing and the aesthetics of the area. While there are several small streams in the Bear Paws, lakes and ponds were practically nonexistent. By 1959, the fisheries laboratory at Montana State College in Bozeman was the focal point for many fish and game Department projects. Originally established in 1948 to conduct age and growth studies on fish, the lab expanded to include other projects. Age and growth studies remained one of the lab's most important responsibilities. Dick Graham, a fisheries biologist, was in charge of the laboratory from 1951 until May 1959. Jack Heaton succeeded Graham in 1959. Information provided by the lab was used by fisheries managers in managing the state's waters.

By FY1959, annual D-J funding had nearly doubled from the first funding received in 1951, totaling $113,430.

During the 1950's, Montana received D-J funds totaling $783,765.

The 1960's

The Georgetown Lake creel census was continued during the winter of 1960-61 and summer of 1961. Although the census, which was designed to be made at two-year intervals, had only completed its second year, it was already showing that Georgetown Lake could be open to fishing for one more month per year with little, if any, loss in fishing quality.

In the January 1962 issue of *Montana Wildlife*, Lloyd Casagranda and Vern Waples, Department employees, summarized some of the more accessible mountain lakes in the Beartooth Mountains and provided a general map of the lakes, roads and trails in the area. The intent was, supposedly, to let fishermen know of these waters and how to take advantage of them.

During the 1960-1962 biennium, fisheries management biologists surveyed 114 lakes and 67 streams, gathering physical, chemical and biological data useful in future fisheries management recommendations for these waters. Twenty-four lakes and three streams were rehabilitated with toxicant to remove undesirable fish populations.

During the 1960-62 biennium, fisheries studies were continued on Noxon Rapids, Cabinet Gorge and Hungry Horse reservoirs. Principal aspects covered by the research program included evaluation of stocking hatchery-reared rainbow trout, creel census, population trends with emphasis on recovery of nongame fish in partially rehabilitated Noxon Rapids Reservoir, physical and chemical characteristics of the two Clark Fork reservoirs, and methods to increase or establish spawning runs of trout.

Following the partial rehabilitation of the Noxon Rapids project in 1958, three million fingerling rainbow trout were planted during 1958, 1959, 1960, 1961, and 1962. These hatchery trout produced good fishing from 1959 through the spring of 1961. Fishing success fell markedly by May 1961 and continued to be low. In 1959, rainbow comprised 80 percent of the total population. In 1961, rainbow comprised only 10 percent and initial 1962 information indicated that the percentage of rainbows had fallen to less than 5 percent. Somewhat offsetting the decline of the rainbow trout were the increased numbers of three other game species: brown trout, Dolly Varden and whitefish.

The rapid buildup of the rough fish and decline of the rainbow as it occurred in Noxon Rapids cast doubt on the value of partial chemical treatment of large rivers being inundated by reservoirs. Management of the two lower Clark Fork River hydroelectric impoundments was at a transitory stage by the end of 1962. Planting of large numbers of fingerling rainbow trout had produced good to excellent angling but only for a relatively short time. These hatchery trout apparently had not established themselves as a reproducing population and nongame fish had increased in numbers to preimpoundment levels. Brown trout and Dolly Varden had fared well in the two lakes, but whether these two species of fish could maintain a desirable angler success level was debatable.

Research on Hungry Horse was initiated during the 1960-1962 biennium to determine when and where the lake cutthroat and Dolly Varden spawn and the abundance of young fish entering into the lake each year. Surveys were started on tributary streams suitable for cutthroat spawning. Work was started in conjunction with the Forest Service to repair certain road culverts acting as barriers to upstream movement of fish. It was believed the removal of these culverts as barriers would considerably increase the area available to spawning cutthroat and Dolly Varden.

Population trend information was collected yearly from Hungry Horse Reservoir. This trend information showed that the peak reservoir population was reached about 1958 and then began declining. This decline was the result of many factors, of which the most important was the increasing age of the reservoir. Numbers of Dolly Varden, whitefish, suckers and squawfish remained constant but the numbers of cutthroat appeared to decline.

Creel census information collected from Hungry Horse Reservoir during the 1960-1962 period indicated that fishing success had declined since the late 1950s but that it had leveled off to a steady rate. The average size of the cutthroat caught by anglers increased from 0.5 pounds in 1958 to 1.0 pounds in 1961. Large Dolly Varden (5 to 15 pounds) were increasing in numbers in the annual catch. In general, Hungry Horse Reservoir was an excellent "quality" fishery.

Joe Huston, Department fishery biologist in Region 1, spent many years studying Hungry Horse Reservoir and its tributaries. One of his earliest studies involved Hungry Horse Creek, a reservoir tributary, where he researched spawning of cutthroat trout in that stream. One of the problems in sampling spawning cutthroat is that they spawn during high water, making sampling difficult. Houston related his early attempts to sample with fish traps in an interview with Art Whitney on April 21, 1995:

> "Nobody has ever done much work on spring-spawning fish, particularly westslope cutthroat because they spawn during high water. And most of our creeks will have a ratio of anywhere from 100 to 200 to 1, the difference between low flows and high flows. Making traps stay or having traps stay through high water was very difficult. Our first attempt was in Hungry Horse Creek in 1964; we got all the traps in just right before the 1964 flood hit and after that we picked up parts of traps and whatnot for about two years thereafter. Then we went into what they called a modified wolf trap and eventually after experimenting for two years we were able to make one work. And we were able to fish it anywhere from 2 or 3 cfs flow up to four or five hundred cfs. Then the Corps of Engineers liked the design so much that they built one on Young Creek that was capable of being operated up to 900 hundred cfs."

In the early 1960's, Department interest in the fishery of Lake Mary Ronan in Region 1 increased. Bob Domrose, Department fisheries biologist worked in that region for most of his career. In an interview with Art Whitney on April 20, 1995, he talked about the fishery:

> ".... We had a fishery there in the early '60s that had decreased in numbers. The fish had somehow disappeared. Kokanee fishing fell flat, there were very few caught but the ones that were caught were large. This indicated that there was poor survival of those fish that were planted. It may, in part, be because the fish were planted too small, maybe planted a little too early and ended up down in the mud. Some may have been too small to survive. Any rate, in the early '60s, the fishing was very poor. The catch rate was one fish in every five hours which is not acceptable to fishermen. Another thing, it was only a summer fishery. There was no fishing in the winter because there were two resorts on the lake and people decided that we should save these fish for the summer fishermen. There should be no winter fishing. We decided we were going to try to provide a little more fishing for the lake so, gradually, we started a winter fishery that was restricted to weekends. Lo and behold, everyone thought winter fishing would be great because no one's hit the lake in the winter time. It was still the same thing -- not very much at all. So we got together with the hatchery people and started stocking a little bit larger fish. We were more careful in how these fish were released into the lake and what time they were released.
>
> "By the mid '60s, the fishing started to improve and we had some great fishing there by the '70s and '80s and opened up the fishing to winter fishing all the way to the middle of March. Winter fishing was terrific and about 80 percent of the people caught limits of salmon without affecting the summer fishery. We'd come back to the resort people and ask them how things were going. They were very happy with the (summer) fishing and here we had opened up a winter fishery as well."

The early 1960's continued to see conflicts between the evolving new fishery management philosophies and the historical use of hatchery fish to create fishing. Sportsmen had not yet accepted the new ideas

that good fishing was not necessarily dependent upon hatchery plants. During an interview with Art Whitney on September 29, 1993, John J. "Bud" Gaffney, who became District Fisheries Manager in Bozeman in 1960, recalls one of his first sportsman's meetings :

> "Sometime after I moved to Bozeman as fish manager in 1960 -- shortly after I came down here -- one of the local clubs asked me to meet with them and talk about fish management. We didn't get a date arranged until the early part of the winter and I remember that the night I went to the meeting was a stormy night. I drove quite a ways on slippery, snowy roads. The meeting was scheduled to be with the fish committee with this club and I anticipated three or four, maybe half a dozen people. When I walked into the room there were 24 people sitting around the table. And that was the fish committee. You can imagine the outcome of any meeting where you had 24 people on one committee. They weren't particularly interested in discussing management philosophy or long-range goals. They had a list of all the waters they wanted planted with hatchery fish -- the numbers of fish, the species, the sizes. I tried to explain to them what the division's policy was on fish planting and what my personal philosophy was on that type of management. They weren't interested at all. I felt somewhat like a clerk in a Sears catalogue office. I just went over to pick up the order – the items they wanted and where they wanted them put. It was interesting and there was a lot of that during that period of time. In fact, later on that same club modified their philosophy over time and by the time I left the region in the '70s they were thinking about wild fish management and habitat protection. There was a lot of progress made with sportsmen's groups over the years."

A fish population study of Dailey Lake was made during 1960 and 1961. A creel census was conducted during the regular fishing seasons of both years. Fishermen harvested approximately thirty pounds of rainbow trout per acre and approximately ten pounds of yellow perch per acre each year. The estimated annual harvest was about 10,000 rainbow as compared to the annual plant of 20,000 catchable rainbows. Natural mortality apparently took about 50 percent of the stocked trout. In 1962, the plant was reduced by one-fourth and the creel census continued to evaluate this change in the planting schedule.

During the 1962-64 biennium, the Department, in cooperation with the U.S. Army Corps of Engineers, built a dike across the eastern end of the dredge cut which was dug when Fort Peck Dam was built in the 1930's. The dike isolated a 65-acre lake which was chemically treated to eliminate nongame fish and then replanted with trout.

During this same period, some lakes and ponds throughout the state were treated with toxaphene or emulsifiable rotenone to remove populations of undesirable fish. Few, if any, of these rehabilitation projects were ever successful in removing 100 percent of the rough fish; however, the number was usually reduced to the point where the reintroduced trout had a much better chance of survival and sport fishing was improved.

One of the larger waters chemically treated was Hebgen Reservoir following the earthquake in that area in 1959. The opportunity for treating the lake occurred when the reservoir was drawn down for the inspection and repair of the control gates at the dam. The lowered reservoir pool was treated with toxaphene to remove the Utah chub population that infested the waters. Even though the toxaphene was introduced into the various tributaries of Hebgen Reservoir through a series of drip stations and into the reservoir pool by an airplane equipped with a spray system, the results were negligible. It is believed that the high turbidity of the water at the time interfered with the effectiveness of the toxicant.

A series of articles in *Montana Wildlife* in the early 1960's entitled "Trail Trout" each described a fisheries survey of mountain lakes in one small portion of Montana's high country. Prior to 1962, mountain lake surveys were conducted by foot or horseback, and the number surveyed was as many as careful planning, long hours and hard work could make possible.

It was estimated that Montana had 2,000 mountain lakes, with a considerable number of them inaccessible to even four-wheel drive vehicles. Although mountain lakes supported a relatively small part of Montana's sport fishing, there was considerable interest from sportsmen and outfitters regarding their management. Usually these were lakes where fishing was reported to have become poorer in recent years. Also, the Department was frequently asked for recommendations on mountain lakes that were being considered for irrigation development. These recommendations needed to be based on a knowledge of all lakes in the immediate area. Only in this way could the importance of an individual lake be judged.

Once a crew reached an area by packing in, however, it was most economical to survey all the lakes possible in that drainage. While this gave good coverage for long-range inventory of waters, it also meant that widely separated problem lakes had to be surveyed in different years. For example, over 200 mountain lakes in District 2 are scattered throughout four widely-separated parts of the district, and survey emphasis could be placed on only one part of the area each year. This meant that some problem lakes might have to wait up to four years to be surveyed. If two lakes happened to be at opposite ends of the same group, one of them might be carried on the survey list for eight years. Slow, usually difficult transportation, a short field season, and the widely-separated groups of lakes which demanded attention, seemed to destine the survey of problem mountain lakes to a perpetual snail's pace.

Then, early in 1962, the Fish and Game Department purchased a helicopter. Fisheries personnel immediately began to modify and adapt survey gear and methods to this new form of transportation. The 60-mile per hour speed of this flying pack horse allowed surveyors to include lakes from many drainages on the 1962 program. So, on July 17, 1962 the high-gear, high-lake survey got underway. The survey covered 45 lakes in four major drainages and ended on September 7. Forty-four hours and 40 minutes of actual flying time for the summer cost $3,350. This was $74.44 per lake - $5.00 less than the lowest cost per lake for rented, horseback transportation.

Twenty-one of the 45 lakes surveyed in 1962 were in the upper Clark Fork drainage of the western district. They were in five separate portions of the drainage and extremes of the group were 35 miles apart. Surveys by the old method would have taken approximately 30 days; with the helicopter the job was finished in 13 days.

The helicopter was used to survey 87 mountain lakes during the 1962-1964 biennium.

In January of 1963, Dr. C. J. D. Brown and Dr. Richard Graham met with the Commission to discuss establishing a Cooperative Fisheries Research Unit to be located at Montana State University in Bozeman. The Commission approved financial support of the unit with the minimum contribution to be $10,000 annually. On July 1, 1963, the Montana Fisheries Research Unit came into being. It was supported jointly by the Department, Montana State College and U.S. Bureau of Sport Fisheries and Wildlife. Its established purpose was multiple: training of professional fisheries workers, research on fisheries problems and demonstrating fisheries principals to other agencies, landowners and the public. Fisheries units were established in several other states at the same time as Montana's and are comparable to Cooperative Game Research Units, which play an important part in the game management programs of many states.

The University provided office and laboratory space as well as secretarial services. The Fish and Wildlife Service paid the salaries of the leader and his assistant and furnished operating funds. The Department's contribution was used primarily to fund graduate students. For many years, the Unit served as the research section of the Fisheries Division. Dr. Richard Graham was appointed Unit Leader and Dr. William Gould was the Assistant Leader.

The most intensive surveys of mostly inaccessible mountain lakes in Montana were conducted by Pat Marcuson, Department biologist stationed in Red Lodge. Marcuson spent 10 years surveying and sampling more than 1,000 lakes in nine major drainages in the Absaroka and Beartooth mountains

between 1967 and 1977. His book, *The Beartooth Fishing Guide*, describes location, access, size, stocking frequency, what fish to expect and how to catch them. The surveys began with a survey of 20 lakes in 1967 and 50 in 1968. Then, the pace quickened so that nearly 250 lakes were surveyed in some years. Some of the work was done by helicopter but all of the work within established wilderness boundaries was done by foot travel since mechanized equipment was not allowed in wilderness areas. The completed studies were used by the Department to establish a management plan for lakes in this remote area.

The Fish Records Program, keeping track of the largest fish caught by angling in Montana, seems to have begun through an article in the April 1963 issue of *Montana Wildlife* entitled "Big Fish in Montana". The article states that,

> "....unfortunately, there are few records to verify the tales of lunker trout. Perhaps they did exist, or perhaps mediocre fish have grown monstrous, fed on years of imagination. Except for passing mention and a possible picture in local papers, bragging-size fish have mostly gone unrecorded in Montana. A few have been entered in the *Field and Stream* annual fishing contest and this publication has graciously supplied the following list of the largest fish entered from Montana, 1911 through 1961.
>
> "Further, it would be of interest to sportsmen and an advantage to fisheries workers if a list were kept, over passing years, of larger Montana fish taken. The Fish and Game Department is prepared to compile and maintain such a listing but we must depend on you fishermen to supply the data. No prize will be offered but each spring *Montana Wildlife* and whatever newspaper coverage can be mustered will carry a running list of larger fish taken the past season, where they were taken, and who took them. So, we are requesting that if you take an unusually large fish, regardless of what kind it is, report it to the Fish and Game Department – I & E Division, Helena.
>
> "Standards must be set. Of course, the fish must be taken by legal means from Montana waters. They must be weighed on scales legal for trade to within the nearest ounce, and weight must be attested by signature of two witnesses. The length of the fish to the nearest 1/8 inch must be determined by laying it on a yard stick or other rigid rule. Measurement must be from the point of the snout to tip of tail when depressed. Measurements by flexible rules are not accurate because they may curve around the body and give a biased reading.
>
> "When sending information on fish, list where and when the fish was taken and by what lure, fly, or bait. A photograph of the fish and fisherman would also add interest and authenticity to a historical file."

A federal law, the Commercial Fisheries Research and Development Act of 1964 (16 USCS 779), passed May 20, 1964, provided definitions relating to state commercial fisheries research and development projects, cooperation with the states, use of funds, joint projects, authorization of appropriations and apportionment of funds among the states.

Under the Act, the Department commissioned a study to determine the practical and economic feasibility of commercial fishing in Montana and whether there were markets for commercial fish species. A report by Glenn R. Barth of the Bureau of Business and Economic Research at the University of Montana in Missoula entitled *Markets for Montana Commercial Fish* was submitted to the Department in 1969. The study evaluated the potential for commercial fishing in Montana and gave an evaluation of the markets that were available which might buy the commercial catch from Montana waters.

Barth's study found that a small amount of commercial fishing in Montana had occurred since the building of reservoirs in the Missouri River system. Fish and Game Department research had indicated a

substantial supply of fish available in the state for commercial markets, including goldeye, carp and buffalofish as well as suckers, sheepshead, catfish and bullhead. Harvesting these appeared to present no particular difficulties other than winter ice conditions.

Further, in years past, several individuals had attempted to harvest Montana fish commercially but, with few exceptions, failed in their efforts. If the social and economic costs of such failures were to be minimized and the prospects for a successful Montana fishing industry improved, more information was needed by resource managers, fishermen, and prospective processors and handlers. The purpose of the report was to provide this information.

Fish and Game records indicated that commercial fishing began in Montana in 1954. Several early attempts failed for lack of experience and markets. During 1966, there were two commercial fishing enterprises licensed in Montana. However, they did not operate exclusively in Montana but also in North Dakota and Washington when fishing in those states was more profitable. A third enterprise began operations in 1967.

Barth's report concluded that Montana fish found acceptance in the market only when similar species from other sources were not available in adequate quantity. Buyers preferred Louisiana buffalofish and Canadian goldeye. Montana carp were small and were seldom shipped east due to low value and high transportation costs.

Additionally, the report found that Montana was a minor producer of several species of fish enjoying a severely limited market. Montana fishermen were at a competitive disadvantage because of distance to market and the species available for them to catch. These species were considered inferior, even unfit to eat, by many people. Also, the small quantity available made the production of various industrial products unfeasible.

Finally, the report concluded that within the foreseeable future, there would be a continuing demand for limited quantities of Montana fish. This demand could best be served by "poor boy" operations presently active which did not require a large capital investment

The Commercial Fisheries Research and Development Act was repealed by Congress on November 14, 1986.

In the late 1950's and early 1960's, various agencies of the federal government had made recommendations for development of the Missouri River from Fort Benton downstream to Fort Peck Reservoir. Recommendations ranged from complete impoundment with a series of dams to preservation of this reach of river as a national wilderness waterway. None of the reports by these agencies contained factual information on the fisheries resource or the probable effects the various developments would have on this resource.
To gain needed information, a fish population study with fish traps was undertaken by the Department in 1962 and 1963. By 1964, information indicated the presence of a sauger population, underutilized but of great potential value. Also found were channel catfish, paddlefish and burbot, all with potential sport fishery value. The Fisheries Division planned to continue the inventory of these fish populations with emphasis on the relationship between fish in the river and in its tributaries. Only in this way could the proposed developments on the Missouri River be adequately evaluated and provisions made to preserve the fisheries resource.

In April 1962, an unusual fishery was rediscovered at Intake Dam on the Yellowstone River some 20 miles downstream from the City of Glendive – it was paddle fishing. Paddlefish feed on plankton (microscopic animals in the water) and will not take ordinary bait. Fishing is done by snagging.

Intake Dam is an irrigation diversion built across the Yellowstone River in 1903. "Old-timers" reported paddlefish snagging was excellent in 1914, 1915 and 1916 but, after that, sport catches of paddlefish were

not heard of until 1962. Starting in 1962, snagging was excellent for a few weeks each spring during the paddlefish spawning migration. As many as 30 fishermen at one time lined the banks 50 to 100 yards below the dam.

The sport of paddle fishing was, thus, rediscovered and gained in popularity by leaps and bounds. The paddlefish was not listed as a game fish under Montana codes and was, therefore, not within the jurisdiction of the Fish and Game Commission. Now that this ancient member of the fish world had become a primary target in Montana's big eastern rivers, the Commission foresaw the need for some regulatory measures.

Paddlefish are not newcomers to Montana. In fact, they may be the most native of the state's native fish, as their remains were found in 63-million-year-old fossil beds north of Jordan. Knowledge about the species was scarce, considering it has been around so many years. Most of the life history information Montana biologists had acquired came from other states.

A study was launched in May 1964 to answer questions about paddlefish in Montana – their migrations, age and growth rate, and extent of fisherman harvest. A total of 1,146 paddlefish were tagged. The capture and release site for most of these was the Yellowstone River near Intake. Tag returns showed that they moved considerable distances both up and downstream.

The increased paddlefish fishing pressure and interest in this species required that the Fish and Game Department learn the details behind this interesting fishery. A number of questions needed to be answered before this species could be wisely managed. Sportsmen and fishery biologists, alike, wondered why the paddlefish appeared so suddenly and in such great numbers in 1962, when very few had been reported before then. Where did the fish come from and should there be a limit set on the number of fish taken by fishermen? In addition to these questions, many other facts about the life history of the fish needed to be learned before sound recommendations as to seasons and limits could be made.

By 1966, a portion of this study had been completed. The results provided some insight into the paddlefish and its future management in Montana. The combination of tag returns and age data lead investigators to surmise that Garrison Reservoir in North Dakota was the source of paddlefish caught at Intake. This large impoundment was completed in 1953 and, while filling, it probably provided ideal habitat for young paddlefish. The filling of Garrison Reservoir and the formation of a large group of 7-to-12-year-old paddlefish at Intake corresponded exactly. Therefore, it was believed future paddle fishing at Intake depended upon the continued suitability of Garrison Reservoir as a nursery area. If conditions remained favorable, the runs would occur each spring. If conditions become unfavorable, the runs would gradually fade out.

By 1964 the point was reached in fisheries management where a hard look had to be taken at allocation of the fisheries management dollar. The use of hatchery fish was often effective, but expensive. Under many circumstances, the use was thought to be ineffective. However, it was the major expenditure in fisheries management. In many waters, the point of diminishing returns had been reached. In other words, on these waters the planting of hatchery fish did not improve fishing enough to justify the additional cost. Even more important, money spent on the ineffective fraction of hatchery production was denied to more effective programs.

The Fisheries Division planned a shift in the fish management program from over emphasis on fish planting to a better balance between planting and other programs. These other programs included lake building, acquisition of fishing access, and chemical treatment to eliminate undesirable fish so desirable species could be replanted. Highest priority was to be given to preservation and restoration of fish habitat.

In the mid-1960's, air compressors were used in Brown's and Georgetown lakes during ice cover to see if pumping air into the water would prevent winterkill. Winterkill conditions did not occur while compressors

were installed. However, it was discovered that the circulation of water due to pumping air was limited to less than 100 feet from the airline. Therefore, temperatures and oxygen content improvement were also limited to this area. It was concluded that air compressors could do little to lessen winterkill in these lakes. It was also suspected that air-induced water circulation might cause winter kills instead of preventing them by circulating bottom water devoid of oxygen to upper water layers that already were marginal in oxygen content, thus reducing what remaining oxygen there was in the water bodies.

By the mid-1960's, one of the nagging problems associated with large reservoirs was the lack of adequate spawning areas to provide sport fish for these large bodies of water. The problem was further complicated by the fact that reservoirs are much more favorable to reproduction and survival of fish species which are not held in favor by fishermen. Many reservoirs had to be stocked excessively each year in order to provide sports fishing. So, the Fisheries Division was trying a system that might be termed "partial artificial propagation" as an aid for an ailing reservoir. Fisheries workers dubbed the project "Houston's Hatchery" in reference to amicable Joe Houston, who initiated the project. Basically, the program involved man-made plants of eyed fish eggs in man-made spawning beds, and leaving nature to do the rest.

Many Noxon Rapids tributaries were blocked to spring-spawning trout because of the spring drawdown of the reservoir, impassable box canyons during high water on the Vermillion River and Prospect Creek and the drying up of some streams with trout eggs buried in the gravel during the fall and winter. Graves Creek, since 1961, had dried up each year after brown trout spawned. This killed all the eggs and, in some cases, the adult fish too. Many of the streams had large amounts of silt in the gravel or muddy flows that deposited silt over the eggs and killed them.

In the summer of 1965, the Washington Water Power Company leased a series of spring-fed ponds located on the R. Wilkinson property along Prospect Creek. The springs feeding the ponds flowed at a constant rate of 1.7 cfs and maintained temperatures of 44°F to 50°F year-round. The water was clear with little silt or debris. These ponds, with development and experimenting, were thought to be well suited to hatching trout eggs with little mortality. The company and the Department cleaned out two ponds and built two hatching channels in the summer of 1965. Trout eggs were to be planted here, hatched, and released into Prospect Creek in alternate years starting in 1966 and extending through 1970.

In January 1966, 600,000 eyed eggs were planted in the two artificial channels. As with any new program, problems arose that were not anticipated. Egg and fry mortalities were much greater than expected in one of the two gravel beds. Of the eggs planted, about 60 percent hatched. Of these, it was anticipated that about 240,000 fry would be released into Prospect Creek. Even with the high mortalities, this phase was termed successful since similar numbers of eggs deposited in the creek would have suffered a mortality of 75 percent or more.

However, a reduction in hatching mortality would not guarantee a successful program. To be a success, fish hatched in the channel would have to drift into the reservoir in large enough numbers to provide some angling and enough must survive to return to Prospect Creek and spawn. Whether living conditions in the reservoir would allow this survival was yet to be seen.

The ultimate success of the program would be determined between 1966 and 1972. If about 600 adult female fish from the egg plant of 1966 returned to spawn in any one year and if several thousand others were caught by anglers through the years, then it was thought this experimental program could be termed successful.

In 1965, Richard Johnson was assigned as Fisheries Manager in District 7, with headquarters in Miles City. This was the seventh district to be assigned a fisheries manager. From 1953 to 1964, the area had been covered from Districts 5 and 6. Fisheries work in the southeastern part of the state emphasized studies on the Yellowstone and Tongue rivers, in addition to numerous ranch ponds and small lakes.

Investigations had been carried out on Flathead Lake for many years by researchers at Yellow Bay. Most of the studies, however, were short-term and not directly related to fisheries. In 1965, the commission approved a project for a very thorough study of Flathead Lake and its tributaries. Department biologists had been studying some of the fisheries problems in the main parts of the Flathead River as they drain into Flathead Lake. They had also been doing some experimenting with salmon in the area and working on the lake trout in order to find some of the better methods of catching these fish.

It became obvious to the Department that there has been a great deal of hit-or-miss work done on Flathead Lake. It was thought that, only after a very thorough study was completed and all of the work that different people had done was drawn together could we expect to manage Flathead Lake so it would produce the very most for Montanans and others who enjoy this area every summer.

Some of the problems that were faced on Flathead Lake were seemingly insurmountable. First, the lake had to be mapped so there was some idea of where the deep places were, where the reefs were, and the location of places that were of special interest to fish. More had to be known about the food produced in the lake – food that would support fish - and where the fish could be habitually found. Information was also needed on the relative abundance of various fish species, their growth rates, where they were spawning and what each species could contribute to the fisherman's creel.

The project was headed by Delano "Laney" Hanzel. The commission, in approving the project also approved the purchase of a boat of adequate size to work on the lake. A former West Coast salmon gill netting boat was purchased in November 1966 for use as a research vessel for the project. It was named the "Dolly Varden". The boat was fitted with electronic sounding and temperature sensing gear and altered to also handle trawls and purse seines. Some people criticized this purchase and stated that the boat would be a pleasure cruiser. It was far from this. The boat was a working platform that had booms on it to operate some of the netting gear, some of the sounding gear and other equipment. There was a cabin but only big enough for the wheelhouse. The boat was not designed for people to sleep on or to cruise around in but as a work boat to help fisheries workers approach some of the problems on Flathead Lake in a uniform and coordinated manner.

Some of the very specific intricate and academic programs on the lake were to be carried out in cooperation with universities and other institutions. These include some phases of water chemistry, water currents, fish food organisms, parasitism and many other facets of fish life in the Lake.

In 1965, the Bureau of Commercial Fisheries, now the National Marine Fisheries Service, and the Fish and Game Commission approved a commercial fisheries research project for Fort Peck Reservoir. The objective of the project was to obtain information on the abundance, distribution and reproduction of potential commercial fish species such as buffalo, carp, suckers, drum, goldeye, river carpsuckers and channel catfish. The project also involved methods of harvesting the fish. There was enough evidence to lead the Department to believe that Fort Peck Reservoir would support a good, sound, basic commercial fishery which would be of real economic value to the area, and, at the same time, provide a sound sport fishery which would benefit the area economically as well as offer many days of recreation. There was evidence that, if the water levels were manipulated properly at given times of the year when the pike are spawning, there could be an even more tremendous fishery for pike than was currently being enjoyed on Fort Peck. The study's findings would be used to recommend to the Corps of Engineers how this lake level could better be managed so the Department would be in a position to show that Fort Peck has a very equitable and profitable recreation and commercial fisheries. James Cooper was named project leader.

Fort Peck Lake is a large one and necessitated the purchase of a rather large working platform somewhat similar to the boat the Department purchased for the Flathead Lake study. A 35-foot research boat, constructed of heavy gauge aluminum over marine plywood, carrying electronic sounding and temperature sensing equipment, was authorized for the project. The purpose of the boat was to provide quarters and a base for reservoir operations. However, design criteria were not tight enough to eliminate a poorly qualified low bidder. Thus, the unit, when completed, proved to be poorly designed and constructed and

considerably underpowered. It handled poorly, broke down frequently and was difficult to repair. It was disposed of in less than 10 years.

In the July 1966 issue of *Montana Wildlife,* Jim Posewitz, District Fisheries Manager in Glasgow, wrote about Fort Peck Reservoir. The article, *Big Fish in the Big Pond,* explains how northern pike reproduction improved between 1954-1964 when the reservoir was severely drawn down to expose bare land. Vegetation grew on the land and when the reservoir level again rose to flood the vegetation, pike reproduction gradually improved.

In 1965, the fourth phase of the management plan for the Clearwater River Drainage was completed. Phase One, construction of a fish barrier at the outlet of Rainy Lake, was completed in 1957. Phase Two, chemical treatment of waters above this barrier to eradicate nongame fish was completed in 1958. The waters were restocked with native cutthroat trout and excellent fishing resulted. Phase Three, construction of a fish barrier below Inez Lake was essentially completed in 1963, with finishing touches added in 1964. These barriers permitted progressive chemical treatment from the headwaters downstream to eliminate nongame fish without danger of reinvasion by nongame fish from below. The small fish management units created by the barriers could be thoroughly treated with chemicals and individually managed. Phase Four, chemical treatment of Alva and Inez Lakes, lying between the two barriers, was completed in September 1965.

“Pro-noxfish”, a rotenone-containing chemical, was distributed in both Alva and Inez lakes from outboard motor boats. Fifty-five gallon drums mounted in the boats were filled with toxicant. Outlet pipes from the drums to the stern of the boats allowed the chemical to be released into the propeller wash as the boats were driven across the lakes.

Initial restocking of this area with cutthroat trout was accomplished in December 1965. The Clearwater was the only drainage in Montana on which fish barriers had been built specifically to create fish management units. This management approach appeared to have real merit on drainages where undesirable species had overrun waters that were otherwise suitable for game fish.

Beginning May 1, 1966, Montana fishermen could take up to 10 pounds of brook trout in addition to other limits of game fish.

By the mid-1960’s, paddlefish snagging in eastern Montana had developed into a very popular sport. A considerable number of these large fish, some weighing 100 pounds or more, were being caught. The greatest concentration of paddlefish occurred below the low diversion dam on the Yellowstone River at Intake, near Glendive. To prevent waste of these fish by some fishermen, the paddlefish was classified as a game fish and the daily and possession limit set at two fish.

About 50,000 pounds of goldeye from Fort Peck Reservoir were marketed in Winnipeg, Manitoba, Canada in 1967 and a contract was arranged for 100,000 pounds in 1968. With the netting techniques used previously, it was impossible to harvest goldeye without also taking quite a few game fish. Research by Department fisheries personnel resulted in the development of a method of using floating gill nets, fished away from the shallow areas, that caught almost 100 percent goldeyes. The total commercial catch in 1968 was over 1¼ million pounds of fish, which included bigmouth and smallmouth buffalo, river carpsuckers, channel catfish, freshwater drum, carp, white suckers and goldeye.

The mid-1960’s found fisheries management personnel continuing surveys and inventories of state waters, adding to a growing file of information which would be valuable in future fisheries and water resource management recommendations.

The January 1967 issue of *Montana Outdoors* carried a copy of a clipping from a Helena newspaper telling how carp came to Montana. The source of the article was a scrapbook kept by Col. W.F. Wheeler, first librarian of the Montana Historical Society and which belonged to his granddaughter, Mrs. Thomas

Topping. No date was given for the article except February 3 stated in the article, but from the fact that on the same page of the scrapbook there were other items dated February 1886, that might be the year. The newspaper was either the Montana Livestock Journal or the Helena Independent:

> "One year ago Messes Hundley and Preuitt, courtesy of Major Maginnis, received from Washington 100 German carp and put them in a pond on their ranch in the valley. They have never seen one of them since until this morning (Feb 3rd) when an ice cutter brought in a specimen which had been killed by a stroke of the ice saw.
>
> "It was put in the pond two inches long and now, by actual measurement, is 15 inches long and weighs three pounds and one ounce. This is the first carp raised in Montana so far as we know. The fact that they can be cultivated successfully here will be worth millions to the territory."

Research on Flathead Lake during the 1968-1970 biennium showed that annual fluctuations of climate and, in turn, water temperatures had a considerable effect on the patterns of kokanee distribution. This knowledge could be used to increase the success of sports fishermen.

In 1966, the Department launched a program to get better fish population estimates in larger rivers and streams where previous methods of electro fishing from the banks of streams by wading could not be used. Dick Vincent was hired to fill this research position in Bozeman. Over the years, electro fishing techniques markedly improved and fish population estimates became the primary basis for stream fishery management. Dick Vincent recalled this work in an oral interview with Art Whitney on October 26, 1994.

AW: Your job, first permanent job was in Bozeman?

DV: Yes, the first permanent job was actually stationed in Bozeman. I've been in Bozeman my entire career. Bud (Gaffney), who was the district manager at that time, hired me to work on large rivers to develop electro fishing gear and fish population estimate techniques.

AW: I remember that myself as well. I was Chief of Fisheries at the time and, up until this time, every region had experimented with their own method of trying to shock large rivers. It was a sideline for each fish manager and none of them had come up with a good solution. Finally, (we) decided that it should be a primary job of one person and that was you.

DV: Right, basically, that's how we started all the fish population estimates in the region, by experimenting with various electro fishing gear, boats, electrodes, and population type estimate systems. The first estimates, quite frankly, in 1966, were just experiments to see if we could do such a thing.

AW: You changed the gear and the method too. I remember at that time we walked back and forth between 300 - 600 foot sections of stream with electrodes. You changed the whole idea for big rivers.

DV: Yes, basically, we went to, rather than a vacuuming system, where you just electrofished everything out, we went to a mark and recapture system, which involved long sections of river. In many cases, like the Madison and the Yellowstone, three to four miles of river were actually electrofished and estimates made on very long sections of rivers. Made by the mark and recapture, where fish were marked and then over a period of a week or so you returned and did more recapturing and marked and got the estimates. And, frankly, that was sort of the beginning as I understand it in Montana of estimates in general and

particular in large rivers where we had little or no data. Most of the data we had prior to that was much like Art described where we had a count, more than an estimate, of the number of fish. You were restricted to areas that you could walk.

AW: And your estimate was for that piece of stream? Now, your method didn't use block nets?

DV: No block nets. In fact, we used the concept that you use along the section, the edge effect, of a fish escaping either at the start of the section or out the end of the section was minimal. So, you really didn't worry about that. Whereas, with the method where you extracted all the fish or did a fish count, you did a block. It would lower your estimate. This (population estimate) technique discounted that because the edge effect was so small in relation to total population. The few (fish) that would escape were of little or no importance.

Studying fish populations in the large and deep Kootenai River below Libby Dam was a new challenge. New electro fishing techniques were developing to sample smaller rivers like the Madison and Big Hole but were lacking for the larger rivers. Joe Huston and Bruce May, fishery biologists in Region 1, recall attempts to sample the Kootenai in order to make fish population estimates. Huston and May talked about these efforts in separate interviews with Art Whitney on April 21, 1995:

Joe Huston with Whitney:

AW: One of the things you had to do in the order to accomplish some of these jobs was sampling rivers the size of the Kootenai and develop some night-fishing techniques. Do you want to give me the background on that, how you experimented with that?

JH: Well, actually the basic idea came from Bob Shumacher for this development of (sampling) gear for large rivers and reservoirs and started in about 1966. We worked with Washington Water Power trying to develop a machine to do it but they were not successful. Then, jet boats came on the scene which really eased the problem of working in large rivers. And, we threw together a jet boat and some sampling gear and did the first major large river work in Montana in about 1969.

AW: The technique of sampling from boats had been developed by (Dick) Vincent in Bozeman but he was on smaller rivers and you had to change the timing to get a sample. I think you were the first one to go into nighttime shocking in order to corral the fish.

JH: Yes, everybody who comes on has to be convinced. But, the problem is, you can go out in daylight on large rivers and work for two hours and catch two fish and in the nighttime you can go out and work two hours and catch two thousand fish because fish will not run from a boat even if it's lit up with underwater lights at night. Whereas, they'll run from a boat in the daylight, probably from the shadow.

AW: And they may even be in different places in the river in the daylight.

JH: Yes, in the dark they'll come in the shallows and feed.

AW: Well, that took some doing too. You just don't take any biologist that happened to be walking by and have them run your shocking boat when you're sampling a river at night. You need to do a little bit of work familiarizing yourself.

JH: Oh, yes. You got familiar with a section and some people just can't drive at night at all. We had one man who was a responsible boat driver during the daytime but anytime he got out at night he got completely disoriented and lost and he got us in a couple of big jams. Wrapped the boat up around a bridge on the Fisher River.

AW: Crosswise against the bridge or crosswise against a large boulder?

JH: Crosswise . . . on the bridge. Only thing that was damaged was one dog who happened to fall out over the boat and the guy grabbed his tail and hauled him back in the boat and in the process kinda roughed up his genitals and they were swollen for two or three days.

AW: But none of the humans got hurt?

JH: None of the humans got hurt.

Bruce May with Whitney:

BM: Probably the most important thing we did with Joe (Huston) and Bill Bothman who was our field man at the time. We pioneered night shocking on the major river systems in Montana. I think we were the first ones to do population estimates on the large rivers at night. The reason we had to work at night was the river was so deep and wide that we couldn't collect enough; we couldn't get enough fish marked to make a decent estimate. So we found out, and Joe pioneered this work, that if we went out at night the fish seemed to come in and lay along the banks more. In the shallow water they weren't near as spooky and we were able to collect lots and lots of fish and get enough marked and tagged to make a population estimate. So that was a real, interesting technique that we developed that I believe is being used not only in Montana but I believe other states that are sampling large river systems -- they can do it at night. Thanks to the work that was pioneered by Joe and the rest of the folks in Libby.

As the ability to electrofish larger streams improved, the safety of fisheries personnel working with electricity in larger and deeper waters was of concern to everyone involved in these operations. Although safety precautions were taken, there was always the chance that an accident could happen. Fortunately, no one was killed or seriously hurt due to these operations. John J. “Bud” Gaffney was the District Fisheries Manager in Bozeman during the early days of electro fishing techniques’ development. In an oral interview with Art Whitney on September 29, 1993, he recalled a rather humorous incident that occurred:

JG. There was one interesting side line on the electro fishing operation. You recall, Art, one time a fisheries administrator from Australia or New Zealand was here.

AW: Chas Hardy, he wrote his name Chas and that was what he wanted to be called, Chas.

JG: You got him around to look at a number of field projects and you met us on the Big Hole River. We had planned some shocking that day and you brought him

around to see the operation. I still remember the one question he asked me. The fellows were getting their boots on and the gear ready in the boat, getting ready to make a run down the river. He looked at me with his "down under" accent, rather quizzically and said, "I say, do I understand you right, that you chaps actually get in the water when that device is running?" He was pretty amazed that we would get in the water when you mix electricity and water.

AW: Apparently in New Zealand they stay in the boat. They have a lot of safety features in the boat. He asked what safety precautions we have and George (Holton) said we have a long list of applicants who want to go to work for us.

JG: Well, admittedly, Art, our safety precautions left something to be desired in the early years but we did improve over the years. As you say, initially we were walking ahead of the boats and the people operating the electrodes and the nets actually got in the water and walked ahead of the boat. In the deep holes, they had to jump on the bow of the boat. In later years they got to the point that everyone stayed in the boat, which was a better safety factor. And, we improved some of the safety considerations. We did get a lot of good information from that shocking on the Madison and other parts of the region. Other regions adopted the gear, too. One gratifying thing was that we didn't have many serious injuries. There had been some serious injuries around the country with electro fishing gear, and we did have some near misses and people got a pretty good jolt. That scared us considerably but actually no one (Department employee) was seriously injured or killed.

In order to insure a well-balanced fisheries program, the Fish and Game Commission adopted a new fish stocking and management policy in 1967. This policy limited expenditures for the fish cultural program to no more than one-third of the direct and indirect fish conservation expenditures. Certain criteria were also included in the policy to insure that fishermen creel as many of the planted catchable-size fish as possible. Following are some of the standards which a stream or lake had to meet before it would be planted with catchable size trout for immediate harvest:

1. For each six fish planted there must be an increase of one fisherman day on the water stocked.

2. It must be established that a catchable plant will provide more days of recreational fishing than would an equal value of smaller fish.

3. At least 40 percent of the planted fish must be creeled and these must provide 25 percent of the game fish harvested from the water stocked.

4. The body of water when planted must show significant fishing pressure.

5. For a new plant to be made, or an existing plan to be increased, anglers must have a catch of less than one-half game fish per hour as determined by creel census.

The planting of catchable size fish or fingerlings of any species for population manipulation, rather than immediate harvest is considered resource management. To ensure this type of planting makes a significant addition to Montana's sport fishery and does not merely replace wild stocks, the following criteria must be met:

1. The planted fish, after growing to a desirable size for harvest, must comprise at least 10 percent of the water's catchable size game fish and must result in a significant

increase in the population as determined by the best available method for assessing fish populations.

2. The planted fish must comprise at least 25 percent of the water's game fish harvest.

3. At least twice the weight of fish planted must be returned to the creel.

The feasibility of planting fry of any species and the feasibility of transplanting fish from one water to another were to be judged by the merits of the individual project.

The concept of fisheries management for wild fish budded into fruition in 1967. Each form of recreation can be either common place or outstanding depending on certain things that give it quality. Many persons felt that catching wild fish was an essential part of a quality fishing trip. A wild fish was considered one which was the product of nature rather than of artificial culture. While other fishermen did not feel strongly on this point, they might still prefer their quarry to be a true product of the wild.

The wild fish concept was not immediately popular. Some biologists in western states and Montana sportsmen didn't agree with the Department's belief that planting hatchery-bred trout in rivers and streams was not only a waste of money but also was not a very wise way to treat a river. However, a team of Department biologists, under Fisheries Chief Art Whitney, armed with information gathered from a limited research project on the Madison River – championed the idea that if the naturally spawned fish in rivers no longer had to compete with the big hatchery planted trout, the river and stream fishery would restore itself. The notion was too radical, and Whitney so adamant, that a Fish and Game Commissioner asked Whitney at a public meeting, "If this doesn't work, will you quit?" He didn't have to quit.

In keeping with the wild fish concept, provisions were made in the commission's 1967 fish stocking policy to set aside certain streams or outstanding streams for wild fish only. Such streams were not to be planted except to reestablish fish in an area where some disaster killed off the natural fish residents. Streams in the wild fish category included all streams or sections of streams in wilderness areas, streams or sections of streams outside wilderness areas that were not accessible by graded road, select sections of state recreational waterways and select sections of blue ribbon trout streams.

There were quite a number of other streams in the state which had, in essence, been wild trout waters because they provided excellent fishing for many years without planting. The Madison River below Ennis Lake was one example. The Fish and Game Commission was to consider declaring some of these streams as wild trout streams at a later date after Montanans had a chance to think over the wild fish concept.

By the late 1960's, big rivers, like the Madison, Missouri, Jefferson, Yellowstone and Big Hole were very popular with Montana anglers and were major tourist attractions in Montana. Because of their size, it was previously impossible to sample and research them as could be done on the smaller streams. Research technique breakthroughs made possible the gathering of adequate and accurate information to manage these large rivers in a manner to enhance and sustain this already tremendous fishery resource. Research dividends were realized on the Madison River in the late 1960's where survival of wild trout was improved because of better water flows in the river. The improved flows were due to regulated releases of water from Hebgen Reservoir by the Montana Power Company.

According to the 1968-1970 biennial report, the loss of fish habitat through stream alteration, competition for water, siltation and other forms of pollution still remained the major concern of fisheries biologists.

In 1968, Mysis shrimp were introduced into several lakes in the Flathead basin in an attempt to improve the kokanee fisheries. Bob Domrose, long-time Department fisheries biologist in Kalispell, in an oral interview with Art Whitney on April 20, 1995, remembers going to Waterton Lake in British Columbia to collect them:

> "....So, (Bob) Shumacher and I went to Waterton Lake where most of the Mysis shrimp were collected. In 1968 we went up there on two occasions. On the first occasion, we didn't catch very much; we weren't too successful. That was in the spring. In the following fall we went up and towed drift nets in the middle of the night while the shrimp were migrated up towards the surface and picked up a fair amount of shrimp and transported them back to Montana and planted them in the lakes.
>
> "...We had a hatchery truck where we kept them cold with ice water and brought them back and immediately planted them in about five or six lakes in northwestern Montana - Swan, Whitefish, Bitterroot, Ashley, Crystal, Holland, and Lindberg lakes. ..... Holland and Lindberg were the last lakes we planted and what happened there, I guess they were all dead by the time they got there. So, fortunately we didn't get any success in survival in those two lakes. However, we did get very good success in Whitefish Lake, Swan Lake, and Bitterroot Lake. As time went on, we sampled and started picking up more and more and density increased in those lakes . . . another lake (where Mysis was introduced) was MacGregor Lake."

Unfortunately, the success of Mysis introduction was to be regretted in later years because their presence actually hurt kokanee populations rather than helping them.

Montana's first fish import statute was adopted in 1969 when Montana's 41st Legislature enacted a law that required that salmonid fish or eggs shipped into Montana be certified free of whirling disease and other diseases as identified by the Fish and Game Commission. This law gave the Commission the authority to add pathogens and diseases it felt were necessary to protect Montana's fisheries from introduction of disease. Once this law passed the Legislature, Montana's fish health program really began to develop.

During the 1960's, Montana's share of Sport Fish Restoration (D-J) funds was $1,587,871.

The 1970's

Fishing regulations were established in 1970 which allowed winter spearfishing for pike, walleye, sauger and rough fish in some areas. Spearing proved to be very popular with Montanans.

By 1970, tagging programs disclosed that paddlefish which provided good fishing at Intake on the Yellowstone River were migrants from Garrison Reservoir in North Dakota. Tagged paddlefish were also recovered from dredge cuts in the Missouri River below Fort Peck Reservoir.

In 1970, Dr. James Liebelt succeeded James Cooper as project leader of the Fort Peck Reservoir commercial fisheries study.

Fishes of Montana, by Dr. C. J. D. Brown, which had been in production stages for several years, was published in 1971. This very complete description of Montana fishes involved 52 native species and 28 introduced species. The book was a landmark publication, culminating Dr. Brown's long and distinguished career in teaching and research at Montana State College. The Department of Fish and Game and the Montana Agricultural Experiment Station at MSU cooperated in the printing of the book, which fulfilled a long-felt need in identification and distribution of state fishes.

In 1971, a final report was completed for the 10-year Rock Creek creel census study begun in 1958. Catchable-size rainbow trout were planted during six years of the study. Only 35 percent of the 139,000 planted fish were caught by fishermen. Stocking increased overall fisherman success; however, more skillful fishermen benefitted much more than the less skillful. This study was believed to be of great value in establishing fish planting policies.

During the 1970's annual fish health inspection programs were initiated for all state and federal brood hatcheries and wild broodstock sources. Annual inspection programs and ongoing fish health inspections at all state hatcheries became the primary focus of the Department's fish health program. Inspections at private hatcheries were also initiated. Initially, these inspections were the responsibility of the U.S. Fish and Wildlife Service but, as Montana's fish health program developed, the state picked up most of the responsibility for inspecting private facilities.

In 1971, the Infectious Pancreatic Necrosis (IPN) virus was added to Montana's list of pathogens of concern. During the next few years, two other viral pathogens and three bacterial pathogens were added to the list, and, in 1974, the Fish and Game Commission adopted the revised Administrative Rules of Montana (ARM) which included the list of pathogens of concern and other guidelines under which fish may be imported into Montana. The pathogen list adopted in 1974, which includes seven pathogens, including the whirling disease parasite, represents the primary list of pathogens of concern still in use at the end of the 1990's.

The fish health program grew during the 1970's from one Fish Health Specialist conducting fish health work for about 10% of his time to a project requiring full time attention. Montana's first Fish Health Specialist, Thurston Dotson, was located at Washoe Park Trout Hatchery. He was later relocated to Bluewater Springs Trout Hatchery, where the fish health laboratory was located until 1985. Montana's current Fish Health Coordinator, Jim Peterson, took over the fish health job in 1977, when Dotson was promoted to a Fish Hatchery Manager position.

The March/April 1971 issue of *Montana Outdoors* carried an article by Art Whitney entitled "Who Pays for What?". In it, Whitney discusses catchable fish stocking in streams and its associated costs to anglers, whether they want to catch hatchery fish or not. Stream planting was effective and popular and public demand expected that it be continued at its present level. However, to be equitable to all anglers, Whitney suggested that stream planting of catchable trout be subsidized by those anglers who like that type of fishing through a special fee requirement that would provide a much more equitable distribution of fishery management costs among all anglers.

A bill authorizing a "Catchable Fish Stamp" (SB49) was defeated in the 1971 Legislature**.** The bill would require a separate stamp in addition to the regular fishing license for those anglers fishing in waters where catchable (6" or greater") fish were planted by the Department.

Six commercial fishing permits were issued on Fort Peck Reservoir for 1970 which provided employment for about 15 people. In 1971, the buffalofish catch was the second greatest since commercial fishing began in 1957 on Fort Peck Reservoir. The goldeye catch in 1971 was down 66% from 1970 due to unfavorable commercial market conditions in Winnipeg, Canada.

Libby Dam, constructed by the Corps of Engineers on the Kootenai River, was completed and water was stored early in 1972. The sport fishery that existed in the river was flooded by the impoundment, Lake Koocanusa. To mitigate the loss of the river fishery and to maintain a desirable sport fishery in the reservoir, the Corps provided funds to construct and operate a fish hatchery at Murray Springs near Eureka. Fisheries and fish habitat studies were conducted on the new impoundment, its tributaries and in the river below the dam.

Beginning March 31, 1972, following completion of Libby Dam, the temporary sluices were closed in the dam and water was relayed through the permanent sluiceways. The water falls approximately 100 vertical feet into a 60-foot deep stilling basin. The configuration of the basin is ideal for producing supersaturated conditions. Total gas concentrations were above 130 percent saturation at the construction bridge immediately below the sluices. When the spillway was used, from July through November 1974, saturation values varied from 126 to 131 percent saturation.

During bioassaying tests on mountain whitefish and wild cutthroat trout placed in live cages in the river in 1972 and 1973, it was found that total gas concentrations of more than 130 percent were lethal to both species. When saturation values dropped below 120 percent, mortality rates were markedly reduced. Seventy five percent of the whitefish and 35 percent of the trout had external signs of gas bubble disease at the end of the test.

Game fish populations were adversely affected by supersaturated gases for at least five or six miles below the dam. The spawning run of mountain whitefish from the Kootenai River into the Fisher River was adversely affected. Mountain whitefish appeared to be more sensitive than cutthroat trout to supersaturated gas conditions. Depth, cold water temperatures and the influence of tributary streams allowed some fish to survive for several months or more in areas of the river where total gas concentrations were above 130% saturation.

Fish hatchery production schedules were rearranged by 1972 so a substantial initial plant of westslope cutthroat trout could be made in the newly formed lake Koocanusa.

In 1972, the Department designated the westslope cutthroat trout as a “Species of Special Concern” within Montana based on a recommendation from the Montana Chapter of the American Fisheries Society.

Studies on the Madison River and O’Dell Creek during the 1970-1972 period indicated that substantial plants of catchable-size hatchery trout caused summer mortalities in wild trout. Since few planted fish survived over winter, the net result was a measurable reduction in the trout population. The implication, if these results were borne out in other studies, was that “put and take” planting should be restricted to waters with insignificant wild trout populations.

Determination of fish populations and distribution in streams too deep to wade had long been a goal in fisheries management. In the late 1960’s and early 1970’s, fisheries project leader Richard Vincent of Region 3, headquartered in Bozeman, was successful in assembling field methods and analytical techniques from several sources into a practical approach whereby this goal could be accomplished. The equipment consisted of a boat carrying a generator, variable voltage pulsator and mobile electrodes. The boat traversed the river and fish attracted to the electrodes were netted, marked and information as to the species, size and numbers recorded. Subsequent traverses of the same area gave the numbers of marked and unmarked fish and, thus, an indication of the total numbers of fish.

This “Mark and Recapture Method” has proven extremely valuable in fisheries management and has been widely used in evaluating the effects of habitat alterations and in making management recommendations such as creel limits and other fishing regulations. Vincent's approach was published in the *Progressive Fish Culturist* in July 1971. In an addendum three years later, he wrote a description of a computer system to handle the mathematics involved. Other biologists in Montana and elsewhere have modified boats to include a "boom shocker" by attaching electrodes to a boom extending forward from the bow. This has permitted electro fishing in Montana's largest rivers and on the shoals of lakes.

Prior to Executive Reorganization in 1972, the Fisheries Division consisted of a fisheries management section headed by a Chief Fisheries Biologist and a hatchery section headed by a Superintendent of Fisheries. The head of the division was called Fisheries Division Chief.

Problems with this arrangement were:

1. The review of other agencies’ water resource development plans during the past several years began to consume so much of the Chief Fisheries Biologist’s time that he could not adequately do that job and also keep up with his main function, which was quality control of the division’s fishery management and research studies.

2. Supervision of hatchery production and distribution alone did not require the full time of one section leader. Therefore, additional functions, such as supervision of commercial fishing contracts, preparation of all division construction project documents and supervision of commercial fisheries federal aid projects had been added to the function of the Superintendent of Fisheries over the years. These additional functions required well-trained fisheries biologists for the job. However, such an individual was usually not the most experienced person to handle the original function of the section (the supervision of hatchery production and distribution).

3. The titles of "Fisheries Division Chief" for head of the division and "Superintendent of Fisheries", which was required by law for head of the hatchery section, were confusing.

In an attempt to solve these problems, the division organization was changed under Executive Reorganization to a Bureau of Management and Research, headed by a Bureau Chief who was also Assistant Division Administrator, and a Bureau of Fisheries Services, headed by a second Bureau Chief who was assisted by a Hatchery Production Specialist for the function of fish production and distribution. The Hatchery Production Specialist served part time in that function and part time as manager of one of the production stations. The Executive Reorganization Act's title requirements of Division Administrator and Bureau Chief superseded the old law and solved the Superintendent of Fisheries and Chief of Fisheries title problem.

The Fisheries program had both fact-finding and action phases. The fact -finding phase consisted of survey and investigational work under a scheduled program to provide basic data necessary for management. The action phase included: 1) habitat preservation, restoration and improvement, 2) population manipulation (i.e., removing rough fish with chemicals and restocking with game fish, stocking small game fish in waters where there was inadequate reproduction and introducing new species); 3) planting catchable size trout for "put and take" fishing; 4) developing regulations; 5) developing commercial fishing for rough fish; 6) determining needs and making recommendations for fishing access sites and impoundments to be built for sport fishing.

In the fall of 1971 and spring of 1972, an instream flow study was made by the Department and the Montana Water Resources Board in the Kootenai and Clark Fork River basins. The results were to be used in Montana's State Water Plan and also incorporated into the Westwide Water Study being undertaken by federal and state agencies in the western U.S. The objective of the study was to provide managers and planners baseline information on the quality streams in western Montana. This was done by determining reasonably accurate instream flow values for streams recognized on Montana's 1965 Stream Fisheries Classification Map. Resources of time, money and help were limited so the "Montana Method" was selected as the basis for estimating the instream flow needs of these streams. Two crews took instantaneous discharge measurements and colored photos on streams selected by Regional Fisheries Managers for their regions. The Water Board crew measured 152 stations on 134 streams during the fall of 1971 and spring of 1972. The Department measured 92 stations on 72 streams during the summers of 1972 and 1973. A report authored by Al Elser, Department biologist, entitled *Instream Flow Recommendations for Aquatic Life, Kootenai and Clark Fork River basins* dated March 5, 1974, summarized these activities for eight streams in the Kootenai and 28 streams in the Clark Fork basins that were colored blue, red and yellow on the classification map and that had historic flow information. Although preliminary in nature, the recommendations were the first approximations of instream flows necessary to maintain aquatic life in these streams. Additional recommendations on the remaining yellow colored streams and all gray colored streams studied were awaiting hydrologic information from the USGS.

Gear and methods were developed which allowed fisheries personnel to make valid fish population estimates in the Kootenai River, a river too large to handle with previous equipment and techniques. Estimates were made of fish numbers in the Kootenai River immediately downstream from Libby Dam in August 1971. These new techniques allowed an assessment of the damage Montana was receiving from

the gas supersaturation problem in the Kootenai River. This problem was created when Libby Dam was closed in late March 1972.

In FY73, monitoring the quality and the quantity of water in streams and lakes, as these factors pertained to the fisheries resource, was an important segment of division activities. Examples would include measurements of nitrogen concentrations below Libby Dam and its effect on fish; intensive studies of the Swan River drainage and its tributaries; establishment of measurement stations on many of the important streams such as the Clark Fork River, the Bitterroot River, the Madison River and others. At a number of measurement stations, stream cross-sections were established to determine variations in stream depth and velocity. The effect of industrial discharge effluents into the Clark Fork River, such as those from the Hoerner-Waldorf Company and the Anaconda Company were monitored regularly. With the potential for much greater activity in coal mining, measurements were intensified on the lower Yellowstone River so that valid management recommendations could be provided.

Art Whitney, Fisheries Division Administrator, wrote about “The Changing role of the Fish Hatchery” in the March/ April 1973 issue of *Montana Outdoors.* He reviewed the history of fish planting in Montana from its earliest days, when the philosophy seemed to be to “plant everything you can wherever you can”, through the realization 20-25 years ago that this policy was not in the best interests of the fisheries resource, up to the present where studies on the Madison River showed that stocking catchable trout actually hurt the wild trout population. Whitney alerted sportsmen to the study’s results and to probable future action by the Department and Commission to cease stocking catchable trout in streams where there are thriving wild trout populations. He emphasized that the role of hatcheries would continue to be important in the fisheries management program but that raising trout for stream plantings would be discontinued and emphasis shifted to raising them for planting lakes and reservoirs, where they are a valuable management tool.

During FY73, surveys of state waters continued to rank high in importance. Ninety-seven mountain lakes in the Beartooth Mountains and 48 lakes in the Crazy Mountains were surveyed for such characteristics as size, depth, temperature, oxygen concentration and fish populations. The status of the grayling and golden trout in these waters was also included in the overall survey. At the end of FY73, a total of 464 mountain lakes had been surveyed in these mountains since 1967; about the same number remained to be checked. Use of the helicopter helped immeasurably in mountain lake surveys.

During FY73, survey findings on Big Horn Reservoir behind Yellowtail Dam were the basis for negotiations with the Bureau of Reclamation which resulted in stabilized water levels in the reservoir during the spawning and hatching period. The abundance of fry around the reservoir edge was ample evidence of the success of the project. Similar negotiations were being carried out with the Corps of Engineers relative to water levels on Fort Peck Reservoir. It was hoped that a system of water level manipulations could be worked out to aid northern pike spawning. A survey of fish populations in Tiber Reservoir indicated that the management of this body of water with walleye would be successful – two year classes were taken in the sampling. As a result of previous introductions and subsequent natural reproduction, walleye fishing attracted many fishermen to the Big Dry Arm of Fort Peck Reservoir.

Paddlefish studies continued in the lower Yellowstone and Missouri rivers in FY73. Research was intensified in the lower Yellowstone River in view of the effects of coal mining-related water use might have on this important species. At Intake alone, some 3,000 snaggers tried for paddlefish this past year. Research indicated that the paddlefish reside in Garrison Reservoir and move up the lower Missouri and Yellowstone rivers at the peak of spring runoff. Just where the paddlefish spawn remained a mystery. Hopefully, a telemetry study designed during FY73 would help provide some of the answers. Planes and boats were to be used to track mature paddlefish that were fitted with radio transmitters.

Lower water levels during FY73 made it economically feasible to rehabilitate several of the more popular reservoirs. Fish populations, top-heavy with suckers and other undesirable fish, were removed from Ackley Lake, Martinsdale Reservoir, Nilan Reservoir, Sutherlin Reservoir and Hubbart Reservoir. These

waters were to be restocked with sport fish to provide improved angling for a number of years. Private fish ponds were becoming an increasingly important part of the sport fishery in the eastern part of the state. These ponds were regularly monitored and evaluated for fishery potential and stocking suitability.

Commercial fishing was limited primarily to Fort Peck Reservoir and Lake Helena. During FY73, the commercial catch totaled approximately 750,000 pounds, for which the fishermen received about $100,000. Fish taken were carp, suckers, goldeye, drum, and catfish.

In FY74, emphasis was on research in the lower Yellowstone River drainage because of the anticipated impact of energy development on water resources in that area. The movements of paddlefish in the lower Yellowstone river were being monitored through the use of miniature radio transmitters attached to the fish. This was one phase of studies to determine minimum flow requirements in the Yellowstone.

Several fisheries investigation projects associated with Libby Dam construction were funded in FY74 by the U.S. Army Corps of Engineers and were being carried out by Department biologists.

Studies conducted by Region 3 fisheries personnel on the Madison River drainage indicated that the stocking of catchable trout in a stream with good natural reproduction resulted in poorer quality fishing than when the stream was not stocked. Based on the Madison River study, the Commission approved revision of the fish planting policy to include a prohibition against planting catchable size trout in streams with a thriving wild trout population. The first application of this policy was in 1974. Compared to previous years, the Department made a 70 percent reduction in the number of catchables planted in streams and a 40 percent reduction in the number of stream areas planted.

Using this information, it was possible to significantly reduce stream planting and put more emphasis on lake and reservoir planting. This improved opportunities for catching larger, wild-spawned trout and larger put-grow-take hatchery trout as well.

Dr. Richard Gregory replaced Dr. Richard Graham as leader of the Montana Cooperative Fishery Research Unit in August 1974. **GET INFO ON WHEN GREGORY BECAME LEADER**

In 1974, commercial fishermen harvested 510,177 pounds of rough fish from Fort Peck Reservoir and 36,783 pounds from Lake Helena. Catfish previously allowed in the harvest were classified as a game fish on July 1, 1975 under HB292 in the 1975 Legislature. Classified also were all species of the sturgeon family and all species of the burbot (ling) family.

An eight-year survey of mountain lakes on the Beartooth Plateau was completed in 1975, with more than 1,000 lakes having been surveyed.

HB493 in the 1975 Legislature provided for penalties for violation of provisions of the Montana Nongame and Endangered Species Act.

During FY75, a two-year survey of all streams with fishery potential in the Beartooth and Absaroka Mountains was completed. Basic information was documented on about 400 streams.

A two-year creel census completed in FY75 on the upper Madison River showed an important segment of the trout population was caught and released, whereas, a comparatively small portion was creeled. Eighty percent of the fishermen were nonresidents.

Coordination with the Bureau of Reclamation to enhance walleye production at Bighorn Lake through water level management paid off. Gill netting in FY75 showed strong year classes of walleye resulted.

Through the efforts of the Planning Division, an inventory of fish habitat and available fisheries was continued during FY75. All waters that provided recreational fishing and those that had the potential to do

so were being identified on base maps. The waters were classified as to type, number and size of fish available to the angler to indicate a supply of recreational fishing on a local, regional or statewide basis. Data was received from all seven administrative regions and these data were being processed.

Also, through the Planning Division, a mail survey designed to measure angling pressure on Montana waters was started in May 1975. The survey was basically the same as one conducted by the Department in 1968-69. Questionnaires were mailed to a sample of the current license holders for two or four week periods throughout the year. The anglers were asked to list the waters used during a specific period of time. The returned questionnaires provided a basis for estimating statewide pressure and relative pressure on individual waters.

Beginning May 1, 1975, the Department initiated the Employee Activity Reporting System (EARS) whereby all employees were to keep detailed records of time spent on their daily activities. The information was to be used in the Department's Strategic Planning process.

In 1975, the Flathead Lake Study was adapting new oceanographic acoustical stock estimation gear to inland waters. When fully developed, this would allow estimation of lake fish populations with sounders, which would greatly increase the efficiency of lake survey work.

In November 1978, the Department published a planning document entitled *Design for Tomorrow 1977-1990.* This document was an abbreviated version of the *Montana Statewide Comprehensive Outdoor Recreation Plan* of March 1978. This was a strategic plan for the protection, perpetuation and wise use of Montana's fish, wildlife and recreational resources. The plan contained three major sections addressing fish, wildlife and parks and was compiled by Department employees Tom Mussehl, John J. "Bud" Gaffney and Wes Burnett. Don Brown, planning coordinator, and later Director of the Department, coordinated the overall effort.

The Fisheries program in the plan was divided into stream fisheries and lake fisheries, including nongame fish and other aquatic animals. Each section had a stated objective, e.g., "To enhance the 12,000 miles of streams that support wild trout. To manage wild trout populations in streams to support an annual use of approximately 1,650,000 days of recreational fishing within resource limitations and acceptable quality standards. To manage wild trout populations for scientific, aesthetic and other nonconsumptive uses." The plan then went on to discuss the species of interest, their current distribution, management and utilization and the projected future of these resources.

Art Whitney, Fisheries Division Administrator, was elected President of the American Fisheries Society in 1978.

Nels Thoreson, Regional Supervisor for the Great Falls region and former Fisheries Manager in Great Falls, was one of three Montanans selected to receive the 1978 American Motors Conservation Awards. The other two recipients were John J. Craighead of Missoula and Doris H. Milner of Hamilton. The national awards are presented annually by American Motors Corporation to 10 professional and 10 nonprofessional conservationists who have shown dedicated efforts toward conservation of the nations' renewable natural resources. Thoreson was selected because of his leadership in the successful fight to include the upper Missouri River under the national Wild and Scenic Rivers System.

About 1978, The Department's George Holton and Joe Huston began collaborating with Dr. Fred Allendorf of the University of Montana to determine the genetic status of cutthroat trout in Montana using allozyme electrophoresis. This collaboration continues and has made Montana the leader in using genetic information for the management and conservation of native fishes. This information also led to the recognition that native cutthroat trout inhabiting the Missouri River basin referred to as "Upper Missouri cutthroat trout" were indistinguishable from other westslope cutthroat and thus were the same subspecies.

Dr. C.J.D. Brown, professor of zoology at Montana State University in Bozeman, died December 18, 1979 in Prescott, Arizona. Dr. Brown was in charge of fish and wildlife programs at MSU. While there, he directed research for 56 masters and 14 doctoral students. He was an internationally recognized fisheries biologist. His broad experience in research, in the academic field and with state and federal fisheries agencies made him especially effective in training fisheries biologists. Dr. Brown served as president of the American Fisheries Society during its centennial year (1969-1970). He is the author of *Fishes of Montana.*

During the decade of the 1970's, Montana received $3,948,520 in D-J funds.

The 1980's

The use of computers for fisheries data management increased over the years as data processing equipment became more sophisticated. By 1980, the computer files contained a catalogue of lake and stream names and locations, survey information, fish planting records, data from fisherman logs (diaries kept by cooperating fishermen) and data from fishing pressure surveys.

In 1973, the Montana Legislature had passed the Nongame and Endangered Species Conservation Act, declaring a state policy to perpetuate nongame as well as game species of wildlife. In pursuit of this double goal, the Department identified species of "special interest or concern". By 1980, Montana had 14 fishes (13 species) of "Special Concern". Species were to be added or dropped from the list as their status changed or new information was obtained. No Montana fishes were on the U.S. Department of Interior's official list of threatened and endangered species and Montana's "Special Concern" category was established with the hope that no Montana fishes ever would be.

The sampling of Flathead Lake fish populations, plankton organisms, water quality and water temperatures continued, using the 35-foot "Dolly Varden," a commercial fishing vessel purchased by the Department in 1966. Inspections of the vessel in 1984 found some of the timbers rotting, making its future use and safety questionable. The vessel was sold in 1984 and replaced with a smaller vessel capable of working other waters.

Dr. Robert White replaced Dr. Richard Gregory as leader of the Montana Cooperative Fishery Research Unit in 1980.

In 1980, Pat Marcuson, Department fisheries biologist in Red Lodge, wrote fisheries management plans for mountain lakes in seven drainages in the Absaroka-Beartooth Wilderness Area based on information he had gathered during his years working on lakes in those drainages. The drainages were the Boulder River, West Rosebud Creek, East Rosebud Creek, Rock Creek (Red Lodge area), Slough Creek, Stillwater River and Clarks Fork of the Yellowstone River. The wilderness area and adjacent lands contain 948 lakes, 318 of which contained fish and 630 which were barren. Approximately 204 of the lakes had self-sustaining fisheries and 114 were stocked.

Joe M. Halterman, at one time a warden with the Department and later a career fisheries biologist with the U.S. Fish and wildlife Service, died January 19, 1981 at age 67. He retired from the USFWS in 1965. Joe was an avid outdoors man and dedicated conservationist. He was instrumental in the development of the state's blue ribbon stream classification system in the mid-1950's and his foresight and dedication were important in the struggle to preserve the Yellowstone as a free-flowing river.

Fish health management became an integral part of fisheries management in the 1980's. Regional Fisheries Managers and biologists consulted the fish health project for a variety of fisheries management projects which required fish health consideration. It was also during the 1980's that Montana's fish health project began coordinating with other states and agencies, and fish health professionals realized the importance of sharing information on fish pathogens, treatments and disease testing techniques. The

American Fisheries Society was also actively pursuing development of fish health programs during this time. The AFS Fish Health Section had developed a certification program for fish health professionals and developed standardized techniques in the AFS Fish Health Section “Bluebook”. The Bluebook standards were adopted by the Department and incorporated into state law.

Concern over the Yellowstone River paddlefish population prompted dramatic regulation changes for that fishery in 1981. Since the paddlefish matures at a relatively old age and is a long-lived fish, Montana's regulations have tended to be conservative. Beginning in 1981, snaggers were limited to two paddlefish a year from the Yellowstone River. A tag system was initiated as a control with no charge for the tags. The 1981 Legislature authorized a $3 charge for the two tags beginning in 1982. A second regulation change prohibited the release of paddlefish caught, eliminating the practice of “high-grading.” Heavy pressure was exerted on the paddlefish population in the early 1980’s as a result of increasing demands for caviar. Economic sanctions against Iran brought paddlefish roe to the surface as a viable alternative to Caspian Sea sturgeon roe. At one time, offers of $50 per pound for paddlefish roe were rumored. Montana law, however, prohibited the sale of game fish eggs, so the threat did not fully materialize.

During 1981, in response to heavy angling pressure and a demand by anglers wanting better opportunities to catch larger trout, two more trophy trout management areas were established, one on the Gallatin River and one on the Big Hole River. This of management included severe limit restrictions which required that anglers release a considerable number of the fish they caught. For good survival of released fish, angling was restricted in these areas to artificial flies and lures only because the mortalities of fish caught on bait and released were far higher than those of fish caught and released on artificial lures. Even though trophy trout waters comprised less than 1 percent of the total miles of trout streams, to be most effective, they had to be the best portion of the trout stream resource. This was because only our most productive stream sections are capable of growing trout to trophy size rapidly under any type of fishing regulations.

Early in 1981, a U.S. Supreme Court decision confirmed Montana’s jurisdiction over the bottom and banks of the Bighorn River within the boundaries of the Crow Indian Reservation. On August 20, 1981, the Montana Fish and Game Commission opened this river section to fishing. During the five months between the court’s final decree and the morning of August 20, angler anticipation at the prospect of fishing a “virgin” trout stream was incredible. National interest in the reopening of this very productive river was expected to result in masses of fishermen and the Department had no opportunity to collect any fish population data on the river during its closure. Thus, the Department believed it should be conservative in the initial regulations imposed on the Bighorn. A slot limit (two fish under 18", one over 22") established on the most accessible portion of this river section was felt necessary to demonstrate Montana’s determination to maintain the quality of this nationally important trout stream.

The reopening of the Bighorn River 1981 was not without some conflicts. Most anglers who were excited about trying their luck on the Bighorn on this “opening day” were turned around by a large group of Crow Indians who had set up barricades to block angler access. At least three separate incidents were reported where shots were fired near anglers on the river during the first few weeks the river was open. Once these conflicts settled down, angling pressure on the Bighorn picked up where it had left off in 1975. Angler success was excellent on this previously lightly fished population and many trophy fish were caught.

During 1981, a computer storage and retrieval system for lake survey information was developed with 70 percent financing from the Department of Health and Environmental Sciences. This was the counterpart of the stream system already developed. The lake and stream systems together were to be the heart of the Interagency Fishery Database with input from the Department, U.S. Forest Service, U.S. Bureau of Land Management and additional agencies wishing to participate. The result would be a pooling and computerizing of fishery data to make it conveniently and economically available to agencies, private consulting firms and others interested in aquatic resources.

Within the planned Department reorganization in 1983, the Ecological Services Division was disbanded after 14 years of existence and its fisheries responsibilities and personnel were transferred to the Fisheries Division. To meet its expanded responsibilities, the Fisheries Division staff organization was changed.

On June 7, 1983, the Fish and Game Commission passed a resolution designating August 14 as "Dan Bailey Fishing Day throughout Montana". Dan Bailey, noted Montana fly fisherman and pioneer in fish conservation, died May 23, 1982 in Livingston, Montana. He founded Dan Bailey's Fly Shop in Livingston in 1938, which grew to become an international angling institution.

In 1984, Congress passed significant amendments to the Sport Fish Restoration (D-J) Act of 1950, adding motorboat fuel, fish finders and other products to the list of taxed goods. Many of these products sport the Federal Aid logo. The 1984 amendments more than tripled the funding for state sport fisheries programs. Because the sponsors of that legislation were Senator Wallop from Wyoming and Representative Breaux of Louisiana, this program has been referred to as the "Wallop-Breaux" or "W-B" Program.

The Bighorn River was a news maker in 1984. New regulations went into effect that raised the limit to five fish but allowed only one rainbow in the creel. In July, an apparent chemical spill, the origin of which was never determined, caused a fish kill on the upper portion of the river. It was fortunate in that, what could have been a very serious situation, resulted in only minor impacts to the fish population. Fall electro fishing produced an estimate of more than 8,000 brown trout per mile, twice as high as it was in July 1981, before the river reopened to fishing. Overall fishing for 2-4 pound brown trout was superb during the summer and fall of 1984 and the outlook for 1985 was excellent.

Since 1981, the Department had attempted to reduce the impacts on private landowners along the Smith River by hiring a seasonal river ranger to patrol the most heavily floated section. In 1984, an Ad Hoc Advisory Committee was established to work with and advise the Department on the river's management. The committee was made up of recreationists, outfitters, landowners, U.S. Forest Service and Department employees. In 1985, Joel Shouse, an engineering, planning, management and environmental consultant in Bozeman, was retained by the Department to undertake additional studies and to make recommendations for a formal management plan.

An element addressing recreational waterways was included in the Parks Division Program of the Department's strategic plan for 1985-1990. The objectives of this element were the development of formal management plans for the Blackfoot and Smith rivers, development of objectives for quality levels, and to provide for an increase in activity days. Resource exploitation threatening in-stream values was the problem of most concern identified by the plan.

In 1985, the Fisheries Division initiated a comprehensive two-year study to determine the economic value of fishing in Montana. The Montana Bioeconomics Project was primarily the brainchild of Pat Graham, administrator of the Department's Fisheries Division and Arnold Olsen, administrator of the Department's Wildlife Division. They recognized that fish and game agencies in other states were beginning to benefit from recent advances in the economics of outdoor recreation. In conjunction, a preference study on trout stream fishermen was also conducted.

A comprehensive two-year study was completed during 1985 on the fishery of the Fort Peck Dam tailwater and dredge cut area. The study assessed the potential impacts from a proposed increase in hydro-power production at the dam.

By 1985, gill netting data from Willow Creek Reservoir near Harrison collected since 1973 showed, after the cessation of fall spawning rainbow trout stocking in 1977, the number of wild spring-spawning rainbow trout increased 427 percent and wild brown trout 94 percent. Most of the increase in wild rainbow trout numbers was due to introductions of the lake DeSmet rainbow trout.

The Fish Health Laboratory was relocated from Bluewater Springs Trout Hatchery to Giant Springs Trout Hatchery in 1985. This allowed the Fish Health Coordinator to operate from a more central location and meet statewide commitments.

By 1986, Joe Huston's continuing studies on Noxon Rapids Reservoir resulted in recommendations to Washington Water Power Company to alter their reservoir operations to benefit the reservoir fisheries. Joe states in his interview with Art Whitney on April 21, 1995:

> "Another major accomplishment was getting Washington Water Power into a new reservoir operation plan that went into effect in 1986. Of course the major man who helped me was Art Whitney, who at that time was Chief of Fisheries and for the price of several trips to Missoula and the price of a few cups of coffee and donuts and maybe some beers after work we were able to convince the company they should reduce their overall drawdown and make the reservoir much more stable. Which, in turn, has led to tremendous improvement in the Noxon Rapids fishery as measured by fisherman days. Prior to 1985, it may have shown up on the creel census as about 300 man-days per year. Now, it is up around 10,000 and 15,000 man-days per year. And, this is strictly for a warmwater fishery comprised of largemouth bass as a primary species and smallmouth bass as a secondary species. An occasional large brown trout is a bonus."

In 1986, the Department published another planning document entitled *Design for Tomorrow 1985-1990.* This was an apparent update of the planning document of the same name published in 1978, however, no reference is made to the latter document. With information from many sources, the document was prepared by Thomas Mussehl, Wildlife Program Planner, John J. "Bud" Gaffney, Fisheries Program Planner and David G. Conklin, Parks Program Planner. Fish, Wildlife and Parks programs were discussed. The Fish Program was outlined similarly to the one in the 1978 document: Game fish in Streams; Game Fish in Lakes and Aquatic Nongame species. The plan provided a mission statement, objectives for achieving results and a list of problems and strategies. The five-year plan was to be continued after that period with revisions and updating of objectives as necessary. The plan also provided the basic structure for the six-year Federal Aid Program which would run from 1989 to 1995.

In August 1986, the Department completed a draft of Montana's first statewide warm water fish management plan and sent it to sportsmen for comments or suggestions. The cornerstone of the plan was the construction of a better water supply and more ponds and raceways at the Miles City Fish Hatchery. Walleye stocking guidelines were also included.

The final Montana Warm Water Fish Management Plan was completed in March 1987. The goal of the plan was to increase opportunities for warm water fishing by increasing the number of waters producing warm water species and /or enhancing the production from waters presently producing warm water fish, and to preserve or enhance the habitat in waters that support warm water fisheries. Specific plans for individual waters in each region were given.

In 1987, the crayfish market increased dramatically due to a disease-induced collapse of crayfish populations in Europe. Crayfish are a popular food in Europe, especially Sweden, which was consuming four to six million pounds annually. A fungus wiped out European crayfish and stimulated the market for American crayfish.

Responding to the crayfish crisis in Europe, crayfishermen across the nation expanded their fishing operations during 1987. The native western Montana species, *Pacifasticus leniusculus* resembles the European species and was especially favored in the European markets. Crayfishermen in Northwest Montana began harvesting crayfish in the lower Clark Fork reservoirs and around Lake Mary Ronan. Catches of thousands of crayfish per week were common in these previously unwished waters. Prior to that time, crayfish were harvested on a small scale for personal use and were not regulated by the Department. The public, including sport fishermen and other conservationists, immediately expressed

their concern about the commercial exploitation of crayfish, fearing that it would damage food supplies for game fish or eliminate the crayfish population in some areas.

The Department could find no evidence in the scientific literature that commercial crawfishing negatively impacted crayfish populations, but, at the same time, had few studies in Montana or the dollars to conduct them. There was considerable social conflict associated with commercial crayfish operations on the Clark Fork and Clearwater rivers and it was evident that increased commercial crayfishing would increase the level of conflict.

By 1988, commercial crayfish activity resulted in the Department seeking public comment on a proposal to designate crayfish as a nongame species in need of management. The Department did not have specific authority to regulate the fishery and was seeking the designation to determine the necessity of regulating the amount of crayfish harvested from certain waters in the state. By designating the crayfish as a species in need of management, the taking of crayfish could be curtailed until regulations could be developed and implemented for their management. A number of public meetings were held to air the issue in August 1988.

The Department contracted with OEA Research, a Helena consulting firm, to provide information on crayfish in six bodies of water in the state. The six waters were Seeley Lake, the Clark Fork River near Superior, Lake Mary Ronan and Echo Lake west of the divide, and Pishkin and Tiber reservoirs east of the divide. The information was gathered to assist the Department in determining whether or not crayfish were nongame species in need of management in Montana. OEA released its report in 1988.

Under the Montana Nongame and Endangered Species Act, the Department initiated a rule-making process to designate crayfish as a nongame species in need of management so that regulations could be developed. The designation was adopted on January 3, 1989.

Also, in 1989, the 51st Legislature passed SB294 which authorized the Department to regulate the taking of fish food organisms, including crayfish. That same year, the public was invited to assist in formulating annual rules to govern crayfish harvest. Rules were developed with assistance of interested parties, including crayfish fishermen, and the Fish and Game Commission adopted the first commercial crayfish rules in May 1990.

Surveys were initiated during the 1986-1987 biennium to determine the economic value of fishing in Montana and assess the preferences for trout by stream fishermen. A report on the economic value of fishing was nearing completion in late 1987. A draft report on the trout stream angler preference survey was released in the fall of 1987.

Management plans for the Bighorn, Smith and Blackfoot rivers were initiated during the 1986-87 biennium. Final editions of these plans were expected to be issued, after public review, in late 1987 and early 1988. Additional management plans, emphasizing public involvement, were to be written during the next biennium. These plans were being prepared for rivers where complex biological or social management issues existed or problems were anticipated.

A study was completed in August 1987 on the net economic value for fishing and hunting in Montana. Completed by John Duffield, the results were determined using a survey of Montana anglers and hunters. The net economic value was determined for most of the major rivers and major river basins in Montana, providing a comparative analysis that could allow prioritization of rivers based on their recreational fishing value. The method employed to evaluate the recreational benefits of fishing in Montana was a regional Travel Cost Method, one of the most widely applied demand-estimating techniques.

Duffield stated that the net economic values are the appropriate values to use in benefit/cost analysis or where economic efficiency decisions (i.e., forest or range planning) are being made. If the annual values of stream and lake fishing are put into net present value, they can be used in trade off analysis with

marketed resources such as timber, coal, or grazing. For example, the present value of the net willingness to pay values for stream fishing are conceptually comparable to stumpage prices for timber.

The study concluded that the state average net economic value for lake fishing was $89 per trip. For streams, the value was $113 per trip. This means an angler would be willing to pay $89 and $113 more per trip to have the opportunity to fish lakes or streams, respectively. The annual aggregate value of Montana's stream and lake fishing was $122 million and $93 million, respectively.

Following the net economic value study, a lake and reservoir preference survey was scheduled for January 1988, as well as a warmwater use survey for summer 1988, to estimate net economic values of Montana's warmwater fish species.

In November 1987, the Fish and Game Commission instructed the Department to establish river management plans for the state's top ten fisheries. The Department became involved in developing river management plans in order to provide a high quality recreational experience for an increasing number of recreational users with conflicting interests and desires. The first fishery management plan was developed on the upper Bighorn River covering the period 1987-1992. Its goals were to address the angling public's concern with catch rates, access, and the quality of their fishing experience. Subsequent plans expanded into other areas, including users fees, limitation of access, and protection of a river and its corridor in order to provide and maintain the desired recreational experience. The Department prioritized rivers in need of management plans based on a broad set of criteria including fisheries and recreation management and political and social issues. By the end of the 1980's river management plans had been completed on the Bighorn River, Rock Creek near Missoula, the Big Hole River, the Stillwater River near Billings, and the Missouri River from Holter Dam to Great Falls. Plans for other major rivers were planned for 1990.

Following the circulation and comments on a draft plan in early 1988, the Commission approved a management plan for the Smith River in the summer of 1988. The plan resulted from efforts by the Department, federal land management agencies, the Concerned Citizens of the Smith River Ad Hoc Advisory Committee, and a private consultant. The goals of the plan were to identify ways to provide public recreational use consistent with the river's capabilities while maintaining a level of solitude, minimizing conflicts between users and private landowners, and protecting the integrity of the river's water and canyon. Strategies were established to increase the authority of the Fish and Game Commission to regulate recreational use on the Smith, establish policies for specific user groups, and have the ability to assess user fees to accomplish the goals of the plan.

The 1988 survey of resident and nonresident anglers found the average value per fishing day for trout stream fishermen was $114 in 1989 dollars and $60-65 for lake and reservoir anglers pursuing salmonid as well as warm water species. Nonresidents spent from $200 to $540 per trip while residents spent from $36 to $80 per trip. The study also provided information on why anglers fish, why they chose certain places to fish, the type of equipment they used and their attitudes and perceptions on fish management in Montana.

In January 1988, the Fisheries Division initiated a comprehensive review of its organization and structure to address workloads and to improve upon the implementation of its projects and programs. That review resulted in the creation of a new bureau called the Habitat Bureau, which includes a Habitat Protection Coordinator and Pollution Control Biologist. This reorganization concentrated all habitat protection, permitting, enhancement, and training programs within one bureau. This bureau is also responsible for new hydropower licensing review and Stream Preservation Act, 310 and 404 permitting activities, as well as liaison responsibilities with other agencies, portage coordination, and all water pollution control activities.

The reorganization was completed in the spring of 1988. As a result, the Fisheries Division was composed of four distinct bureaus: the Habitat Bureau, Management Bureau, Hatchery Bureau, and

Special Projects Bureau. For planning and budgeting purposes, the fisheries program was broken down into four ecologically based elements – cold water streams, cold water lakes, warm water streams, and warm water lakes. Biennial and annual budgets were prepared and allocated to approximately 80 fisheries projects statewide. Each project operated under an annual work plan. Those projects funded by Federal Aid in Sport Fish Restoration funds required five-year planning documents approved by the U.S. Fish and Wildlife Service.

The passage of the Wallop-Breaux amendments to the Federal Aid in Sport Fish Restoration program provided an important increase in funding for the fisheries program. By 1988, most of this money was being directed at repairing the program's infrastructure, e.g., rebuilding hatcheries, repairing dams, and developing fishing access sites.

The Division's central staff provided statistical and design services for field projects, conducted statewide surveys, maintained a computer database for stream and lake information, and designed computer programs for fish population estimates, use estimates, etc.

Historic ground was broken in 1988 when the Department and the Confederated Salish and Kootenai Tribes jointly released a draft Flathead lake/River Management Plan. The plan, which addressed management of the Flathead Lake ecosystem during the 1989-94 period, marked the first venture into co-management of a fishery between the state and Montana's Indian tribes. Development of the plan came at a critical time in the history of Flathead Lake management. Kokanee populations had been severely depressed for two years and an experimental program to restore the salmon fishery was in progress. A final management plan was released in August 1989.

On June 6, 1988, a first-ever National Recreational Fisheries policy was signed by President Ronald Reagan. This policy was the result of intensive cooperation among federal agencies, state and local governments, fishing advocacy groups, and industry. It was conceived and based on the premise that protection and enhancement of recreational fisheries are dependent upon the cooperation and coordination of all who use or benefit from them. This policy provides a framework of common principals, goals, and objectives from which each signatory should develop more specific and productive actions so that Americans could continue to enjoy and benefit from this nation's recreational fisheries for years to come. The policy was the first step toward fully developing a comprehensive national effort to improve the health and abundance of the nation's fishery resources.

During the 1989 legislative session, HB655, the Smith River Management Act, was passed which reiterated the goals of the management plan. Rulemaking authority was granted to the Fish and Game Commission to administer the Smith River waterway and allow for user fees to be established, if necessary.

In 1989, the Montana Legislature passed SB260, which revised Montana's fish disease laws and added much needed fish health protection requirements. The new law required an import permit for all species of live fish or fish eggs imported into Montana. The only exception was aquarium fish for use in home or office aquariums. The law also gave the Department more authority to deal with intrastate fish transports and authority to quarantine infected facilities. Shortly after the new law was enacted, the Administrative Rules of Montana dealing with fish disease were revised, which further defined the Department's authority to protect Montana's fisheries from introduction of disease. The enactment of the new statutes and rules was the single most important disease protection development of the 1980's.

The Department had systematically sampled the Canyon Ferry Reservoir fishery since the reservoir first filled in 1955. Historically, no walleye were observed in these efforts, nor did Department biologists document a single walleye being caught by anglers. This all changed in 1989, however, when biologists sampled a single walleye in gill nets used to monitor the Canyon Ferry rainbow trout population. Additional walleye catches were to follow.

In the 1980s fisheries professionals and knowledgeable anglers began to fully recognize the seriousness of the problem of illegal fish introductions as recreational fisheries began to fall behind anglers' demands and native fish stocks slipped toward listing under "Species of Special Concern" lists or under the federal Endangered Species Act. Chemical rehabilitation was used to remove some unwanted fish but it was impractical in larger waters, expensive, sometimes controversial, and not always effective. Northern pike and yellow perch were the fish most commonly moved around but the list included about any fish species you could think of—and a few you probably didn't think about, such as pacu—a fruit-eating Amazon fish that was found in two locations. Basically, every drainage in the state had been affected. Yellow perch in Lake Mary Ronan and walleye in Canyon Ferry Reservoir were two of the more visible illegal introductions that threatened very popular fisheries.

In the late 1980's, the Department formed a westslope cutthroat trout (WCT) Conservation Genetics Committee to develop a plan for conserving and restoring that fish in the state. This committee consisted of Dr. Robb Leary (chairperson), Kathy Knudsen, and Kevin Sage from the Wild Salmon and Trout Genetics Laboratory at the University of Montana, Thurston Dotson, Bill Hill, George Holton, Joe Huston, and Scott Rumsey from the Department, and Dave Genter from the Montana Natural Heritage Program. This committee developed recommendations for a rating system for conservation and management of WCT that relied on genetic status and threats from introgression or competition, and recommended brood stock development, maintenance, and stocking policies. While these recommendations were incorporated into the Department's database system and as policy for managing the WCT brood, no further actions were taken by the Department to implement these recommendations into a conservation/restoration strategy until 1994.

During the 1980's, Montana received $17,620,128 in D-J funds.

The 1990's

In the early 1990s, the Department initiated the development of a five-year fisheries management plan for Canyon Ferry Reservoir. The primary issues identified in this planning process were concerns about the declining rainbow trout fishery and a growing interest in establishing walleye in Canyon Ferry. The walleye issue was not a recent one; certain anglers had been advocating such an introduction since the early 1980s. Through an extensive public participation process, it was concluded that habitat conditions in Canyon Ferry were highly favorable for the development of a self-sustaining walleye population. In fact, it was likely they would do too well. This caused great concern because, if this top predator fish became too abundant, it was possible they could negatively affect existing fisheries in the entire reservoir complex. Additionally, the majority (77 percent) of respondents to a survey supported maintaining the existing rainbow trout and yellow perch fishery in Canyon Ferry; they generally opposed walleye introduction, particularly if it were to pose a high risk to the existing fishery. The 1993-1998 plan, presented to the Fish, Wildlife and Parks Commission, recommended that walleye not be introduced into the reservoir and that management emphasis be directed at enhancing the existing rainbow trout and yellow perch fisheries. It was unanimously adopted by the Commission. Ironically, at the very time the Department was addressing the potential for walleye introduction in Canyon Ferry, a population was quietly developing in the reservoir.

On September 6, 1990, the pallid sturgeon became the first Montana fish to be listed as endangered under the Federal Endangered Species Act. The listing came more than two years after the Dacotah Chapter of the Sierra Club petitioned the U.S. Fish and Wildlife Service to add this native Montana fish to the federal list of endangered species.

In 1991, a group initiated by the Montana Chapter of the American Fisheries Society formed to make conservation management recommendations for conserving Yellowstone cutthroat trout. This group consisted of Bruce May and Ray Zubick of the Forest Service, Brad Shepard and Jim Darling of the Department, Dave Genter of the Nature Conservancy, Lynn Kaeding of the Fish and Wildlife Service, and Robb Leary of the University of Montana's Wild Salmon and Trout Genetics Laboratory. Mike Stone of

Wyoming Fish and Game was added to this group in 1994. The group developed a draft conservation management guide by 1994 and presented this guide to the Department. Unfortunately, Department priorities at the time prevented the adoption and implementation of this management guide.

In 1991, the Department reported the commercial fish catch of the Negaard Fish Company from Fort Peck Reservoir from 1981 to 1991 to be a total of 1,528,792 pounds. Goldeye contributed the most fish to the catch (989,752 pounds) followed by buffalo (524,787 pounds), river carpsucker (13,101 pounds) and carp (1,152 pounds). The highest catch rates occurred between 1981 and 1986. The lowest catch was in 1991 (2,028 pounds, mostly buffalofish).

In 1994, Howard Johnson, Management Bureau Chief, wrote in response to a request for information that Montana had issued one commercial fishing license on an annual basis for the past several years. The license was for seining of carp and suckers. He estimated the average annual harvest to be approximately 70 tons. He further said that several years ago there were as many as four licensed commercial fisheries in Montana.

Final rules governing commercial crayfishing were adopted in 1990. The Department felt confident that the rules would protect crayfish populations.
However, anglers and boaters became annoyed by a commercial fisherman's trap locations on the Clark Fork River, which were marked with orange spray paint on stream side rocks. The fisherman subsequently changed to buoys to mark his traps but these, too, were disliked by others. Therefore, the Commission approved annual rule changes in 1991 which prohibited traps marked with visible buoys.

In March 1991, the Department contracted with Ginger Thomas to prepare a literature review of crayfish ecology and management to provide information that would be helpful in managing the commercial crayfishery.

Between 1990 and 1996, additional river and lake management plans were completed. These included Canyon Ferry Reservoir, Dailey Lake, Thompson Chain of Lakes, Boulder River (near Big Timber), Fort Peck Reservoir, Hauser Reservoir, Bitterroot River, South Fort Flathead River, upper Flathead River, and the Bob Marshall Wilderness Complex.

In 1991, Mike Poore, Department fisheries biologist, updated the fisheries management plans for the Absaroka-Beartooth Wilderness Area that had been written by Pat Marcuson in 1980. Since that time, a computer database containing the latest fisheries information on the lakes had been developed at the Department's regional office in Billings, which enabled the plans to be updated.

In 1991-92, a new planning effort was initiated along with the Department's Strategic Plan. In this document, the Department adopted a new vision statement, a mission and five departmental goals. The new document expanded upon previous planning efforts by providing broad directives for employees to meet new challenges and enable the Department to address changing public values toward fish and wildlife as well as increasing demands for public involvement in dealing with issues regarding the management of natural resources. The Fisheries Program and each fisheries region subsequently used this document to set goals and objectives that complemented the Department's vision statement.

On December 8, 1991, Stan Ross, Kalispell, caught a 29.02-pound rainbow trout from the Kootenai River below Libby Dam. His catch broke the previous Montana state record of 22 pounds. Also, the Freshwater Fishing Hall of Fame certified his fish as a new world record in the Division 1, Rod/Reel, 10-pound and All-tackle Line Test Class.

In 1993, several projects were directed at Fishes of Special Concern in Montana. The Department worked closely with the Governor's Office, Forest Service and U.S. Fish and Wildlife Service to help develop a bull trout recovery plan. These efforts culminated in a Governor's Bull Trout Roundtable where participants recommended that the state develop a restoration plan for bull trout.

Projects were active in 1993 to expand the range of stream-dwelling Arctic grayling included protection of the population in the Big Hole River, establishment of a genetically sound brood stock and reintroduction of the species in three river systems.

In cooperation with North Dakota, a draft plan for paddlefish research and management in the Yellowstone-Sakakawea and Fort Peck populations was completed in 1993.

In 1993, 54,000 Chinook salmon were released in an effort to establish a self-sustaining salmon fishery in Fort Peck Reservoir.

In 1993, gill nets set specifically for walleye in Canyon Ferry Reservoir, turned up several, all less than four years-old. It was evident a walleye population was developing in the reservoir.

The 1993-1998 Canyon Ferry Reservoir management plan addressed the likelihood of walleye becoming established illegally and laid out options, including removal. To better understand the situation, the Department collaborated with the Montana Cooperative Fishery Research Unit at Montana State University in Bozeman to implement a study to determine the status of walleye in Canyon Ferry. Research completed from 1994 through 1996 showed that walleye were firmly established in Canyon Ferry. Age and growth data indicated they had been reproducing in the reservoir since at least 1985. While it was uncommon to sample walleye when the study was initiated in 1994, by 1996 it was routine. The population was expanding quickly.

Fishes of Special Concern continued to be an active program in 1994. A paddlefish management plan was prepared in cooperation with North Dakota. The plan took the research and information strategies obtained in both states and laid out possible management strategies and harvest quotas that would join the management of this interstate fisheries. Five hundred native paddlefish were marked above Fort Peck Dam to study their movements and mortality in the Missouri. Work with larval paddlefish in the Yellowstone River had pinpointed paddlefish spawning to an area near the Montana/North Dakota border. This information would allow protection of critical paddlefish spawning habitat.

The Montana list of fish “Species of Special Concern” was updated again in 1994 by Chris Hunter, Fisheries Division Special Projects Bureau Chief. The list was now being developed jointly by the Fisheries Division and the Montana Chapter of the American Fisheries Society. The society is a group of professional fishery biologists working in Montana for federal and state governments and private companies. Unlike the two previous lists prepared by George Holton in 1979 and 1986, there was now one species on the list that had been listed as endangered under the federal Endangered Species Act. The pallid sturgeon was listed in September 1990. Several other species were petitioned for listing under the federal law, including the Arctic grayling and bull trout, two species that would receive a lot of attention in the state.

The Department chaired the Governor’s Bull Trout Restoration Team, charged with preparing a bull trout recovery plan for Montana. Several Department biologists participated on the scientific group, which is providing the restoration team with technical expertise in the development of the plan. In addition, stream restoration activities to help bull trout recover in the Blackfoot, Bitterroot and Flathead drainages were undertaken.

In 1993, Missoula artist Monte Dolack produced a poster to help raise money for the Arctic grayling recovery efforts. The 24”x31.5” poster captures not only the beauty of these Montana native fish but also the feel of the Big Hole River, their last stronghold in Montana. Signed copies sold for $75 and unsigned copies for $30.

In 1994, an inventory was taken of streams draining the Beartooth and Pryor Mountains to clarify the present distribution of pure-strain Yellowstone cutthroat trout. Surveys were also made to determine the

distribution and abundance of pure, native Missouri River (westslope) cutthroat trout were conducted in the upper Missouri River Basin.

In December 1994, the Department announced that whirling disease was the suspected cause of a 90 percent decline in the upper Madison River's wild rainbow trout population. Whirling disease is a parasitic and potentially fatal infection of trout and salmon for which there is no known cure.
The Department was seeking to decipher the relationship between wild trout and the whirling disease parasite. Through intensive study and experimentation, it hoped to find a mechanism or technique for curtailing the spread of the disease.

The discovery of whirling disease in the Madison River greatly increased awareness of fish disease. With the announcement of the presence of the disease parasite and a 90% decline in the river's rainbow trout population, whirling disease made headlines across the country. The response was overwhelming and fish health was immediately moved to one of the top priorities of the Fisheries Division. A statewide survey was initiated to determine the presence of the parasite in Montana waters. A major emphasis was placed on whirling disease research and an unprecedented effort was made to understand whirling disease and how to fight it. The governor appointed a task force to deal with the disease and the Whirling Disease Foundation was formed. A fish disease with its own foundation emphasized the new public awareness of fish disease. For the first time, many people in the public, as well as fisheries managers, realized the impact fish disease can have on wild fish populations and that fish disease is not just a hatchery problem.

In 1994, the Department formed another technical committee to recommend strategies for conserving westslope cutthroat trout in Montana that were strictly based on biological criteria. The initial emphasis of this committee was to conserve westslope cutthroat in the Missouri River basin. The technical committee was made up of fish professionals from throughout Montana and included representatives from the Department, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service, and the Wild Salmon and Trout Genetics Laboratory at the University of Montana.

In 1994, a change in the management of rainbow trout in Canyon Ferry Reservoir continued to improve fishing success. Rainbow trout numbers increased more than 400 percent. Illegal introductions of walleye, smallmouth bass and northern pike could, however, negatively impact the future of the Canyon Ferry trout fishery.

In 1994, the Department completed a three-year project to rejuvenate the Marias River tailwater rainbow trout population by introducing wild rainbows.

The state/tribal agreement between the Department and the Confederated Salish and Kootenai tribes was reauthorized in 1994 regarding bird hunting and fishing on tribal lands.

During 1994, the Fisheries Division hosted workshops on crowding and recreational conflicts on Montana rivers, lakes and reservoirs. Participants, which included representatives of aquatic recreation groups, the outfitting industry, resource management agencies and industry, developed legislation and educational materials to help relieve future conflicts and to protect resource quality.

Bull trout restoration efforts hit full stride in 1995 with a major increase in efforts by Department wardens to enforce regulations protecting bull trout and in a public education effort to inform people about the issue. The Flathead River bull trout spawning run increased moderately and the spawning run in the Swan River reached another record high.

During 1995, the Department and the Forest Service crafted the nation's first framework for jointly managing fish and wildlife and their habitat in the Bob Marshall Wilderness Complex. This unique agreement set up shared responsibility for law enforcement, fish stocking, fire management, public education and other functions.

The Department increased its education efforts and enforcement patrols in 1995 in areas inhabited by "Species of Special Concern", especially bull trout, westslope cutthroat trout, grayling and paddlefish. The effort was intended to minimize unlawful and unintentional taking of these species to ensure viable and sustainable populations of native species.

In an attempt to help recover the only remaining stream-dwelling Arctic grayling population in the lower 48 states, biologists reintroduced them into the Gallatin and East Gallatin rivers in 1995 to determine if those waters were still suitable grayling habitat.

In the spring of 1995, after a year of study, the Governor's Whirling Disease Task Force told Governor Marc Racicot that "whirling disease is the most significant threat to the survival of wild, naturally reproducing trout populations in Montana." So far, the disease had been discovered in trout in 23 Montana locations, including streams in the Madison, Jefferson, Clark Fork, Beaverhead and Swan River drainages. The disease had been found in wild populations of rainbow, brook and brown trout. Arctic grayling and westslope cutthroat trout had also been infected in field experiments. The task force believed that whirling disease was likely, over time, to spread to every major river drainage in Montana where both trout and the parasite's alternative host – small, stream-dwelling worms – are found. The task force recommended that all actions to address whirling disease be consistent with protecting, preserving and restoring self-sustaining populations of wild, native and nonnative trout.

The Ruby River Task Force developed a first-of-a-kind fishing access plan for that southwestern Montana waterway in 1996.

In 1996, Montana's citizen Fish, Wildlife & Parks Commission, in recognition of its exemplary service to all Montanans, received the "Commission of the Year" award from the Western Association of Fish and Wildlife Agencies for the first time in the 100-year history of the Commission.

The Department, in concert with a citizen's advisory group, prepared a draft plan during 1996 to guide management of Montana's warmwater fishery (walleye, bass, catfish, etc.) over the next decade. The plan aggressively pursues improvement of warmwater fishing in Montana through stocking, regulations, habitat improvement and education efforts.

In cooperation with the Bonneville Power Administration, the Department hired two additional game wardens in 1996 to increase enforcement and education activities to reduce poaching and unintentional harvest of bull trout in Montana.

Bull trout status reviews were completed for 12 drainage basins in western Montana during 1996. Local bull trout watershed groups were formed in the Blackfoot River and Rock Creek areas.

The Fisheries Division organized the Governor's Westslope Cutthroat Trout Workshop in September 1996. This event provided a focal point for cooperative efforts by the Department, federal land management agencies, local landowners and others to take actions to benefit westslope cutthroat trout. The most ambitious proposal announced was restoring westslope cutthroat to tributaries of the upper Madison River.

By the end of 1996, continuing studies of pallid sturgeon since 1989 provided an estimated adult population of only 250 in the lower Missouri and Yellowstone rivers in Montana. No evidence of juvenile or young pallid sturgeon had been found. The Department would attempt to artificially spawn pallids in the spring of 1997. If successful, young pallids could be reintroduced into the Missouri River above and below Fort Peck Reservoir.

During 1996, major waterways that tested free of whirling disease included the Yellowstone, Bighorn, Stillwater, Boulder (of the Yellowstone), Gallatin, East Gallatin, Big Hole, upper Missouri (headwaters to Canyon Ferry Reservoir), Teton, Bitterroot, Flathead, Kootenai and Marias rivers, Big Spring Creek, and

the Madison River above Quake Lake. Montana's nine state fish hatcheries, three federal and 10 private fish hatcheries remained "clean."

In 1996, isolated pockets of whirling disease infection surrounded by "clean" waters were discovered in Cottonwood Creek (Blackfoot Drainage), in the East Fork Rock Creek (Rock Creek Drainage near Missoula) as well as in the Missouri River below Holter Dam and one of its prime spawning tributaries, Little Prickly Pear Creek. How whirling disease is spreading from water to water was a question that future testing could help to resolve.

Laboratory and field testing of various salmonid species and strains found that cutthroat trout (both westslope and Yellowstone) and all strains of rainbow trout tested are very susceptible to whirling disease. Other native salmonids, such as bull trout and Arctic grayling, had received very limited testing, but early indications of resistance were promising.

During 1996, an action plan that addressed research, management and communications priorities was developed by the Montana Whirling Disease Task Force. This action plan subsequently attracted the federal and private funds necessary to construct a new research facility in Montana and the dollars to support the aggressive research needed to combat this threat to the state's world-renowned fisheries.

In 1996, the Department maintained offices in the 10 largest communities in Montana for the first time in the agency's history. The Butte and Havre Area Resource offices opened their doors in 1996 to provide enhanced customer service and accessibility to the public in southwestern and north-central Montana.

Off the press in 1996 was the second edition of *A Field Guide to Montana Fishes*. The authors, retired Department biologists George Holton and Howard Johnson, served as volunteers in completing this revision for the Department. The guide has a waterproof cover, fits easily into a gear bag or tackle box and is a valuable reference for biologists, students and anglers.

By 1997, with the public's financial support, the Department had more than 100,000 acres in conservation easements to protect critical habitat, hunting access agreements with 942 landowners, covering 7.5 million acres, 93 completed stream and lake improvement projects, and improved access and visitor services at a number of popular state parks.

Bull trout recovery efforts continued throughout 1997. A draft restoration plan being developed by an interdisciplinary group appointed by Governor Racicot was nearly finished. Local watershed groups and management agencies were implementing habitat restoration efforts throughout Northwestern Montana, and fisheries management continued to emphasize bull trout and native fish restoration. A decision on whether bull trout would be listed as threatened under the Endangered Species Act was to be made by the U.S. fish and Wildlife Service as early as June 1998.

Montanans' spirits were buoyed in 1997 by the discovery that Arctic grayling and bull trout were resistant to whirling disease. The research team further established that Yellowstone and westslope cutthroat trout were prone to infection, yet were slightly less susceptible than rainbow trout to contracting a fatal dose of whirling disease.

These continuing discoveries – in conjunction with extensive research being conducted on Montana's wild trout waters and in Montana laboratories – were helping fisheries managers to recognize a broad spectrum of whirling disease vulnerability that included how, when, and where wild trout and the parasite interact. The Department's ultimate hope was to develop a way to naturally segregate young wild trout – perhaps in natal tributaries – from the whirling disease parasite when the parasite is most abundant and active.

In March 1997, the Department released an updated Warmwater Fisheries Management Plan for the period 1997-2006. The plan responded to growing interest in warmwater fishing since the 1987 plan and

provided an opportunity for the public to help shape the future management of the warmwater resource. The plan was the result of considerable public involvement begun in 1995 when the Commission approved a process for development of a new warmwater management plan. A Citizen's Advisory Group was created to further solicit external input into the plan. The purpose of the new plan was to enhance and increase warmwater fishing in Montana by guiding the Department's management of this resource for a 10-year period. Issues covered in the plan were special regulations, illegal introductions, legal introductions, the role of hatcheries, habitat management, native fish, bait fish industry regulation, private ponds, fishing derbies, facility development and access, urban fishing opportunities and law enforcement

In April 1997, after 16 months of work and planning, including more than 2,000 angler surveys, development of a draft plan for public comment, and 18 public meetings throughout the state, the Commission approved a new statewide Warmwater Fisheries Management plan.

The list of Montana "Fishes of Special Concern" was updated for the fourth time in 1997 (Previous lists were published in 1979, 1986, and 1994). Since the 1994 list, one additional fish, the white sturgeon found in the Kootenai River, was listed as endangered by the U.S. Fish and Wildlife Service and the Arctic grayling and bull trout were federally categorized as candidate species for listing. Other federal candidate species were the sturgeon chub and sicklefin chub.

In 1997, a Steering Committee was formed by the Department to develop formal recommendations to conserve westslope cutthroat trout throughout the state using biological strategies developed by the Technical Committee formed in 1994. The Steering Committee included representatives from the agriculture (Montana Stockgrowers and Farm Bureau), timber (Intermountain Forest Industry Association), land and fish conservation (American Wildlands, Montana Chapter of the American Fisheries Society), and angling (Trout Unlimited and Montana Wildlife Federation) communities, as well as several federal and state agencies in the state.

As 1997 drew to a close, almost 60 bodies of water – about 20% of all sample sites – had been found to be holding wild fish with varying degrees of whirling disease infection. None of Montana's state, federal, or private hatcheries was infected with whirling disease. Major waterways that were still believed to be whirling-disease free included the Bighorn, Stillwater, Boulder (of the Yellowstone), Gallatin, East Gallatin, Missouri below Cascade and from its headwaters to Canyon Ferry Reservoir, the Teton, Bitterroot, Flathead, Kootenai, Marias, Big Spring Creek, and the Madison River above Quake Lake.

In 1998, the westslope cutthroat trout Technical Committee published its recommendations for genetic conservation of westslope cutthroat trout in the upper Missouri River basin.

In 1998, a second effort to develop a conservation strategy for Yellowstone cutthroat trout in Montana was initiated. **[GET PARTICULARS OF THIS EFFORT FROM KEN MCDONALD, JOEL TOHTZ, BRUCE RICH AND JIM DARLING –Brad Shepard's note].**

When the first Canyon Ferry Reservoir Fisheries Management Plan expired at the end of 1998, managers immediately began working on a new plan. The new plan included Hauser and Holter reservoirs and addressed the potential implications of the developing Canyon Ferry Reservoir walleye population on these downstream fisheries. Because walleye were now firmly established throughout the system, the central objective of this new plan was to maintain multispecies fisheries (including walleye) in all three reservoirs. To accomplish this, walleye densities would need to be maintained at levels low enough to be compatible with the other fisheries.

In 1998, the Department completed three planning documents – an Environmental Impact Statement for the Wildlife Program, "Fisheries Beyond 2000" for the Fisheries Program and a 2020 Vision for Montana State Parks. These documents reflect the agency's current vision and goals, explain what has been heard from its publics and detail those challenges as well as opportunities that the Department will need to consider in the future.

The Fisheries Division's planning document, *Fisheries Beyond 2000; Fisheries Program Strategic Plan – 1999–2010*, was the result of Departmental as well as public involvement. In the document, the Fisheries Program identifies specific outcomes for its programs and measures for how successfully these programs are performing their functions. The preparation of outcomes will involve the public in the planning process. The planning process and the resulting plan are expected to enhance public understanding of the program's activities and the benefits derived from them. At the same time, the Division hopes to gain a better understanding of the public's expectations about the Division's programs and activities. So, as the second millennium ended, outcomes-based planning was expected to determine the public's satisfaction with the Division's management activities. The current process uses a different approach than past planning processes that emphasized outputs, such as the number of fish stocked or the number of waters inventoried, but did not address the public's satisfaction with the Division's activities.

During 1998, the Montana Bull Trout Restoration Team completed a draft restoration plan for bull trout and was seeking public comment on it before finalizing it in early 1999. Also, in July 1998, despite Montana's ongoing restoration efforts, bull trout throughout the Columbia River basin were listed by the federal government as threatened under the Endangered Species Act. However, it was expected that Montana's bull trout restoration plan would serve as the basis for the Montana portion of a federal recovery plan and that these planning efforts would be beneficial to Montana.

A comprehensive assessment of the status of the Yellowstone cutthroat trout in Montana waters was completed in 1998 in concert with fisheries personnel from the U.S. Forest Service and the U.S. Fish and Wildlife Service. The goal of the assessment was to provide baseline information for formulation of a conservation plan for Yellowstone cutthroat trout in the state.

By 1998, the Fish Health Laboratory at Great Falls had relocated from a 7' x 14' room to a remodeled facility developed in a house at Giant Springs Trout Hatchery. Also by that time, a Fish Health Specialist, Ken Staigmiller, was added to the staff, which doubled the Department's fish health staff to two full-time employees.

At the turn of the century, the fish health project had developed into an effective and efficient disease control and health management program. Montana now had a comprehensive program which was capable of dealing with fish disease issues in hatchery and wild stocks. Fish import and transport issues were managed to reduce risk of disease introduction and, through the Fish Health Laboratory in Great Falls and the contracts with other agencies and partnerships which have been developed, the Montana fish health project was ready to deal with any fish health issue.

In June of 1998, the U.S. Fish and Wildlife Service (FWS) was petitioned, under the Endangered Species Act, to list the westslope cutthroat trout as "threatened" throughout its range (The FWS determined in 2000 that WCT were "not warranted" for formal listing).

The westslope and Yellowstone cutthroat received tremendous attention in 1999, as did the fluvial Arctic grayling and bull trout. To help save these declining populations, biologists continued gathering information on the distribution, population sizes, genetic purity, and habitat requirements of these native fish. Planners crafted conservation agreements uniting state and federal agencies, private landowners, conservation groups, and tribal representatives to maintain, and in some cases reestablish, these native fish in their traditional waters.

By the end of 1999, whirling disease had been found in varying degrees in 83 of more than 350 sites sampled. Studies by the Department had shown that when daily mean water temperatures fall below 45 degrees F or exceed 63 degrees F, infection levels are near zero. Therefore, trout which live in very cold streams may not experience severe disease.

The 1990s saw increased educational efforts to head off the problem of illegal fish introductions – stiffened statutes and penalties, prosecution of some bucket biologists and development of a database to track and document the illegal introduction problem. But the problem continued. Through 1999, the Department had documented 345 introductions into 211 waters statewide, including six illegal introductions into five waters in 1999. Illegal introductions were believed to be one of the defining issues for fisheries management in Montana and the nation in the next century.

By the end of the 1990's, several conservation efforts to enhance recruitment of Yellowstone cutthroat trout to the upper Yellowstone River were accomplished, including installation of fish ladders to surmount barriers at road and railroad crossings, water leases to improve instream flows in tributary streams and tributary barriers to prevent upstream fish migration of unwanted species into pure cutthroat headwaters to reserve the genetic integrity of these fish. **[GET OTHER PROJECTS – INCLUDING SHIELDS RIVER FROM JOEL TOHTZ AND SCOT SHULER]. [GET PROJECTS FOR MID-YELLOWSTONE FROM MIKE POORE AND JIM DARLING –Brad Shepard's note]**.
During the 1990's, Montana's share of D-J funds amounted to $49,129, 636.

Between July 1, 1951, when funds first became available, and the end of 1999, Montana received $73,069,920 in Sport Fish Restoration funds as follows:

The 1950's - $ 783,765
The 1960's - $ 1,587,871
The 1970's - $ 3,948,520
The 1980's - $17,620,128
The 1990's - $49,129,636
$73,069,920

I know most fishermen will relate to the snappy rejoinders you get when you ask one of the natives, "How's fishing? Or "Are they biting?"

The one that sticks in my craw was on an excursion to a lake recommended by a mutual friend.

My buddy and I threw everything in the tackle box at them with nothing to show for our efforts but an undersize northern and a couple of small bass.

We decided after four hours it was time for a tall cool one so we beached the boat and hit the local pub.

When the bartender brought our beers I asked, "Say, are there any fish in this lake?"

Without a change in expression he said, "Must be, I never see anyone take any out!"

---- Raymond Bell; Milwaukee, Wis.
In: Montana Outdoors,
November/December 1985.

FISHING ACCESS

"Man has empathy towards rivers because, of all the inanimate elements of nature, they are the most personal. Rivers have a birth, a strengthening youth, a majestic maturity. They move. They speak. They have moods, laughing or angry, brooding or serene. Man, who yearns for immortality, observes the eternal life of rivers with admiring awe."

---- John M. Kauffmann, National Park Service

1945-1950

The concept of providing public fishing access began in the 1940's when Department acquisitions were almost exclusively limited to game ranges. The first fishing access program was designed to provide only access. Small tracts of land were purchased with money from the sale of fishing licenses and very little development beyond boundary fencing was attempted. However, the sites became very popular with campers and picnickers as well as fishermen and the program had to be expanded to provide more and larger sites so sanitary facilities, parking areas, boat launching areas, etc. could be provided.

The 1950's

Some of the first attempts at securing fishing access for the public began in the mid-1950's. A federal aid report (F-10-R-2, Job 1) for the period 1954-1960 stated that Clint Bishop, biologist for the department in Helena, conducted numerous surveys of state and federal lands throughout the state with the intention of recommending them for withholding from sale.

In 1954, land surveys were conducted on 149 tracts in southwest Montana. Of these, 100 were recommended for retention from sale. Water shortage from irrigation and other causes were the main reasons for not recommending the other 27 tracts.

In 1956, surveys were conducted on 243 tracts in western Montana. Of these, 81% were recommended for withholding from sale. Natural drying up of streams was the main reason for not recommending the remaining tracts. As of this survey, 91,000 acres had been requested for retention from sale through the Bureau of Land Management and 139,000 acres through the State Board of Land Commissioners.

By 1958, additional surveys had compiled a total of 152,000 acres of BLM land and 99,000 acres of State lands to be recommended for retention from sale. Again, tracts that were surveyed but not recommended were those that had problems with water supply, either from natural drying up of streams or from irrigation use.

The last report made by Bishop appears to be for the 1960 survey but no figures are given for the total number of lands recommended to date for retention from sale. **CHECK THIS WITH COMPLETE REPORT F-10-R-8, Job I AND INCLUDE FIGURES IF AVAILABLE**

The 1958-1960 biennial report stated that access to fishing waters in Montana was becoming increasingly important each year. During the biennium the Lands Division working under the direction of the Superintendent of Fisheries, purchased a total of 17 tracts. Four additional tracts were donated. Six of the sites were on lakes, the balance on rivers. Of the sites on rivers, five were over one mile long. With these sites, thirty-three were now under department ownership. The objective was to have guaranteed public access with facilities for parking automobiles at strategic points on important lakes and streams.

The 1960's

By the early 1960's, access to fishing waters in Montana was becoming increasingly important each year. Because of changes in land use, fisherman access became limited in many areas and further limitations were expected in the future as more lake and stream tracts were developed for home sites. The Department initiated an accelerated program of acquiring fishing access sites anticipating that land prices would only increase in the future.

By the end of 1962, 12 additional fishing access sites were obtained or were under option.

The 1962-64 biennial report stated that the Fish and Game Commission had acquired 73 fishing access sites. These were carefully selected on and adjacent to important fishing waters. In addition, 25 excellent recreation areas were determined to be available for development on presently existing game ranges and wildlife management areas. Detailed development plans were being prepared for all of these areas. This program included the installation of necessary sanitary facilities, as well as basic recreational developments.

The Land and Water Conservation Fund Act of 1965 (Public Law 88-578) provided funds to the states on a 50-50 basis for the development of outdoor recreation programs. For Montana, the apportionment amounted to somewhat less than a million dollars per year. These funds were collected in the federal treasury from the sale of entrance and user fees at developed federal recreation sites and from other sources.

In each state, an existing state agency was designated to administer the LWCF program. In Montana, this agency was the Fish and Game Department. On the federal level, the newly created Bureau of Outdoor Recreation (BOR) within the Department of Interior was the administering agency. Close coordination was maintained between the BOR and the state of Montana.

LWCF funding was authorized for outdoor recreation acquisition or development projects on a state, county and city basis. All projects were, however, processed through the Department. The program provided for use of 50 percent of the funds by state agencies with the remaining half being available for county and city projects. A 3 percent surcharge was levied on the projects to defray processing costs.

Not until 1965, however, could an expanded fishing access program be started. In that year, the governor named the Department the state outdoor recreation agency. A new Parks and Recreation Division soon followed, with a charge to acquire, develop and maintain fishing access sites. The Division completed a Statewide Outdoor Recreation Plan in the fall of 1965 to act as a guide to the complete and orderly development of Montana's outdoor recreation potential. This plan was the first inclusive plan of this kind prepared for the state.

Approval of the state recreation plan by the Bureau of Outdoor Recreation in November 1965 made the Department eligible for federal matching funds to greatly expand the fishing access site program through participation in the federal Land and Water Conservation Fund program. In 1965, the Department began to actively acquire suitable river and lake frontages throughout the state.

Twenty-five projects were processed for 50/50 Land and Water Conservation Fund financing during the 1964-1966 biennium.

The Statewide Outdoor Recreation Plan approved in 1965 included an Action Program which planned for the preservation and recreational development of selected sections of Montana's free-flowing rivers. This part of the plan was implemented by the newly developed State Recreational Waterway System. Acquisition of land to provide access to lakes, rivers and streams was one plan recommendation.

In 1966, the Commission approved an approach to the State Recreational Waterways program in Montana and directed the Department to bring recommendations to them for several major areas. The

Yellowstone Waterway from Yellowstone Park to east of Billings was under close consideration. It had been designated as a state waterway and was important because it was one of the routes followed by Lewis and Clark. It is a free-flowing stream and had great recreation potential. Access areas were being developed along this waterway in conjunction with various communities and the Forest Service. This provided opportunity for sportsmen to fish and float the Yellowstone River for various periods, including one, two and three-day trips. This also assured people of areas where they could picnic and camp. The same type of approach was to be used on several other rivers, which would be sampled for fisheries production and access opportunities. The Madison, the Big Hole, and Rock Creek, near Missoula, were three streams under consideration. The commission had also asked the Department to explore the Missouri River from Fort Benton to Fort Peck where other plans were being developed and fostered by several other groups.

No river was to be named for inclusion into the waterway system until it was throughly mapped and considered. In this way, the Department was to be sure that the best opportunities would be taken to provide sportsmen with fishing and access.

Nineteen fishing access sites and four state parks were acquired during the 1964-66 biennium.

During the period from July 1, 1968 to June 30, 1970 recreation lands were acquired at 21 separate areas. Acquisition methods included purchase, lease, donations and transfers from other governmental agencies at nominal or no cost.

The 1970's

A major fishing access site acquisition was accomplished in August 1970 when 1,070 acres were acquired on Belt Creek, which provided necessary access to about five miles of that stream.

By 1971, more than 100 fishing access sites had been acquired. The final building block was set in 1977 when anglers were successful in creating a fishing access program supported by earmarked license fees, where $1 from resident and $5 from nonresident fishing licenses were earmarked for purchase of new access sites.

In 1974, the Crow Tribe, by tribal resolution No. 74-05, sought to prohibit hunting and fishing within its reservation by anyone who was not a member of the Tribe. Relying on its purported ownership of the bed of the Big Horn River, on treaties which created its reservation and on its inherent power as a sovereign, the Tribe claimed authority to prohibit hunting and fishing by nonmembers of the Tribe even on lands within the reservation owned in fee simple title by non-Indians. The state of Montana, however, continued to assert its authority to regulate hunting and fishing by non-Indians within the reservation.

On October 9, 1975, the United States, proceeding in its own right and as fiduciary for the Tribe, filed a lawsuit against the state of Montana in United States District Court for the District of Montana at Billings, Montana. The sitting judge was James Battin. The government sought: 1) a declaratory judgement quieting title to the bed of the Big Horn River to the United States as trustee for the Tribe; 2) a declaratory judgement establishing that the Tribe and the United States have sole authority to regulate hunting and fishing within the reservation; and 3) an injunction requiring Montana to secure the permission of the Tribe before issuing hunting or fishing licenses for use within the reservation.

The case was tried before the court without a jury on June 27, 1978. On July 31, 1978, the court denied the relief sought by the United States, stating that 1) the State of Montana owns the bed and banks of the Big Horn River and that the same are not held in trust by the United States for use by the Crow Tribe; 2) the State of Montana has authority to regulate hunting and fishing by non-Indians on the Crow Reservation and that Montana's fish and game laws apply to such persons, and 3) the State of Montana was properly acting within its power and authority in regulating hunting and fishing by non-Indians within the reservation.

The United States appealed the District Court decision to the Ninth Circuit Court of Appeals, which reversed the judgement of the District Court. The United States then took the case to the U.S. Supreme Court. The court argued the case on December 3, 1980. On March 24, 1981, in a 6 to 3 opinion, the court reversed the opinion of the Ninth Circuit Court and remanded. **(Clarify with Bob Lane whether the case was remanded back to the Ninth Circuit or the District Court**. **See 450 U.S. 544, Montana ET AL. v. UNITED STATES ET AL.)** A petition for rehearing was denied by the **Supreme Court or Ninth Circuit Court?** on June 1, 1981.

<u>NOTE</u>: BOB LANE, DEPARTMENT ATTORNEY, SAID THE ABOVE WRITEUP OF THE BIGHORN CASE WAS NOT QUITE ACCURATE. LITER SPOKE TO BOB IN SEPTEMBER, 2000. BOB SAID HE WOULD REVIEW THE WRITEUP FOR ACCURACY. HE SAID HE HAD TO RESEARCH THE SEVERAL COURT CASES AND WRITE SOMETHING DIFFERENT THAN WHAT IS HERE STATED. NOTHING HAD BEEN RECEIVED BY LITER FROM BOB AS OF FEBRUARY 19, 2001.

The Department had closed the Bighorn River to fishing in March 1978 while question of river ownership went through the courts. During the five months between the court's final decree and the morning of August 20, 1981, when the river was officially reopened to fishing, angler anticipation at the prospect of fishing a "virgin" trout stream was incredible.

HB661 in the 1975 Legislature authorized the Fish and Game Commission to use the installment contract method for acquisition of wildlife management areas or public fishing access sites. The total cost of the installment contracts could not exceed the cost of purchases authorized by the Commission and appropriated by the Legislature.

The May/June 1976 issue of *Montana Outdoors* reported the U.S. Forest Service had purchased 1,233 acres in the lower Rock Creek valley in the Lolo National Forest. Once known as the Valley of the Moon Ranch, the land is about 23 miles southeast of Missoula. The Nature Conservancy purchased the land from Robert Bandy in 1975 and offered it to the Forest Service for $406,900, or about $330 per acre.

During 1976, an experiment was begun to work with landowners and local governments to use conservation easements to perpetuate public access to the lower Blackfoot River in Missoula County.

By the end of FY76, public access and outdoor recreation opportunities were provided on 194 individual areas, including eight state parks, 54 recreation areas, 156 fishing access sites, 14 state monuments, one recreation road containing several sites, and one recreation trail.

The 1977 Legislature earmarked portions of fishing license fees for the purchase, development, operation and maintenance of fishing access sites.

In the May/June 1977 issue of *Montana outdoors*, the Department published "The Floaters Guide" by Hank Fischer. The intent of the guide was to encourage preservation of free-flowing rivers, to make recreationists aware of the value of some of Montana's rivers in light of their potential degradation from impoundments, channelization, water depletion and pollution, and to answer numerous inquiries the Department had received for information on floating in general and for details on specific streams.

By 1977, after 11 years of implementation of the Land and Water Conservation Fund Act, Montana had received nearly $15 million. With 50% matching funds from sponsors, more than $30 million had been spent on planning, acquisition and development of public outdoor recreation areas and facilities. Also by 1977, 85 fishing access sites and 40 state parks and recreation areas had been acquired or developed with LWCF assistance.

The 1980's

The Bighorn River access case between the Crow Tribe and the State of Montana was resolved in 1981 (See above).**CHECK TO SEE HOW THIS FITS WITH BOB LANE'S SUMMARY.**

The Montana Supreme Court, in precedent-setting decisions in 1984, declared the waters of the Beaverhead and Dearborn rivers open to public recreational use. These decisions were based on the state constitution that stated waters could be used for recreation without regard as to whether the state or a private person owns the bed of the stream.

Because of the Beaverhead and Dearborn court decisions, legislation dealing with stream access was the most controversial issue considered before the 1985 Legislature. HB265, commonly called the compromise Stream Access Bill, which became law on April 19, 1985, addressed the rights and responsibilities of recreationists as they related to the recreational use of Montana rivers and streams. The issue was in need of clarification after the two cases were filed questioning the public use of rivers and their beds on private property. HB265 states "all surface waters that are capable of recreational use may be so used by the public without regard to the ownership of the land underlying the waters" (Section 23-2-302, MCA). The law designated two classes of rivers. Class I waters were larger streams that have been declared navigable or are capable of supporting commercial activity such as float trips. Class II waters were all other rivers and streams that were not Class I waters. The law addresses recreational restrictions on private lands, including the operation of motorized vehicles, diversion of water, overnight camping, and big game hunting. Portaging around artificial obstacles above the ordinary high-water mark and landowner liability are also addressed.

Rules to implement the Act were adopted by the Fish and Game Commission in 1985. These rules describe the process by which people may petition the Commission to limit, restrict, or prohibit the level of recreational use of surface waters and portage procedures. Although not a protective measure, the stream access law clarifies the rights of individuals using streams and streambeds.

The Department was given the lead in regulating recreational use on streams under HB265. It produced an informational brochure to help explain ways in which the new law affects both landowners and recreationists. The Fisheries Division took the lead in coordinating evaluations of petitions by landowners to close or limit recreational use on streams and it also coordinated development of portages on streams flowing through private property.

The 1990's

During 1993, projects at 13 fishing access sites improved accessibility for those with disabilities, boating access and site protection.

In December 1993, the Commission accepted ownership of the 4,000-acre Thompson Chain of Lakes located between Kalispell and Libby. The Chain of Lakes Advisory Council helped develop a management plan and environmental assessment.

In 1993, at Big Casino Creek Reservoir new Lewistown, a cooperative effort between a private landowner, Fergus County, the City of Lewistown and the Department resulted in flat water fishing opportunities for those with disabilities and the residents of the State Center for the Aged in Lewistown.

In 1994, fishing access opportunities were improved by adding seven new sites and initiating site protection and facility improvement at 19 others.

The second year of the floater launch allocation and permitting system on the Smith River was completed in 1994. A boating access site was acquired at Eden Bridge, the take-out-point for the 67-mile float that begins at Camp Baker.

"Roger's Pier" at Lake Elmo in Billings was completed in 1994. Located at the Department's Regional Headquarters, the wood, concrete and metal structure provided new access to the lake for persons with disabilities as well as other users. Roger supervised the Department's Billings office for 21 years. He died of a fall in July 1992. Roger knew the importance of easy recreational access because of his own mobility challenges resulting from a car accident many years ago. Roger encouraged cooperation between sportsmen and women and landowners and worked with many groups for the benefit of wildlife. The pier was funded through numerous private donations that were used to match federal funds from the Sport Fish Restoration Fund.

A Department study committee was formed in 1995 to review the Fishing Excess Site program and to make recommendations to the director on how the program could be improved to better serve the public while continuing to protect the more than 300 sites in the program. This review was scheduled for completion in 1996.

A second annual "Fishing Without Barriers" day was sponsored by the Department and its "Crossing the Barriers" Committee on Flathead Lake in June 1995. Twenty-four anglers with disabilities caught 30 lake trout. The Montana Charter Boat Association provided seven boats free of charge.

The Ruby River Task Force made significant progress to create public fishing access on the lower Ruby River. By the end of 1996, negotiations were underway with over a dozen landowners to obtain public access through either easement, lease or fee title purchase.

The primary goal of the lower Ruby River Fishing Access Plan is to provide 7,500 to 8,000 annual angler-days of recreation dispersed to the highest degree possible along the 47.9 miles of the lower river, while maintaining the quality of wild fish populations and their habitat and minimizing potential for landowner/angler conflict. The objectives of the plan include the acquisition of several dispersed permanent fishing access sites (FAS) and the negotiation of short-term lease agreements to further disperse angler pressure under a managed access scenario which emphasizes minimal development costs. The plan includes FAS evaluation criteria, implementation guidelines and a tentative implementation schedule going into July 1997.

By 1997, with the financial support of sportsmen and women, the Department had obtained more than 100,000 acres in conservation easements to protect critical habitat, had hunting access agreements with 942 landowners covering 7.5 million acres, had completed 93 stream and lake improvement projects and had improved access and visitor services at a number of popular state parks.

During 1997, volunteers helped monitor water craft on lakes in the Flathead Valley and served on groups that led to the purchase and lease of five fishing access sites on the Ruby River.

Forty acres adjacent to Lake Mary Ronan State Park were acquired from Plum Creek Timber Company in 1997. The acquisition helped provide expanded access to this popular fishing lake.

A formalized public fishing access plan on the lower Ruby River was implemented in 1997. This community-grown solution culminated years of work to provide angling access on this southwestern Montana stream. The access sites were prepared for opening with parking areas, signs and fencing, and a caretaker was hired to maintain the sites, work with area landowners, collect use data and assist with weekly reports.

Information on all of Montana's fishing access sites was gathered and compiled by the Department into a statewide brochure in 1998. The brochure identifies 275 Fishing Access Sites and provides maps and directions for all individual FAS's in each of the seven administrative regions of the Department. The distribution of the 275 access sites by region were: Region 1 - 28; Region 2 - 50; Region 3 - 83; Region 4 - 40; Region 5 - 38; Region 6 - 13 and Region 7 - 23. The brochure also identifies facilities available at each site, the type of use allowed and fees charged, if any. Special regulations or other information that

gives the user more specific information is also given for each site. The brochure was very popular and provided the public with an overview of the extent of Montana's FAS program.

By the end of 1999, the Department had 312 fishing access sites that welcomed anglers and campers alike. During 1999, these sites, funded by angler license fees, benefitted from nearly $1 million in upgrades and maintenance. Campers would see a new $10 camping fee at about 10 percent of the sites if they didn't have a valid fishing license. For those with a fishing license, the camping fee was to be $5.

"A river may be compared to life; always moving, ever changing. The rapids represent the obstacles and hardships we all encounter from time to time. The challenges to be faced squarely and taken with enthusiasm. The slow peaceful stretches are like the quiet uneventful days we never see enough of.

"Often the river breaks up into several channels and one must make a decision as to which course is best. In life, as on the river, we can't be sure what lies ahead around the bend. But we can look forward to the unknown as a challenge and an opportunity rather than as a possible disaster.

"Watch and study the river. It has much to teach about life."

...James M. Quinn
In: *Handbook to the Rogue River Canyon*, 1978.

AQUATIC EDUCATION

"The gods do not subtract from the allotted span of men's lives the hours spent in fishing"

— from an Assyrian tablet, dated 2000 B.C.

1945-1950

The 1948-1950 biennial report stated that the primary mission of the Fish and Game Department's Public Information Section was to keep before the public of the state those facts and figures relating to the management and conditions of fish and game in Montana. It was constantly striving to reach more and more persons through the various media; newspapers, magazines, radio and personal correspondence and contact.

A theme being concentrated upon as of 1950, and to be continued into the future, was the fact that each and every person had a direct interest in the well being and good management of the fish and game resources in Montana. Utilization of every communication source available was a partial answer to the problem of making the public aware of its interest and the Public Information Section was taking advantage of these outlets.

Films, the themes of which deal with fish, game, and conservation, were purchased and were on deposit in the state film library, available to any group in the state interested in showing them. Lists of these films were sent to all outdoor associations, schools, and clubs so that a selection of available films could be made. This proved highly successful and eased the job of answering inquiries, both for the Fish and Game Department and for the state film library.

Weekly news releases, issued from the Department's Helena office, averaged over five pages of copy per week. These went to every newspaper and radio station in the state and to the major sports magazines and fish and game departments in other states.

Daily news releases were issued from the Department for publication in all daily newspapers in the state. They were written from information gathered by personnel of the Public Information Section.

Requests were received for a radio program of from five to fifteen minutes in length, written by section personnel. It was hoped that these requests could be granted in the near future.

An inter-Department publication, *Bear Facts and Fish Tales*, was issued once a month to all Department employees. This dealt strictly with Department affairs and was not for general consumption.

Emphasis was placed on the issuance from the Department of more pictures to local newspapers for publication. So far, all pictures of Department personnel and the work they were doing had been well received, and a great deal of space was allocated to them. Cartoons were also sent out and published, dealing with various phases of conservation work

The 1950's

In the early 1950's, public interest in hunting and fishing made apparent the necessity for expanded information and educational facilities. The Department recognized that an informed public could supply the support needed to meet new problems in the business of supplying fish for the creel and game in the bag. Thus, it was the primary objective of the Division of Information and Education to supply facts and

figures concerning the status of fish and game and its management in Montana. It was also believed that pleasure in the outdoors could be increased if the hunter and fisherman were made aware of the habits and values of wild animals.

Daily and weekly news releases providing current information were supplied to all of the wire services, newspapers and radio stations in the state. This material was used extensively and provided one of the best media for news dissemination.

A planned quarterly publication, *Sporting Montana*, was published by the Department in the Fall of 1950. The publication was short-lived. Three subsequent issues, comprising one complete volume, were published, with the final issue in the Summer of 1951.

The Spring, 1951 issue of *Sporting Montana* carried an editorial about the meaning of conservation:

> "Conservation has a multitude of meanings. Originally it meant total saving, but, as this concept developed, it was found that often total saving was not the entire answer in many cases. In fact, it was noticed that unless some use was made of many of the natural resources, the objectives of conservation often failed. So, we find conservation changing to mean a wise use of our natural resources.
>
> "Obviously game and fish administrators must move in step with other changes if this valuable wildlife resource is to find its proper place in the world today. This may mean new methods of management and often departure from old practices. This brings up a major problem, that of bringing before the public these conditions and reasons for changes.
>
> "The Department felt the proper medium for this informative activity was conservation education through news releases, magazine articles, movies and lectures. An informed public and sportsmen's groups are powerful backing for the wise use and perpetuation of the resources which mean so much to our state.
>
> "The job of making available timely and accurate information was the responsibility placed upon the Division of Public Information and Education.
>
> "However, information for adults only was not enough, as a very important group of potential hunters and fishermen was growing each day. Upon these youngsters much of the future of outdoor sports was dependent and a program of conservation education was well justified so that they, too, could know the problems and needs of wildlife.
>
> "The attempt to keep Montana's hunters and fishermen informed and to establish a youth educational program is to be the primary objective of the Division of Public Information and Education."

The last issue of *Sporting Montana* (Summer, 1951) carried an article about the need for a means to get kids involved with fishing. One of those means was kids fish ponds, waters set aside only for use by young people:

> "In this topsy turvy world, there's something almost spiritual about a kid out fishing. Maybe the little monster has a frog in his pocket or an unkind name in mind for his new teacher but, still, there's something about the fact that he's fishing that makes you confident he's being prepared to take his future place as a good sportsman and citizen.

> "For nearly half a century, sportsmen had planted and reared fish to insure better fishing sport, but not until very recently had they entertained the idea that angling could be better yet if they reared conscientious fishermen with which to stock our fair waters.
>
> "This year the 1951 state Legislature, after a crusade for kids staged by Senator Don Valiton and Montana outdoor columnist, John Willard, gave the Montana Fish and Game Department ". . . authority to declare certain fishing waters within the state of Montana closed to fishing by all persons excepting . . . that class of persons whose ages are twelve years or less; it being the purpose of this section to provide suitable fishing waters for the exclusive use and employment of juveniles .. . at such times and in such areas as the state Fish and Game Commission shall in its discretion deem advisable and consistent with its policies relating to fishing in the state of Montana."
>
> "When it came time to set fishing regulations shortly thereafter, sportsmen from thirteen Montana towns requested local waters set aside for kids. After the closures were granted, the waters in most of the places were stocked with legal size fish and opening days were highlighted with children's derbies."

Sporting Montana was replaced with a new magazine called *Montana Wildlife*, first published in 1952. This was to be a quarterly magazine to provide informative and entertaining reading. This publication carried full-length stories of Department projects and activities with photographs, drawings and charts to bring to the reader complete details of what was being done in wildlife management. While many states charged for their wildlife magazine, *Montana Wildlife* was sent free to anyone requesting it.

The 1951 Montana Legislature had passed a law directing that conservation education should be taught in public elementary and secondary schools of the state. The law also provided that such a program would be presented as a part of, and integrated with, other related subjects and courses. The instructions from the Legislature further stated the extent and application of such a program should be determined by the State Board of Education and the State Superintendent of Public Instruction. No monies were provided for this program.

During the 1950-1952 biennium, requests for special articles, photographs and lectures were handled within the limits of Department personnel to do so. Members of the Department also participated in educational lecture series on adult education and talks to civic and sportsmen clubs. Educational problems of farmer-Department-sportsmen relationships also fell to this division.

Youth education was progressing and promised to be one of the most important activities of the education division. The Department felt that young Montanans are the backbone of the resource conservation movement. Every effort would be made to supply the state's youth with facts concerning the status of wildlife resources. Initial efforts included teaching assistance at the annual 4-H Conservation Camp and instruction and talks to school groups.

Moving pictures were acquired and distributed to schools, sportsmen's clubs and other interested groups.

By 1952, recognizing a definite need to acquaint Montana's youth with basic principles of conservation practices, representatives of state and federal conservation agencies worked cooperatively for the past several years toward this educational goal.

One of the best examples of this effort was the annual 4-H conservation camp, now in its sixth year, attended by teenage boys and girls representing more than half of Montana's 56 counties.

In 1952, 32 boys and 32 girls were selected from their own 4-H groups to attend the camp at Little Bitterroot Lake in Flathead County from July 7 through 11. Attending in addition to the 4-H members were eight 4-H leaders, 14 county extension agents, five guests and the 10 members of the resource staff.

One of the programs given was a demonstration of electric fish shocking equipment used by the Department, which was demonstrated to campers by Frank Stefanich, District Fisheries Manager in Kalispell. This method of obtaining fish for tagging purposes was the principal means of determining species migration patterns. Several shocked fish later placed in small containers showed that the fish suffered no ill effects.

Looking forward to the long-range benefits derived from an informed public, the Department adopted the Adult Education Program in 1952. The program was developed at Montana State College in 1949 and adopted by the Montana Wildlife Federation in 1952. 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.

During the 1953-1954 biennium, the Commission provided $15,000 to be divided between the two schools to finance the Adult Education Program.

In 1953, the Montana Fish and Game Commission released a 20-minute sound and color motion picture called “The Case of the Shocked Fish.” This release inaugurated a new program which was to provide sportsmen of the state with unusual documentary films of Department activities. This was the first in a series of low-cost movies which the Department planned to produce from film footage taken by biologists and other technicians during actual field operations. Director of Education and Information Ken Thompson and his assistant Vernon Craig produced the script and sequence of the new motion picture.

The animated artistry of Vernon Craig introduced the movie, which was filmed to illustrate one of the most useful means of capturing fish for management studies – the electric shocking system. A step-by-step demonstration of “shocking” fish and the more important phases of a subsequent study were carefully recorded in this film. The locale was primarily Prickley Pear Creek in the Helena valley, where fisheries biologists had conducted their most intensive surveys of migration, growth and weight increases, longevity and species composition of the stream. The movie was previewed for Helena sportsmen and was made available for sportsmen’s meetings by writing the Department in Helena.

During the 1953-54 biennium, the Information and Education Division, the newest major section in the Department, made definite progress in developing a suitable program of conservation information and education. Youth and adult education programs were the newest developments to materialize during the past two years. Continued participation at youth camps, such as 4-H and Boy Scouts, was also a feature of the biennium and the first annual Young Montana Conservationists program to reward and recognize outstanding teenage conservationists was completed with considerable success.

The Department also adopted the general philosophy that citizens provided with the basic background and information would make wise decisions and laws in the management and use of state resources.

During the 1953-1954 biennium, increased effort was made in scheduling the Department’s educational wildlife display at County and State Fairs. This exhibit was much in demand and was generally considered one of the outstanding attractions. In 1952, 16 fairs featured the collection of native Montana game animals, birds and fish with an estimated attendance of over 200,000.

Montana’s free quarterly magazine, *Montana Wildlife*, featuring Departmental activities and programs, continued in popularity with an estimated readership of over 25,000. It was sent to all Montana schools and to any person making a request. In addition, a special booklet, *Hunting and fishing in Montana*, was distributed to hunters and fishermen all over the nation during the 1953-1954 biennium.

A lending library of moving pictures and colored slides provided illustrations for talks as well as educational entertainment. Photographs and moving pictures were also prepared on Department projects. The preparation of sound movies was expected to be an even more important future activity of this division, since it had developed practical techniques for economical moving picture productions.

During the 1956-1958 biennium, I&E activities were basically the same as during the previous two years. The Wildlife Education Extension program at Montana State College and Montana State University established in the 1953-54 biennium was continued.

In 1957, the Montana Fish and Game Commission provided the State Department of Public Instruction with a grant of $9,000 to initiate the conservation/education program for schools passed in 1951. In August 1957, a Conservation Education Supervisor for the Department of Public Instruction was appointed, with funds provided under the cooperative program.

During the 1958-1960 biennium, I&E personnel continued their work in all communications media: correspondence, bulletins, newspapers, radio, television and magazines and worked with civic and sports organizations. *Montana Wildlife* continued to be a popular free pamphlet. Also, television opened new horizons and the I&E Division decided to take full advantage of this new medium.

Local operations of the Department were based upon seven administrative districts during the 1958-60 biennium. Information and Education representatives were assigned to four of these districts, Missoula, Great Falls, Billings, and Glasgow. District operations for the Information and Education program facilitated a more complete and well rounded program. Local television and radio shows gave special attention to current management operations and problems. Newspaper contacts were based upon events in the immediate vicinity. This tied the Information and Education program to the problem affecting the surrounding public.

During the 1958-1960 biennium, the Fish and Game Department continued to finance the program of adult education in cooperation with Montana State University and Montana State College. Wildlife Extensionists operating from the two university units presented forum lectures to groups in many sections of the state. Funding by the Department was increased to $19,000 annually during the biennium.

The 1960's

Between 1960 and 1962, I&E activities continued pretty much as in previous years. One new I&E officer was assigned **WHERE?**, making a total of five officers in the seven administrative districts.

During the 1962-1964 biennium, I&E activities were the same as in the previous biennium. There were still five information officers in the seven administrative districts.

Between 1964 and 1966, I&E continued its activities as in previous years. The wildlife extension programs at MSU in Bozeman and UM in Missoula were continued. A sixth district Information officer was assigned to the seven administrative districts. **WHERE?**

At the end of the 1968-70 biennium, a full-time editor and staff were employed to publish the Department's official magazine, *Montana Outdoors.* A new format employed a four-color process and, for the first time, the Department's official publication was distributed on a paid subscription basis.

Several other publications were prepared for public distribution, including magazines on *Montana Amphibians, Turtles of Montana, Tularemia of Animals and People* and several minor publications.

Films continued to be produced at the I&E Division's Film Center. One of the films, "Winter Range" was awarded second place in a National competition for the Outdoor Writers Association film contest.

The 1970's

I&E activities during the 1970-72 biennium included producing 4 movie films, 80 radio & TV spots, producing *Montana Outdoors* magazine, film library loans, news releases, answering public inquiries and working with youth groups.

Beginning with the November/December, 1970 issue of *Montana Outdoors*, the Department began to take a "new look" at conservation. The new look took the form of a full-color magazine that would be published six times per year. The new *Montana Outdoors* was a combination of *Montana Wildlife*, which was published on a quarterly basis, and the previous *Montana Outdoors*, a black and white monthly publication. Publication of these two magazines ceased with the formation of the current *Montana Outdoors* as the official publication of the Montana Fish and Game Department. It was scheduled to be free to the public until July 1, 1971, when it would go on a paid subscription basis.

After joining the Information and Education Division in March, 1970, William A. Schneider was appointed editor of the new *Montana Outdoors* magazine in September,1970.

In mid-November, 1970, H. Max Stone, former District Supervisor in Miles City, became the Department's Chief, Information and Education Division, replacing Richard J. Monroe, who accepted a position with the National Park Service. Stone transferred from the Fur Division (no longer in existence) to the Information and Education Division in 1960, two years after he joined the Department. He served as District Information Officer in Glasgow, Great Falls, Kalispell and billings and was appointed District Supervisor in Miles City fours years ago.

Beginning with the May/June 1971 issue, *Montana Outdoors* would become more attractive to women. In the past, the magazine had been slanted towards sportsmen. To further interest sportswomen, the magazine would contain at least one article that was of special interest to women. Thus, emerging as a regular feature, "The Other Half" would contain information for women readers.

In early 1972, the Department released two new half-hour films that became available on free loan to the public. *The Yellowstone* shows major threats to wildlife and suggests ways and means of preserving and improving water and other qualities of this substantial portion of Montana. *Rock Creek* was produced to show the intricate ecological web that produces an outstanding blue ribbon trout stream and shows why a multitude of skills and a great amount of cooperation are necessary to maintain the fragile balance of Rock Creek in light of conflicting water and land use philosophies.

In April, 1972, as a part of executive reorganization, the Department's Environmental Resources and Information Divisions were combined into the Environment and Information Division. The division was separated into two bureaus – Environmental Services and Public Information. This division's responsibilities were a combination of duties previously performed by the two separate divisions. These were to assist in the protection of Montana's natural environment, with emphasis on fish and wildlife habitat. It would do so through administration of the Stream Protection Act, through special planning projects and by reviewing projects occurring within the state. The division would also offer technical assistance to other agencies and organizations involved with the environment and provide programs of public information through such media as newspapers, radio, television, magazines, youth and school programs, correspondence, a film library and personal contacts. Movie films were in continuous production and the full-color magazine, *Montana Outdoors*, continued to be published bimonthly.

At the American Association for Conservation Information's international conference in Salt Lake City June 26–28, 1972, *Montana Outdoors,* in its first year of publication, placed second in the magazine category.

The Department's television film, *The Yellowstone*, won first prize in the film category. Agencies from the U.S. and Canada entered the competition.

To dramatize the prominent role sportsmen played in conservation, Governor Forrest H. Anderson proclaimed September 23, 1972 as the state's first "Hunting and Fishing Day". President Nixon, Congress and more than a dozen states had already honored this day, now known as "National Hunting and Fishing Day", that would be celebrated annually on the fourth Saturday of September.

In 1974, the Information Unit of the Environment and Information Division continued activities as in past years providing public information and education in a variety of media, programs and public services.

On September 15, 1974, Bill Pryor joined the Department as the information officer for Region 5 in Billings. He replaced Harley Yeager who moved to the same position in the Region 4, Great Falls, office. Dave Wedum, who held the Great Falls job, joined the Enforcement Division as a warden in Region 1, Kalispell. Pryor was formerly the conservation education representative for the Illinois Department of Conservation.

Substantial savings were realized in the production of *Montana Outdoors*, the Department's official magazine, during FY 75. A new printing contract was negotiated which resulted in considerable savings to the Department. For example, under the old contract, the average cost was approximately 35 cents per copy. Under the new contract, the cost was decreased to approximately 23 cents per copy. Comparing this final figure to the original cost of a single copy of about 80 cents, it was obvious that, during an inflationary period, the Department continually reduced the cost of production in this one area.

During fiscal year 1975-76, the Information Bureau participated in the first Montana Trade Showcase in Billings. The event resulted in increased contact between the Department and public, enabling the bureau to meet people on a one-to-one basis, which benefitted the information effort and the Department's obligation to the fish and wildlife resource as well as to the people.

In still another educational program during FY 75, Department funds and personal services were contributed toward support of an environmental education course conducted by Helena High School at the Beartooth Game Range. This was one of the first such courses in the state and the first joint educational program of this nature involving the Department.

A new program of providing colored slides, photos and movie footage on a weekly basis to Montana TV stations for use in news and sportscasts was in the planning stage during 1976. This material was to be designed to complement the Department's information effort by providing timely materials on topics of interest to the sportsmen and the public. The program was scheduled to start in mid-FY77.

During 1976, as the result of balloting from 64 Montana towns and four other states, the black spotted cutthroat trout got the nod as Montana's state fish – if the Legislature concurred. According to the State Fish Campaign, the cutthroat received 520 votes followed by the grayling with 200 votes and the rainbow trout with 107. Lesser votes were cast for other fish species that reside in Montana. A bill to name the state fish was to be introduced into the 1977 Legislature.

In 1976, during the controversial water reservation process in the Yellowstone River basin, the Environment and Information Division proceeded with a major public information effort. The Department had a well-distributed magazine, *Montana Outdoors,* a film production unit and seven regional information officers around the state. Everyone was mobilized. A documentary film, *Yellowstone Concerto*, was produced in 1976 and a special issue of *Montana Outdoors* devoted entirely to the Yellowstone River was produced the same year. The film provided an emotional appeal while the magazine provided the factual information. A first-ever news conference was held by the Department in Billings on February 1, 1977 to release and promote the film and magazine. Both media forms were extremely successful in getting out the message of the river to the public.

Governor Thomas Judge signed into law a bill passed by the 1977 Legislature declaring the black spotted or westslope cutthroat trout as Montana's state fish. The cutthroat was the public's choice as shown by a poll conducted by Norma Ashby of the Montana Television Network's morning program "Today in Montana". This designation did not differentiate between the two cutthroat subspecies, westslope and Yellowstone, both native to the state.

Beginning with the July/August 1978 edition of *Montana Outdoors*, the magazine had a new editor. Dave Books, formerly the editor of *Western Wildlands,* a natural resource journal published by the Montana Forest and Conservation Experiment Station, succeeded Bill Schneider, who joined the director's special staff to study the possibility of producing a children's magazine.

In 1979, The Environment and Information Division was split into two divisions – Ecological Services and Conservation Education. Jim Posewitz, E & I Division Administrator, was appointed Administrator of the Ecological Services Division and Steve Bayless, who had been Information Bureau Chief, became Conservation Education Division Administrator. **CHECK THIS FOR ACCURACY**

The 1980's

The May/June 1981 issue of *Montana Outdoors* was devoted to the fishery management programs and policies of the Department and was intended to help clarify the Department's role in water resources management. Articles in the issue addressed "Species of Special Concern", habitat protection, fish stocking, fish population inventory, fish research, fishing regulations and fishing access. Art Whitney, Fisheries Division Administrator, stated in the issue's "Overview" on page 1, that management of Montana's aquatic resources was an ever-changing and ever-growing challenge and hoped this issue of *Montana Outdoors* would help clarify the Department's role in water resources management. The issue also included a full-color, eight-page guide to the identification of Montana's most common game and sport fishes. The fish guide was subsequently issued separately as a reprint at a cost of 50 cents.

Project WILD got its start in 1983. Project WILD is a conservation and environmental education program for teachers of kindergarten through high school. The project provides teachers with instructional materials and techniques for integrating education about wildlife and the environment into the mainstream of public education. Project WILD instructional activities fit within major school subject areas –reading, writing, mathematics, science, social studies, etc. Project WILD's goal is to assist learners of any age in developing awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment upon which all life depends.

Aquatic education in Montana covers a host of activities. Much of the funding for these programs stems from a 1984 amendment to the Sport Fish Restoration Act of 1950. Called Wallop-Breaux, the amendment expanded the federal excise tax program on fishing and fishing-related equipment that historically has augmented state fisheries management efforts. It also increased the range of activities the money could be spent on, like aquatic education.

The 1990's

In early 1991, the Department made available to anglers a new video on catch-and-release fishing. Entitled *Gentle Hands, Firm Intentions*, the 9-1/2 minute video shows state-of-the-art techniques for handling and releasing wild trout. Its purpose is to make sure anglers catch and release trout with minimal stress and injury.

In an attempt to identify and then solve some of the most common conflicts on Montana rivers, the Pat Barnes Missouri River Chapter of Trout Unlimited, the Missouri River Flyfishers, and the Department of Fish, Wildlife & Parks put their heads together and came up with "The Ten Commandments of River

Etiquette. It was believed that many of the conflicts on rivers could be avoided entirely by following a few simple rules. Published in the July/August 1991 issue of *Montana Outdoors*, the Ten Commandments are:

> Thou shalt not block the access;
> Though shalt give fellow anglers plenty of elbow room;
> Thou shalt not trespass;
> Thou shalt make no wake;
> Thou shalt not litter;
> Thou shalt conserve the resource;
> Thou shalt know the regulations;
> Thou shalt not wade in spawning areas;
> Thou shalt know how to handle your boat;
> Thou shalt think before acting.

In 1991, Project WILD, administered in Montana by the Department and the Office of Public Instruction, received one of three 1991 President's Environment and Conservation Challenge Awards for Education and Communication. The award was bestowed by President George Bush. Since 1984, Project WILD had provided conservation education materials and workshops to more than 3,600 educators in Montana, who in turn had taught more than 60,000 Montana students about wildlife, habitat and responsible ways to protect the environment.

In 1993, information such as posters, videos and computer programs were developed and provided for grades K-12. Interpretive facilities at fish hatcheries, state parks and popular fishing access sites were improved.

In cooperation with private conservation organizations, fishing clinics were conducted in all Department administrative regions during 1993. These clinics provided youngsters with the opportunity to learn first-hand how to fish and what fish, other stream species, and stream side inhabitants need to survive.

During 1993, as a result of a public-private partnership, the Department began distributing a conservation education magazine, *Falcon,* to fourth graders throughout Montana. Teachers would use the information to conduct classroom activities. Also during the year, 1,200 Montana educators attended 42 Project WILD workshops.

A "Fort Peck Fishing Guide" showing key locations, illustrations of fish and other pertinent information was produced in 1993.

The Department released a national award-winning 16-mm film documentary in 1993 entitled, *"Three Men — Three Rivers."* The intent of the documentary was to increase awareness, understanding and appreciation of the many values of our rivers and what they mean to our way of life. The film received a first-place award from among all agency-produced films at the International Wildlife Film Festival in Missoula. It also received honorable mention in both the "Cinematography" and "Instilling a Conservation Ethic" categories.

It was expected that the Department would expand the aquatic education program to include a warm water segment.

During 1994, teacher and youth education projects were a major activity for the Department:

> The Department conducted or participated in 42 "How to Fish" clinics to ensure that new anglers had knowledge, responsible attitudes and skills to appreciate fisheries resources; 6,630 youngsters attended.

Through Project WILD, in partnership with Montana's educational community, the Department provided training sessions, curriculum guides and resource materials on Montana's natural resources to school administrators, teachers and youth groups throughout Montana. The training occurred through 37 workshops hosting 962 teachers and administrators. An estimated 12,698 students were reached through these efforts.

Over 3,000 educators received information on the Department's education assistance program at the Montana Education Association and Montana Federation of Teachers joint conference in Billings.

The Department provided stipends to eight Flathead Indian Reservation teachers who participated in curriculum development and implementation workshops at the Salish-Kootenai College designed to bring water quality and environmental management content into their classrooms.

River Watch equipment and training were provided to nine schools – Livingston, Big Timber, Laurel, Billings West High, Hardin, Forsyth, Miles City, Savage, and Terry – all in the Yellowstone River watershed. Fourteen teachers involved 516 students in the program and spent 100 hours sampling water with students and 190 hours teaching in the classroom.

The new conservation education magazine – *Falcon* – was distributed to fourth graders throughout Montana. As a result, eighty-seven percent of the teachers interviewed indicated they increased the amount of time they spent teaching about fish and wildlife in their classes. Ninety-two percent of the teachers interviewed said they believe their students increased their awareness and knowledge of fish and wildlife and the importance of habitat as a result of the magazine.

In 1994, the Department's recent video "*Three men – Three Rivers*" received two gold medals at the New York International Film and Video Festival, one in the "Nature and Wildlife" category and one in the "Best Camera work" category.

Montana's first "Becoming an Outdoors-Women" workshop was held in the summer of 1994 at the Birch Creek Outdoor Education Center near Dillon. Women are often overlooked as outdoor recreationists but that notion was quickly changing. The workshop was for women interested in trying outdoor activities. Students learned new skills or improved existing ones in such topics as orienteering, archery, fly-fishing, riflery, stream ecology and nature photography. All ages and walks of life from around the country were represented and future workshops were being planned.

Leadership through Education was a theme during 1995:

Four issues of the award-winning youth magazine, *Falcon*, were distributed to Montana's approximately 13,000 fourth graders with financial assistance from the Northern Region, U.S. Forest Service and the Boone and Crockett Club.

The second annual "Becoming an Outdoors Woman" workshop provided 60 women from six different states with the opportunity to try new outdoor activities. Over 25 volunteer instructors taught classes in wildlife conservation and hunting, fishing, canoeing, survival, stream ecology, shotgun and rifle use and plant identification.

A total of 1,200 students attended Youth Angler Education courses at 22 sites across the state. They received hands-on experience in angling skills, aquatic ecology, water safety, ethics, etc.

The first Billings Fishing Fair was conducted in the summer of 1995.

By 1995, Montana citizens, young and old, were involved in a volunteer lake monitoring program. Sponsored by the Department and other public and private groups, the program monitored water quality in numerous lakes around the state. The program was a nationwide effort spawned by the 1972 Clean Water Act. Although relatively new, Montana's program was considered equal to some of the best programs in the nation. The program was a way of establishing an information baseline for lakes that would get no attention from government agencies because of limited funds. It also got students involved to make them more aware of water quality problems and to assist in this long-range monitoring program.

By1995, the Department, the Montana Environmental Education Association and other groups were providing hands-on educational experiences for young Montanans through the use of "educational trunks". The 56 trunks available contained articles and information on topics such as air quality, birds, dinosaurs, endangered species, fish, pond and prairie ecosystems, water resources and other interests. Trunks for various grade levels were available from the Department.

Talking books were also available during 1995 free of charge from the Montana State Library. All issues of *Falcon* magazine from its inception in 1993 and *Montana Outdoors* for the previous two years were available on audio cassettes. Many volunteers contributed their time and reading talents for this worthwhile program.

National Fishing Week was held June 5-11, 1995.

Vince Yannone, assistant administrator for the Conservation Education Division retired May 12, 1995 after 25 years with the Department. Known throughout Montana as "Mr. Wildlife", Vince was one of the most popular personalities in Montana. He began developing the Department's youth education program in 1970. His unique personality and sense of humor quickly made him a favorite presenter throughout Montana school systems. His gift for communicating with people of all ages and from all walks of life is well known, but that gift sometimes overshadowed his uncommon compassion for wildlife. He worked to establish Project WILD in Montana and in 1990 was nationally honored with the Project WILD Director's Award. Vince's talks were characteristically exciting and humorous but he often ended his presentations with the more serious words that "There are four things to remember. To survive, wildlife need clean air, food, water and a place to live".

During 1996, Montana youths and their families had even more opportunities to learn how to cast a line and partake of the state's renowned fishery resources thanks to an expansion of the Department's aquatic education program. A new program called Family Fishing Adventures contained five elements:

1) The establishment of a cadre of trained, volunteer angler education instructors;
2) An equipment lending program across the state;
3) Creation of a "free-fishing day" for participants of Department-approved angler education courses, which will be introduced to the 1997 Legislature;
4) Establishment of an angler education program for Montana schools based on a highly successful national educational campaign; and
5) Creation or development of existing accessible fishing areas for youths and their families.

Three schools in Montana began pilot testing the national "Hooked on Fishing–Not on Drugs" program, and three communities were testing a fishing tackle loaner program in 1996. Over 1,000 youths attended angler education courses taught by volunteer angler education instructors.

The third annual "Becoming an Outdoors Woman" workshop was conducted in August 1996 at the Beartooth Mountain Christian Ranch in the Absaroka-Beartooth Mountains south of Columbus. The objective of the workshop was to provide an atmosphere where women could have fun learning skills that

would enhance their enjoyment of the outdoors. The workshop provided 100 women from seven different states the opportunity to try their hands at a variety of outdoor activities.

The March/April issue of *Montana Outdoors*, published a copy of a colorful poster depicting fish and wildlife that occupy the lower Missouri and Yellowstone rivers and prairie of Montana. Titled "Habitat - Wild things Need Wild Places", the poster highlights the importance of preserving healthy habitats for fish and wildlife. The Montana Chapter of the American Fisheries Society sponsored the poster with funding from a variety private and public sources. The poster was distributed free.

In 1997, the Department provided copies of *Wild Outdoor World* youth magazine, published in cooperation with the Rocky Mountain Elk Foundation, to all fourth graders in Montana public schools. *Wild Outdoor World* was formerly *Falcon* magazine, which was purchased by the Rocky Mountain Elk Foundation.

The Department's new Family Fishing Adventures program expanded in 1997 to include 40 Montana schools in the nationally acclaimed "Hooked on Fishing--Not on Drugs" program. Fishing tackle loaner sites were established in each "Hooked on Fishing-- Not on Drugs" community to provide free loan of fishing equipment to children and their families. Newly trained volunteer fishing instructors and other educators conducted over 200 aquatic education courses and fishing clinics, reaching nearly 9,000 participants of all ages. Youngsters visited Montana's first urban fishing site in Miles City more than 1,000 times.

In 1997, a new youth education effort known as the M*A*Y (Montana Angling Youth) Club was initiated. The concept was developed in Montana by John Fraley, Department information officer in Kalispell. Most of the members were pretty young. Three times a year they received the M*A*Y Club newsletter, and once a year they got a small package of fishing supplies. By the spring of 1998, the club included more than 2,000 kids. The club's newsletter received contributions from the "Hooked on Fishing -- Not on Drugs" program. The newsletter was free due to financial help received from Flathead Valley sportsmen clubs and other grants.

The "Family Fishing Sites" program got off the ground in 1997. Finding places where kids can go fishing close to home by walking or riding their bicycles was the goal of this program. Cook Lake in Miles City was one of the first sites managed as a kid's fishery. The Department planted it with perch in 1997 and it became very popular. The Department was seeking other such sites "where mom and dad could grab a can of worms and go catch some fish with their kids."

Also in 1997, a fishing pond designated "just for kids" was in the initial stages of development at Havre. Growing enthusiasm related to angling in the area was likely the result of Department employees spending increased time with five Havre elementary school classes as part of the Department's increasingly popular "Hooked on fishing–Not on Drugs" program.

The fourth annual "Becoming an Outdoors Woman" workshop was held at Beaver Creek Park south of Havre during the summer of 1997. Fifty participants from north-central Montana and beyond attended the workshop.

In 1997, the Department went "online" for the first time at http://fwp.mt.gov. The new service was designed to give Montana citizens, schools and non-residents a new means to get information about the Department, the resources it manages and to provide comments to the Department. The site also provides links to other state, federal and private Internet sites.

The Water Watch volunteer program in Northwestern Montana, initiated in 1996, was again extremely active in 1998. Volunteers, acting as information conduits for the Department, distributed pamphlets and information to boaters.

During 1998, angler education instructional opportunities were provided to 558 educators who would reach nearly 14,000 Montana students. Also, the success of Department involvement with the national acclaimed "Hooked on Fishing–Not on Drugs" program in Montana schools was evidenced by the fact that the program had expanded to include nearly 60 schools and over 1,000 students.

In cooperation with the Governor's Bull Trout Recovery Team, the Department, in 1998, produced a video for use in schools to help call attention to some of the problems facing bull trout in Montana.

1999 marked the beginning of another Department-sponsored educational program for young anglers. The program provides free fly rods, reels, and fly-tying equipment on a loan basis for any noncommercial educational group. The program helps groups overcome a major obstacle: obtaining enough equipment to conduct classes and activities. Apart from being a way to support fly fishing and aquatic resources, such events are also a great way to build community togetherness. Equipment is available from the International Fly Fishing Center in Livingston, Montana.

By 1999, after three years of educational fishing clinics and events, the Family Fishing Adventures program was thriving. The "Hooked on Fishing - Not on Drugs" program involved 100 classrooms and 2,300 Montana students. Over 600 teachers had been trained in aquatic education and would potentially reach 15,725 students annually. Through the Montana Angling Youth (M*A*Y) Club established in 1997, 4,000 youngsters were receiving a newsletter with information on fishing in Montana. In addition, the Family Fishing program continued to create more fishing opportunities in urban areas.

As the decade of the 1990's ended, a new reality had the Department in its grip. In the Department's 1999 Annual Report, Director Pat Graham presented some thoughts and questions about the future of hunting, fishing and the conservation of the fish and wildlife resources we currently enjoy. His thoughts were (partly paraphrased):

> After 100 years of successful fish and wildlife conservation funded by hunters and anglers, was it possible to do for other species of fish and wildlife that are not fished or hunted? Can we maintain our open spaces and preserve important wild places? Are the historic and cultural remnants of this past century going to be preserved through the next one? Although hunters and anglers would continue to pay their own way, Montanan's would have to find a way to fund this new work.
>
> Part of the answer to these questions was the creation of the Fish, Wildlife & Parks Foundation, launched in December 1999. It will build an endowment of individual and corporate donations and gifts to fund programs that will conserve wild places, restore imperiled species, maintain access, protect unique cultural and historic parks and educate kids about the wonders of our world.
>
> Another part of the answer may be the "Conservation and Reinvestment Act" Congress was considering. This bill would send millions of federal dollars to state parks and wildlife programs by redirecting existing tax revenue. With these two options, the Department believed that there was never a better opportunity for people to make a difference in conservation. It was time for this generation to shape our legacy for the next century. When wildlife calls, who will answer?

NOTE: CON ED DIVISION WAS GIVEN AN <u>UNEDITED</u> COPY OF THIS SECTION TO FILL IN ANY INFO THEY FEEL MAY BE MISSING. UPDATED VERSION IS SUPPOSED TO BE RETURNED TO TIM GALLAGHER. CONTACT PERSON IN CON ED IS DAVE HAGENGRUBER.

A Fisherman's Prayer

“I hope that I may live to fish
Until my dying day,
And when it comes to my last cast
I then most humbly pray:
When in the Lord’s great landing net
And peacefully asleep
That in his mercy I be judged
Big enough to keep!”

Tex Mobley, Missoula Montana

APPENDIX

Observations

Author Unknown

From: Alvord, Bill. 1991. A History of Montana's Fisheries Division from 1890 to 1958, p. 85.

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.

A Review of Fish Planting

By Arthur Whitney

From: Alvord, Bill, 1991. A History of Montana's Fisheries Division from 1890 to 1958

For 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 that 50 years of effort were: some very good, such as rainbow and brown trout; quite a few ineffective, such as planting Pacific salmon everywhere; and some disastrous, such as the carp everywhere and brook trout in our headwaters streams that contained only cutthroat and bull trout. 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 were 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, we added a requirement 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.

In summary, for about 30 years, we have had a fish planting program which is based on scientific data and is governed by Commission policy. The system continues to work well.

Official Test of Planting Fish by Airplane in 1938

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. 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 virgin 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 B. L. 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 was quickly 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. The finding of no dead fish prompted us to try the dumping of 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 go to the lake where we would be dropping the fish from altitudes of 50-400 feet. There they would have a positive position for checking the fish as they fell from the air and see them strike the water to either be killed or swim away.

When all was set, we loaded a can of fish in the plane and with Dick Logan in the rear seat filling a gallon pail with fish from the can, they were dumped directly over our lake judges. When these fish were dumped (about 300 at a time), I 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 dumps, 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 dumped into the air which caused them to flutter down similar to a falling leaf, at which speed they could hit the water without injury. Should the fish become exhausted, they would gain a velocity that would no doubt bring destruction.

Thus, successfully ended the official experiment of the aerial fish planting.

ADDITIONAL INFORMATION ON THE FIRST FISH PLANTS BY AIRPLANE:

Henrickson, Herman H. 1939. Planting fish by airplane. October 11, 1939. 2 p mimeo.

"On October 11, 1939, following the successful test of planting fish by airplane made at Billings in October, 1938, it was decided by the Billings Rod and Gun Club to sponsor planting of some fish in the inaccessible lakes lying in the beautiful and capped range of the Beartooth Mountains."

THIS IS A REPORT OF ACTUAL FISH PLANTING BY PLANE IN THE BEARTOOTH MOUNTAINS IN 1939 THAT WE MAY WANT TO COPY AND ADD TO THE FIRST HENRICKSON REPORT OF 1938 THAT IS ALREADY IN THE ALVORD HISTORY APPENDIX. CHECK FISHERIES LIBRARY FOR LETTER OR IT MAY BE THAT RON SPOON HAS A COPY.

Marcuson, Pat. 1987. Letter to Warren Elwood, Harlowton, Montana on stocking of fish by airplane in the Beartooth Mountains. 2 p.

".... Mr. Henrickson had said this was the first time fish had been planted in this manner at these high altitudes. I assumed from this, not counting a practice air drop into a pond near the Billings airport, to be the first air transport and planting of fish in Montana.

The references I dug out of the past are dated August 6, 1940, August 10, 1940 and October 11, 1939...".

Liter's Note: The 1940 references sound like there were other fish plantings by plane in the Beartooths in 1940 as well as 1939. Ron Spoon may have this information since his former wife's grandfather, Mr. B. L. Price, then Chairman of the Fish and Game Commission, was present at the 1938 test of fish planting by plane in Billings in 1938. Ron says he has some information and photos that apparently were in the family that could be useful to add further documentation to the history.

MORE WRONGS WILL NOT MAKE IT RIGHT

Author unknown

From: *Montana Wildlife*, 1953, Vol. III, No. 3, pp. 4, 5.

Why is it, in the trout areas of our state, as fishing success becomes poorer and poorer, sportsmen look to other areas where fishing is no better than it is at home? They pick some exotic fish whose introduction into their trout waters is considered as the cure-all to their fishing ills.

Haven't there been enough disastrous examples of this in the past to demonstrate that new introductions seldom aid and are more often harmful? The fish populations of the state as a whole are answers to the question, "What harm will it do?"

If the decision could be made again, would the sportsmen at Polson endorse the introduction of sunfish into Lake Mary Ronan? What would be the attitude of the Libby and Kalispell sportsmen to planting perch in the Thompson Lakes and other trout lakes of their areas? Certainly the Missoula sportsmen would not endorse transplanting bass, sunfish and perch into the lakes of the Clearwater chain. Nor would Helena and Great Falls fishermen consider perch and carp as wise introductions to be made in the Missouri River and its main stem impoundments.

No one will deny that the eastern brook trout is a fine fish in suitable waters. But, just what would be the reaction of the Red Lodge sportsmen to introducing it into their high mountain lakes or to the anglers of the Flathead and Kootenai drainages to spreading it so widely through their fine cutthroat and rainbow trout streams?

True, the walleye and northern pike are different species. What harm could they do? They are voracious feeders and would rid our waters of all rough fish – carp, suckers, squawfish, sunfish and perch – and would leave us with a game fish paradise.

Unfortunately, such a simple utopia would not be realized. It is noteworthy that in spite of the northern and walleye populations, Minnesota found it profitable in 1952 to remove some six million pounds of rough fish from its waters.

These fish are not cure-alls. What might they do to our trout populations? The relationship of walleyes and northerns to the trout is not understood clearly. The sad experience of other introductions in the past should erect a barrier of caution to block further introduction of these fish into trout areas.

Most sportsmen agree that the northern and walleye should not be placed in trout drainages, but they may feel that no harm could come from introducing them into pot hole lakes with no outlets. If every person interested in fish and fishing were law-abiding introductions might be desirable.

Many well-meaning people in the not too distant past transferred fish from one water to another without authorization. The Thompson Lakes between Kalispell and Libby met their fate in that manner a very short time ago when perch were liberated in the lakes.

It is not wise at this time to make these fish easily available to such self-proclaimed fishery managers who might act unwisely with their own selfish interests in mind. While it is true that we should act for our own benefit in Montana, nevertheless, we should realize a moral obligation to those downstream. This is true particularly in the Columbia River drainage. A mistake in Montana would jeopardize not only Montana's fishery west of the divide, but could affect the fisheries of Idaho, Washington and Oregon as well. Pressure is exerted upon the Fisheries division to introduce fish other than northern and walleyed pike into trout waters. Some believe muskellunge, white bass, crappie and smallmouth bass would be desirable;

and in spite of past experiences, the largemouth bass, sunfish and perch are mentioned Certainly no more need be said to justify denying these requests.

But now what of the trout? The sportsmen of the Flathead country are among the most dissatisfied in the state. Most of their lakes have become contaminated with undesirable fish. Many of their once fine cutthroat trout streams have been contaminated with large populations of stunted eastern brook trout. People have learned through experience to ignore these waters and go to the few remaining streams where native fish thrive. The result is heavier fishing pressure with a decrease in individual fishing success.

A dominant cry seems to be that the native cutthroat trout is not suited to the water, and were rainbow and brown trout introduced in their place, fishing would improve. This is not valid reasoning. The decline in fishing success has a cause which will not normally be corrected by the introduction of a new species of trout. New introductions will not help the situation. The cause of the decline in cutthroat fishing should be uncovered and sound corrective measures taken.

The Fish and Game Commission in order to deter further complication of the state's fisheries has adopted the following as policy:

1. The hatchery planting programs for both the state and federal hatcheries in Montana shall be designed from the best information available and shall be approved by the Superintendent of Fisheries as the agent of the Fish and Game Commission before becoming effective.

2. All changes in the planting programs as adopted and all plantings of waters not included in the programs shall be approved by the Superintendent of Fisheries before planting.

3. No plantings of fish other than cutthroat and Dolly Varden trout shall be made in the Flathead river drainage above Kerr Dam without approval of the Superintendent of Fisheries, the agent of the Fish and Game Commission and the Fish and Game commission, except for certain plantings of rainbow trout in lakes without outlets which may be approved by the superintendent of Fisheries.

4. No plantings of fish shall be made in the South Fork of the Flathead river drainage above Hungry Horse Dam except for cutthroat trout reared from eggs taken from this drainage.

5. No introductions or new introduction of walleyed pike, northern pike, or spiney-rayed fishes shall be made in the waters of the Missouri River drainage above Black Eagle Dam, the Yellowstone River drainage above Laurel or in any waters west of the Continental Divide without prior approval.

6. No introductions of fishes not now found in Montana shall be made in any waters of the state without approval of the Superintendent of Fisheries as agent of the Fish and Game Commission.

Fish Stocking and Management Policy of the Montana Fish and Game Department

General

1. The Fish Stocking and Management Policy hereby established shall constitute the official directions regarding the management and planting of fish in the State of Montana. All personnel acting under the jurisdiction of the Montana Fish and Game Commission shall comply with this policy. The provisions contained herein shall supercede all others and changes may be made only with the approval of the Montana Fish and Game Commission, the Superintendent of Fisheries and Chief Fisheries Management Biologist of the Montana Fish and Game Department.

2. No state or federally raised fish shall he planted in any water of Montana where public access is denied, except as provided for under **Pond Planting and Management or under Planting and Management of Waters Affected by Natural or Artificial Disaster**.

3. The Five-year Fish Distribution and Management Plan shall be revised to conform with the provisions of the Stocking and Management Policy and shall hereafter be known as The General Fish Distribution Plan.

4. The General Fish Distribution Plan shall be changed only with the written approval of the Superintendent of Fisheries and the Chief Fisheries Management Biologist of the Montana Fish and Game Department.

5. No plant of fish shall be made in any water of Montana not specifically designated for planting in the General Fish Distribution Plan without written approval from the Superintendent of Fisheries and the Chief Fisheries Management Biologist of the Montana Fish and Game Department.

6. Experimental plants of any species of fish, of any size, may be made in specific waters for specific purposes where there is no danger of damaging that water or adjacent waters from a fishery standpoint. Such plants of fish must be made by the conservation personnel responsible for the fishery management of the waters wherein the fish are planted and must first be approved by the Superintendent of Fisheries and the Chief Fisheries Management Biologist of the Montana Fish and Game Department.

7. Eastern brook trout shall be reared, as need for stock arises, at one only of the following state or federal fish cultural stations: Big Timber, Lewistown, or Great Falls.

Stream Planting and Management

1. The provisions of this section shall apply to all streams except as provided for under **General or Planting and Management of Waters Affected by Natural or Artificial Disaster .**

2. Only grayling, rainbow or cutthroat trout shall be planted in the streams of Montana.

3. Cutthroat trout and grayling shall be given preference in stream plants where they are likely to become established.

4. Rainbow trout plants shall not be made in predominant cutthroat trout populations and cutthroat trout shall not be planted into predominant rainbow trout populations.

5. No rainbow or cutthroat trout planted in streams shall be less than six inches long (total length).

6. Fish placed in streams shall be planted at locations readily accessible and used by the angling public.

7. Fish planted in streams shall not be placed in any stream location closer than one-quarter stream miles from portions of the stream where public access is denied.

8. The number of fish planted in any stream shall be dependent upon the fishing pressure exerted on that stream; the more heavily fished streams receiving greater numbers of fish.

9. Continued plants of fish in any stream shall be dependent and based upon a reasonable return of the planted fish to the creel.

10. Stream plants of fish shall not be made until after the opening of the general fishing season and not later than August 15th in any calendar year.

11. Stream plants of fish shall be made frequently and repeatedly in streams warranting such plants.

12. Streams warranting plants of fish shall be stocked each year.

Lake Planting and Management

1. Only grayling, cutthroat trout, rainbow trout or golden trout shall be regularly planted in the lakes of Montana. Kokanee, lake trout and silver salmon may be planted in lakes where it is recommended by the conservation personnel responsible for the fishery management of the specific water and with the written approval of the Superintendent of Fisheries and the Chief Fisheries Management Biologist of the Montana Fish and Game Department.

2. Trout, kokanee, silver salmon or grayling planted in Montana lakes shall be advanced fry or fingerling, exceptions to be approved by the Superintendent of Fisheries and the Chief Fisheries Biologist of the Montana Fish and Game Department.

3. Lakes shall be planted only where spawning is nonexistent or inadequate to provide a fishable population.

4. Not less than one-hundred fish shall be planted per surface acre of lakes. The number of surface acres shall be determined during the lowest annual lake level.

5. Continued plants of fish in any lake shall be dependent and based upon a reasonable return of the planted fish to the creel.

6. Fish planted in lakes shall be well distributed in the littoral zone.

7. Planting boats shall be used to release fish when planting accessible lakes.

8. Specific plants in specific waters by airplane shall be allowed when accomplished under the direction of the conservation personnel responsible for the fishery management wherein the fish are to be planted and with the written approval of the Superintendent of Fisheries and the Chief Fisheries Management Biologist of the Montana Fish and Game Department.

Ranch Pond Planting and Management

1. No pond in Montana shall be managed, from a fishery standpoint, by the State Fish and Game Department which contains less than one hundred acre feet of water and which has less than ten feet of depth over two surface acres during the lowest pond level.

2. Suitable ponds shall be planted with fry, fingerling or larger fish of species determined to be best suited by the conservation personnel responsible for the fishery management of the specific water and with the approval of the Superintendent of Fisheries and the Chief Fisheries Management Biologist of the Montana Fish and Game Department.

3. There shall be no minimum size restrictions applying to private trout ponds.

4. Size restrictions applying to warm water ponds shall be as follows: Ponds less than one-half acre in size shall not be planted. Ponds from one-half to three acres shall not be planted unless 50% of the pond area is at least ten feet deep during the lowest annual pond level. Ponds over three acres shall not be planted unless 20% of the pond area is at least ten feet deep during the lowest annual pond level.

5. All applications for fish to be planted in Montana ponds shall be submitted to the Montana Fish and Game Department and approval must be obtained from the Superintendent of Fisheries and the Chief Fisheries Management Biologist before any plants may be made.

6. Applications for securing warm water fish shall be approved only if submitted by pond owners or lessees.

7. The number of fish planted in the suitable ponds of Montana shall be based upon maximum survival and maximum return of the planted fish to the creel.

8. No black, yellow or brown bullheads (*Ameriurus*); yellow perch (*Perca flavescens*); or sunfish (*Lepomis*), with the exception of the common bluegill (*Lepomis macrochirus*) shall be planted in the ponds of Montana.

Planting and Management of Waters Affected by Natural or Artificial Disaster

1. Streams, lakes and ponds from which the fish population has been removed by natural or artificial disaster shall be planted with advanced fry or small fingerling trout or warm water fishes of a species determined to be best suited to the particular water, and not damaging from a fishery standpoint to adjacent waters, by the conservation personnel responsible for the fishery management of that water and with the approval of the Superintendent of Fisheries and the Chief Fisheries Management Biologist of the Montana Fish and Game Department.

2. Fish planted into such waters shall be widely distributed throughout the stream, lake or pond in which the population is to be established and they shall be planted in such a manner so as to obtain maximum survival.

Source: Fish and Game Commission Biennial Report, 1953-1954, pp. 52, 53.

Big Medicine for the Marias

By Nels Thoreson

From: Thoreson, Nels. 1955. Big medicine for the Marias. Montana Wildlife. Vol. 5, No 3. Fall 1955. Pp. 18-20.

On Saturday, October 15, 1955, the last truckload of earth fill was hauled to the top of Tiber Dam in Liberty county.

A brief ceremony marked the completion of the 205 foot crest of the fill. When the diversion tunnel was plugged, the formation of the reservoir began and a 25 mile section of the Marias Rive above the dam began its conversion from a stream to a lake.

Because of the nature of the structure the dam will afford a fishery block in the Marias River and the upper waters will be isolated from the stream below.

With the large population of rough fish already present in the river, the impoundment would probably provide ideal conditions for their reproduction and the reservoir no doubt would be saturated with undesirable fish almost as fast as it formed.

The subsequent spread of carp and goldeye upstream would be a potential threat to trout fishing in the lakes and streams of the upper Marias drainage.

In addition to this problem, the best fishery management of the 22,000 acre impoundment also had to be considered.

Fishery management of large impoundments is difficult where harvest is negligible. Initial treatment by way of rough fish removal and stocking is probably the most effective fishery management the Tiber impoundment will receive.

Restricted upstream pockets of carp infestation was believed to have been damaging the quality of trout fishing. Removal of carp and goldeye in the Marias River drainage was obviously necessary to some degree.

Since various species of suckers are to be found far up into the headwater streams and lakes, and are not considered to affect trout as adversely as other trash fish it was not an objective of the project to remove all suckers from the area.

The upper limits of carp and goldeye infestations in the drainage established the upper boundaries of the rehabilitation area. The broad scope of the rehabilitation work and the restricted time in which to do it was brought about by the anticipated 1955 closure of the Tiber Dam.

With known toxicants and existing costs, rehabilitation of the reservoir when filled would not be economically feasible.

The Montana Fish and Game Department recognized the urgency of rehabilitation work before the closure of the dam and the project was initiated last spring.

Through stream survey work and especially population census conducted with electric shockers it has been found that many Montana streams have large numbers of undesirable fish and small numbers of trout.

The need for reduction or complete removal of rough unwanted fish prompted experimental stream rehabilitation work on a limited scale. Results of such work provided a basis for estimating amounts of toxicants necessary on the streams in the Marias drainage.

Because only fragmentary information was available, much had to be learned concerning the different methods of toxicant applications during the Marias Rehabilitation Project.

The streams to be treated in the drainage varied from small, cold, clear, rapidly moving and relatively sterile waters to large, warm, turbid, slow, fertile waters.

Different techniques were used but in general the small streams were completely covered with toxicant by drawing a sack through the water, by with a back pump or by aerial application or a combination of these methods.

Large streams and rivers were slugged at effective intervals, small isolated pockets of water out of the main current were sprayed or sacked by hand and larger sloughs and backwaters were aerially dusted sprayed and sacked by hand from a boat.

Isolated pockets of water hidden by brush and trees were often difficult to locate and frequently were found to contain carp.

The Marias drainage within the rehabilitation area covered the greater portion of Toole, Liberty and Pondera counties. As many as 27 men were working at one time in applying approximately 60,000 pounds of toxicant. The main period of application lasted approximately two months.

Trout, whitefish and suckers predominated in the fish killed within the first several miles after initial points of toxicant application. But beyond this only an occasional game fish was seen and many tons of carp, suckers and other rough fish turned up in the riffle areas and along the shores.

In the lower portion of the Marias near the impoundment area, sturgeon, carp, buffalo, carp suckers and red horse suckers predominated with an occasional catfish or sauger.

Shortly after the toxicant had been cleared out of the tributary streams, replanting was started. Small fingerling rainbow trout were well distributed along the tributary streams of the Marias drainage. In some of the more accessible locations, larger rainbow trout were planted.

When the impoundment has formed large numbers of small trout will be distributed throughout in order to initiate as complete a trout fishery as possible within the reservoir.

Fishing Regulations – 1956 Philosophy

By Charles Phenicie

From: *Montana Wildlife*, Spring, 1956 (Vol. VI, No. 1, p. 5)

"Did you ever take a look at the fishing regulations for Montana and shudder? We in the Department do many times a year when we write them and each time we explain why this or that regulation is made. In some respects, fishing regulations have characteristics of a communicable disease which spreads and spreads until it assumes epidemic proportions if allowed to proceed unrestrained. Montana's fishing regulations have grown in just such a manner, until, in 1955, they filled a 63-page booklet.

"Much of the detail in the fishing regulations is there because some group or groups of sportsmen have requested that a regulation be made or that an exception be provided for some general regulation. It is only fair to note here that we in the Department are equally guilty about inserting pet theories into the regulations or in making special regulations for waters of particular interest to us. But regardless of responsibility, the regulations have grown into a formidable document.

"All will agree that fishing in Montana is a sport, a recreational outlet, and because of this we should make every effort to have fishing as enjoyable and relaxing as possible. One aspect of this of course is providing fish to catch. Don't we, however, in our anxiety to do the right thing by the fish populations, lose sight of the fact that by over-regulating our fisheries and by making the regulations unnecessarily complicated, we are only detracting from recreational enjoyment of fishing?

"Most fishermen find little enjoyment in pondering over verbiage prior to a fishing trip. As a consequence, many go into the field without knowing whether or not they are violating a regulation. They are consoled mainly by the fact that, since they have never yet been checked by a game warden, probably they will not be today.

"The Fish and Game Commission is making a concerted effort to simplify the regulations. This year they took a major step in this direction. In the past, regulations have been made by counties. The regulations for the coming year are based on drainage areas instead, eight of them. Thus, in place of 56 management areas, the regulations will have but eight.

"The fishing regulations for 1956-57 have not been altered greatly in content. The main change has been to rewrite the previous year's regulations in the new drainage form, resulting in simplification. And the change will result in a monetary saving. It cost approximately $15,000 to print the 1955-56 regulations and the estimated cost for printing this year's regulations is $5,000, a savings of $10,000.

"Have you every considered why we have regulations? Considering the regulations and laws we have, it appears that they were adopted for five main reasons: 1) to prevent over-fishing a population of fish and to provide the most equitable distribution of available fishes among the fishermen; 2) to cause fishermen to use sporting means of taking fish and to prevent these fishermen from being a nuisance to other anglers; 3) to protect a fishery from being ruined by introduction of undesirable fish; 4) for purpose of public health and safety; and 5) for purposes of psychological response.

"Most often when a regulation is proposed, we envision that it will make fishing better or prolong good fishing. No 1 above: to prevent over-fishing a population of fish and to provide the most equitable distribution of available fish among the fishermen.

"Almost without exception, such regulations are, whether recommended by Department personnel or by sportsmen, made purely on a hunch or on an opinion that they will do some good. Exceptions to this statement are seasonal closures of some streams tributary to a lake which are used for spawning. Look

through the regulations and see how many of the entries are made for reason No. 1. We would be hard-pressed to justify most of these.

“The object is to simplify the regulations as much as possible and to keep them as simple as possible. but on the other hand, we want to take adequate steps to insure that fishing will remain good. Too often, however, when fishing success either declines or appears to decline, we blame over-fishing and propose either a new regulation or a plant of hatchery fish. Most often than not there is another cause, the true cause. This goes undisclosed and uncorrected and fishing either gets poorer or stays poor.

“What we are proposing is this, that we all start looking at the fishing regulations intelligently for what they can accomplish and not as one of the two great cure-alls to fishing ills. Since the monies we have available for research and investigations to determine what really is needed are very limited, it will still be necessary to use the regulations somewhat to test an informed guess. But, if each of us will be alert to the needs which regulations can fill, we will have simpler and more adequate regulations.

“In addition to this, and even more important, if each of us will be alert to the natural requirements of fish, the true cause of fishing ills can be determined; and well-guided efforts will see our streams and lakes remaining in such a state of naturalness that excellent and sustained fisheries will be guaranteed.”

FISHERIES ISSUE PAPERS

The Stream Protection Act of 1963

Compiled by Liter Spence

By 1962, the accumulative effects of dam building, stream straightening, pollution of all kinds (including silt), removing excessive amounts of water from streams for irrigation, stream bank trampling by livestock, and other abuses were reducing trout stream habitat at an alarming rate. Compared to these factors, fishing pressure was a minor cause of the decline of fishing in Montana.

The introduction to the Fisheries section of the 1960-62 biennial report remarked on the importance of trout stream fishing in Montana, that trout stream fishing was primarily supported by wild fish and that stream habitat must be maintained to continue producing trout of a size desired by anglers. It proposed legislation for the upcoming Legislature to protect trout stream habitat to ensure the perpetuation of the state's trout streams and fisheries.

The major public relations effort of the 1959-1962 period was to let the sportsmen know the seriousness of the fish habitat destruction problem in Montana. The Department began seeking a means to preserve stream habitat through an overall conservation program. Lloyd Casagranda and Perry Nelson, Department biologists, began working on a plan that would become the first and most aggressive and successful stream preservation program in the nation. They saw stream preservation as having three basic ingredients:

1. A physical stream channel that included natural meanders, stream side vegetation, clean bottom substrates and other in-channel features such as woody vegetation and undercut banks that, when covered by water, provide the living places for fish and the food they eat;

2. A quality of water flowing in these channels which must not be detrimental to fish and fish food production; and

3. A quantity of water, or instream flow, which must be sufficient to fill the physical spaces in the channel that provide the living spaces for fish and fish food.

At the beginning of the 1960's, not one of these three necessities was achievable under Montana law. Out of necessity, Casagranda and Nelson's first priority was protection of the physical stream channel. Working for clean water and instream flows was meaningless without a protected stream channel. If channels were kept intact, water could be cleaned up or instream water rights secured. But, once the channels were destroyed, restoring a river became a remote possibility. And, out of the three goals, this one seemed achievable at the time.

The interstate highway system was just getting underway in Montana, which emphasized the need to act quickly. In mountain country, interstate highways follow rivers, and engineers consider rivers easier to push around than work around.

In 1960, there was major conflict with the road builders concerning the harmful effects of road construction on trout streams. After a history of attempting to get adequate consideration for preserving the stream environment, it became painfully clear that they would listen, but could not implement major proposals for minimizing damage. The Department had no recourse but to ask the Legislature to give us the legal framework to protect our stream resources from the bulldozers. Faced with that task, it was obvious that facts were needed before we could adequately support our case.

So, in 1961, a pilot study was initiated on the Little Bighorn River by Perry Nelson and Don Bianchi, Department biologists, to develop methods for measuring channel alterations and their impact on fish populations. Then, in 1962, using the techniques developed in the 1961 pilot study, each of seven fisheries districts measured at least one stream Twelve streams or rivers were subsequently measured. Thus,

inventories on 13 streams and rivers located throughout the state were completed. The results showed that far more of the trout stream environment had been tampered with than had been suspected.

About the same time, Gene Welch, Pollution Control Biologist for the Department, conducted a short survey of stream habitat loss during the summer of 1961. His 1961 report summarized the results of a survey complied by enforcement personnel of the Fish and Game Department. The purpose of the survey was to initiate a statewide habitat loss evaluation. It was realized that it was impossible to completely assess the habitat loss over the entire state in one summer. But, at least this was a start - considerably more information than Fisheries had in one place prior to the survey. The response from the wardens was good, but some variation in the results was experienced. The bulk of the report was a tabular summary of stream habitat destruction examples categorized by drainage basin and type of habitat destruction (pollution, dewatering, sedimentation and channel alterations).

In 1962, the Department published a little booklet called *Montana Trout Streams – Will We Have Tomorrow What We Have Today?* The booklet summarized the studies on the 13 streams, showing how altering natural stream channels greatly reduced a streams's ability to produce fish. The booklet also reported that Montana had no laws to control stream alterations and encouraged its citizens to support legislation to protect trout streams.

Measurements made on the 13 streams showed the following:

1. One-third of the total length of these 13 streams (250 of 768 miles) was altered from the original state.

2. About three alterations occurred per stream mile, with an average altered length of 664 feet.

3. Alterations produced about a 10 percent decrease in the natural stream channel length.

4. Over 5½ times as many catchable-size trout and nearly 10 times as many whitefish were found in unaltered channels as in the altered channels.

Following publication of the booklet, Casagranda and Nelson began pushing for a Stream Preservation Act to protect stream channels. After failing to receive support from the local rod and gun club, they went to the Billings Jaycees, where they received a warm reception.

The Jaycees were immediately captured by the cause and the challenge of a statewide legislative project. The Billings' Jaycees president, Harrison Fagg, was among the most supportive. Later, Fagg would serve several terms in the Montana Legislature and become a Republican leader in the House of Representatives.

Casagranda and Nelson both joined the JC's and, using the results of the stream inventories, began doing programs on stream protection.

The Billings Jaycees succeeded in getting their state organization to adopt the project as a common goal. Soon, the youthful service organization had the entire state aware of the problem and its solution: a Stream Preservation Act.

The Montana Wildlife Federation also pitched in, with the Western Association of that federation providing noteworthy leadership. Together, these groups, supported by the data, convinced a rather reluctant Legislature that Montana needed a Stream Preservation Law.

Harry Mitchell, a Great Falls Jaycee, became one of the primary lobbyists for the Montana Stream Preservation Act, and in 1963, Governor Tim Babcock signed into law the first such act in the nation. Mitchell was later elected to the Montana Senate and the JC's received a National Conservation Award for their part in obtaining passage of Montana's first Stream Preservation Act.)

The nation's first Stream Preservation Act (SPA) was passed as SB45 and became effective on July 1, 1963. The act narrowly passed, with the house voting 53-33 and the Senate 32-21. The bill was killed twice in committee, only to be pulled out and passed after some interesting political maneuvering.

The Stream Protection Act (SPA) stated that an agency of state government, county, municipality or other subdivision of the state of Montana could not construct a project that affected the natural shape of a stream or its banks without first notifying the Fish and Game Department. The act did, however, exclude State Water Conservation Board irrigation projects, either current or proposed, projects by private landowners or to any other irrigation project in the state.

However, the law was only good for a two-year trial period which expired June 30, 1965. Thus, the Department had to repeat its previous efforts. So, during the two years following passage of the first law in 1963, the Department continued to educate the public about stream protection. "Show Me" trips were held at which biologists electrofished natural and altered stream channels to show why these alterations were detrimental to fish. It also published a revised version of the 1962 booklet. Prepared in 1963 by John Peters and William Alvord and titled *Channel Changes in Thirteen Montana Streams*, this new edition was similar to the earlier publication but was of higher quality and contained more photos of altered stream channels. Also, three more streams with channel alterations had been inventoried to further substantiate the effects on fisheries.

Armed, then, with facts from channel inventories on 16 streams and a record of not having stopped the entire road building program in Montana during the previous two years, the Department again enlisted the support of several groups during the 1965 Legislature. These efforts were successful because a permanent law was passed in 1965, this time with only one dissenting vote (from a possible 146) cast by a road contractor. The passage of this bill gave stream preservation overwhelming approval. The new law differed from the old by changing the method for selecting a board of arbitration. More importantly, biennial legislative renewal was no longer required.

However, the law continued to exclude projects by private landowners, district irrigation projects or irrigation systems.

John Peters was the first SPA Program Supervisor for the Department. He was followed by Al Wipperman for a brief period, then Ralph Boland, who retired from the Department in that position in February, 1988. Ken Chrest took over the program from Boland and supervised the program as a Department employee until his retirement in December, 1993. He then continued the work as a contractor for the Department and was still doing that work as of January, 2000.

Pipes and Meanders

By Art Whitney

Very early in the application of the new Stream Protection Act, we received a challenge from an unexpected direction. Bearmouth East and West were highway construction projects for Interstate 90 along the Clark Fork River west of Drummond. The plans called for substantially shortening the river in the project area by a large number of very small channel changes. Trying to replace each small channel loss individually was considered infeasible from a hydraulic engineering standpoint. Therefore, we recommended the lost length be replaced by constructing two new river meanders in the location where two straight riffle sections presently existed.

The first meander, on Hazel Marsh's land, proceeded without controversy. But, the owner of the land on which the second meander was to be built, Morris Weaver, objected. He had a valid complaint. The old, straight section, which would become part of his pasture, was bare rock - just a stretch of gravel and rubble stream bottom. The land wanted for the new meander was nicely sodded pasture. Mr. Weaver asked the Highway Department to fill the old channel with black dirt. It refused. He then brought suit against it, questioning its authority to condemn land for stream channels.

On February 6, 1968, we headed for the Granite County Courthouse in Philipsburg, quite confident of the logic of our position and of our ability to convince Judge Stewart of it. To our great surprise, we not only found this was to be difficult, we almost missed a chance to even participate in the argument.

We were astounded to hear Mr. Weaver's attorney open by asking the Judge to exclude the Fish and Game Department from the hearing because his client's case was solely against the Highway Department. Judge Stewart replied, "I'm inclined to agree with you Mr. Boone" (Weaver's attorney). He then said to Mr. Smith (our attorney), "I don't think your client has any place in this hearing".

For the next hour and a half, Judge Stewart and the two attorneys went into the many fine points of the law and agency responsibilities while the rest of us enjoyed the sights of Philipsburg.

Finally, we were called back. Our attorney had won the first round and we were allowed to participate in the trial. I was put on the witness stand. The questions to me revolved around why it was necessary for us to put all of our new channel on Mr. Weaver's land. (We weren't, but our reasons for placing even half of it there seemed incomprehensible to the court). At one point, I was asked, "If you lost five or ten miles of stream all over Montana, would you want to build it all back on Mr. Weaver's land?" My response, which went into the technical aspects of fish habitat requirements, stream gradients and the folly of trying to replace channel losses on the Missouri River, for example, by lengthening the Clark Fork River was not fully satisfactory. The questions eventually got back to the Clark Fork, its channel and fish habitat.

Near the end of my time on the witness stand, Judge Stewart asked me, "When you have so much water coming in one end of a stream section and the same amount coming out the other end, why do you care how long the channel is? Your fish have only that same flow of water to live in, don't they?"

While desperately trying to think of an analogy, I noticed a water pipe running across the courtroom ceiling from one side to another. I said, pointing upwards, "Your honor, there is a half-inch pipe full of water up there. That means there's a half-inch of water going in and a half-inch going out. If we got some elbows and more pipe and ran the pipe back and forth two more times, we would have three times as much water up there on the ceiling as we have now but there would still be just a half-inch coming in and a half-inch going out."

By this time, everyone in the courtroom was looking at the ceiling. I watched the Judge, wondering what his response would be. Finally, with great relief on my part, he said, "Mr. Whitney, I see what you mean."

Judge Stewart made no decision that day nor, as it turned out, did he ever have to make one. While he was still deliberating, the Highway Department agreed to fill in the old channel with black dirt and Mr. Weaver dropped his case. So, the question of the Highway Department's authority to condemn land for building stream channels was never settled in court. But, today, almost 30 years later, the two meanders are still in place, providing fish habitat just as they were designed to do.

The Weaver meander is difficult to see from Interstate 90 but the Marsh meander is easy to spot. Just look to the north and a little east from highway mile marker 146 on I-90 a short ways west of Drummond and you will notice a large loop in the river, nicely protected with large rip-rap. It and similar ones on other Montana streams are providing fish habitat today because a section of old plumbing in the Granite County Courthouse provided the basis for an analogy which convinced a judge that stream channel length really is related to fish habitat.

Art Whitney retired from Fish Wildlife and Parks in 1986 after 34 years of service, including 23 years as Chief of the Fisheries Division.

Rock Creek 10-year Creel Census Study

By Liter Spence

In 1971, a final report was completed for the 10-year Rock Creek creel census study begun in 1958. During the summer of 1958 and winter of 1959, a pilot creel census study was conducted on a 40-mile section of Rock Creek east of Missoula. The study was designed ...."to obtain the necessary harvest and pressure information for an evaluation of the catchable-sized trout-stocking program, certainly for Rock Creek itself and likely with considerable application to other western Montana waters as well."

The Rock Creek Creel Census study was established in an attempt to answer some of the questions surrounding the stocking of catchable-sized hatchery fish in streams which have a resident wild trout population. The stocking of "catchables" had been used as a major fish management tool in Montana. Public sentiment had encouraged this management practice to the point where most of the larger, assessable streams and rivers received plants of hatchery fish. The economic feasibility of stocking large numbers of these fish had been questioned by fish managers, though it was generally agreed that stocking catchables would increase fishing success. However, the return of hatchery trout to the angler and their harvest in relation to the wild trout harvest had never been evaluated with respect to the numbers of fish planted. Such an evaluation was considered essential to good management, particularly since up, until then, the stocking rates of catchables in Montana streams had been based principally on public pressure, past stocking rates and availability of the hatchery product.

Following the completion of the1959-1960 pilot study, it was decided the methods used were applicable to a more intensive study, which was then established for an initial three-year period. A project biologist was assigned to carry out the study. Continuing recommendations were made to continue the study, which eventually lasted 10 years.

Approximately 40 miles of Rock Creek are served by a single access road, limiting access to either the headwaters or the mouth of the stream. This 40-mile section was chosen for the study. The study area was divided into a 26-mile lower section and a 14-mile upper section. The division point was Little Hogback Creek, a tributary stream. This division point was chosen because it seemed to be a natural limit of use by anglers entering either the upper or lower end of the stream. The lower section was designated Section 1 and the upper ,Section 2. The division point was marked by a sign to let anglers know they were changing sections.

After the 1958 pilot study, permanent wooden checking stations were constructed at the upper and lower ends of the study area. Portable signs requesting fishermen to stop and be interviewed were placed at each station during periods when they were manned. A boundary sign was installed near each station to designate to fishermen the study section being entered. One of the interview questions asked of anglers was "Where did you fish" and the signs helped anglers answer that question. All angler interviews were held at the checking stations. Summer and winter censuses were conducted during 1958 and 1959. Only summer censuses were conducted thereafter.

Portable, hourly-recording, battery-operated traffic counters were installed at each checking station to make counts of vehicle traffic 24 hours per day. The counter information was used to obtain fishing pressure and harvest information for non-census days. Traffic counts were obtained for each day of the fishing season whether or not a creel census technician was on duty at the checking stations. A statistical analysis was made using traffic counts and creel data obtained on census days to determine the relationships between car counts and fishing pressure and harvest. This information was then made to estimate creel data for non-census days. These regression estimates, plus the creel data gathered on census days, gave total fishing effort and pressure for the season.

Catchable rainbow trout from the Anaconda fish hatchery were planted during the first three years of the study. No fish were planted during the following four years, but were again planted, in increasing numbers, during the last three years. To identify the catchable trout planted each year, a different fin was clipped each year before planting.

Study results showed that the average catch per hour was 26 percent higher for the six years with stocking than it was for the four years without stocking (0.77 with stocking and 0.61 without stocking). The average catch per angler was 40 percent higher during stocked years than during non-stocked years (2.8 compared to 2.0). The number of hours fished per angler was only 12 percent higher during stocked years than during non-stocked years. Stocking catchables did not increase the number of fishing trips made to Rock Creek. Stocking increased overall fisherman success; however, more skillful fishermen benefitted much more than the less skillful. The poorer anglers caught more fish when they were stocked than when they were not stocked. But, the better anglers caught more hatchery fish overall. It was concluded that stocking of catchables helped the poorer angler only slightly while most of the hatchery fish were caught by the better anglers who did not need the help.

During the four stocked years, an average of 81 percent of anglers caught no hatchery fish. Only two percent caught a limit of 10 hatchery fish and this was during 1967 when the largest number of hatchery fish were stocked during the study. The most frequent catch was one hatchery fish but this was accomplished by only eight percent of the anglers. Even during stocked years, the least successful 50 percent of anglers caught only four percent of the fish. On the average, during non-stocked years, 47 percent of the anglers caught no fish of any kind while 41 percent caught no fish during stocked years. Only 35 percent of the 139,000 catchable fish stocked during six years of the study were caught by fishermen. It was found that during stocked years, there was little carryover of stocked fish from year to year, as indicated by the anglers's catch of marked fish.

The census design did not allow the determination of optimum stocking rates, if any, for Rock Creek and none were recommended. However, in a few succeeding years after the study ended, small numbers of catchables were still planted.

Seven fisheries biologists worked on the 10-year creel census study:

1958 - Robert Averett and Art Whitney
1959 - Tommy Smith
1960-61 - Ralph Boland
1962-63 - Robert Domrose
1964 - Keith Seaburg
1965-67 - Liter Spence

The 1973 Montana Water Use Act

Compiled by Liter Spence

In 1973, the Montana Legislature passed the Water Use Act. This was an historic event in that, for the first time, instream flows for fish, wildlife and recreation were considered to be beneficial uses of water. In addition, a reservation process was put into place to allow for allocating and protecting water for future uses including agriculture, municipal and instream uses such as fisheries and recreation.

The impetus for the Water Use Act was the energy crisis of the early 1970's, caused by the Arab oil embargo and the resultant emphasis in the U.S. for energy self-sufficiency. This anticipated energy crisis focused a great deal of attention on the rich coal deposits of southeastern Montana. The Yellowstone River also figured into this plan. With new opportunity under the 1973 Water Use Act, it became apparent that substantial inventory work in the Yellowstone River basin would be required. To accomplish this work, money was obtained from numerous sources to study various aspects of the river's ecology.

Susan Higgins, writing in the January, 1992 issue of the *Montana Farmer-Stockman*, related some of the early history of the Water Use Act:

> "Gary Wicks was head of the Montana Department of Natural Resources in 1972 when the big push came from energy companies to use water in the Yellowstone Basin to produce energy from coal development. Energy companies had filed for large quantities of water from the Yellowstone River and its tributaries. This kind of large-scale water development could have put a real constraint on other future water uses. So, Wicks appointed a five-member Water Law Advisory Council to review the status of water law and make a final report to the Legislature. Ted Doney, then chief legal counsel and later director of the DNRC, helped draft a bill, and the Council adopted its recommendation that a water use permit system become law**,** similar to laws already adopted in other western states.
>
> "This recommendation was all well and good, but it left to question the effects of the large water use filings by the energy companies in the Yellowstone Basin. So, Wicks asked Doney to draft a bill allowing individuals to acquire permits for instream flows. This was an unconventional concept and the Council turned it down.
>
> "Doney went back to the drawing board and discovered a bill that had been introduced in the Legislature in the late 1950s by state representative George Darrow from Billings. This bill contained a provision for instream flow "water reservations" by public entities but did not pass the Legislature.
>
> "Doney injected this idea into a revised bill which allowed public entities to get a water reservation for future consumptive uses. The Council liked the concept because it gave only public entities - agencies, conservation districts, municipalities - and not individuals, the right to instream and consumptive use reservations."

The 1973 Legislature also agreed with the idea and the water reservation concept became part of the 1973 Montana Water Use Act.

Instream Flow Water Reservations in the Yellowstone River Basin

Compiled by Liter Spence

Most of this history is attributed to Posewitz, Jim. 1985. *Preserving Paradise*. In: Montana's Yellowstone River. No. 10 of the Montana Geographic Series by Bill Schneider. Published by *Montana Magazine*. p. 82. Other Department records were also used.

While the 1973 Legislature hammered out the specifics of the Montana Water Use Act, energy related events were about to occur in the Mideast which would profoundly influence the fate of the country itself. The Arab oil embargo emphasized our dependence on foreign crude oil, while at the same time, highlighted our reliance on all forms of energy. Energy self-sufficiency became a national goal and attention focused on domestic sources of fuel.

Suggested as a part of the solution to the energy problem was the utilization of the vast coal reserves of the western United States. The Fort Union coal formation underlies much of eastern Montana as well as portions of Wyoming and North Dakota. The conversion of coal to more usable forms of energy requires significant quantities of water. Flowing through the Fort Union Coal Formation was the 650-mile-long, free-flowing, Yellowstone River, expected to supply much of the water for the developing energy industry.

The early 1970's were a time of apprehension and concern in the lower Yellowstone basin. Energy-related reports such as the North Central Power Study (1971) and the Montana-Wyoming Aqueduct Study (1972) took a national "boiler room" approach to energy development in southeastern Montana.
A number of energy companies had filed applications for water use permits from water sources in the lower Yellowstone basin in anticipation of coal development.

Public sentiment ran heavily against the uncontrolled development of eastern Montana's coal resources and accompanying water depletions in the semi-arid plains.

The Legislature passed the Yellowstone Moratorium in 1974. This law suspended all large applications for water use in the Yellowstone basin until March 10, 1977. Legislative amendments and a Montana Supreme Court decision extended the moratorium until December 31, 1978.

Because of passage of the Yellowstone Moratorium, the Department decided to put together an instream flow reservation application on the Yellowstone River. Industry had threatened a challenge to the moratorium and the Department decided to put in a reservation request in case the courts overturned the moratorium. It was put together in a few months using available information rather than detailed facts, which the Department did not have.

The application was dated March, 1974 and requested flows in the Yellowstone mainstem from the Clark's Fork of the Yellowstone near Billings to the North Dakota border. The "Murphy Right" instream flow water right above Big Timber was relied upon for that part of the river and there was no protection requested for the reach from Big Timber to the Clark's Fork. Seven Million acre-feet of water were requested. The application was 10 pages long.

Industry did not proceed with its threat to overturn the moratorium so the Department never pursued this application. Instead, it got to work on the river trying to find out how it all worked.

Then, the Department of Natural Resources established a deadline of November 1, 1976 for filing all applications for reservations of water in the Yellowstone basin. So, the Department had about three years to conduct studies sufficient to justify a new water application for the fish, wildlife and recreational resources of the Yellowstone basin.

The Yellowstone drainage covers about one-third of the state, with a length of over 650 miles and containing seven major tributary systems. The Department was faced with an unprecedented opportunity and an enormous challenge. Baseline data was either inadequate or, in some cases, completely lacking and instream flow methodologies were in their infancy. Even sampling techniques for large rivers had to be developed or modified. During a five-year period in the 1970's, sampling techniques and instream flow methods were developed and baseline data were gathered.

By 1975, a number of fisheries and aquatic studies were being conducted in the lower Yellowstone basin that were funded by various agencies and companies that had a stake in energy development in the basin. These were (funding source in parentheses):

> Yellowstone River Migratory Bird Study (Old West Regional Commission); Lower Yellowstone River Furbearer Study (Old West Regional Commission); Yellowstone River Periphyton and Phytoplankton Study (free - Dr. Loren Bahls, botanist with the Montana Environmental Quality Council agreed to analyze 240 algae samples from the river); Lower Yellowstone Aquatic Invertebrate and Forage Fish Study (Intake Water Company); Lower Yellowstone Fisheries Study, Miles City to Sidney (U.S. Bureau of Reclamation, Colorado Interstate Gas, Panhandle Eastern); Tongue River Fisheries Study and Lower Yellowstone Aquatic Invertebrate and Forage Fish Study (Old West Regional Commission); and, Investigation of Water-based Recreation in the Yellowstone River (Old West Regional Commission).

The main purpose of all these studies was to assess the impact of reduced streamflows on the ecosystem being studied with the ultimate aim of determining instream flow regimes that would be recommended to the Montana Board of Natural Resources in a Yellowstone basin water reservation application

The numerous studies in the Yellowstone basin resulted in a Department application to the Board of Natural Resources and Conservation that requested 8.2 million acre-feet of water for instream flows on the Yellowstone mainstem at Sidney plus individual flows on 65 tributaries throughout the basin. The average annual flow at the U.S. Geological Survey stream gage at Sidney at that time was 8.8 million acre-feet. This fact alone was to be cause for great consternation among other water user interests in the basin and, in fact, was cause for some concern by some Department personnel. Some doubted that the Department should ask for the full amount because of the political process it would have to go through for approval. But, the internal debate was actually quite short. How could the biologists defend an application based on political pragmatism rather than biological facts?

On November 1, 1976, Liter Spence, Water Resources Supervisor for the Department, hand carried *Application for Reservation of Water in the Yellowstone River Basin* to the Department of Natural Resources and Conservation. It was 300 pages long.

The Department's request was substantial and the public needed to know why, because the politically - appointed Board of Natural Resources and Conservation would be making the decision and would not be oblivious to public opinion. The Environment and Information Division proceeded with a major public information effort. The Department had a well-distributed magazine, *Montana Outdoors,* a film production unit and seven regional information officers around the state. Everyone was mobilized. A documentary film, *Yellowstone Concerto*, was produced in 1976 and a special issue of *Montana Outdoors* devoted entirely to the Yellowstone was produced the same year. The film provided an emotional appeal while the magazine provided the factual information. A first-ever news conference was held by the Department in Billings on February 1, 1977 to release and promote the film and magazine. Both media forms were extremely successful in getting out the message of the river to the public.

In 1977, a contested case hearing was held on reservation applications under both the Montana Water Use Act and the Montana Administrative Procedures Act. A seven-week adversary hearing began in Billings at

Eastern Montana College on August 8, 1977. After a month in Billings, the hearing was moved to the Capitol Building in Helena and continued through September 27, 1977.

Testimony at the hearing was presented by 21 Department fish and wildlife biologists, two economists and one geomorphologist. Commission attorney Clayton Herron and Department attorney F. Woodside (Woody) Wright were counsel for the Department at the hearing. The Department's principal opponents were Utah International and Intake Water Company, both of whom were seeking large quantities of water for energy production, and 14 state conservation districts seeking irrigation water from the same stream sources requested by the Department. Also, the state Department of Natural Resources and Conservation consistently attacked the Department's application.

The entire record of the proceedings consisted of the reservation requests of 14 conservation districts, 2 irrigation districts, 8 cities and 5 government agencies, including the Department. In all, 33 volumes of testimony, numerous exhibits and final argument transcripts were prepared by the parties.

After the hearings, the Department continued its fast-paced information campaign promoting the river's assets and the need for a significant reservation of instream flows.

On August 18, 1978, 11 months after the hearing ended, the Board of Natural Resources and Conservation heard the final arguments and retired to deliberate the river's future.

Then, amid all the hard work, a piece of good luck came along to brighten the outlook.

Glenmore Distilleries of Louisville, Kentucky had been associated with the name "Yellowstone" for more than a hundred years. After a visit to Yellowstone Park by a company executive, Glenmore had had a subsidiary called Yellowstone Distillery.

Glenmore had been planning to initiate a new product called Yellowstone Mellow Mash in early 1978. It originally considered sponsoring a tennis tournament to promote its new product. Trout Unlimited put Glenmore in touch with the Department and, after learning about the Yellowstone cause, decided to put their efforts into it, to the tune of $50,000. Their efforts went into letting the nation know of the trouble brewing on the Yellowstone. They bought 30 copies of the Yellowstone Concerto film and promoted it through television, universities and other groups.

During the summer of 1978, the Department laid plans for a press tour of the Yellowstone. It was held in late September. Fifteen writers and photographers, guests of Glenmore, arrived in Billings to cover the two-day publicity event titled "Kentucky Bourbon Helps Save Montana River". They were welcomed by Lt. Governor Ted Schwinden. They took an airplane tour of the basin and floated the upper river in Paradise Valley.

The results of the tour were immediate and long term. Full page stories appeared in several Montana newspapers and popular national magazines. Of particular significance was an article in Life Magazine, 10 pages in full color, and it had the most impact. It hit the stands in Montana on December 1, 1978.

On December 15, 1978, the Board of Natural Resources signed an order establishing water reservations in the Yellowstone basin. All applicants were granted their requests but not necessarily in the amounts of water requested. The Department was granted 5.5 million acre-feet of instream flows at Sidney plus flows on 65 tributaries throughout the basin. The Department reservations were granted priority over agricultural reservations in the basin above the Big Horn River. Agriculture was granted priority over Department reservations below the Big Horn. This was due to the recreational emphasis in the upper basin and agricultural emphasis in the lower basin.

The results of the entire reservation process were a major success for the Department and for the future of the 650-mile free-flowing river. It was the result of years of hard work by many people in the Department.

Directed by the Environment and Information Division, the effort had active support and participation by the Fisheries Division.

Jim Posewitz remembers that, in the final analysis, it was the people who made it happen. These were people with a variety of skills and backgrounds who lived with the river for a while and then did what they had to do, speak up for the river when it really counted. Perhaps the best compliment paid these people came from the Glenmore press tour. Don Roberts, one of the 15 journalists, captured the character and sprit of these people late one night in the hot pool at Chico Hot Springs. In the November/December, 1978 issue of *Fly Fishing the West* he wrote:

> "It was well past midnight when the fisheries people, a river guide from Bozeman, and I decided to test the fabled hot springs. I was the only writer in the group; consequently, the fishery people quickly became unofficial. After numerous associations with bureaucrats, it was a relief to find a state agency which seemed to be dominated by Departmental types who are human. We didn't really swim, but porpoised hopelessly in the 104 degree water, stomachs distended with Montana beef. Posewitz hollered for beer and a mysterious figure emerged from the nearby saloon, tossed a six-pack of Bud into the center of the pool, and disappeared back into the darkness. Fisheries people swooped toward the bobbing cans and an uproar ensured. It was similar to dropping a throat cut horse into an Amazon river teaming with giant piranha. The survivors of the frenzy retired to isolated corners and sucked at the brew with primitive vigor.
>
> "As the night wore on, the fisheries people complained openly of the political pandering in Montana, of the foolish ranchers who were bedding with the corporate wolves, of inter-Departmental bungling, and of the lack of real statesmen like Mansfield and Metcalf. Jim Posewitz listened in silence, then announced to me, 'In Montana, we are allowed to get emotional.'
>
> "I had finally found a place where the agency people did not speak in tongues, did not hide behind jargon, did not hesitate to speak directly to the issue. In Montana, the state wildlife people are real ... you scratch them and they bleed (they will also claw back) ... Fill their river with concrete and they cry."

Instream Flow Water Reservations in the Upper Clark Fork River Basin

Compiled by Liter Spence

Following the completion of the Yellowstone River basin reservation process, the Department began a reservation process in the upper Clark Fork River basin above Milltown Dam near Missoula.

In the early 1980's, the Department conducted fisheries studies in the upper Clark Fork from the headwaters at the confluence of Silver Bow and Warm Springs creeks downstream to Milltown Dam that would be used to prepare an application to reserve waters in the upper Clark Fork and several of its major tributaries. The reservation would establish a minimum flow level in the river and selected tributaries to maintain fisheries and recreational opportunities. The reservation would not include Rock Creek near Missoula or the Big Blackfoot River, which already had instream flow protection under the 1969 "Murphy Rights" legislation.

For about 100 years, the Clark Fork had been polluted by intensive mining activities in the Butte and Anaconda areas. For over 70 of those years, mining effluent was untreated and was deposited in the streambanks and floodplain as far downstream as Milltown Dam. For much of this time, fish life in the upper river was all but eliminated and the river suffered from frequent and severe "red tides"; the result of spills of untreated, acidic metal-laden waters directly into the Clark Fork. These effects were felt as far downstream as Missoula. The upper river did not show measurable signs of life until the latter part of the 1950's, when some attempt was made for waste treatment -- construction of waste treatment ponds and liming of the waste inflow to the ponds.

Beginning in 1972, when the Anaconda Company installed more effective waste treatment facilities at their industrial facilities, reclamation of the river has been progressing through a number of projects, including the federal Superfund designation and the Governor's designation of the Clark Fork Basin Advisory Council to advise the Governor on various aspects of the basin issue. The Clark Fork is, therefore, a reclamation project and the Department's instream flow reservation would be an integral part of the recovery plan for the upper river.

In 1986, the Department had completed its studies and filed an instream flow reservation application with the Board of Natural Resources and Conservation (BNRC) for four reaches of the main river and 17 selected tributaries. The Granite County Conservation District also filed for reservations for agricultural purposes which included two water storage projects in the Flint Creek valley. The Department application subsequently sparked considerable controversy, mostly from agricultural folks. The Department of Natural Resources and Conservation, staff to the BNRC, completed a Draft Environmental Impact Statement and held public hearings on the applications. During the public's involvement, it became apparent that it was going to be quite an adversarial process, with the Department against Granite County CD, others in the agricultural community as well as some cities and towns in the upper basin. Contested case hearings were scheduled to be held before the BNRC.

However, because of the controversy, a new, less confrontational, approach to resolving water issues was initiated. The Northern Lights Institute, a non-profit, conflict resolution group located in Missoula, contacted the principal parties that would be involved in the reservation process and suggested that they come together and see if the issue could be settled without so much confrontation. As a result of that inquiry, an informal committee was assembled which recommended a formal steering committee be appointed. The informal committee negotiated an agreement to present to the 1991 Legislature. The parties to the agreement were representatives of local irrigators (Headwaters RC&D, Granite Conservation District and the Montana Water Resources Association), recreationists and environmentalists (Trout Unlimited and the Clark Fork-Pend Oreille Coalition), Hydroelectric utilities (Montana Power Company and Washington Water Power Company), and state and local government agencies (Departments of Fish, Wildlife and Parks and Health and Environmental Sciences and the City of Missoula).

The 1991 Legislature, in Senate Bill 434, subsequently authorized the creation of The Upper Clark Fork River Basin Steering Committee, a 21- member committee whose duties were to prepare a comprehensive water management plan for the basin and report back to the 1995 Legislature. In October, 1991, the Director of DNRC appointed the committee composed of the parties to the original agreement.

Four years later, the steering committee completed the Upper Clark Fork River Basin Management Plan. The plan was submitted to the 1995 Legislature, which approved the continuation of the committee, closed the basin above Milltown Dam to issuance of certain new water use permits and authorized a pilot instream flow water leasing program. It also indefinitely postponed the reservation applications of the Department and Granite County CD while preserving the priority dates of both applications in the event the suspension is lifted (the Department's priority date is May 1, 1991). The committee continues to pursue other ways to resolve the water issues in the basin that effect fisheries. Although instream reservations have not been obtained, the basin closure helps prevent further dewatering of the river and its tributaries and, thus, protects the status quo of the stream resources in the upper basin as of the date of the closure.

Instream Flow Water Reservations in the Missouri River Basin

Compiled by Liter Spence

Note: Some of this information came from Higgins, Susan. 1992. Water Reservations in Montana. *Montana Farmer-Stockman*. January 1992. Cover Story.

A water reservation proceeding was established in the Missouri River basin by the 1985 Legislature. Water reservations were seen as a means of allocating water for current and future beneficial uses so that Montana would have a solid basis for participating in any future apportionment of water among the 10 Missouri River Basin states. In other words, in any future attempt to divide up Missouri River water, Montana would be able to show it was using, or intended to use, the water allocated by its reservation system. The Legislature recognized the threat of losing Montana's water to downstream states and directed that a basin-wide proceeding be undertaken by DNRC to reserve Missouri River basin water for future uses in Montana.

However, due the overwhelming nature of a basin-wide process, the 1989 the Legislature divided the process into two parts: 1) that part of the basin above Fort Peck Dam and, 2) that portion of the basin below the dam, including the Little Missouri River basin. Applications for the upper basin had to be submitted by July 1, 1989 and in the lower and Little basins by July 1, 1991. Any reservations granted would have a priority date of July 1, 1985, the date of the originally established by the Legislature, except the priority date for the Little Missouri basin is July 1, 1989, because it was not originally included in the 1985 legislation.

The Missouri basin supports a large and diverse fisheries resource. It contains 53 of the 80 fish species known to occur in Montana, ranging from cutthroat trout found in headwater streams to the sturgeon, catfish and paddlefish found in the lower river reaches. The pallid sturgeon occupies a portion of the lower Missouri. Recreational opportunities associated with streamflows are abundant throughout the basin and many resources are nationally acclaimed. Several species of special concern occupy the basin. Thus, it was important for the Department to apply for a large number of instream flow reservations in the Missouri River basin.

The Department's application in the basin above Fort Peck Dam was a major undertaking, consisting of three volumes. Volume 2, prepared by Fred Nelson, contains over 600 pages of fisheries data and instream flow recommendations for waters above Canyon Ferry Dam. Volume 3, prepared by Ken Fraser, is similar in content to Volume 2 for waters between Canyon Ferry Dam and Fort Peck Dam . Although not as extensive, it nevertheless contains significant information. Volume I was comprised mainly of information required to be furnished by statute. The completed application contained instream flow requests for 249 rivers and streams.

There were 40 applicants for reservations, including 18 conservation districts (for 220 projects), 18 municipalities, the Department and Bureau of Land Management for instream flows, Bureau of Reclamation for the Virgelle irrigation project and the Dept. of Health and Environmental Sciences for instream flows for water quality protection.

A draft EIS was distributed in July, 1991, followed by 11 EIS hearings in the basin in August, 1991. The final EIS was released in January, 1992.

The formal hearing began in Helena at the Capitol building on February 3, 1992 and ended February 28, 1992. Thirty-three attorneys represented various applicants and objectors to applications from agricultural, environmental, municipal, industrial, federal and state governments and conservation districts.

Twenty witnesses for the Department presented testimony at the hearing; 16 were Department biologists, one was from the USGS, and two were private consultants in the agricultural and economic fields hired by the Department to testify in their fields of expertise.

Informal public hearings were also held in Lewistown, Great Falls, Bozeman, Dillon and Glasgow. Public sentiment at most of the hearings was strongly against the Department's application.

The hearing examiner submitted a proposal for decision to the Board on May 15, 1992. On June 16 and 17, 1992, the Board heard oral arguments on exceptions to the proposal. The Board issued the Final Order establishing reservations on July 1, 1992. The Department was granted instream flows on all of the 249 streams in the application.

Following the completion of the upper Missouri basin reservation process, the Department was working on the application for instream flows in the lower Missouri basin and in the Little Missouri River basin. This was to be a much smaller process than the upper basin. The Department made requests for a total of 18 streams, 14 in the lower basin below Fort Peck Dam and four in the Little Missouri basin. However, the application still generated much controversy between the Department and agricultural and municipal interests in those basins.

Applications for reservations in the lower basin were submitted by July 1, 1991. The priority date for the reservations is July 1, 1985, except in the Little Missouri basin, where the date is July 1, 1989. The Board received applications from 14 municipalities, 11 conservation districts and the Department.

The hearing was conducted in Glasgow during the two weeks of September 19th and 26th. Fourteen attorneys represented various government agencies, conservation districts, irrigation districts, water districts, and cities and towns. Curtis Larson was the single counsel for the Department. The Department presented the testimony of 11 witnesses: 8 Department biologists, one hydrologist from the USGS, the Leader of the Cooperative Fisheries Unit at MSU, and one geomorphologist under contract to the Department.

Public testimony was received by the hearing officer at hearings in Baker, Glasgow, Havre, Plentywood and Wolf Point. Just as occurred in the upper basin process, public sentiment was against the Department, but, in some ways, not quite as hostile at most of the hearings.

The Board heard summation arguments by counsel for the full parties on October 26, 1994. Following further legal procedures, the Board issued its Final Order establishing water reservations in the lower Missouri River and Little Missouri River basins on December 30, 1994. The Department was granted instream flow reservations on all 18 streams.

With the granting of these reservations, the Department had instream flow reservations, "Murphy Rights" and other rights on 9,012.9 miles of 340 streams throughout the state as well as on two lakes (Bean Lake in the Dearborn River drainage and Antelope Butte Swamp on the Blackleaf Wildlife Management Area along the Rocky Mountain Front near Bynum. In addition, two streams, Young Creek and the Tobacco River in northwest Montana received instream rights claimed through water court adjudication proceedings and upheld by a July 23, 1986 water court case decision. As significant as this appears, instream water rights and reservations are held on only 4.8 percent of the total known miles of streams in the state (189, 460 miles).

Proposed Coal Mine in the Flathead River Basin

Compiled by Liter Spence

Text from:

(1) International Joint Commission. 1988. Impacts of a proposed coal mine in the Flathead River basin. 11 pp.; and,

(2) Mayhood, Dave. 1989. A model of excellence: IJC Flathead decision. In: *Wilderness Alberta*, Vol. 19, No. 2.

A major threat to the waters of the North Fork of the Flathead River and Flathead Lake arose in the late 1970's. Sage Creel Coal Limited, a subsidiary of the Rio Algom Mines of Toronto, began exploring the coal deposits in the Cabin Creek region of the Flathead River valley in southeast British Columbia in 1970.

In Montana, considerable effort had been made to preserve the North Fork Flathead River and adjoining areas. Montana had adopted a comprehensive stream preservation and streamflow allocation process for the Flathead River basin.

The Flathead River Basin Environmental Impact Study (1983) identified the proposed Cabin Creek coal mine as the largest environmental threat currently facing the basin. Serious concern had been expressed at public hearings and in the Montana press that the proposed mine was a serious threat to the future of Flathead Lake.

In February, 1984, the British Columbia government granted Sage Creek Coal Limited approval-in-principal for an open-pit coal mine producing 2.2 tons of thermal coal annually. The proposed mine was to be located six miles upstream from the international boundary on Howell and Cabin creeks, tributaries to the Flathead River.

The United States and Montana governments were concerned about the possible effects of this proposed mine on the Flathead River system, Glacier National Park and Flathead Lake. The centerline of the North Fork of the Flathead River (as it is called in Montana) is the western border of Glacier National Park. The park had been designated as a Biosphere Reserve by the United Nations and had been nominated as a World Heritage Site. The North Fork is a designated river under the U.S. National Wild and Scenic River legislation. The water quality of the river had been given Montana's highest water quality classification (Class A-1) by the state, which had also set a non-degradation standard for these waters. The North Fork and Flathead Lake support important outdoor recreational resources, including valuable sport fisheries for trophy bull trout and westslope cutthroat trout, both designated by Montana as species of special concern.

The United States and Canadian governments, in parallel letters of December, 1984 and February, 1985, respectively, responded to these concerns by requesting the International Joint Commission (IJC, or Commission) to examine the possible impacts of the proposed mine on water quality and quantity, fisheries and water uses of the Flathead River at the international boundary and downstream through Flathead Lake.

The Reference from Governments, pursuant to Article IX of the Boundary Waters Treaty of 1909, also asked the Commission to make recommendations that would assist the governments to ensure that the provisions of Article IV of that treaty, which states that such waters "shall not be polluted on either side to the injury of health or property on the other" are honored.

The Commission set up the Flathead River International Study Board (Board, also known as FRISB)) to undertake this investigation and to report its finding to the Commission. The Board included experts of various disciplines, and consisted of an equal number of members from the U.S. and Canada.

The Board began its work in 1985 and appointed four technical committees, a special subcommittee and a task force "....to describe the existing environmental conditions and water uses in the study area and to assess the potential changes to those conditions that could arise as a consequence of the development, operation and reclamation of the proposed mine." The Commission directed the Board to use existing information, including any that became available during its analysis and to assess the environmental impact of the existing Stage II mine plan with conditions attached by the British Columbia government as part of the approval-in-principal.

It soon became apparent that the Commission's terms of reference contained two major problems that were going to make it difficult for the Board to judge the potential environmental impacts of the mine. First, the Stage II mine plan was a conceptual plan only. Second, the base of existing data was inadequate. A detailed mine plan (Stage III in the B.C. approval process) and additional environmental information were required before predictions of likely environmental impacts could be made with any degree of confidence.

Faced with evaluating an incomplete plan on the basis of inadequate data, the Board attempted to bracket the possible impacts using a best case - worst case approach. The Board's Biological Resources Committee, however, believed the Board's definition of the worst case to be impossibly naive. It insisted on using what it believed to be a more realistic interpretation.

The company had said the mine was not presently an economic proposition and it had no plans to reapply for a permit. But, shareholders refused to endorse a resolution that would end all support for the project, which company directors argued could be brought into production in an environmentally safe manner when economic conditions warranted.

After more than three years of determined work and consensus building, the Board forwarded a number of reports to the commission. The reports formed an important technical basis for the Commissions's assessment of the matter. Considerable effort was made to describe the mine as it might be expected to exist and to assess its potential impacts under two scenarios: an "optimal" or most desirable situation and an "adverse" scenario in which occasional failures would be expected.

One critical aspect of the location of the proposed mine was that it rested astride two streams that formed a significant component of the remaining available spawning and rearing habitat for prime game fish in the Flathead basin – the bull trout and, to a less critical degree, western cutthroat trout and mountain whitefish. Available evidence indicated that Cabin and Howell creeks contained up to ten percent of the habitat remaining in the system, which translated into up to 10 percent of the Flathead River basin bull trout population and a much higher percentage of those fish in the North Fork of the Flathead River.

Based on the information gathered by the Commission, it concluded that damage would inevitably occur to this habitat that would be located in the midst of a major mining development and consequently to the fishery dependent on that habitat. Such losses would be such as to cause a reduction in the quantity and quality of the sport fishing activity in the U.S. And, it would create a negative impact on the associated economic infrastructure since the affected fish populations migrate for much of their adult lives to the U.S. waters.

Under Article IV of the Boundary Waters Treaty, the conclusions of the Commission were that it was not pollution crossing the boundary that would be the problem but, rather, that pollution on one side of the boundary would cause a loss to the fishery on the other side of the boundary, to the injury of property in the U.S. and would be a breach of Article IV. It was also noted that it had not been demonstrated that effective mitigation of the impacts was feasible or even possible.
In its 1988 report, the commission recommended that, in order that governments can ensure that the provisions of Article IV of the Boundary Waters Treaty are honored, that the mine proposal as currently defined and understood not be approved and not receive regulatory approval in the future unless it could be shown that potential transboundary impacts would not occur with reasonable certainty and the impacts to the sport fisheries in the U.S. would not occur or could be fully mitigated.

Kootenai Falls Hydropower Project

Compiled by Liter Spence

In 1978, Northern Lights, Inc. had applied under the Federal Power Act for a license to construct, operate and maintain a hydroelectric development on the Kootenai River at Kootenai Falls, the last undammed waterfall on a major river in Montana, located 26 miles downstream from Libby Dam. The principal project works would include a diversion dam approximately 925 feet long and 30 feet high extending across the river near the crest of the falls. It would create a reservoir about 3.5 miles long. The proposal was opposed before the Federal Energy Regulatory Commission (FERC) by the State of Montana (of which the Department was included), the Secretary of Interior, the Kootenai people, FERC commission staff and a number of environmental, sportsmen, and other groups.

The Department objected to the proposed construction based on the negative impacts on Montana's only population of white sturgeon and the valuable rainbow trout fishery. In addition, the proposed project would seriously affect both fisheries and wildlife mitigation efforts associated with the construction of Libby Dam. The Kootenai Indians valued the site for religious reasons and the Department of Natural Resources and Conservation (DNRC) said there was no need for the energy to be produced.

Following their submission of a hydro license application to FERC for the Kootenai Falls project, Northern Lights contracted with DNRC for a baseline study of the aquatic environment. The results of the study were completed by Pat Graham in May, 1979. Graham's report included data on the physical/chemical environment, benthic invertebrates, the white sturgeon, other fish populations and a creel census.

To keep the data base current Northern Lights again contracted with DNRC in 1979 to monitor certain aquatic resources in the study area on a continuing basis. DNRC contracted with the Department to conduct the studies, which were done by Joe Huston. Huston completed three reports of the monitoring in 1979, 1981 and 1982.

A draft Environmental Impact Statement (EIS) for the Kootenai Falls project prepared by FERC was distributed in May, 1980. A final EIS was published in April, 1981. By order issued June 19, 1981, FERC determined that a hearing should be held concerning all issues relevant and material to the Northern Lights application.

Evidentiary hearings commenced on August 16, 1982 in Washington, D.C. and were conducted periodically thereafter through April 8, 1983. A total of 67 days of hearing were required to hear testimony of 53 witnesses. Two sessions of the hearings were held in Helena, Montana in 1982 and 1983. The presiding judge toured the area on October 11, 1982.

In April 1984, the FERC administrative law judge denied a license for the Kootenai Falls project. The administration decision was brought before the Commission. Final action by the Commission occurred on June 25, 1987 when it voted 5-0 to deny the license, stating:

> "We find that the proposed development is not best adapted for beneficial public uses of the river, including its use for wildlife and aquatic habitat and other recreational purposes, and for religious practices of the Kootenai people. Accordingly, and without reaching other issues, we affirm the initial decision denying a license for the proposed development."

This marked the first time FERC received such a recommendation on a major project in Montana and it was only the second time in FERC history that a project was denied on the basis of fish, wildlife and recreational concerns.

Painted Rocks Reservoir Water Purchase

Compiled by Liter Spence

In the 1950's, the Department and two local sportsmen's groups purchased 5,000 acre feet of water from Painted Rocks Reservoir on the West Fork of the Bitterroot River. In 1981, the Department proposed to the Northwest Power Planning Council that an additional 10,000 acre feet of uncommitted water stored in the reservoir be purchased to serve as mitigation for fisheries impacts from construction of Thompson Falls Dam on the lower Clark Fork River.

On December 17, 1982, the Department intervened in the license amendment petition of Montana Power Company (MPC) for its dam at Thompson Falls, Montana. The intervention was intended to address impacts associated with the proposed expansion of the Thompson Falls facility as well as damages caused to the fisheries and wildlife by the construction and operation of the dam pursuant to the Fish and Wildlife Program of the Northwest Power Planning Council.

The MPC had not mitigated the impacts at the time of the original construction and operation of Thompson Falls Dam on resident fish. The opportunity to mitigate fishery losses at the project site were very limited.

Several options for mitigation were investigated but the Department finally recommended that MPC, as operators of the project, provide permanent funding to purchase in perpetuity 10,000 acre feet of water from Painted Rocks Reservoir on the West Fork of the Bitterroot River to maintain summer and fall flows for resident fish in the Bitterroot River.

The Council put the measure in their program and the Department began negotiations with the BPA and MPC. In 1983, BPA agreed to fund a four year evaluation of the effectiveness of flow releases and development of a water management plan. Mark Lere was the first biologist to work on the study. He was followed by Ron Spoon.

To aid in evaluation, the Bitterroot Conservation District and the Department proposed that the 1983 Legislature fund a two-year Water Development Grant at $20,000 per year to purchase 10,000 acre feet of water. The Legislature granted the request, which was approved again in 1985.

Negotiations were ongoing with MPC from 1981 through 1988 to establish a $250,000 trust fund to pay for the water. The 1987 Legislature passed a law to allow creation of a trust fund by the Department for mitigation of impacts from hydropower. In 1988, MPC finally delivered the check.

However, water purchases from the reservoir had been made from DNRC on an annual basis. Interest in securing a longer term agreement for water purchases arose from several sources, including the Bitterroot Conservation District.

A July 13, 1988 letter from the Bitterroot CD to James Flynn, Department Director stated in part:

> "We strongly believe, and several studies have verified, that preservation of instream flows in the Bitterroot River supports the economy of the area from recreational use of the river. In addition, preservation of flows reduces conflicts with water use by irrigators from the river. Basically, everyone benefits."

The letter went on to say that members of the Bitterroot CD had met with several representatives of other interested groups, including Trout Unlimited, Bitterroot Chamber of Commerce, Painted Rocks Lake Users and a number of irrigation districts and ditch companies in the valley and.

> "From these meetings, it is now apparent that there is agreement among all groups that protection of instream flows is essential, and that a long-term solution towards providing for

> sufficient releases of water from the Painted Rocks Reservoir must be found. We have been asked by these other groups to lead the effort to find such a solution."

The letter requested assistance of the Department to work with the CD to develop a long-term solution to the problem and, since local interest in such a solution was higher than it had ever been, now was the time for the Department to begin working with them.

Following the request by Bitterroot CD, the Department and DNRC exchanged correspondence outlining their ideas about a long-term agreement. Between 1988 and 1989 the two agencies came close to an agreement but it was never concluded. Both agencies had differing views about what an agreement should consist of and how funding for the water purchase should be handled. The Department wanted to use the $250,000 trust fund to implement a 30-year water purchase agreement. DNRC was reluctant to commit to such a long agreement because conditions, such as changing cost of water, would hamper its ability to adjust to the changing conditions. It was also concerned about the financing commitment proposed by the Department. Thus, no agreement was reached. However, a Memorandum of Understanding between the two agencies was concluded in April, 1989 that established, in principle, how the existing annual water purchase contracts would be handled, that the Department would have an annual first right of refusal to enable it the opportunity to meet any higher offer for the water, and that the agencies would continue to develop strategies to fund the operation and maintenance of Painted Rocks Dam.

Nothing further happened until Stan Bradshaw, Resource Director of Trout Unlimited in Montana, wrote a letter dated December 5, 1991 to both DNRC and the Department expressing concern that nothing was happening on a long-term agreement. He outlined the history of discussions between the agencies up to that time and strongly urged them to get negotiations going again soon while interest was still high in the Bitterroot Valley.

In January, 1992, DNRC responded that it thought the present annual contract arrangement, with the first right of refusal by the Department was sufficient for the short term, but it would be willing to pursue a long-term agreement. The Department gave a similar response but said the current effort to obtain instream water reservations was consuming most of the time of the Fisheries Division water resources personnel and would preclude further work on the issue until the reservation process was completed. However, since DNRC was still interested in pursuing some type of long-term agreement, the Fisheries Division Administrator requested his staff to begin further discussions.

Numerous drafts of a long-term agreement were passed between the agencies and, finally, a compromise was reached on December 3, 1992. A 13-year agreement, expiring September, 30, 2004, provided the Department the opportunity to purchase 10,000 acre-feet of water per year at a cost of $15,000 annually plus an additional O&M charge. The Department then proceeded to set up an account to utilize interest from the $250,000 trust fund to pay for the water.

Water Leasing for Instream Flows

By Liter Spence

Probably the most controversial natural resource issue that came before the 1989 Montana Legislature was HB 707, a bill to allow leasing of private consumptive water rights for instream flow purposes. The issue arose primarily as a result of the 1988 drought's impact on stream fisheries. The bill was strongly supported by the environmental community. When the bill was introduced, it was strongly opposed by the agricultural community and was, at one point, rejected by the Legislature. However, it was revived and, through amendments, approved in the closing days of the session. It was signed into law by Governor Stan Stevens in May, 1989.

The purpose of the leasing law was to study the feasibility of leasing existing water rights to enhance streamflows for fisheries. The 1989 bill created a four-year pilot program that allowed only the Department of Fish, Wildlife and Parks to lease water rights from willing individuals. Private individuals or parties could not lease water under this bill. The Department, with the consent of the Fish, Wildlife and Parks Commission, was required to provide the Board of Natural Resources and Conservation (Board) with a list of specific stream reaches on which leasing was desired. Under the law, the Board could designate up to five stream reaches where water could be leased for instream flows to enhance the fisheries. This included approving streams submitted by the Department for water leasing). (Due to reorganization of some state government agencies in 1995, the Board was eliminated and most of its duties were taken over by the Department of Natural Resources and Conservation (DNRC).

The initial pace of the leasing program was slow. The Department took a slow but deliberate approach to the program. It contracted for a study on the market value of leasing agricultural water for instream flows so there could be some basis for paying water right holders for the use of their water rights. The initial slow pace can also be attributed, in part, to the post-legislative carryover of agricultural concerns that leasing would interfere with their water rights and would go against the traditional concept of water use -- that water must be diverted to be used beneficially. Some potential lessors were unwilling to be the first persons to lease water because of perceived repercussions from others in the agricultural community. However, with the passing of time, an ensuing dialog and on-the-ground experience with water right holders, and the fact that the Department was not acquiring water leases very fast, opposition to water leasing waned. It became more accepted, and even supported, by many of its former foes as a win/win situation, particularly in cases where the Department helped fund more efficient irrigation systems for ranchers so that the water conserved could be left in the stream. So, in 1999, the Legislature, and with the support of agricultural groups who opposed the concept in 1989, renewed the program for another 10 years by approving SB 98.

Leasing water for instream flows by entities other than state government was made possible during the 1990's. In 1995, the Legislature authorized water leasing for instream flows by private parties and individuals. It also allowed a water right holder to convert his/her existing water right to instream flow use. The Department is not allowed to lease water under this law. Also passed in 1995 was a pilot water leasing program in the upper Clark Fork River Basin. This was a provision of the Upper Clark Fork River Basin Management Plan that was approved by the1995 Legislature. The Department is allowed to lease water rights under this law and also to convert its own water rights to instream flow. This was, in fact, done with the Department's water rights on Cottonwood Creek on the Blackfoot-Clearwater Wildlife Management Area, where, in 1997, the Department rewatered a section of the stream to benefit bull and cutthroat trout.

River Protection in Montana

Compiled by Liter Spence

From: Janet Decker-Hess, 1990. River Protection in Montana. DFWP, May, 1990

Unlike many other states, Montana has not had a statutory river policy. A state wild and scenic river bill was introduced in the state Legislature in the early 1970s, but fears of land confiscation killed the bill.

The idea of preserving a river in its "wild" state originated in Montana with John and Frank Craighead. While opposing the Army Corps of Engineers' Spruce Park Dam proposal on the Middle Fork of the Flathead River, John Craighead wrote in a 1957 edition of *Montana Wildlife* that conservationists should have a rivers program rather than being continually forced to act on the defensive. He wrote, wild rivers were a *"species now close to extinction"* and were needed *"for recreation and education of future generations'*.

Over the next 10 years, the Craigheads and other citizen advocates of river protection helped in the passage of the National Wild and Scenic Rivers Act (16 U.S.C. 1271), a federal program aimed at river conservation. The Act, passed in 1968 and amended in 1982, established a policy "that certain selected rivers of the nation which, with their immediate environments, possess outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations".

The Act initially designated parts of eight rivers for protection and identified 27 others for study and possible inclusion. The Act allows for rivers to be designated through legislative authorization by an act of Congress or an act of a state or states' Legislature. If a river is designated through a state program, the state has the option to use Section 2 (a)(ii) of the Act, which enables the U.S. Secretary of the Interior to designate state-managed streams as components of the federal system subject to all of its protections.

With the passage of the Act, the National Wild and Scenic Rivers System was established. A classification system was developed and a three-step process which determined eligibility, potential classification, and suitability for river designation was outlined. The Act allows for the establishment of management standards for each classification by the U.S. Departments of Interior and Agriculture. Land acquisition limits were established and the Act encourages the use of easements--allowing residents to retain their property. Language was written prohibiting the Federal Energy Regulatory Commission (FERC) to license the construction of any dam, transmission line, or any other project works under the Federal Power Act on a designated river. The issue of state's rights with respect to hunting and fishing, water rights, and access were also addressed in the Act.

Each river included in the Act was classified, designated, and administered as one of the following:

> **Wild River** - Those rivers, or sections of rivers, that are free of impoundments and generally inaccessible except by trail. Standards for management of these rivers attempt to maintain the primitive nature of the river through no timber harvest, prohibition of new mining claims, and no road construction or any recreational development within the corridor.
>
> **Scenic River** - Those rivers, or sections of rivers, that are free of impoundments, with watersheds and shorelines still largely primitive and undeveloped but accessible in places by roads. Standards of management allow for silvicultural practices, mining, road construction, agricultural practices, and recreational development that do not cause substantial adverse effects and maintain the river area in a near natural environment.
> **Recreational River** - Those rivers, or sections of rivers, that are readily accessible by road or railroad and may have some development along their shorelines, and that may have undergone

some impoundment or diversion in the past. Standards of management parallel standards established for rivers outside the Wild and Scenic Rivers system except for the prohibition of dam construction for hydroelectric development.

Two river systems have been included in the federal system in Montana. The Middle, North, and South forks of the Flathead River were included in the original bill as study streams and received designation in 1976. A 149-mile reach of the Missouri River from Ft. Benton to the Fred Robinson Bridge, where Montana citizens, the Fish and Game Commission, and Interior Department planners had proposed national protection in the early 1960s, also was designated in 1976.

In an effort to identify potential rivers for inclusion in the Wild and Scenic Rivers System, the Nationwide Rivers Inventory (NRI) was undertaken by the National Park Service in 1982. The inventory, a compilation of information on the nation's significant free-flowing streams, listed 1,524 segments in 61,700 miles, or two percent of the nation's river miles. Intended for use by Congress, government agencies and the private sector, the NRI provided information on the resource values, utilization, development, and protection needs for each river identified. Criteria used to select rivers for the inventory included a minimum length of 25 miles; no dams, channelization, or impoundments; and a lack of significant cultural development within a 1/4 mile of the river's banks. Montana was one of three states where the NRI was not completed. The inventory was stopped in Montana at the request of the Governor. The state felt the inventory's methodology did not adequately address a river's natural attributes.

The federal Wild and Scenic System has not been used extensively across the nation. Until 1986, only 66 major rivers and 7,200 miles of streams had been included. A recent revival of the system came from Oregon's omnibus rivers bill which designated 40 streams for inclusion in the federal program in 1988. The system was overshadowed by the wilderness program and hampered by funding problems, changes in administrations, and fear of condemnation of private landowner's property. Mixed ownership patterns, water development demands, a distrust of government, the absence of land acquisition funds, and the rights and needs of riparian landowners also reduced the system's effectiveness.

In December, 1988, an agreement between Montana, the Bureau of Land Management (BUREAU OF LAND MANAGEMENT), and the U.S. Forest Service (USFS) was signed which addressed interagency cooperation in fulfilling the intent of the Wild and Scenic Rivers Act and the broader issue of river management and protection in Montana. The agreement addressed interagency preparation of an 'Action Plan'' including study criteria, priorities and process. Natural Resource Council meetings were to be used as the forum for discussion of the agreement and its issues.

A STREAM CONSERVATION CHRONOLOGY

Compiled by Liter Spence

1950's - Concept of stream conservation program (physical channel, water quality, water quantity). First attempts to classify streams
1959 - First “Blue Ribbon” stream classification map
1963 - Stream Protection Act (temporary) (Public streambed alterations)
1965 - Stream Protection Act (permanent)
1965 - First update of Stream Classification map
1969 - State Water Quality Act
1969 - “Murphy Right” legislation
1970/1971 - “Murphy Right” filings for instream flows
1970's - State Water Quality Act strengthened
1973 - Montana Water Use Act (fish/wildlife as beneficial uses; water reservations authorized)
1975 - SB310, Natural Streambed and Land Preservation Act (Private streambed alterations)
1976 - Department submits instream flow reservation application in Yellowstone River basin.
1978 - Board of Natural Resources (Board) grants Department Yellowstone basin reservations
1985 - Legislature authorizes Missouri River basin reservation process
1986 - Department submits upper Clark Fork River instream reservation application
1989 - Department submits upper Missouri River basin instream reservation application
1989 - HB754, River Restoration Fund approved
1989 - HB707, pilot water leasing study approved
1989 - Northern Lights Institute brings upper Clark Fork River basin water users together
1991 - Upper Clark Fork Steering Committee authorized by Legislature
1991 - Department submits instream flow reservation application in lower and Little Missouri River basins
1992 - Board grants upper Missouri basin instream flow reservations
1994 - Board grants lower and Little Missouri basin instream reservations
1995 - Legislature approves Upper Clark Fork River Basin Management Plan and the continuation of steering committee. Leasing of water rights for instream flows by private entities approved. The Department’s instream flow reservation application in upper Clark Fork basin placed on hold
1995 - HB349, Future Fisheries Improvement Program approved
1997 - HB546 passed by Legislature to implement a federal clean water act directive that requires states to determine which streams and lakes have water quality problems and take steps to clean them up. The result was establishment of TMDL’s (Total Maximum Daily Load) for state waters.
1999 - Future Fisheries Improvement Program expanded to add additional funding to support bull trout and cutthroat trout habitat restoration
1999 - SB98, Department water leasing program extended for another 10 years

HISTORY OF THE BIGHORN RIVER FISHERY

By Ken Fraser

The history of the current Bighorn River fishery started in the early 1960s when plans were finalized to construct a 525 foot high concrete dam across the Bighorn River at the lower end of the spectacular Bighorn Canyon. Closing of Yellowtail Dam in October 1965 changed this silty warmwater stream into a world renowned tailwater trout fishery. The final report on the proposed "Yellowtail Unit", completed in 1962, predicted that Yellowtail Dam would improve the fishery in the river below the proposed dam. Little did anyone realize how big this change would be.

FWP began planting rainbow trout into the Bighorn River in 1966. Rainbow plants continued on an annual basis until 1973, then intermittently until 1983 in the upper river, and 1989 in the river near Hardin. Brown trout were never planted, but began to develop a wild population on their own shortly after the dam was closed. The trout grew rapidly in the Bighorn and the river gained a reputation for producing trophy fish. A 1965 FWP survey estimated less than 500 angler days of fishing were spent on the entire 84 miles of river downstream of Yellowtail Dam. By 1973, fishing pressure on the upper 12 miles of river above Bighorn Fishing Access Site (FAS) had grown to 13,000 angler days, roughly the same intensity of angler use being experienced on the Madison River.

Angling on the Bighorn River came to an end in 1975 when the crow tribe passed a resolution closing the entire reservation to hunting, fishing and trapping to all but tribal members. This started a long series of legal battles in which numerous sportsman organizations joined together to fight for the Bighorn. The fate of the Bighorn River fishery was finally decided in March 1981 when the Supreme Court ruled that the Bighorn River was a navigable stream, and that the bed and banks of the river belonged to the state of Montana.

The Bighorn River was finally reopened to anglers on August 20, 1981, but not without some conflicts. Most angers who were excited about trying their luck on the Bighorn on this "opening day" were turned around by a large group of Crow Indians who had set up barricades to block angler access. At least three separate incidents were reported where shots were fire near angler on the river during the first few weeks the river was open. Once these conflicts settled down, angling pressure on the Bighorn picked up where it had left off in 1975. Angler success was excellent on this previously lightly fished population, and many trophy sized fish were caught. Through the early to mid-1980s fishing regulations on the Bighorn were changed several time while FWP tried to develop proper management practices for this new fishery.

With the reopening of the river, FWP began annual electro fishing to monitor fish populations. A mark/recapture estimate in the fall of 1981, on the upper river, found 2,218 age 1 and older brown trout per mile. Rainbow numbers were low and no estimate was obtained this first year. Good flow conditions in the early 1980s in this new coldwater stream really helped the Bighorn trout populations expand. The trout population in the upper river reached a peak in 1987 of around 9,900 brown trout and 1,000 rainbow trout per mile. Poor flow conditions in the late 1980s and early 1990s resulted in a significant drop in Bighorn River trout numbers. The trout population in the upper river reached a low of around 3,900 trout per mile in 1995 before the effects of better flows took over. With the improved flow conditions experienced through the remainder of the decade, trout populations in the Bighorn fluctuated between about 4,000 and 7,500 trout per mile, with a growing part of this population being made up of rainbow trout.

As the fish populations increased, the Bighorn's reputation as one of the best trout streams in the world also increased. The Bighorn River began to draw nonresident anglers from around the world to compete with the many resident anglers who were already using the river. The big increase in interest in fly fishing in the early 1990s added to this influx of new anglers. As angler use continued to increase, many resident anglers quit going to the Bighorn because they did not want to fight the crowds. A creel census conducted on the Bighorn in 1982 - 1983 found that nonresident anglers accounted for 34% of the anglers using the river. Forty nine percent of these anglers fished strictly with flies. A similar creel study in 1992 - 1993 found that 74% of the

anglers on the Bighorn were nonresidents, and 88% of Bighorn anglers fished exclusively with flies. Despite a feeling by many of the anglers contacted in 1992 - 1993 that the Bighorn was becoming too crowded, the number of anglers using the river continued to grow. The latest statewide angling pressure estimate for the Bighorn River estimated there were 91,909 angler days of use on the upper 12 miles of river between March 1997 and February 1998! An additional 21,514 angler days of use were reported for the river downstream of Bighorn FAS.

The future of the Bighorn fishery is not at all certain as we head into the next millennium. So far whirling disease has not been discovered in the Bighorn River, but whirling disease has the potential to devastate this fishery if it becomes established. Ongoing efforts to develop use regulations for the Big Hole Drainage will probably be carried over to the Bighorn River in coming years. And negotiations are currently going on to finalize a water compact with the Crow Tribe which would include the water in the Bighorn Drainage. Flow conditions seem to be the single most important factor that controls the Bighorn River fishery. The amount of water these compact negotiations provide for fisheries flows will be critical to the Bighorn River fishery well into the next century.

Fisheries Program History – Bull Trout

By Ken McDonald

1950s-1970s

As large predators that feed on other fish, bull trout were considered an undesirable species by many in the angling community. Anglers were allowed to haul out bull trout and throw them onto the bank as a trash fish. Government sponsored suppression and eradication programs were carried out against bull trout through the 1930's in an effort to rid certain lakes and streams of this fish-eating predator. In addition, but trout habitat was degraded in many areas, resulting in further declines. Bull trout have very specific habitat requirements that are generally classified as the four C's – clean, cold, complex, and connected – referring to cold, clean, high quality water, complex in-stream and riparian habitat, and connectivity between spawning and rearing areas. Bull trout are very sensitive to changes in their habitat, and have declined in many areas where habitat conditions have been degraded.

1980s

By the 1980s, attitudes towards bull trout began to shift as bull trout ecology became better understood and concerns about declining numbers and distribution became more apparent. By 1986 bull trout were listed as a Species of Special Concern by FWP, and regulations resulting in protections to bull trout were gradually being implemented

1990s

By 1992, all waters were closed to the harvest of bull trout except Swan Lake and Hungry Horse Reservoir. Hungry Horse was later closed. In late 1993, in response to growing concern about the status of bull trout in Montana, Governor Marc Racicot convened the Governor's Roundtable to discuss issues and threats facing bull trout. As a result of the Roundtable, the Governor chartered a nine-person restoration team consisting of members from Montana Fish, Wildlife and Parks, Montana Department of Natural Resources and Conservation, U.S. Fish and Wildlife Service, U.S. Forest Service, Confederated Salish and Kootenai Tribes, National Wildlife Federation, Plum Creek Timber Company, Bonneville Power Administration and Montana Chapter of the American Fisheries Society. The Restoration Team was directed to develop a plan that maintains, protects, and increases bull trout populations:

1. which includes a process and timetable for recovery;
2. that uses shared research, appropriate information, and resources;
3. that sets specific restoration goals, resource management criteria and methods to monitor results;
9. complies with MEPA and other applicable state, federal, and tribal statutes and regulations; and
10. that is based upon the best available current information, and that identifies the biological habitat and needs of bull trout.

The Restoration Team appointed a Scientific Group that developed status reports for the 12 major drainages (or portions thereof) where bull trout occur in western Montana, referred to in the plan as Restoration Conservation Areas. These status reports described the current status and distribution, as well as summarized threats to bull trout within each drainage. They also identified core areas, which are watersheds containing the best remaining spawning and early rearing habitat in each major drainage. Over 120 core area watersheds have been identified. These status reports became the foundation around which the restoration plan was written. Additionally, the Scientific Group prepared three technical reports addressing specific issues related to bull trout: use of hatcheries to supplement bull trout, suppression or eradication, and the relationship between bull trout habitat requirements and land management activities.

The focus of Montana's bull trout restoration plan is protection of core areas, which comprise the majority of spawning habitat in Montana. Towards that end, the plan has the following objectives:

1. Protect existing populations within all core areas and maintain the genetic diversity represented by those remaining populations.
2. Maintain enlarged populations in historically connected core areas
3. Restore and maintain connectivity between historically connected RCAs.
4. Develop and implement a statistically valid population monitoring program.

A draft plan was completed in 1999, and the final is expected to be completed in early 2000. In addition to the goals, the state restoration plan contains guidelines and recommendations for local watershed groups and resource management agencies to meet the above objectives.

On June 10, 1998, bull trout throughout the Columbia River basin, including Montana, were listed as threatened under the Endangered Species Act. With listing comes federal oversight of bull trout management, as well as the requirement to develop a federal recovery plan for the species. Recovery planning began in January, 1999, and a final recovery plan is expected in late 2000. The Montana portion of the federal recovery plan will incorporate information already developed for the state's plan, especially the emphasis on protection of core areas. De-listing of bull trout will require achieving criteria set forth in the federal recovery plan for the entire Columbia River basin, including populations in Idaho, Oregon, Washington, and Montana.

Scientific Collector's Permits – 1990s

By Chris Hunter

Until the mid-1990s every state except Montana issued scientific collector's permits to consultants. By virtue of our statutes, we could only issue collector's permits to educational institutions. During the 1990s, there were more and more consultants attempting to obtain these permits. This increase in interest was due in large part to the relicensing activity and the Natural Resources Damages lawsuit on the Clark Fork River. Companies doing business in Montana found it necessary to obtain fishery information but were unable to retain consultants to conduct the work.

This became an administrative nightmare for the regional fish managers, Jim Vashro in Region 1 and Dennis Workman in Region 2 in particular. Since the consultants could not obtain collectors permits and the needs of the businesses involved were legitimate, we had to have a member of our staff in the field with the consultants at all times. This put a real strain on our regional fish staffs.

The stage was set when MPC approached the Department about seeking a change in the scientific collector's permit statute to allow the issuance of permits to qualified consultants. Bob Lane, chief legal counsel and Chris Hunter, Special Projects Bureau Chief worked with MPC and several other corporate groups to develop legislation that would allow this change in the statute. The legislation passed successfully.

The History of FWP's Conservation and Management of Cutthroat Trout in Montana

Compiled by Brad Shepard – FWP
January 2000

Meriwether Lewis first described cutthroat trout on June 13, 1805 in his journal based on six fish ranging in length from 16 to 23 inches caught by Private Silas Goodrich at the Great Falls of the Missouri River (Moring 1996). The cutthroat trout described by Lewis are today recognized as the subspecies westslope cutthroat trout (abbreviated as WCT in the rest of this report). In 1836 Richardson formally described a cutthroat trout from a lower Columbia River tributary as *Salmo clarki* (Behnke 1992). All native species of North American trout were originally classified as belonging to the genus *Salmo.* This genus also included the Atlantic salmon and Eurasian trout. However, more recent information has led taxonomists to conclude that North American trout are more closely related to Pacific salmon, classified in the genus *Oncorhynchus,* consequently all North American trout species have been moved to the genus *Oncorhynchus* (Stearly and Smith 1989).

Fisheries biologists from Montana played a significant role in understanding the taxonomy and evolution of cutthroat trout. Montana biologists long recognized that cutthroat trout from the Clark Fork River basin appeared different from cutthroat trout inhabiting the Yellowstone River basin. They used the common name "westslope cutthroat trout" to describe those cutthroat trout inhabiting waters west of the Continental Divide and "Yellowstone cutthroat trout" (abbreviated as YCT in the rest of this report) to describe those cutthroat trout inhabiting the Yellowstone River drainage. Montana biologists also referred to those native cutthroat trout that inhabited the Missouri River basin as "Upper Missouri cutthroat trout", though they appeared to be more similar to "westslope cutthroat trout" than to "Yellowstone cutthroat trout". J.G. Cooper (1870) described and discussed catching WCT from the Missouri River near Fort Benton and reported catching cutthroat trout from mountain streams in the Missouri River basin and taking them across the Continental Divide "… to compare with those on the western slope, and am very doubtful whether these can be considered a distinct species,…."

George Holton of Montana Fish, Wildlife and Parks (FWP) was interested in the distribution and status of cutthroat trout in Montana and this led to a Master's thesis by Delano "Laney" Hanzel completed at Montana State University, Bozeman in 1959. In his thesis Hanzel (1959) provided photographs showing the differences between "westslope" and "Yellowstone" forms of the cutthroat trout, but he did not make specific taxonomic recommendations based on the different forms. It wasn't until much later that WCT (*Oncorhynchus clarki lewisi*) and YCT (*O. c. bouvieri*) were formally recognized as subspecies of cutthroat trout (Behnke 1979, 1988, 1992).

The historical distribution of both WCT and YCT in Montana can never be known with certainty. Hanzel (1959) reported that WCT were distributed in the Missouri River basin down to the mouth of the Musselshell River and throughout the state west of the Continental Divide. George Liknes (1984) conducted a status review of WCT in Montana for FWP and reported that the known distribution of WCT included the entire portion of Montana west of the Continental Divide and the upper Missouri River and its tributaries downstream to Fort Benton, as well as the headwaters of the Judith, Milk, and Marias rivers. Behnke (1992) concurred with Liknes's assessment of the historical range. WCT are also native to waters in Idaho, Oregon, Washington, and southern British Columbia and Alberta in Canada. Leading to the confusion were early transplants of native (including WCT) and introduced trout to waters surrounding forts in Montana used by U.S. Army troops for use as a food source in the late 1800's. The historical range of YCT in Montana included only the upper Yellowstone River basin and extended from the Wyoming border at Yellowstone National Park down to about the Tongue River according to a status review conducted by Kathleen Hadley (1984) who was contracted by FWP to conduct this review. May (1996) documents that YCT did not occupy the lower Tongue River or Yellowstone River near the Tongue during the earliest documented fish surveys in the region, but speculates that YCT may have occupied these areas much earlier when climatic conditions were cooler.

Since all cutthroat trout subspecies were identified and managed as a single species until the 1970's, YCT were often stocked into drainages that supported WCT prior to 1980. YCT eggs were first taken from the West Thumb of Yellowstone Lake (Yellowstone National Park) in 1899, and from then to 1957 over 818 million eggs were gathered from Yellowstone Lake cutthroat trout (Gresswell and Varley (1988). Fish from some these eggs were distributed to Montana for stocking and records show that 400,000 of these YCT were planted out in 1903 and 600,000 were planted in 1904 (Alvord 1991). In 1908 Montana Fish and Game constructed the Washoe Park Hatchery and by 1912 this hatchery was raising over 2 million YCT for release throughout the state. Most of these fish were distributed to individuals and groups at railroad stops by a rail car called the "Thymallus" specially designed to transport fish.

In 1956 YCT egg-taking operations at Yellowstone Lake ended. Montana wanted a cutthroat trout to stock in high mountain lakes, so in 1969 gametes from 15 spawning pairs of YCT from McBride Lake in Yellowstone National Park were brought into the state's hatchery system (McMullin and Dotson 1988). Thus began the Department's brood of McBride strain YCT. These cutthroat trout can survive, spawn successfully, and grow well in mountain lakes and remain one of the primary sources of fish for stocking mountain lakes today.

The abundance and distribution of WCT have been on a long-term decline and WCT are now estimated to occupy less than 20% of their historical habitats in Montana. Their status is even worse in the Missouri River basin where they occupy less than 10% of their historical range. YCT have declined in a similar fashion in Montana and are now believed to occupy less than 650 miles of stream habitat and about 32% of main river habitats of the approximately 2,000 miles of river and stream habitats they were believed to historically

occupy in the Yellowstone River basin from Yellowstone National Park down to about the Big Horn River (May 1996). Factors that have led to declines in distribution and abundance of cutthroat trout include over-harvest, habitat loss, and introduction of nonnative fish into waters historically occupied by cutthroat trout. Over-harvest was probably a major impact in the late 1800's and early 1900's, but fish regulations presently restrict harvest for cutthroat trout to "catch-and-release" in streams and rivers where populations need protection. Habitat loss has occurred due to poor land management practices, de-watering of streams to divert water for human or agricultural use, construction of dams and diversions, and human development of flood plains. Nonnative fish introductions, especially brown, rainbow and brook trout, have led to serious consequences for cutthroat trout. Rainbow trout can interbreed with cutthroat trout and their progeny can reproduce. These hybrid crosses change the genetic make-up of the original cutthroat population; thus they are no longer pure WCT or YCT. YCT can hybridize with WCT and since YCT were stocked into many waters within the historic range of WCT this type of hybridization is common. In addition, nonnative trout can compete with and prey on both subspecies of cutthroat, and eventually nonnative trout will replace native cutthroat trout in most waters where they occur together.

George Holton and Joe Huston of FWP began collaborating with Dr. Fred Allendorf of the University of Montana to determine the genetic status of cutthroat trout in Montana using allozyme electrophoresis around 1978. This collaboration continues and has made Montana the leader in using genetic information for the management and conservation of native fishes. This information also led to the recognition that those native cutthroat trout inhabiting the Missouri River basin referred to as "Upper Missouri cutthroat trout" were indistinguishable from WCT and thus were the same subspecies.

FWP biologists and fish culturists have been actively conserving cutthroat trout throughout the Department's history. Unfortunately, the lack of scientific and management distinction between the two cutthroat trout subspecies prior to the 1970's led to a mixing of the two subspecies. A 1971 article in Montana Outdoors by Vern Campbell (Vol.2, Number 3:7-9) cites Hanzel's (1959) study and concludes that the greatest need is for the "immediate preservation and restoration of as much natural habitat as possible". FWP designated the WCT as a "Species of Special Concern" within Montana in 1972 based on a recommendation from the Montana Chapter of the American Fisheries Society. The cutthroat trout was designated as the "state fish" of Montana in 1977. This designation did not differentiate between the two subspecies, westslope and Yellowstone, native to the state. The USDA Forest Service designated the WCT as a "Sensitive Species" in 1988. These designations recognized the unique stature of WCT as a native fish species that requires clean, cold waters to survive. These designations also recognized that special management emphasis was needed to slow their decline. In June of 1998 the USDI Fish and Wildlife Service (FWS) was petitioned, under the Endangered Species Act, to list WCT and "threatened" throughout its range. The FWS determined in 2000 that WCT were "not warranted" for formal listing.

Westslope Cutthroat Trout

Joe Huston, a retired FWP Fisheries Biologist who was instrumental in initiating numerous conservation actions for WCT, and the Conservation Genetics Committee (Leary et al. 1991) provided the following synopsis of Montana's effort to culture WCT. There is no evidence that WCT were raised in FWP or federal fish hatcheries prior to 1952. The first attempt to bring WCT into a hatchery occurred when Bob Mitchell, Jim Lucas, and an unidentified game warden from Great Falls flew horses into Big Prairie within the South Fork of Flathead River basin in 1952 and collected 32 live WCT from Big Salmon Lake by angling. These WCT were flown out and kept in FWP's Jocko River (Arlee) Hatchery. Eggs were taken from these fish in 1953 and 1954, but only spawning success was low. Fish raised from these eggs were transferred to the FWP Hamilton Fish Hatchery in May of 1955 to start a WCT brood. There is a question whether this brood maintained its genetic integrity because either rainbow trout were present in Big Salmon Lake or were also held at this hatchery. Genetic testing of WCT in North Bigelow Lake that originated from this hatchery found the fish population was 97% WCT and 3% rainbow. In 1961 the Hamilton Hatchery was closed and its WCT brood was moved to the FWP Libby Hatchery. Both westslope and Yellowstone cutthroat were raised at the Libby Hatchery and it is likely that the WCT became even more introgressed during its use at Libby. All WCT brood were planted out from the Libby Hatchery in 1969.

In 1954 personnel from FWP, the U.S. Fish and Wildlife Service (FWS), and several anglers from Kalispell captured 135 adult WCT from Hungry Horse Reservoir tributaries (Felix, Hungry Horse, Murray, Quintonkon, and Sullivan creeks) during the spawning season. These fish were taken to the federal FWS Creston Hatchery. It is likely that this brood became contaminated with YCT because male WCT ripened much later than female WCT and YCT males were sometimes used to fertilize eggs from WCT females. This WCT brood and all WCT were moved to FWP's Anaconda Hatchery in the spring of 1957 and subsequently all fish were planted out sometime in late 1957. However, eggs from two or three pairs from the Creston Hatchery were transferred to FWP's Somers Hatchery. These eggs were used to found a Laurie Lake WCT brood in 1958 after it had been chemically treated to eliminate all fish. The Somers Hatchery started taking WCT eggs from Lauri Lake in 1960. This brood was also released into Spoon Lake (Ninemile) in 1965. From 1960 to 1970 WCT eggs were taken by the Somers Hatchery crew from Laurie or Spoon lakes for rearing and planting. In 1964 some WCT from Laurie Lake were moved back to the FWS's Creston Hatchery where they were maintained until 1971 when they had to be destroyed due to a furunculosis disease outbreak.

The first documented genetically pure WCT brood stock was collected by Joe Huston and Bob Mitchell. They collected about 23,000 eggs from Hungry Horse Creek and 2,000 from Emery Creek in 1965 and another 4,000 in 1967. Fertilized eggs from these two creeks were taken to FWP's Arlee Hatchery. Vern Campbell was the Hatchery Manager of Arlee at the time. Ironically, the first 23,000 eggs taken in 1965 were destined for the Anaconda Hatchery, but Bob Mitchell stopped at the Arlee Hatchery and he and Vern Campbell decided to keep the WCT brood stock at Arlee. This brood remained in Arlee until 1980. It was then moved

to the Murray Springs Hatchery, after its construction by the U.S. Army Corps of Engineers as partial mitigation for impacts of Libby Dam on the Kootenai River fishery.

This original WCT brood was found to have had a significant reduction in its genetic variation compared to the wild source WCT in Hungry Horse Creek after 14 years in the hatchery (Allendorf and Phelps 1980). The hatchery stock had (1) a 57% reduction in the proportion of polymorphic loci, (2) a 29% reduction in the average number of alleles per locus, (3) a 21% reduction in the average heterozygosity per individual, and (4) significant changes in allelic frequencies between age-classes. The loss of variation was attributed to both a limited number of founders of the hatchery stock and the effects of genetic drift in the maintenance of the hatchery stock because of non-random matings. By 1983 this lack of genetic variation was adversely affecting hatching success and developmental problems including morphological deformities were prevalent (Leary et al. 1985). Because of these problems it was decided that this broodstock would be terminated and all these fish were stocked out in 1986.

Based on the genetic problems that occurred with this brood FWP worked with the Salmon and Trout Genetics Laboratory at the University of Montana to develop a new "wild" brood that was designed to preserve as much genetic diversity from the wild as possible. The present WCT brood stock was founded in 1983-84 from 6,445 fish collected from 12 South Fork Flathead River tributaries and two Clark Fork tributaries. Prior to collecting these fish, genetic electrophoretic analyses were conducted on individuals from all donor populations and all donor populations were found to be 100% pure WCT. In addition, disease testing was conducted on all populations and no detectable fish pathogens were found. Part of the genetic breeding program for this wild brood was that the source of fish for this brood were obtained from many different WCT populations that exhibited different life history strategies - lake stocks, river stocks, and stream stocks.

This new brood was initially housed at FWP's Murray Springs Hatchery to obtain fast growth to maturity in the relatively warm water in this hatchery. After two years this brood was moved to the Washoe Park Hatchery in Anaconda in 1986 where it resides today. According to the genetic plan there was, and continues to be, no intentional selection at the hatchery for domesticate characteristics, such as fast growth or early spawning. In addition, matings between fish are done randomly and wild fish are to be brought into the hatchery at periodic intervals to ensure domestication is kept to a minimum. In addition, the plan calls for the infusion of enough wild fish from aboriginal populations to contribute at least 5-10% contribution to the brood stock for three successive years every 10 years. This infusion has not yet been done, even though it was scheduled for 1995.

FWP has formed strong collaborative partnerships with Forest Service and Bureau of Land Management Fisheries Biologists to survey WCT populations and collect fish for genetic testing. Genetic testing of WCT populations that began around 1978, primarily by Joe Huston out of the Kalispell Regional Office, have intensified through time resulting in some genetic testing being done for a majority of known WCT populations. Forest Service

Fisheries biologists that have been leaders in this effort include Bruce May of the Gallatin National Forest, Len Walch and Archie Harper of the Helena National Forest, Mike Enk of the Flathead and Lewis and Clark National Forests, Pat VanEimeren of the Flathead National Forest, Dick Kramer of the Lolo National Forest, Doug Perkinson of the Kootenai National Forest, David Browning Kathy Thompson, Denise Vore, and Bruce Roberts of the Beaverhead National Forest, Brian Sanborn of the Deerlodge National Forest, Rick Stowell of the Forest Service's Region One Office, and David Kampwerth of the Dillon Resource Area of the BLM. FWP biologists that have contributed significantly to this effort include Joe Huston, Bob Domerose, Bruce May, Scot Rumsey, Ladd Knotek, Steve Leathe, John Fraley, Tom Weaver, Mike Hensler, Scott Snelson, Ron Pierce, Don Peters, Dennis Workman, Chris Clancy, Rod Berg, David Schmetterling, Wayne Hadley, Jim Vashro, Pat Byorth, Jim Brammer, Dick Oswald, Ian Chisholm, Mark Delray, Wade Fredenberg, Les Everts, and Brad Shepard.

In addition to survey work and genetic testing, FWP has completed rehabilitation projects to remove nonnative trout from several streams and lakes in the state that were then populated by WCT, either from WCT remaining in the stream drainage or from WCT brought in from another stream. The two earliest projects were completed in the early 1970's. Joe Huston, a leader in WCT conservation for FWP, rehabilitated Young, Sullivan, Big, Five Mile, and Clarence creeks, all tributaries to the Kootenai River drainage, following the creation of Libby Reservoir (Lake Koocanusa), to create a spawning runs of WCT from the reservoir. These streams were treated with rotenone to remove nonnative brook and rainbow trout and then WCT from Libby Reservoir developed spawning runs into these tributaries.

The second project was conducted in Elkhorn Creek within the recently acquired Blacktail Game Range northeast of Helena. Al Wipperman and Ernie Nevula constructed a rock gabion fish barrier on main Elkhorn Creek in 1972 to prevent nonnative fish from moving into upper Elkhorn Creek. On September 6, 1972 the main creek above this barrier was treated with rotenone to remove all fish above the barrier. Headwater tributaries were not treated with rotenone because only WCT inhabited these smaller streams. Following the rotenone treatment these remaining WCT repopulated main Elkhorn Creek and this stream remains a WCT stream. Wildlife managers of the Blacktail Game Range maintain the rock gabion barrier.

FWP formed a WCT Conservation Genetics Committee in the late 1980's to develop a plan for conserving and restoring WCT in the state. This committee consisted of Dr. Robb Leary (chairperson), Kathy Knudsen, and Kevin Sage from the Wild Salmon and Trout Genetics Laboratory at the University of Montana, Thurston Dotson, Bill Hill, George Holton, Joe Huston, and Scott Rumsey from FWP, and Dave Genter from the Montana Natural Heritage Program. This committee developed recommendations for a rating system for conservation and management of WCT that relied on genetic status and threats from introgression or competition, and recommended brood stock development, maintenance, and stocking policies. While these recommendations were incorporated into FWP's database system and as policy for managing the WCT brood, no further actions were taken by FWP to implement these recommendations into a conservation/ restoration strategy until 1994.

In 1994 FWP formed another Technical Committee to recommend strategies for conserving WCT in Montana that were strictly based on biological criteria. The initial emphasis of this committee was to conserve WCT in the Missouri River basin. The Technical Committee was made up of fish professionals from throughout Montana and included representatives from FWP (Dick Oswald, Jim Brammer, Anne Tews, Ladd Knotek, Mark Delray, Brad Shepard [chairperson]), the Forest Service (Mike Enk and Brian Sanborn), the Bureau of Land Management (David Kampwerth), the FWS (Lynn Kaeding, Pat Dwyer, and Robon Wagner), and the Wild Salmon and Trout Genetics Laboratory at the University of Montana (Dr. Robb Leary). In 1998 this technical committee published their recommendations for genetic conservation of WCT in the Upper Missouri River basin (Leary et al. 1998). In 1997 a Steering Committee was formed by FWP to develop formal recommendations to conserve WCT throughout the state using biological strategies developed by the Technical Committee. The Steering Committee was open to all interested parties and letters soliciting members for this committee were sent to a wide group of interests. The Steering Committee included representatives from the agriculture (Montana Stockgrowers and Farm Bureau), timber (Intermountain Forest Industry Association), land and fish conservation (American Wildlands, Montana Chapter of the American Fisheries Society), and angling (Trout Unlimited and Montana Wildlife Federation) communities, as well as federal (FWS, Forest Service, BLM) and state (FWP, DNRC, DEQ, and NRCS) agencies in the state.

This Steering Committee agreed upon an overall conservation goal for conserving WCT in Montana (Montana Department of Fish, Wildlife and Parks 1999). The management goal for westslope cutthroat trout in Montana is to ensure the long-term, self-sustaining persistence of the subspecies within each of the five major river drainages they historically inhabited in Montana (Clark Fork, Kootenai, Flathead, Missouri, and Saskatchewan), and to maintain the genetic diversity and life history strategies represented by the remaining local populations. The Steering Committee also developed five objectives to reach the goal:

Protect all genetically pure WCT populations.
Protect slightly hybridized populations (<10% hybrid) until a basin-wide conservation plan has been developed. Basin planning will occur by river basin (ie. Big Hole, Smith, Blackfoot, Stillwater, Yaak).
Ensure the long-term persistence of westslope cutthroat trout within their native range.
Provide technical information, administrative assistance, and financial resources to assure compliance with these listed objectives and to encourage conservation of WCT.
Design and implement an effective monitoring program by the year 2002 to document persistence and demonstrate progress towards the goal.

Several strategies to conserve and restore WCT will be implemented. Existing populations will be conserved by 1) protecting and, in some cases, enhancing habitats they now occupy; 2) ensuring that nonnative salmonids cannot invade them by constructing barriers to prevent upstream movement of these nonnative fish; and 3) where nonnative fish are presently threatening existing populations, remove nonnative fishes. WCT populations will also be restored to some areas they do not now occupy. In most cases, wild WCT from a nearby

stream will be used to "re-found" these new WCT populations. Using an existing wild stock to "re-found" a new population will help preserve the genetic variability now present in existing wild populations. In addition FWP's Washoe Park Hatchery WCT will also be used to "re-found" some new populations and will continue to be used for stocking mountain lakes. An effort will be made to preserve and restore groups of WCT populations within interconnected habitats in an attempt to preserve the migratory life history form of this subspecies. These strategies are presently being implemented and evaluated.

Yellowstone Cutthroat Trout

Since YCT historically inhabited only the Yellowstone River drainage from Yellowstone National Park down to about the Big Horn River, conservation and management efforts have focused on this drainage. A number of FWP and Forest Service fisheries biologists have been involved with this effort including Al Wipperman, Larry Peterman, Dennis Workman, Rich Stevenson, Chris Clancy, Brad Shepard, and Joel Tohtz who all were fisheries biologists working on the upper Yellowstone River out of Livingston, Montana for FWP; Rod Berg who did a special inventory of the Yellowstone River basin for FWP; Mike Poore, Jim Darling, Ken Frazier, Steve McMullin, Pat Marcuson, and Clint Bishop of Region 5 FWP; and Bruce May, Jim Lloyd, and Scot Shuler of the Gallatin National Forest. In 1991 a group initiated by the Montana Chapter of the American Fisheries Society formed to make conservation management recommendations for conserving YCT. This group consisted of Bruce May and Ray Zubick of the Forest Service, Brad Shepard and Jim Darling of FWP, Dave Genter of the Nature Conservancy, Lynn Kaeding of the Fish and Wildlife Service, and Robb Leary of the University of Montana's Wild Salmon and Trout Genetics Laboratory. Mike Stone of Wyoming Fish and Game was added to this group in 1994. This group developed a draft conservation management guide by 1994 and presented this guide to FWP. Unfortunately, priorities in FWP at the time prevented the adoption and implementation of this management guide. In 1998 [CHECK WITH JOEL TOHTZ AND KEN MCDONALD] a second effort to develop a conservation strategy for YCT in Montana was initiated. [GET PARTICULARS OF THIS EFFORT FROM KEN MCDONALD, JOEL TOHTZ, BRUCE RICH AND JIM DARLING].

Several conservation efforts to enhance recruitment of YCT to the Yellowstone River have been accomplished. Barriers to stream spawning YCT near the mouths of several spawning tributaries were made passable by the installation of culvert fish ladders. A ladder was initially installed and evaluated in Cedar Creek (Clancy and Reichmuth 1990), similar ladders were subsequently placed in a railroad stream crossing in Mol Heron Creek with assistance from the Yellowstone Fly Fishers out of Gardiner and in a culvert near the mouth of Cinnabar Creek. The Cinnabar Creek ladder was later removed during a flood and debris torrent event in Cinnabar Creek. Instream flow leases to enhance recruitment of YCT to the Yellowstone River have been obtained in Cedar and Mill creeks and leases are pending in Mol Heron and Big creeks. A barrier to upstream fish migration was installed in upper Mill Creek to preserve the genetic integrity of YCT inhabiting the upper basin. [GET OTHER PROJECTS – INCLUDING SHIELDS RIVER FROM JOEL TOHTZ AND SCOT

SHULER]. [GET PROJECTS FOR MID-YELLOWSTONE FROM MIKE POORE AND JIM DARLING].

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NOTE: BRAD'S PARENTHETICAL NOTES INDICATE THAT THIS NARRATIVE IS NOT YET COMPLETE.

Dams and Mitigation

By Brian Marotz

Hungry Horse and Libby Dams were constructed on the Flathead and Kootenai Rivers in the northwestern corner of the state. The huge reservoirs (Libby Reservoir was named Lake Koocanusa) are operated by the federal government for hydroelectric generation and flood control. These two headwater reservoirs provide 40 percent of the US water storage for the colossal Columbia River hydropower system. Dams radically affected Montana's fisheries resources by blocking migrations, inundating river channels and changing river flows and water temperatures. Then in 1980, Congress passed the Northwest Power Planning and Conservation Act that directed a portion of the revenues created by the dams into fish and wildlife mitigation and conservation. The Northwest Power Planning Council (Council) was formed, consisting of two representatives from each of the northwestern states, Montana, Idaho, Washington and Oregon. The Council crafted the Columbia Basin Fish and Wildlife Program (Program) that includes specific actions required to mitigate damages to fish and wildlife resources attributable to the construction and operation of Columbia River dams. Scientists throughout the basin submitted specific corrective measures to the Council for inclusion in the Program. In Montana, Pat Graham, now the Director of Fish, Wildlife & Parks, submitted the first program measures. Later, amendments were submitted by John Fraley and Brian Marotz of FWP, and Joe DosSantos of the Confederated Salish and Kootenai Tribes. Once approved by the Power Planning Council, the Program directed the state and tribes to implement the Program through funding by the Bonneville Power Administration. Fisheries mitigation began in 1982.

Dams influence several Fish Species of Special Concern in Montana, including the endangered Kootenai River white sturgeon and threatened bull trout. Westslope cutthroat and interior redband trout have also been petitioned for listing under the Endangered Species Act (ESA). The South Fork of the Flathead River contains an intact native species assemblage, including one of the strongest remaining populations of westslope cutthroat and bull trout. Libby Reservoir and the Kootenai River headwaters in British Columbia contain what may be the most viable metapopulations of bull trout in existence.

Federal funding enabled FWP to launch aggressive programs to repair the fisheries impacts caused by Hungry Horse and Libby dams. Fisheries mitigation includes habitat enhancement, fish passage improvements into blocked areas, rehabilitation of lakes, hatchery technology and monitoring to assess progress. First, researchers determined the extent of fisheries losses and causal factors in each subbasin. Computer models were constructed, using measurements and samples collected from the project sites. Model simulations enabled researchers to assess various strategies for operating the dams that would benefit fish in the reservoirs and rivers downstream. Operational guidelines called "Integrated Rule Curves" (IRCs) were developed to balance the needs of fish and wildlife with power generation and flood control. The Power Planning Council included the IRCs in their Fish and Wildlife Program in 1994, and Governor Marc Racicot adopted the IRCs as Montana's preferred operation shortly thereafter. State agents continue to struggle with downstream states and federal agencies to fully implement the IRCs, although many of the desired features have been implemented.

Through Hungry Horse mitigation, a device was installed on Hungry Horse Dam to restore natural water temperatures in the Flathead River downstream. Called "selective withdrawal", the structure was the result of five years of field research, computer modeling, huge public support and political support leading to a Congressional appropriation for construction. Since 1952, Hungry Horse Dam released frigid water year round from the bottom of the reservoir, causing unnaturally cool summer river temperatures and sudden thermal fluctuations that harmed fish growth and trout food availability. Then, in 1996, selective withdrawal became operational and warm water came through the turbines for the first time since the dam was constructed, vastly improving trout growth potential in 44 river miles downstream. Fish passage improvements reopened 16 percent more tributary habitat for spawning westslope cutthroat from Hungry Horse Reservoir. Lake rehabilitation made Lion Lake the most intensively utilized small lake for anglers in Region One. Rogers Lake became a genetic reserve for the rare Red Lake stock of arctic grayling and a popular fishery for pure westslope cutthroat. Non-native and illegally introduced fish species were also removed from Murray Lake, Hubbart Reservoir, Bootjack Lake near Tally Lake, Dollar Lake and Devine Lake

to create genetic reserves or important recreational fisheries. An innovative fish ladder using mainly native materials and stream reconstruction techniques reconnected Tayor's Outflow to the Flathead River, creating a wild spawning run.

Libby Mitigation reestablished naturalized spring flow conditions in the Kootenai River to aid in the recovery of the endangered white sturgeon, balanced with other native species in the reservoir and river. Lake rehabilitation restored the fisheries in Carpenter Lake, Bootjack Lake near Happy's Inn, and Little McGregor Lake. Stream reconstruction reopened fish passage and restored degraded habitat in Young Creek, Sinclair Creek and Terriault Creek near Eureka. Stream reconstruction on Pipe Creek has decreased bank erosion and restored fisheries habitat. A coordinated effort with the national program "Project Impact" has begun to restore Parmenter and Flower Creeks near Libby. Plans are underway to create youth fishing opportunities in a local gravel pit, which will be converted into a fishing pond. Libby Creek is the site of several mitigation projects, including an effort to reduce juvenile bull trout lost through an irrigation ditch while improving stream stability and fisheries habitat, stabilization of a very large slough, and another project which will insure bedload transport through a bridge site. Work at the mouth of O'Brien Creek will insure bull trout passage and eliminate the stream's access to an erosional bank. Additional work on O'Brien Creek will insure continued secondary water supply to the city of Troy while insuring bull trout passage and stabilizing stream banks.

Research continues on the status of burbot in the Kootenai River in Montana, as well as the Kootenai River white sturgeon. Libby Mitigation is funding a graduate project through the University of Idaho to document habitat use of juvenile white sturgeon in the Kootenai River in Idaho and Canada. Additional research will provide valuable information concerning the food habits of bull trout in the reservoir and river, as well as habitat preferences. A long-term study of habitat requirements and preferences for rainbow trout and mountain whitefish is nearing completion, and will be valuable in determining optimum flows for these species. Data from the white sturgeon study may also prove useful in these regards.

Several bull trout have been captured and radio-tagged to monitor fish migrations, movements, and the timing of spawning in river tributaries. Personnel recently cooperated with the Idaho Department of Fish and Game in capturing and tagging 8 bull trout in O'Brien Creek; Idaho personnel will track the fish. Libby Mitigation personnel also cooperate with B.C. Ministry of Environment – Fisheries personnel in their bull trout research and monitoring efforts, including redd counts and fish tracking.

Hydropower Relicensing

By Chris Hunter

1970s – Kerr Dam

The original license to operate the Kerr Dam project was granted to Rocky Mountain Power in May, 1930. The license was scheduled to expire in May, 1980. The long and painful history of the Kerr Dam relicensing actually began in 1976 when the Montana Power Company (MPC) filed an application with the Federal Energy Regulatory Commission (FERC) for a new license to operate the Kerr Project. One month later, the Confederated Salish and Kootenai Tribes (CSKT) of the Flathead Indian Reservation filed a competing application.

1980s- Kerr Dam

MPC operated the Kerr Project from 1980-1985 under successive annual licenses pending the resolution of a number of environmental issues and studies. In July of 1985 the FERC issued a joint 50-year operating license for the Kerr project to the MPC and CSKT. As stipulated by the joint license, MPC is to operate the project for the first 30 years and the CSKT would have the option of operating the project for the remaining 20 years of the license.

The joint operating license included Articles 45, 46 and 47 requiring MPC to conduct fish and wildlife studies and to propose specific remedial measures to reduce the operation impacts of the Kerr Project. Specifically, operating impacts to fish and wildlife resources in Flathead Lake and the lower Flathead River as well as habitat loss due to erosion along the northern shoreline of Flathead Lake were to be studied.

1980s - Madison-Missouri

During the late 1980s the MPC initiated studies that would become an integral part of the license renewal application for the nine dams on the Madison-Missouri. Hebgen Dam is included in this license renewal application even though it does not generate any power itself. The remaining eight dams in downstream order are Ennis, Hauser, Holter, Black Eagle, Rainbow, Cochrane, Ryan and Morony. The most obvious issues as the process began were Madison River thermal problems believed to be associated with Ennis Dam, the possibility of peaking at Holter and the effect of peaking at Morony on Missouri River fish populations.

1990s – Kerr Dam

Following the issuance of the joint operating license, MPC conducted additional studies and utilized the studies of others to prepare a Mitigation and Management Plan (Plan) that was submitted in June of 1990. The Plan was the result of an extensive negotiation among MPC, CSKT, US Fish and Wildlife Service and Montana Fish, Wildlife and Parks. The Plan contained very little in the way of changes in the operation of the dam although the resource agencies all agreed that wide fluctuations in flow due to power peaking and load following had a huge impact on lower Flathead River fisheries resources. MPC maintained that they had to have the flexibility to operate the dam as they always had and thus would not negotiate on operations. One of the elements included in the Plan was the stocking of 131,000 pounds of salmonids to Flathead Lake to mitigate primarily for the loss of the kokanee fishery. The fluctuations were believed to have caused the dewatering of kokanee redds around the lake margin.

Subsequent to the Plan being submitted to the FERC, the Department of Interior, Bureau of Indian Affairs (BIA) became actively involved in the process for the first time. They determined to use their 4e (Section 4e of the Federal Power Act) conditioning authority to impose operational changes on the dam. These changes would greatly limit the ability of MPC to produce peaking and load following power. These changes would likely benefit the downstream fishery and would greatly impact the economic value of the project. The 4e

conditions also directed the management of lake levels to reduce erosion at the U.S. Fish and Wildlife Service lands at the north end of the lake.

The issuance of the Draft EIS, which included the 4e conditions, unleashed a firestorm of controversy. The MPC was very unhappy with the 4e conditions not only because they limited the operational flexibility and the economic vitality of the project but because FERC chose to make them additive to the mitigation outlined in the Plan. The recommendations for the management of lake levels resulted in the creation by a local politician of the National Organization to Save Flathead Lake. This organization intervened in the proceeding and generated a great deal of heat on FERC. The Final EIS was published in July, 1996 and looked very similar to the Draft EIS.

The greatest concern from the State's perspective was that the final 4e conditions did not recognize or acknowledge the State as co-manager of Flathead Lake with the CSKT. Virtually all of the responsibility for mitigation planning and implementation was given to the CSKT. The issues surrounding the license were still not resolved in late 1999. The MPC and CSKT continued to battle in court over mitigation dollars that the Tribes felt MPC should have to pay from 1985. The amount in question was roughly $15 million dollars.

The Kerr Dam relicensing was intimately interwoven with Hungry Horse mitigation, the development of a management plan for Flathead Lake, the listing of bull trout and the U.S. Fish and Wildlife Services's insistence that the lake trout fishery be decimated so that kokanee could be successfully reintroduced to Flathead Lake for the benefit of bull trout. This somewhat murky line of reasoning ignored the real problem in the lake, the introduction of Mysis, which severely altered the food web, as well as the likely competition of kokanee with westslope cutthroat trout, which, along with bull trout, were also being considered for listing under the ESA. All of these issues, combined, made for a potent witches brew of controversy in the always volatile Flathead drainage. Fortunately, the good working relationship between the Department and CSKT was helping to make the management issues work out.

1990s - Madison-Missouri

MPC hoped to learn from the protracted Kerr Dam fiasco as they began the Madison-Missouri relicensing in earnest in the early 1990s. They hoped to achieve consensus among the agencies on the mitigation included in the relicensing application. If consensus could be achieve by the MPC and state and federal agencies, they believed they could submit a settlement agreement to FERC that would be adopted in total. Several technical advisory committees were established to work on the specific issues of recreation, fisheries and wildlife.

This approach seemed to work well and, over the course of several years during the mid-1990s, a mitigation package was hammered out and submitted to FERC. There were several contentious issues that were resolved during this process, the most volatile of which was the Madison River thermal issue. Since at least the early 1970s, there had been discussions among MPC, FWP and anglers about the role of Ennis dam in creating the thermal problem downstream of Ennis dam. MPC had retained a MSU professor to model the thermal situation and his analysis seemed to indicate that the dam had little effect on the thermal regime downstream. FWP and local anglers never believed this analysis. The issue simmered for at least 20 years until it boiled over as the MPC 'consensus' package was being submitted to FERC.

Trout Unlimited, both the Madison-Gallatin Chapter and the national organization, intervened in the process with the intent to resolve this issue once and for all. They were very unhappy that they had not been party to the negotiations up to that point. They hired their own consultants and began to chip away at the technical analysis prepared by MPC. In an attempt to hold the mitigation package together, MPC retained several thermal modeling experts to meet with the agencies and TU to look closely just at the thermal issue. Unfortunately their attempt was too little, too late, because the battle lines with TU had been drawn. TU refused to participate in the series of meetings.

The agencies found the meetings to be useful and informative. A new piece of the relicensing application package was prepared to deal specifically with the lower Madison thermal issue. It included mitigation

primarily for acute thermal events, but not much for chronic thermal impacts. This was due to the fact that all of the modeling and data analysis showed little chronic thermal impact from the dam. This conclusion seemed to defy logic, but the scientific analysis seemed to bear it out.

The Madison thermal issue controversy made it clear that although there was consensus among the agencies and MPC on the mitigation package, there certainly was not with TU. Consequently FERC essentially threw out the funding portion of the mitigation package and many of the mitigation tasks as well in their draft EIS on the application. The FWP comments to the draft EIS were designed with the help of a FERC consultant, Fred Ayer, to get most or all of the mitigation tasks back into the license. Without a consensus package, FERC will not tell the applicant how much they must spend on mitigation, only the tasks they must complete. The comments were largely successful.

In December of 1999, the resource agencies were in the process of negotiating a memorandum with MPC to implement the license conditions. Because of the nature of the FERC decision, MPC is not committed to the dollar amount they had agreed to in the 'consensus' mitigation package submitted to FERC. MPC has greatly reduced the amount they say they are willing to spend, particularly in the Helena to Fort Benton reach of the river. However, Steve Leathe, the Region 4 fisheries manager, who has been involved in this process since its beginning, is pushing hard to see that the MPC lives up to its mitigation responsibilities.

Toward the end of this process, MPC sold all of its hydropower resources, with the exception of Milltown Dam on the Clark Fork, to **Pacific Power?**, a Pennsylvania-based energy company. This caused great consternation in Montana and in this process.

As the millennium wound down, everyone involved in the process was waiting to see if TU would sue the FERC for their decision on the Madison/Missouri, which largely supported the Madison River thermal mitigation package negotiated by MPC and the resource agencies. This story was far from over, although everyone hoped it was not destined to go as long as the Kerr relicensing process.

1990s - Noxon and Cabinet Gorge

Washington Water and Power (WWP) began their relicensing efforts on Noxon and Cabinet Gorge reservoirs in the mid 1990s. WWP, to their eternal credit, looked at the relicensing landscape and decided it was too dysfunctional. They did not want to become involved in a protracted Kerr or Madison-Missouri process. FERC at this time was interested in seeing a more collaborative approach taken toward the relicensing approach. WWP was willing to take a chance and try to make a collaborative approach work.

WWP basically invited everyone with an interest in the relicensing to participate. They retained a facilitation consultant and let the process role. WWP created a Relicensing Team with representatives of virtually any entity with an interest in the process. The actual team had as many as 40 people at the table at any one time. The Team was supported by several technical committees that again had open membership. Over the span of 3 years, the Relicensing Team was able to develop a true consensus settlement agreement that FERC incorporated in total into the new license for these two projects. The settlement agreement included not only the tasks for which WWP would be responsible, but also laid out the dollars they would spend to achieve the mitigation goals. Four years after the process began, mitigation dollars were being spent on the ground.

A very large component of the Noxon/Cabinet mitigation package is an effort to restore bull trout as well as Westslope cutthroat trout to the lower Clark Fork.

The History of Fish Health Management in Montana

By Jim Peterson

Montana Fish, Wildlife and Parks maintains a fish health program in order to protect Montana's wild and hatchery fish stocks from disease and to insure that Montana has healthy viable fish populations. The program consists of a coordinated effort of state, federal and university laboratories, which is headed by FWP's fish health project located in Great Falls. Montana's Fish Health Coordinator and a Fish Health Specialist lead the project, which is based at a laboratory at Giant Springs Trout Hatchery. Fish health management for the entire state of Montana is coordinated from the Giant Springs laboratory. Through contracts with the U. S. Fish and Wildlife Service's Bozeman Fish Health Center and various university laboratory support, FWP manages fish health concerns from fish kill investigations and health concerns in wild fish populations to trouble shooting and routine annual inspections at all state and private fish hatcheries in Montana.

The fish health management program in Montana today is based on disease prevention. A strong emphasis is placed on preventing the introduction and spread of fish pathogens in order to control disease. Once a disease-causing organism is introduced into a fish population, it is difficult or impossible to eradicate. This is especially true in wild fish populations. The concept of prevention vs. control of fish pathogens got its start at the very beginning of Montana's fish health management program in the mid-1950's. But it wasn't until 40 years later, when whirling disease was discovered in the Madison River, that most Montanan's would realize the importance of fish health management to Montana's fisheries and the impact a disease-causing organism can have on a wild fish population.

1950's

The roots of fish health management in Montana go back to 1955 when the American Fisheries Society (AFS) took up the issue. Several papers at the 1955 AFS annual meeting discussed the potential disease risks associated with importing fish and moving them between states. A special committee established by AFS identified specific threats and made specific recommendations that states which do not have import rules to protect against the importation of disease should develop the necessary rules. This committee conducted a survey of states and found that 24 states did have some limited regulations dealing with the importation of fish and fish eggs. Twenty -one states did not have such regulations, including Montana. However, in the survey, Montana and Maryland were singled out as the two states responding they were most concerned about the danger of introducing diseases and parasites with foreign imports. This was an especially timely concern since we would learn later that the whirling disease parasite was most likely imported to the United States in 1956.

The recommendations of the 1955 AFS committee would be the foundation of current fish import and transport regulations throughout the United States. The committee's report included recommendations that all states adopt importation rules to protect against the importation of disease. Montana's hatchery biologist, Jack Bailey, began working on Montana's first import policy right away. The first policies were fairly limited, but resources were limited. There were few fish health specialists anywhere in the United States that could even conduct an inspection, and even fewer laboratories to conduct the necessary lab work. Biologists were not even sure what diseases to look for. There was very little understanding of fish diseases at that time, and the names of the diseases of concern in 1955 do not much resemble the pathogen lists we have today.

The importance of the AFS efforts in 1955 can not be overemphasized. The AFS committee, which wrote the report dealing with fish imports, was just the beginning for AFS. In later years, AFS established the Fish Health Section, which developed standards for fish disease testing and certification programs for fish pathologists and inspectors, which is used as the standard for fish health management throughout the United States and other countries around the world.

1960's

Montana's first fish import statute was adopted in 1969 when Montana's 41st Legislature enacted a law that required that salmonid fish or eggs shipped into Montana be certified free of whirling disease and other diseases as identified by the Fish and Game Commission. This law gave the Commission the authority to add pathogens and diseases it felt were necessary to protect Montana's fisheries from introduction of disease. Once this law passed the Legislature, Montana's fish health program really began to develop.

1970's

In 1971 IPN virus was added to Montana's list of pathogens of concern. During the next few years, two other viral pathogens and three bacterial pathogens were added to the list, and, in 1974, the Fish and Game Commission adopted the revised Administrative Rules of Montana (ARM) which included the list of pathogens of concern and other guidelines under which fish may be imported into Montana. The pathogen list adopted in 1974, which includes seven pathogens, including the whirling disease parasite, represents the primary list of pathogens of concern which we still use today.

As Montana's fish health program was growing, so were programs across the country and more people became trained in fish pathology. Montana developed a list of pathologists who could conduct fish health inspections for fish shipped into Montana. In 1972, FWP and the U.S. Fish and Wildlife Service (USFWS) entered into an agreement for fish health laboratory services. Under this agreement FWP would hire a fish health specialist to collect fish tissue samples and deliver them to the Bozeman Fish Cultural Development Center. Laboratory analysis of the samples was conducted at the center by USFWS biologists. This was the beginning of a successful partnership, which is still in place today.

During the 1970's annual inspection programs were initiated for all state and federal brood hatcheries and wild broodstock sources. Annual inspection programs and on-going fish health inspections at all state hatcheries became the primary focus of FWP's fish health program. Inspections at private hatcheries were also initiated. Initially, these inspections were the responsibility of the USFWS, but as Montana's fish health program developed, the state picked up most of the responsibility for inspecting private facilities.

The fish health program grew during the 1970's from one Fish Health Specialist conducting fish health work for about 10% of his time to a project requiring full time attention. Montana's first Fish Health Specialist, Thurston Dotson, was located at Washoe Park Trout Hatchery. He was later relocated to Bluewater Springs Trout Hatchery, where the fish health laboratory was located until 1985. Montana's current Fish Health Coordinator, Jim Peterson, took over the fish health job in 1977, when Thurston was promoted to a Fish Hatchery Manager position.

As knowledge of fish diseases grew during the 1970's, so did knowledge of disease treatments. Drugs and chemicals that had been used to treat other animals or as disinfectants were used to treat fish disease. And along with the use of these new drugs on fish came government regulation through the Food and Drug Administration. Montana got its first exposure to the drug approval process when it used erythromycin, an antibiotic used in human medicine, to treat bacterial kidney disease at the Yellowstone River Trout Hatchery. The drug was obtained and administered under an investigational new animal drug permit (INAD). This was FWP's first exposure to the INAD process, but over the next two decades INADs would become a major part of doing business in fish health management. The use of erythromycin to fight kidney disease at the Yellowstone River hatchery was successful, and the disease was eradicated from the stock. The technique used at the Yellowstone River hatchery was experimental at the time and has since been used as an example for other kidney disease treatment plans across the country.

1980's

Fish health management became an integral part of fisheries management in the 1980's. Regional Fisheries Managers and biologists consulted the fish health project for a variety of fisheries management projects which required fish health consideration. It was also during the 1980's that Montana's fish health project began coordinating with other states and agencies, and fish health professionals realized the importance of sharing information on fish pathogens, treatments and disease testing techniques. FWP became affiliated with the Pacific Northwest Fish Health Protection Committee (PNFHPC), which was a newly formed

organization of agencies in the Pacific Northwest states. Membership included fish health professionals and fisheries administrators from state and federal agencies as well as private representation. PNFHPC developed a "Model Program" for fish health management, which included minimum requirements to be incorporated into state programs. Shortly after formation of PNFHPC, another group organized which Montana also joined. This organization, The Rocky Plains Fish Health Committee, included states in the Rocky Mountain and plains states from Montana to New Mexico. Through membership in these organizations, fish health management became a regional issue and an effective network of fish health information exchange and contacts was developed. FWP's participation in these organizations has been a tremendous boost to fish health protection and disease prevention and control in Montana.

The American Fisheries Society was also actively pursuing development of fish health programs during this time. The AFS Fish Health Section had developed a certification program for fish health professionals and developed standardized techniques in the AFS Fish Health Section "Bluebook". The Bluebook standards were adopted by Montana FWP and incorporated into state law.

The FWP fish health laboratory was relocated to Giant Springs Trout Hatchery in 1985. This allowed the Fish Health Coordinator to operate from a more central location and meet state-wide commitments.

In 1989, the Montana Legislature passed Senate Bill 260, which revised Montana's fish disease laws and added much needed fish health protection requirements. The new law required an import permit for all species of live fish or fish eggs imported into Montana. The only exception was aquarium fish for use in home or office aquariums. The law also gave FWP more authority to deal with intrastate fish transports and authority to quarantine infected facilities. Shortly after the new law was enacted, the Administrative Rules of Montana dealing with fish disease were revised, which further defined FWPs authority to protect Montana's fisheries from introduction of disease. The enactment of the new statutes and rules was the single most important disease protection development of the 1980's.

1990's

The discovery of whirling disease in the Madison River in December 1994 greatly increased awareness of fish disease. With the announcement of the presence of the whirling disease parasite in the Madison River and a 90% decline in rainbow trout in the Madison, whirling disease made headlines across the country. The response was overwhelming and fish health was immediately moved to one of the top priorities of the FWP Fisheries Division. A state-wide survey was initiated to determine the presence of the parasite in Montana waters, an effort that found over 80 waters infected by 1999. A major emphasis was placed on whirling disease research and an unprecedented effort was made to understand whirling disease and how to fight it. The governor appointed a task force to deal with the disease and the Whirling Disease Foundation was formed. A fish disease with its own foundation emphasized the new public awareness of fish disease. For the first time, many people in the public, as well as fisheries managers, realized the impact fish disease can have on wild fish populations and that fish disease is not just a hatchery problem.

By 1998, FWP's fish health lab had relocated from a 7' X 14' room to a remodeled facility developed in a house at Giant Springs Trout Hatchery. Also by that time, a Fish Health Specialist, Ken Staigmiller, was added to the staff, which doubled FWP's fish health staff to two full-time employees.

Since the late 1970's the USFWS had provided laboratory service to FWP from their Fish Disease Control Center in Fort Morgan, Colorado. In 1996, the Fort Morgan lab relocated to Bozeman, and FWP and the USFWS entered into a cooperative agreement for laboratory services. This agreement resulted in a very successful partnership, which currently provides excellent fish health protection for Montana fisheries. The Bozeman lab provides laboratory support services for all hatchery and wild broodstock inspections in Montana as well as trouble shooting diagnostic support. The two agencies are also working together to collect information on wild fish populations through the USFWS Wild Fish Survey, which was initiated in the late 1990's.

Since the beginning of Montana's fish health management efforts, Montana has been fortunate to have the Bozeman Fish Technology Center and its staff available to help with fish health issues. In particular, the

support and expertise of histologists Charlie Smith, John Morrison and Beth MacConnell have been essential components of fish health diagnostics. Beth MacConnell has been especially valuable in recent years with a variety of fish health projects, including whirling disease detection and research. Even though Beth is a USFWS employee, she is currently working for FWP under a special agreement.

Another asset to Montana's fish health management program is a contract between FWP and Washington State University (WSU). Through this contract, WSU provides laboratory diagnostic support for state-wide whirling disease research and survey efforts. Montana's fish health project also utilizes WSU for diagnostic trouble-shooting support.

As fish health management became more and more integrated into all aspects of fisheries management in Montana, it became important to involve other fisheries personnel in the fish health decision-making process. The FWP Fish Health Committee was established, which included fisheries administrators, a hatchery manager and a fisheries manager. A commercial fish hatchery operator and representatives from the Bozeman Fish Health Center were also placed on the committee. This committee discusses a variety of fish health issues and makes recommendations to the FWP Fisheries Division. The committee deals with such things as wild fish transfers, import issues, commercial hatchery licensing and other appropriate fish health concerns.

During the 1990's fish disease diagnostics and treatments became more efficient, but at the same time more complicated. Diagnostic techniques include new methodologies that are many times more sensitive than previously used techniques. Some techniques are so sensitive that interpretation of results is sometimes difficult and determination of which technique to use is an important consideration. As knowledge of the distribution and impact of disease is gained we will have a better understanding of how to apply new technologies. Use of new disease treatments is equally complicated. INADs and special requirements for drug and chemical treatments have required very close coordination with FDA and other agencies. In 1998, the USFWS agreed to allow states to access INADs they have approved by FDA. This allows FWP to use non-registered drugs to treat fish disease. In order to handle the paperwork associated with these INADs, FWP entered into a contract with retired USFWS Bozeman Fish Technology Center Director, Bob Piper. Bob coordinates INAD paperwork between FWP, USFWS and FDA. This is a time consuming requirement, but it is necessary in today's operating environment.

Since the 1950's, the Montana Fish, Wildlife and Parks fish health project has developed into an effective and efficient disease control and health management program. Montana now has a comprehensive program, which is capable of dealing with fish disease issues in hatchery and wild stocks. Fish import and transport issues are managed to reduce risk of disease introduction, and through the Montana FWP lab in Great Falls and the contracts with other agencies and partnerships which have been developed, the Montana fish health project is ready to deal with any fish health issue.

Fluvial Arctic Grayling Restoration (1984 - 1999)

By Patrick A. Byorth

1980's - The Decline

Arctic grayling were native to the Missouri River drainage upstream of the Great Falls, but by the mid 1980's, the sole remaining population of river dwelling, or fluvial, Arctic grayling inhabited the Big Hole River. An intense spring runoff in 1984 began a serious decline in abundance of grayling in the Big Hole River. A second blow to the grayling population was persistent drought. Dick Oswald, regional fisheries management biologist, and Brad Shepard, a fisheries biologist working in cooperation between MFWP and the Beaverhead National Forest, were monitoring the grayling population and studying their spawning ecology. Oswald and Shepard's data enabled them to raise awareness of the crisis facing grayling of the Big Hole River. Rising concern in the fisheries community led to a cooperative effort between MFWP, Montana State University, and the U.S. Forest Service to fund a series of short-term research projects aimed at understanding the ecology, origins, and natural history of the grayling in the Big Hole River drainage. Researchers Harold Stevenson, Don Skaar, Geoff McMichael, and Jon Streu investigated grayling distribution, movements, habitat selection, and interactions with brook trout from 1987 through 1990.

1990's - The Recovery Program

Studies in the 1980's emphasized the urgency to prevent the extinction of the Big Hole River Arctic grayling population. An apparent need to establish a full time recovery program led to an expansion of the recovery group to include MFWP, the Bureau of Land Management, Montana Chapter of the American Fisheries Society, Montana State University and the University of Montana, The Nature Conservancy, Trout Unlimited, the U. S. Fish and Wildlife Service, and the U.S. Forest Service. The Fluvial Arctic Grayling Workgroup, chaired by Chris Hunter, Special Projects Bureau Chief, was formed to develop a cooperative funding mechanism and a plan to recover fluvial Arctic grayling throughout its native range. A non-profit organization, The Arctic Grayling Recovery Program, was developed as a fund-raising and -managing group with the purpose of providing for a long-term recovery effort. Through a memorandum of understanding between state, federal, and private organizations, a five-year project was initiated in September, 1991, when Patrick Byorth was hired as project biologist. The Recovery Program was designed to closely monitor the population, determine which environmental factors were limiting the population and work to mitigate those factors, and develop a brood reserve stock to hedge against extinction while providing a representative source of fluvial grayling for reintroductions. A Fluvial Arctic Grayling Recovery Plan was drafted in 1992 to guide the project and was officially adopted by cooperators in 1993. In October of 1991, private organizations submitted a petition to list the fluvial Arctic grayling as "Endangered" under the Endangered Species Act.

The project focused on researching limiting factors such as impacts of angling, winter habitat and seasonal movements, habitat limitations, water quality and quantity, and competition with non-native species. This research demonstrated that while grayling are easily caught by anglers, they sustain very low mortality under catch-and-release only regulations. Research on life history complimented earlier data, demonstrating that grayling in the Big Hole basin moved great distances to seasonal habitats, and were highly faithful to those habitats. A series of studies were conducted from 1993 to 1996 to determine the impacts of non-native trout on grayling,. These studies revealed that brook trout and grayling spatially segregated and intraspecific interactions were strong among grayling. Further studies demonstrated grayling to be fierce competitors, to their own detriment. During daylight hours, grayling fed voraciously, vigorously defending their feeding territories against rainbow trout and other grayling. While rainbow trout rarely dominated a confrontation with a grayling, they created "interference competition" by sheer numbers, reducing graylings' ability to feed successfully.

The bottom line for grayling came down to water quality and quantity. During severe drought years, the Big Hole River was severely dewatered, even ceasing to flow during 1988. Drought-induced loss of habitat, increased susceptibility to predation, and lethal water temperatures likely drove the decline through the mid 1980's. Ranchers in the upper Big Hole valley relied on the river to provide irrigation for a single cutting of

grass hay, and for stock water through the fall and winter. Dry years pitted the survival of ranching against grayling. In 1994, snowpack was miserably low, mid-summer rain was scarce, and the Big Hole River was going dry. Irrigation was over by mid-July, but water was still withdrawn for stock. To maintain live flow in the river, ranchers were offered an alternative source of water: FWP would buy stock tanks and rent a water truck to provide stock water in exchange for closing diversions. While hauling stock water was a temporary solution, it demonstrated that the Big Hole could run through and the grayling could survive severe drought. Drought also provided impetus for discussions between anglers, ranchers, conservationists and agencies. From these discussions, The Big Hole Watershed Committee formed. This group spearheaded protecting minimum flows by securing grants to drill stockwater wells and studied characteristics of the watershed.

By 1995, the Big Hole grayling population had returned to pre-decline levels and the Restoration Program began to turn its sights on expanding the range. Earlier preparations for reintroductions included Dr. Cal Kaya's (Montana State University) review of streams throughout the grayling's native range that identified suitable reintroduction sites. From 1988 to 1992, gametes were collected from spawning, wild Big Hole grayling to build a genetically representative brood stock. These grayling were raised at the USFWS Bozeman Fish Technology Center by Pat Dwyer. The individual year classes were crossed and backcrossed with others to develop a broad founding population. A second brood reserve was established at the Axolotl Lakes. From these broods, young grayling were gathered for experimental introductions in the West Gallatin River in 1992 -1995, the East Gallatin River in 1993 -1995, and Cougar Creek in Yellowstone National Park in 1993. These experimental plants demonstrated that young grayling could survive and grow, and that they made long-range movements as expected. However, it became apparent that long unimpeded reaches of streams with low densities of potential competitors was necessary to establish self-sustaining populations.

In 1996, reintroduction efforts began in earnest when the Ruby River above Ruby Dam was selected as a reintroduction site. After working extensively with the public, the reintroduction was approved and scheduled for 1997. In 1997, Pat Byorth resigned as project biologist, and was replaced by Jim Magee, who had been project technician since 1993. Jim oversaw planting of grayling in the Ruby River and spearheaded the organization of similar efforts in the North and South Forks of the Sun River, and the Beaverhead River. Future reintroductions are planned at the Missouri Headwaters and in the upper Madison River.

Over time, understanding of fluvial Arctic grayling has increased, along with numbers of grayling. While the future of Montana's unique fluvial Arctic grayling is not quite certain, the actions and dedication of biologists in cooperation with anglers, ranchers and conservationists have ensured there will be a future for grayling.

ILLEGAL FISH INTRODUCTIONS

By Jim Vashro

Early fish distribution efforts depended in part on “sportsmen troughs” at state fish hatcheries and railroad whistle stops across the state. Enterprising anglers could load up a cream can of fish to take to their favorite fishing hole. The “Johnny Appleseed” approach to fish plants created a lot of fishing for which Montana is famous—and also a lot of headaches. By the 1930s, the Department had developed its own fish distribution system and controlled all the fish plants but the pioneer spirit lives on with some people.

The Montana Fish and Game Commission Biennial Report of 1941-42 makes note of the disastrous consequences of many poorly planned introductions such as a loss of recreational fishing, stunted rough fish populations, and a loss of native trout fisheries. A Fish and Game Commission report in 1953 repeated the warning and included a cartoon of a character dumping a bucket full of fish—hence, the term “bucket biologist” for anglers that take matters into their own hands.

In the 1980s fisheries professionals and knowledgeable anglers began to fully recognize the seriousness of the problem as recreational fisheries began to fall behind anglers’ demands and native fish stocks slipped toward listing under “Species of Special Concern” lists or under the federal Endangered Species Act. Chemical rehabilitation was used to remove some unwanted fish but it is impractical in larger waters, expensive, sometimes controversial, and not always effective. Northern pike and yellow perch have been the fish most commonly moved around but the list includes about any fish species you can think of—and a few you probably didn’t think about such as pacu—a fruit-eating Amazon fish found in two locations. Basically, every drainage in the state has been affected. Yellow perch in Lake Mary Ronan and walleye in Canyon Ferry Reservoir are two of the more visible illegal introduction that threaten very popular fisheries.

The 1990s saw increased educational efforts to head off the problem, stiffened statutes and penalties, prosecution of some bucket biologists, and development of a database to track and document the illegal introduction problem. But the problem continues. Through 1999 FWP had documented 345 introductions into 211 waters statewide including 6 illegal introductions into 5 waters in 1999. Illegal introductions may prove to be one of the defining issues for fisheries management in Montana and the nation in the next century.

(REF:JV154-99.doc)

Walleye in Canyon Ferry Reservoir

By Dave Yerk

1950s -1980s

Montana Fish, Wildlife & Parks has systematically sampled the Canyon Ferry fishery since the reservoir first filled in 1955. Historically no walleye were observed in these efforts, nor did MTFWP document a single walleye being caught by anglers. This all changed in 1989, however, when biologists sampled a single walleye in gill nets used to monitor the Canyon Ferry rainbow trout population.

1990s

In the early 1990s, MTFWP initiated the development of a five-year fisheries management plan for Canyon Ferry. The primary issues identified in this planning process were concerns about the declining rainbow trout fishery and a growing interest in establishing walleye in Canyon Ferry. This walleye issue was not a recent one; certain anglers had been advocating such an introduction since the early 1980s. MTFWP took comprehensive measures to address this: We hosted a public workshop investigating walleye-trout interactions in other western states; an environmental assessment was completed specifically evaluating the potential impacts of walleye on the existing Canyon Ferry and adjacent fisheries; and, an extensive public survey queried angler's opinions and preferences. Through this public process it was concluded that habitat conditions in Canyon Ferry were highly favorable for the development of a self-sustaining walleye population. In fact, it was likely they would do too well. This caused great concern because, if this top predator fish became too abundant, it was possible they could negatively affect existing fisheries in the entire reservoir complex. Additionally, the majority (77 percent) of the survey respondents supported maintaining the existing rainbow trout and yellow perch fishery in Canyon Ferry; they generally opposed a walleye introduction, particularly if it were to pose a high risk to the existing fishery. The 1993-1998 plan was presented to the MTFWP Commission recommending that walleye not be introduced into the reservoir and that management emphasis be directed at enhancing the existing rainbow trout and yellow perch fisheries. It was unanimously adopted by the Commission.

Ironically, at the very time MTFWP was addressing a potential walleye introduction in Canyon Ferry, a population was quietly developing in the reservoir. Biologists sampled a few more individuals while completing standardized netting in the early 1990s. In 1993, gill nets set specifically for walleye turned up several, all less than four years-old. It was evident a walleye population was developing in Canyon Ferry.

Because of the risks identified in the management planning process, there was an aggressive mandate in the plan addressing the establishment of illegally introduced species: A..... MTFWP will take immediate action to determine the status of the population and evaluate the possible consequences to existing fisheries ..... [and] as determined necessary .... utilize removal methods or reservoir level manipulations to minimize impacts of illegally introduced fish species on resident populations.

The Department collaborated with the Montana Cooperative Fishery Research Unit at Montana State University in Bozeman to implement a study to determine the status of walleye in Canyon Ferry. Research completed from 1994 through 1996 showed that walleye were firmly established in Canyon Ferry; age and growth data indicate they had been reproducing in the reservoir since at least 1985. While it was uncommon to sample walleye when the study was initiated in 1994, by 1996 it was routine. The population was expanding quickly. Recent netting surveys demonstrate that the population is now dominated by two very strong year-classes of walleye produced in 1996 and 1997. Net catch rates of walleye in Canyon Ferry now exceed those observed in other established walleye fisheries in Montana, this just 10-years since the first one was sampled in the reservoir.

Managers immediately began working on a new plan when the first Canyon Ferry management plan expired at the end of 1998. This new plan includes Hauser and Holter reservoirs and will address the potential implications of the developing Canyon Ferry walleye population on these downstream fisheries. Because

walleye are now firmly established throughout the system, the central objective of this new plan is to maintain multi-species fisheries (including walleye) in all three reservoirs. To accomplish this, walleye densities will need to be maintained at levels low enough to be compatible with the other fisheries. Biologists hope that liberalized harvest limits will be effective in slowing the expansion of this population. However, understanding that the current Canyon Ferry walleye population was produced by relatively few adults, the reproductive potential of this population may not be realized until year 2001 when the females from the very strong 1996 year-class spawn for the first time.

ORGANIZATION

NOTE: THE FOLLOWING PERSONNEL LISTS WERE DERIVED PRIMARILY FROM BILL ALVORD'S DRAFT OF THE HISTORY OF THE FISHERIES DIVISION THROUGH 1985. THE LIST WAS NOT PUBLISHED IN HIS 1991 DOCUMENT. ADDITIONS TO THE LIST AFTER 1985 WERE FROM MEMORY AND RECENT PERSONNEL LISTINGS. ALL OF THE DATES OF OCCUPANCY IN THE POSITIONS ARE NOT KNOWN AND ARE INDICATED BY A (?). ALSO, HATCHERY MANAGER POSITIONS SHOULD BE CHECKED AND UPDATED, IF NEEDED. THE LIST SHOULD BE REVIEWED BY OTHERS. Liter Spence 9/10/2000

FISHERIES DIVISION ADMINISTRATORS

This position was first called Superintendent of Hatcheries. It was changed to Superintendent of Fisheries and then to Chief, Fisheries Division. It is now Fisheries Division Administrator.

1908-1912	C. F. Healea
1912-1919	H. D. Dean
1919-1924	J. H. Brunson
1924-1926	C.A. Jakways
1926-1928	I. H. Treece
	J. W. Schofield
1928-1934	K.F. MacDonald
1934-1936	Elmer Phillips
1936-1940	J. W. Schofield
1940-1944	Elmer Phillips
1944-1948	A. G. Stubblefield
1948-1960	W. M.. Allen
1960-1963	William Alvord
1963-1986	Art Whitney
1987-1989	Pat Graham
1989-	Larry Peterman

CHIEF, MANAGEMENT BUREAU

This position was first called Chief Fisheries Biologist, then Chief, Fish Management and Research Bureau ,and currently Chief, Management Bureau.

1947	C. K. Phenicie
1957	George Holton
1983	Al Elser
1986	Pat Graham
1987	Steve McMullin
1989	Howard Johnson
?	Jim Satterfield
?	Karen Zacheim

ASSISTANT ADMINISTRATOR

1983	George Holton
1987	Tim Gallagher

OPERATIONS OFFICER

?	Chris Hunter

CHIEF, HATCHERY BUREAU

1957	F. S. Keller
1963	William Alvord
1971	R. A. Mitchell
1977	Emmett Colley
1986	Thurston Dotson
?	Gary Bertellotti

CHIEF, RESEARCH BUREAU

1983	Pat Graham
1986	Larry Peterman
1990	Chris Hunter
?	Ken McDonald

REGIONAL FISHERIES MANAGERS

Region 1 - Kalispell

1951	Frank Stefanich
1959	Boyd Opheim
1964	Delano Hanzel
1965	Robert Schumacher
1983	Jim Vashro

Region 2 - Missoula

1954	Art Whitney
1964	Boyd Opheim
1969	Dennis Workman
1999	Chris Clancy (acting)

Region 3 - Bozeman

1952	Boyd Opheim
1959	William Alvord
1960	John J. “Bud” Gaffney
1974	Ron Marcoux
1981	Jerry Wells
188?	Dick Vincent
?	Bruce Rich

Region 4 - Great Falls

1951	Nels Thoreson
1966	Richard Johnson
1974	Al Wipperman
198?	Steve Leathe

Region 5 - Billings

1956	Perry Nelson
1962	Clint Bishop
1982	Pat Marcuson
1983	Al Elser
1984	Steve McMullin
198?	Jim Darling

Region 6 - Glasgow

1952	William Alvord
1959	Cliff Hill
1961	Jim Posewitz
1966	Robert Needham
199?	William Wiedenheft

Region 7 - Miles City

1951	Art Whitney
1954-1959	Region 6 covered
1959-1964	Region 5 covered
1964	Richard Johnson
1966	Don Bianchi
1971	Al Elser
1983	Phil Stewart
?	Brad Schmitz

STATE FISH HATCHERIES AND HATCHERY MANAGERS

Arlee

1944-1951	Clarence Ripley
1951-1970	Vern Campbell
1970-1978	Warren Taylor
1978	Jim Crepeau
?	**?**

Big Timber

1922-1923	A.G. Stubblefield
1923-1924	M.L. Matzick
1924-1931	Iver Hoglund
1931-1937	J.W. Schofield
1937-1942	Forest Keller
1942-1944	Leo Gilroy
1944-1957	Forest Keller
1957-1969	Ross Snyder
1969-1977	Tom Morgan
1977-1986	Thurston Dotson
1987	Darryl Hodges

1987 Bluewater

1949	George Ripley
1949-1 951	Vern Campbell
1951-1977	Emmett Colley
1977-1986	Tom Morgan
1987	Gary Shaver

Emigrant

1919	J.W. Schofield
1923-1926	Oren Hathaway
1927-1930	P.G. Botteler
1931-1932	O.E. Johnston
1932-1933	J.P. Campbell
1933-1935	Fred Beal
1935-1937	George Miller

Great Falls

1922-1932	A.G. Stubblefield
1932-1934	P.G. Botteler
1934-1936	Leo Gilroy
1937-1939	P.G. Botteler
1940-1943	Melvin Larson
1943-1945	J.M. Colley
1946-1960	Iver Hoglund
1960-1961	Eugene McBride
1961-1991	Robert Hughes
1991	Bruce Chaney

Hamilton

1922-1935	J.P. Sheehan
1936-1937	Melvin Larson
1940-1950	Eli Melton
1951-1961	Leo LeTray

Lewistown

1922-1923	K.F. MacDonald
1924-1925	Iver Hoglund
1926-1927	Melvin Larson
1927	Reese
1927-1928	J.W. Schofield
1929-1931	L.R. Donaldson
1932-1933	P.G. Bottleler
1933-1944	Iver Hoglund
1944-1953	Leo Gilroy
1953-1976	Ed Furnish
1976-1985	Eugene McBride
1986	Jack Boyce

Libby

1930-1935	Elmer Phillips
1935-1937	J.P. Sheehan
1937	Elmer Phillips
1937-1942	Graham Cadwell
1942-1947	George Ripley
1947-1951	J.P. Sheehan
1951-1961	Les Newman
1961-1964	Eugene McBride
1964	Robert A. Mitchell
1964	Eugene McBride

McNeil

1953	Herb Friede
?	Tom Schurr
?	Jim Eberle
?	Clint Burnett

Murray Springs

1968-1986	Warren Taylor
1987	Jim Schreiber

Ovando

1923-1932	T.E. Day
1933-1937	G. Miller
1937-1940	Vern Campbell
1941-1944	B. Hamann
1944	V. Harper
1953-1954	Tom Schurr

Philipsburg

1931-1935	G. Cadwell
1935	M. Walsh

STATE FISH HATCHERIES AND HATCHERY MANAGERS (Cont'd)

Polson

1927-1932	E. Melton
1933-1935	O.W. Link
1935-1937	G. Cadwell
1937-1940	L. Gilroy
1941-1954	Art Tangen
1954	Tom Schurr

Red Lodge

1931-1932	Art Tangen
1933-1934	M. Hoglund
1935	Ross Snyder

Somers

1912-1926	H.D. Dean
1916-1921	E. Melton
1921-1923	0. Johnston
1923-1932	M. Matzick
1932-1935	E. Melton
1935-1937	J. Campbell
1937-1947	J. Sheehan
1947-1951	F. Marcoe
1951-1953	Ed Furnish
1953-1970	John Cox
1970-1977	Vern Campbell
1977-1980	John VanEngen
1980	Stewart Kienow

ANACONDA HATCHERY IS MISSING. IT WAS MISSING FROM ALVORD'S ORIGINAL DRAFT