Montana Department
of
Fish, Wildlife & Parks

BOULDER RIVER

FISHERIES MANAGEMENT PLAN

1992 Through 1996

Developed by:

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SUMMARY

The Boulder River, its tributaries, and drainages (Figure 1) provide excellent opportunities for wild trout fishing and many other seasonal and year-round recreational opportunities. Several excellent stretches of spawning and fishery habitats produce rainbow, brown, brook, Yellowstone cutthroat, westslope cutthroat, hybrid trout species, and mountain whitefish.

Seasonal fluctuations in trout populations occur within the Boulder River system, but fish populations are reasonably stable. Agricultural dewatering of the lower reaches of the East Boulder River and diversions from the lower main Boulder River adversely affect fish populations and hamper trout movement from the Yellowstone River to the Boulder River system, especially during fall spawning runs.

The Montana Department of Fish Wildlife & Parks (MDFWP) and the USDA Forest Service (USFS) are engaged in cooperative efforts to encourage and expand Yellowstone cutthroat and westslope cutthroat trout populations. The efforts include monitoring and improving spawning habitat for these indigenous species and relocation of native cutthroat to areas above natural barriers.

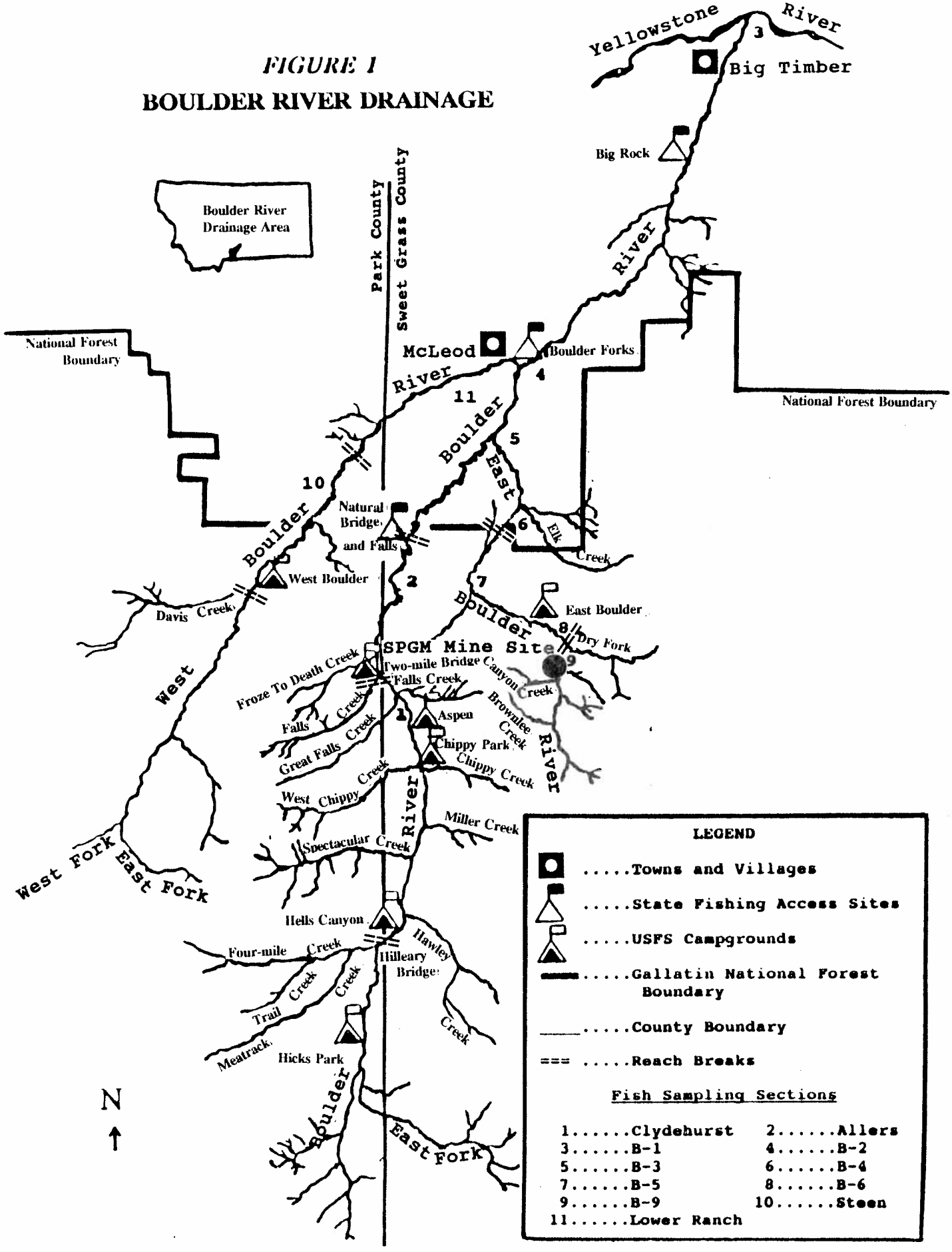
Anglers and other recreationists have adequate access to much of the upper main Boulder and East Boulder Rivers and their tributaries. However, access to the lower main Boulder and West Boulder Rivers is limited due to private land-ownership along the rivers.

A new mine is likely to be developed on the East Boulder River, and interest in recreational property is increasing throughout the Boulder River drainage. With traditional and new uses of resources in the Boulder River area, maintaining and improving the fishery requires thoughtful management, supported by public interest and cooperation.

The MDFWP goal of this five-year *Boulder River Fisheries Management Plan* is to meet public demand for sustained, high-quality wild trout fishing and recreational opportunities. Specific objectives for trout population densities and recreational use are offered, as well as proposed strategies for meeting the goals and objectives.

FIGURE 1

BOULDER RIVER DRAINAGE



INTRODUCTION

Combining spectacular scenic beauty with excellent wild trout fishing, the Boulder River drainage is garnering nationwide attention. A growth in the number of recreational residences, and the prospect of a new mining project in the East Boulder drainage bringing the probability of an increased job market to the area, make the Boulder River and its tributaries a likely subject of increased attention and use.

To sustain and improve this varied and generally excellent fishery for brown, rainbow, and cutthroat trout, and establish fisheries and recreational objectives and strategies, MDFWP prepared this five-year *Boulder River Fisheries Management Plan*. The plan includes descriptions of fish and fish habitat in the drainage. Anticipated population growth in the Boulder River locale, fishing pressure, and other recreational uses are discussed.

The objectives and strategies presented in the plan incorporated comments from many interested persons. Sources included angler creel censuses, opinion surveys, and personal contacts.

THE WATERSHED

The Boulder River originates in the rugged, high elevations of the Beartooth Mountains in the Gallatin National Forest. The Boulder River tumbles through a mixed-conifer forest from the highest point in the drainage on Mount Douglas, at 11,300 feet, to the Natural Bridge Falls, at 5,100 feet. From Natural Bridge and Falls (the bridge collapsed in 1988) to its confluence with the Yellowstone River, the Boulder drops an additional 1,100 feet (to 4,000 feet) through a valley of mixed conifers, deciduous trees, shrubs, grassland, and agricultural land. The total vertical drop is 7,300 feet along its approximately 60-mile path to the Yellowstone.

The 523 square mile Boulder River watershed lies approximately 50 percent in Sweet Grass County and 50 percent in Park County. The watershed drains the East Boulder, West Boulder, and Lake Plateaus as well as the mountains at the extreme headwaters to the south, southwest, and southeast. Much of the land drained by the Boulder River system lies within the Absaroka-Beartooth Wilderness. Annual precipitation varies with altitude and location, but ranges from a high on Monument Peak of 24.6 inches (primarily as snowfall) to 12.0 to 14.0 inches at the Yellowstone River elevations. Twenty-year averages of snowfall during April show Monument Peak having the greatest accumulations at 66 inches, with the Box Canyon recording station having 34 inches, and Placer Basin receiving 50 inches. The East Boulder typically receives 20 to 23 inches of precipitation, most of which falls between April and July. The West Boulder receives comparable amounts of precipitation. Snowpack melting contributes to heavy runoff during the months of May, June, and early July.

The average discharge of the Boulder River, measured at Big Timber for the past 41 years, is 584 cubic feet per second, or approximately 423,100 acre feet per year. The maximum discharge for the river was recorded on March 28, 1956 at 9,480 cubic feet per second, and the maximum gauge height at 8.25 feet on July 8, 1975. The minimum discharge was recorded on August 26-27, 1961 at 10 cubic feet per second. Peak flows typically occur between late May and early June.

Flowing clear, cold, and fast, the upper main Boulder (above Two-mile Bridge) cuts through a glacial valley in the Beartooth Mountains. The steep slopes of the valley give rise to fast, steep tributaries (gradients up to 42%, but normally in the 20% to 30% range), whose gradients lessen near their mouths, allowing stream sediment loads to be deposited. Some portions of the upper main Boulder are currently classed as "Scenic" by the USFS. The upper main Boulder is scheduled to undergo analysis for possible re-designation as a "Wild and Scenic River". This portion of the river has a moderate to steep gradient with flat, rocky riffles flowing between widely-spaced pools and runs. Fish from several lakes above the headwaters may escape and supplement downstream fisheries.

From Allers Ranch (Figure 1) north to the Natural Bridge and Falls, the gradient lessens (down to 1% in places), creating good gravel deposits mixed with riffle areas and large-substrate stretches characterized by pockets and rapids.

The first three to five miles above the Falls is considered the best spawning area on the upper main Boulder. The 200-foot Falls form a natural fish barrier that prevents upstream migration.

Below the Falls for four to five miles, the Boulder meanders through agricultural land on a gentler gradient to its confluence with the East Boulder. There are excellent stretches of small-substrate beds suitable for spawning trout. The Boulder from this point to its mouth is a bit steeper and strewn with boulders and cobbles, producing pocket water with a scattering of gravel beds.

The East Boulder and West Boulder, over their lengths, are quite similar to the main Boulder in terms of gradients and streambed materials. The East Boulder is severely impacted by agricultural dewatering on its lower stretch below the National Forest boundary (approximately 5 miles from its confluence with the main Boulder River). There are fish barriers and some agricultural dewatering over the lower four to six miles of the West Boulder.

Floods and droughts alter fish population cycles in the Boulder River system. During average runoff years, however, there is adequate water for fish, irrigation, and other water uses, with the exception of the lower East Boulder and lower main Boulder Rivers.

Excellent habitat in the Boulder drainage produces abundant wildlife, including antelope, whitetail and mule deer, elk, bear (including grizzly), Rocky Mountain big horn sheep, and mountain goats. Although public access along the lower part of the main Boulder and East Boulder Rivers is limited due to private land-ownership and distance from the roadway, USFS accesses, bridge crossings, and three MDFWP accesses allow for fishing, floating, and other outdoor activities (Figure 1). The upper reaches are available for diverse recreational activities, such as fishing, hunting, hiking, camping, picnicking, horseback riding, photography, and floating (in those areas neither too swift nor too treacherous). The West Boulder below the National Forest boundary lies almost entirely within private land, making access extremely difficult. With the exception of the West Boulder Campground, access requires permission from landowners.

THE GROWTH

Prior to the early 1800's, Native American tribes occupied the Boulder River area. The Shoshoni Tribe was the first to regularly inhabit the area, but was later supplanted by horse-adapted tribes, principally the Crow. The Blackfeet, Cheyenne, and Sioux also frequented the area, and the Nez Perce used it as part of an intertribal hunting ground.

The Lewis and Clark expedition (1804-1806) noted the wealth of fur bearers in the upper Yellowstone. A member of that expedition, John Colter, led Manuel Lisa's Missouri Fur Company to the mouth of the Big Horn River in fall, 1807, where Lisa established Fort Raymond. Fur trappers explored and reaped the wealth of most of the drainages, paving the way for other adventurers, and ultimately the settlers.

Mineral prospecting on the main Boulder and East Boulder drainages began in the mid-to-late 1860's, and placer gold was found on the Boulder in 1866. Extensive deposits of gold, silver, and lead were found at the head of the nearby Stillwater River. By 1879 several silver and gold quartz lodes had opened on the upper main Boulder; and by 1881 the Independence Mining Company was operating the first stamp mill in the area near Independence. In fall, 1892 an estimated 400 to 500 persons were working in the mines around Independence. In the 1890's there were major placer mining sites on Iron Creek, the East Boulder for approximately one mile above its confluence with the Dry Fork, and on the Dry Fork from its mouth to the mouth of Hubble Creek.

Currently, SPGM, a partnership formed between Chevron Resources Company and Manville Sales Corporation, is involved in the permitting process for a mining operation on the upper East Boulder River. The permit area contains a portion of the Stillwater ultra-mafic (extremely dark ore) complex which has relatively rich deposits of platinum group metals. The platinum averages about the same and palladium averages up to seven times the ore grade in a zone twice as thick as the Merensky reef in South Africa. At 28 miles long, it is much smaller than the Merensky reef, but is still a major find and is the only known economically viable source of platinum group metals outside of South Africa and the Soviet Union. Pegasus and Pathfinder have staked claims in the Independence area, but to date have not applied for permits to operate mining enterprises. Several privately-held claims exist throughout the area, including extensive chrome claims held by Dewey Whittaker on the Stillwater ultra-mafic complex.

After the removal of the Boulder drainage from the Crow Reservation in 1882, timber cutting in the Boulder River area began with massive tie hack operations to provide timbers and ties for the Northern Pacific Railroad during 1883 and 1884. During this time the towns of Livingston and Big Timber were founded, and they are still major supply centers for the area today. In October, 1883 an estimated 200,000 ties were stacked along the tracks at Big Timber. Although timbering never became a major industry in the Boulder area, several small sawmills provided rough-cut lumber for homesteaders, ranchers, and miners.

Forest management was introduced to the Boulder drainage, not because of timbering, but because of heavy grazing pressures on the forest by sheep and cattle. In 1896 there were an estimated 15,000 to 18,000 head of cattle, an equal number of sheep, and 2,000 horses running on open forest range. By 1910 it was evident that the flocks of sheep were damaging the fragile forest and mountain environment, and grazing permits were issued to limit the number of sheep allowed on forest property.

Traditionally, agriculture has been the cornerstone of the economy in the area; however, the proposed East Boulder mine is a potential major contributor to the economic base. The proposed SPGM mine for the East Boulder River would be the largest hard rock mine in the state. The mine is projected to begin production by summer, 1994 at the earliest. SPGM proposes to employ 600 full-time workers at full operation, with a projected hiring rate of 30 percent local people and 70 percent from

outside the area. Approximately 180 employees would come from the local population and 420 from elsewhere. An influx of 1,260 people (based on an average family size of 3) is possible, with additional people coming into the area to fill spin-off jobs.

Agriculture remains the single most important industry in the area. Today it provides approximately 30 percent of the jobs and 18 percent of the personal income in Sweet Grass County. Its primary base is sheep and cattle ranching. Per capita income averages approximately $8,100, which is two-thirds the national level. The population of Sweet Grass County has remained fairly stable, at a level of between 3,100 to 3,300. Approximately half reside in Big Timber.

THE HABITAT

The Boulder River drainage constantly changes, as do all ecosystems. The appearance of stability is only an illusion created by dynamic equilibrium. That is, an ecosystem has the ability to absorb and counterbalance forces acting on the system. The condition of a fisheries habitat at any given time depends on the state of these complex changes.

The system, composed of the main Boulder River, East Boulder River, West Boulder River and all their many tributaries, provides a wide diversity of fisheries habitats. The Boulder River system is part of the habitat required by some fish from the Yellowstone River. Trout numbers are directly dependent on habitat quality. Essential factors in that quality are water quality, temperature, and flow; suitable bottom materials; bank and bottom stability; and an adequate food source.

The general suitability of the Boulder River system fisheries habitat is periodically reduced by natural and man-caused events. Among the natural occurrences adversely impacting the habitat are extreme runoffs, droughts, wild fire, and mass wasting of detrital soil and rock due to instability and water infiltration. The more common man-induced hazards to fish habitat are bank trampling by livestock, introduction of pesticides and herbicides by improper application, infiltration of septic system waste into groundwater, use of off-road vehicles, channelization, and irrigation diversions. Any one or combination of these factors can cause extensive damage to habitat and fish populations within the system.

Main Boulder River

Headwaters to Hilleary Bridge (9.6 miles)

The habitat downstream from the alpine headwaters to the Hilleary Bridge (Figure 1) is steep and boulder-strewn, with clear, cold water. This reach of the river is characterized by combinations of rapids, riffles, plunges, and pools in a spectacular sub-alpine setting of mixed conifers, patches of aspen, and picturesque meadows. Data from the USFS Zone Fisheries, Gallatin National Forest indicates that the East Fork of the Boulder (not to be confused with the East Boulder

River), where it joins the main Boulder, has a moderate gradient, with increased volume, large substrate, and scour pools. This provides good spawning habitat for cutthroat. Surrounding habitats are home to deer, elk, bear (this is occupied grizzly country), and a variety of birds, including ruffed grouse. Harlequin ducks nest beside the river in this area. Short stretches of more placid waters, interspersed throughout this reach, provide suitable finer gravel substrate for trout redds and assure good spawning and rearing areas for localized game fish populations.

Hilleary Bridge to Two-mile Bridge (12.8 miles)

From Hilleary Bridge to Two-mile Bridge, the gradient remains fairly steep, with fast water, plunges, pools, and riffles. Interspersed are more moderate gradients where resistant rock exists. Near the mouth of Four-mile Creek, one of the upper main Boulder's main tributaries, the river gradient lessens. This results in the deposition of clean gravels and formation of long, wide pools and pocket water. Several miles downstream from Four-mile Creek, the river plunges through the steep, boulder-strewn Hells Canyon area. Clean gravel substrate provides excellent spawning areas, making it unnecessary for resident trout populations to travel great distances for suitable spawning and rearing habitat. Water clarity and quality are excellent.

The Clydehurst electrofishing section (Figure 1), located within this reach, is named for a guest ranch. There is a church camp across the main access road from the guest ranch. This is an area of steep runs, intermingled with flatter areas. As with the rest of the upper Main Boulder, this provides short stretches of excellent spawning and rearing habitat. Here, the steep sections of the main Boulder are characterized by rapid white-water, a substrate of large boulders, and cobbles with plunges and some pools.

Two-mile Bridge to Natural Bridge (6.5 miles)

From Two-mile Bridge to Natural Bridge the gradient lessens, resulting in the deposition of clean gravels, forming a mix of riffles, runs, and deep pools. The first two to five miles above Natural Bridge is considered the best spawning area on the upper main Boulder. The half-mile of river immediately above the falls is one long, slow, deep hole. The Allers electrofishing section is located within this reach (Figure 1). It begins slightly above the Allers Ranch across from the USFS work station and is a major spawning area for rainbow trout.

In the area of Natural Bridge and Falls, there are cooperative efforts underway to reestablish the peregrine falcon. A major subdivision just below Falls Creek lies close to the river, but it is well-camouflaged from the main road by its position and an abundance of conifers.

Natural Bridge to Mouth (32.9 miles)

Below Natural Bridge (a MDFWP access site managed cooperatively with the USFS) to its confluence with the East Boulder River, the river gradient is gentle and meandering, with superior spawning habitat and

an abundance of good gravels and clear water. This seven-mile portion of the reach has an excellent distribution of riffles, runs, and pools and is important to spawning fish from the Yellowstone River, as well as resident species. Grazing and trampling by cattle have damaged some of the riparian habitat. The MDFWP maintains an access area (Boulder Forks) near the confluence of the main Boulder and West Boulder Rivers. From the confluence of the rivers downstream, the Main Boulder, once again, is boulder-strewn substrate with pocket water, but few plunges, on its way to join the Yellowstone. Approximately four miles upstream from Big Timber, the MDFWP maintains the Big Rock fishing access site. Numerous irrigation water withdrawals often severely dewater the lower four to five miles of the Boulder River. Often during drought years, the river is almost dry near its mouth. Construction of gravel diversion dikes across the entire river channel, to divert water flow to irrigation ditches, creates problems for migrating fish.

East Boulder River

Headwaters to Dry Fork (6.6 miles)

The headwaters of the East Boulder River are located high on the East Boulder Plateau. The clean, cold waters of the river meander in a northerly direction across a high mountain meadow before cascading down several thousand feet through the massive boulder substrate of the spectacular East Boulder Canyon. This canyon is an effective barrier to upstream fish migration. The gradient begins to lessen below the mouth of Canyon Creek, forming a series of plunges, pools, and riffles. Small pockets of clean gravel can be found behind mid-stream boulders. Local resident fish populations rarely have to leave the territory to find suitable habitat for spawning and rearing young.

The proposed SPGM East Boulder Project would be approximately one mile upstream from the confluence of Dry Fork with the East Boulder River (Figure 1). This project is the source of some concern in relation to protecting the East Boulder from road dust, mine waste, and improved access. Proposals to reduce these dangers are addressed in the Plan of Operations and the company has conducted extensive environmental studies to comply with the environmental protection laws of the state of Montana and those of the United States. The MDFWP and other agencies will continue to monitor the progress of this mining project and the mine itself for any adverse effects.

Dry Fork to Forest Boundary (6.7 miles)

Below the mouth of Dry Fork, the gradient is moderately steep, with fast water, plunges, and riffles gradually giving way to more moderate gradients near the Forest boundary. The river flows over a cobble and boulder-strewn substrate with few pools. Short stretches of more placid water interspersed throughout this reach provide limited gravel substrate suitable for trout spawning. This reach has an excellent, varied habitat mix with good canopy cover. The USFS East Boulder Campground is located near the lower end of the reach.

Forest Boundary to Mouth (5.2 miles)

From the Forest boundary, the East Boulder River leaves the mountain front to enter the wide main Boulder Valley. Near its mouth, the river gradient remains fairly steep, with fast water, riffles, plunges, and few pools. Clear, cold water flowing over a cobble-boulder-gravel substrate provides limited spawning and rearing areas for resident trout populations and migrant trout from the main Boulder River. Elk Creek, a small tributary approximately four miles upstream from the mouth, has an identified fishery. Nearly every year, the lower East Boulder is severely impacted by agricultural dewatering. During late summer and fall, major diversions near the Forest boundary and additional downstream diversions combine to almost completely dewater the river at its mouth. Water usage and demand adversely affecting the fishery on this part of the system is a continuing concern to the MDFWP because of the value of the spawning area near the East Boulder's confluence with the main Boulder River. Grazing, residential development, land clearing, and irrigation ditch maintenance have damaged some of the riparian habitat and stream bottom.

West Boulder River

Headwaters to Davis Creek (12.1 miles)

The upper West Boulder is a replica of the main and East Boulder Rivers, cascading through a mixed-conifer forest. There are two natural barriers to upstream fish migration on the upper West Boulder. The second falls (approximately 3.25 miles above the forest boundary) is an apparent barrier; and the third falls (about 8 miles above the forest boundary, just above the confluence with Falls Creek) is a definite barrier. Below the confluence of the East and West Forks (Figure 1), the upper West Boulder meanders through West Boulder Meadows. The clear, cold water flows over a substrate of cobbles and boulders, interspersed with areas of clean spawning gravels in the more placid areas flowing through meadows. Just upstream from Davis Creek, the river is incised through a canyon with a large boulder-cobble substrate. Surveys in the West Boulder Meadows area found livestock trampling was adversely impacting stream banks.

Davis Creek to West Boulder Road Crossing (7.2 miles)

From Davis Creek, where the West Boulder River leaves the mountain front, five miles downstream to the West Boulder Road crossing is the best overall trout habitat in the river. As it leaves the mountain front, the gradient lessens and the canyon opens up, allowing the river to meander and form longer, deeper pools and runs. Substrate through the reach consists of clean spawning gravels, interspersed with cobbles in the riffle areas. The reach has ideal fish habitat, with a moderate gradient and a 50:50 ratio of riffles and pools. The abundance of undercut banks, log accumulations, and deep pools provide excellent cover for fish.

Access to the upper West Boulder is limited to a trail entrance at the USFS West Boulder Campground. The USFS also maintains a work station there. Fishing access below the upper Burnt Leather Ranch is

extremely restricted because of private ownership of land bordering the river. Therefore, fishing pressure minimally affects the fishery. Although there is some bank degradation and riparian habitat damage due to overgrazing and trampling, the fish habitat is excellent. There is a two-mile stretch of wildlife preserve owned by a private cooperative below the upper Burnt Leather Ranch. This stretch is bordered by a mix of conifers, aspen, deciduous brush, and meadow and provides superior habitat for both fish and wildlife species.

West Boulder Road Crossing to Mouth (9.7 miles)

From the West Boulder road crossing to the river's mouth, the gradient steepens and stream velocity substantially increases. This reach has a boulder-cobble substrate, with numerous riffles and limited pools. Because of steep gradient and large substrate, suitable spawning gravels are limited. One exception is a spawning area, used by resident and migrant fish, located near the confluence with the main Boulder River. Along this reach, residential developments, and overgrazing and trampling by livestock have caused some bank degradation and riparian habitat damage.

Because of its spectacular scenic beauty and relative remoteness, the West Boulder and main Boulder are attractive to out-of-state buyers. Several celebrities own summer/vacation homes and ranches there. The area is being subdivided by "occasional sale"; and impacts on the fisheries habitats will depend on the sensitivity of development planners.

THE FISH

Main Boulder River

The main Boulder River was considered as four reaches, based on changes in habitat and composition of fish species. Within each of these reaches MDFWP established electrofishing sections to monitor changes in fish populations. Tributaries, other than the East and West Boulder Rivers, generally will not be discussed because many have precipitous gradients and only nine of the twenty-seven tributaries evaluated for fisheries near their mouths were found to support trout populations.

Headwaters to Hilleary Bridge

From the beginning of the main Boulder and its tributaries to Box Canyon (Figure 1), fish populations include genetically pure Yellowstone cutthroat trout. Electrofishing at the Absaroka-Beartooth Wilderness boundary revealed that fish size is small (averaging 5.9 inches). In 1986-87, trout densities averaged 80 to 100 fish per mile.

Sampling at the confluence of the East Fork of the Boulder with the main Boulder River near Box Canyon revealed the presence of Yellowstone-westslope hybrids in relatively high densities. Trout sampled from approximately three miles up the East Fork of the Boulder

were a combination of pure Yellowstone cutthroat trout and Yellowstone cutthroat-rainbow trout hybrids. Rainbow trout have access to the East Fork via Rainbow Creek, which drains from Rainbow Lakes.

From the Box Canyon trailhead to Hilleary Bridge, the trout population is primarily Yellowstone cutthroat trout hybrids (Yellowstone-westslope cutthroat, Yellowstone cutthroat-rainbow).

There is an established electrofishing section near the Hilleary Bridge (approximately 20 miles above Natural Bridge). Sampling results from 1986 showed there were an estimated 223 fish per mile, ranging from 4.2 to 12.5 inches in length (age 1 and older). There are also localized brook trout populations in this section.

Hilleary Bridge to Two-mile Bridge

In an established electrofishing section near the Clydehurst Ranch (Figure 1), the river supported an estimated 1,600 rainbow trout per mile during 1986. These fish ranged in age from one to three years, with most (70%) in the one-year class, averaging from 4 to 7 inches in length. In fall, 1986 the total sample of all ages ranged from 2.2 to 15.4 inches in length. Some brook trout populations exist in this reach, but too few to estimate fish per mile.

Two-mile Bridge to Natural Bridge

The Allers electrofishing section, named for the Allers Guest Ranch that borders the river, is located within this reach. This reach is a major rainbow trout spawning area. Rainbow and brook trout populate the section, with rainbow dominating in number since 1986 (Figure 2). Fish population studies conducted in this reach in 1972, 1973, and 1974 indicated that numbers varied from 493 to 585 fish per mile over the period. (The rainbow trout population estimates are from 1974 data for fish over 5 inches long.) From 1974 to 1986, rainbow trout numbers increased nearly 200 percent and the increase was evident in all age classes. In 1986, large fish age three and older made up 76 percent of the population.

Rainbow trout were estimated at 1,575 fish per mile in spring, 1986. Up to 250 trout were counted in some of the deep holes. In 1987, rainbow trout numbers decreased to 1,300 fish per mile, but the fish were larger. Fish age five and older made up 44 percent of the total population. In 1988, there was a slight increase to 1,399 fish per mile, and 67 percent of the fish were five years and older.

Brook trout in this section have an unexplained history of wide fluctuations in population, from a high of 2,125 fish per mile in 1972 to a low of 666 fish per mile in 1986. The 691 brook trout per mile in 1974 approximates 1986 numbers (Figure 2).

Natural Bridge to Mouth

This reach begins at the Natural Bridge and Falls (a complete barrier to upstream fish movement) to the confluence of the Boulder with the Yellowstone River. This reach encompasses a variety of habitats

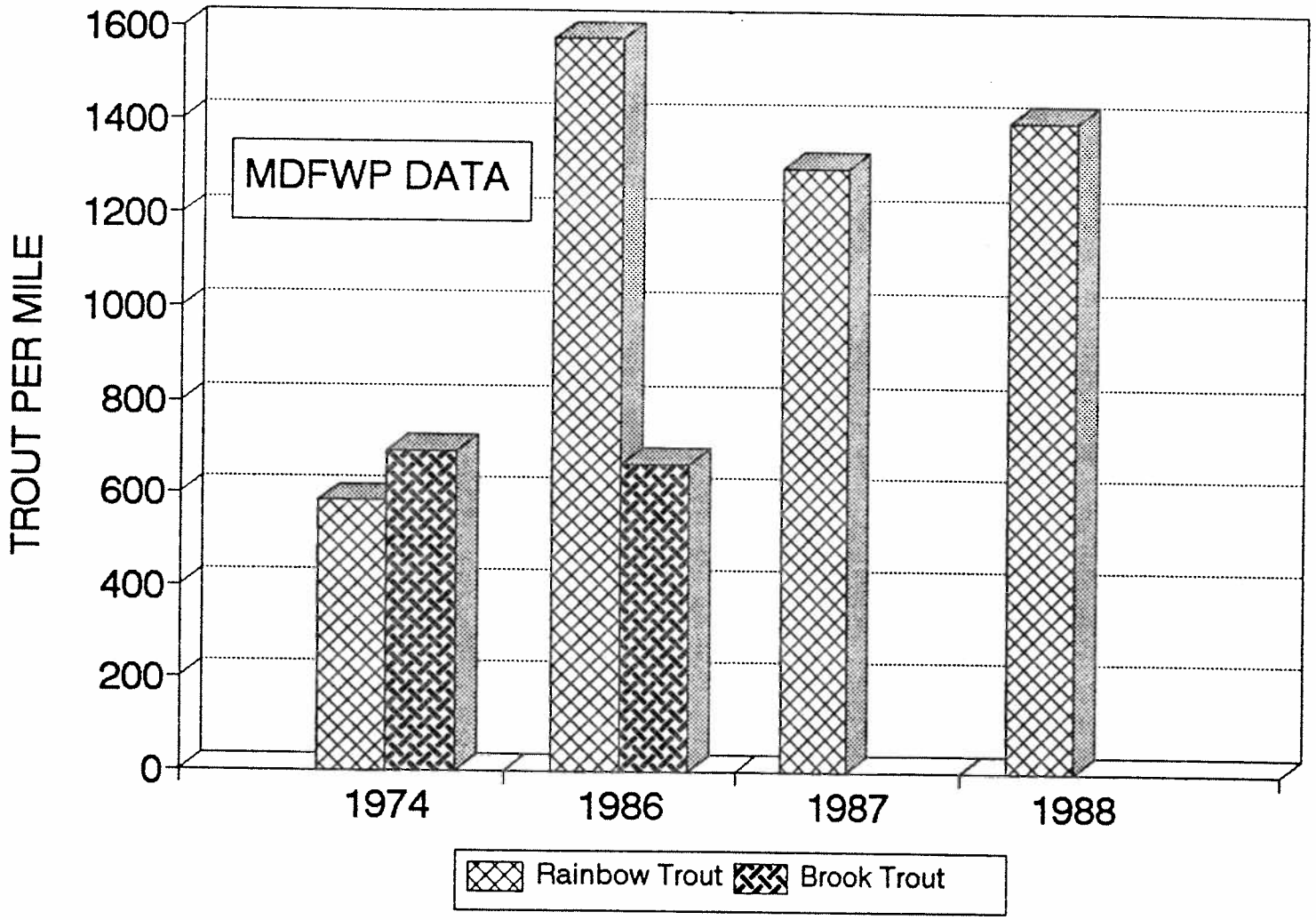


Figure 2. Trout population estimates from the Allers Section of the Boulder River
(Too few brook trout were recaptured in 1987 & 1988 to allow valid estimates)

and fish populations. They are combined in this discussion because of the importance of the upper seven miles of this reach to migrant spawners from the mainstem Yellowstone River, as well as to resident rainbow and brown trout. Fish tagging studies have documented major fish movements. A comparable situation was documented in the Stillwater River system, which is similar to the Boulder River system.

This reach of the main Boulder has a 6,040-feet electrofishing section (B-2 Section) approximately eight miles below Natural Bridge at the mouth of the West Boulder (Figure 1).

Brown trout estimates in fall, 1981 were 1,230 fish per mile; and in 1985, 919 brown trout per mile (Figure 3). By 1986, the population had increased to 1,174 fish per mile. Between 1985 and 1986, the increase in brown trout population was most evident in age one fish (325%) and age five fish (108%). The population in other age classes declined. From 1986 to 1988, brown trout estimates decreased to 787 fish per mile (33%). These decreases were most evident in fish age five and older (41%).

Rainbow trout numbers in this section increased from 368 to 382 fish per mile (approximately 4%) between 1985 and 1986. Sizes ranged from 2.9 to 22.0 inches in length. In 1988, rainbow populations increased to 508 fish per mile. There were significant population gains (+156%) in trout aged four years and older, with slight declines in fish age two and three.

Harvest pressure by anglers was believed to be an important factor in the decline of brown trout aged two to four years and rainbow aged three and four during the 1986-87 period, because this size fish are large enough to be kept. Fishing pressure at the sampling site is relatively heavy because the MDFWP Boulder Forks fishing access site lies in the middle of it. Beyond a mile upstream and downstream, fishing pressure is probably lighter because of poor public access. The overall decrease in the brown trout population in 1988 was probably the result of reduced spawning and recruitment due to lower fall flows in previous years. The decline was probably not due to fishing pressure because rainbow trout, generally more easily caught, yet showed a net increase in population.

Another electrofishing section (B-1 Section) is located near the lower end of the reach just upstream from the mouth of the main Boulder River. The dominant species is brown trout, with mountain whitefish and some rainbow trout present.

Studies conducted in 1981 showed a brown trout population of 581 fish per mile (Figure 4). In 1989, brown trout age two and older numbered 684 fish per mile. A decline in young-of-the-year trout between 1981 and fall, 1989 occurred and can be attributed to several years of drought impacting the lower four miles of the Boulder River. Low flows blocked the movement of spawning fish, reduced spawning area, and limited the habitat for rearing small fish.

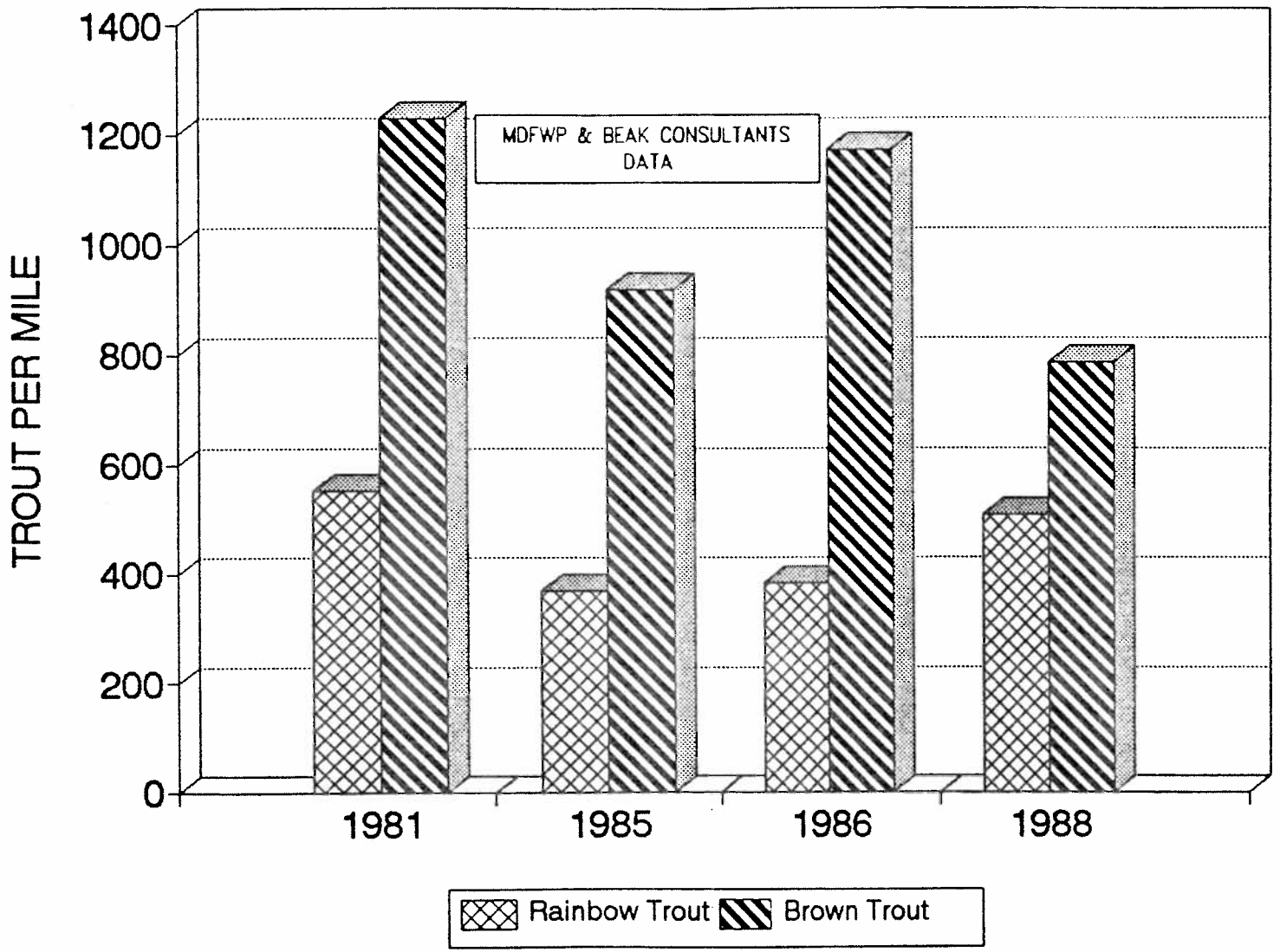


Figure 3. Trout population estimates from the B-2 Section of the Boulder River

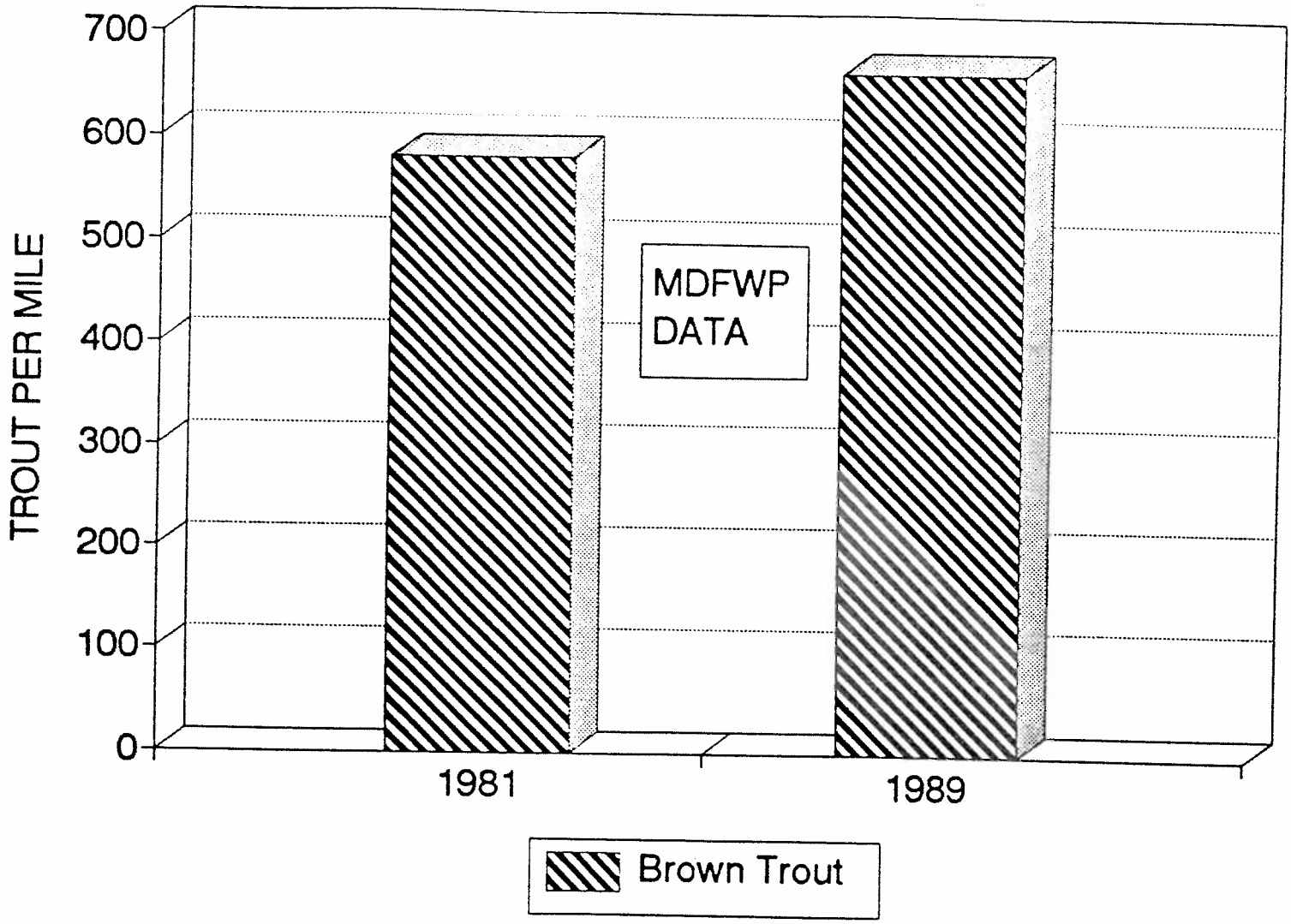


Figure 4. Brown trout population estimates from the B-1 Section of the Boulder River

East Boulder River

The East Boulder is discussed as three reaches, based on habitat changes and composition of fish populations. Because of the East Boulder Project mining proposal, several electrofishing sections were established along the East Boulder, and extensive assessment was done in 1981.

Headwaters to Dry Fork

In the upper reaches of the East Boulder drainage, genetically pure Yellowstone cutthroat trout have been identified by electrophoresis. Pure cutthroat trout populations extend into the East Boulder Canyon to approximately one-half mile below Brownlee Creek (Figure 1). During 1981, the B-9 Section near the confluence with Canyon Creek, rainbow trout (some may be rainbow-cutthroat hybrids) predominated, with an estimated population of 480 fish per mile, averaging 6.5 inches in length. Brown trout aged two years and older were estimated at approximately 57 fish per mile, averaging 9.9 inches in length.

Dry Fork to Forest Boundary

Rainbow trout have predominated over brown trout at two electrofishing sections (B-5 and B-6) established within this reach (Figure 1). Of the total trout densities in 1981 (Figure 5), rainbow population density at B-5 was estimated at 2,587 per mile (86%); and density at B-6 was estimated at 1,642 per mile (82%). At B-6 in 1989, though rainbow trout were still in the majority at 1,214 per mile, brown trout density at 797 per mile represented 40 percent of the total population.

Forest Boundary to Mouth

In 1981, at electrofishing sections B-4 and B-3 in this reach (Figure 1), brown trout predominated over rainbow trout (Figure 5). At the B-4 section near the mouth of Elk Creek, the species composition was 88 percent brown trout (829 per mile), 10 percent rainbow trout (90 per mile), and 2 percent brook trout. In 1989, estimates from this section were similar in species composition and total numbers.

Fall, 1981 estimates at section B-3 near the mouth of the East Boulder River showed brown trout were very predominant. The fall, 1981 estimates of 3,000 brown trout per mile declined to 1,488 per mile by spring 1982, and 612 per mile by 1989 (Figure 6). Differences between 1981, 1982, and 1989 estimates can be attributed to the following: (1) the 1981 and 1982 samples included all fish aged up to five years, while the 1989 sample included 3 inch (age 1?) and longer brown trout; (2) fall 1981 sampling occurred in October-November, when spawning brown trout moving into the section would inflate the estimate; and (3) several years of drought, coupled with increased demands for irrigation water, caused low flows or no flows in much of the lower East Boulder River.

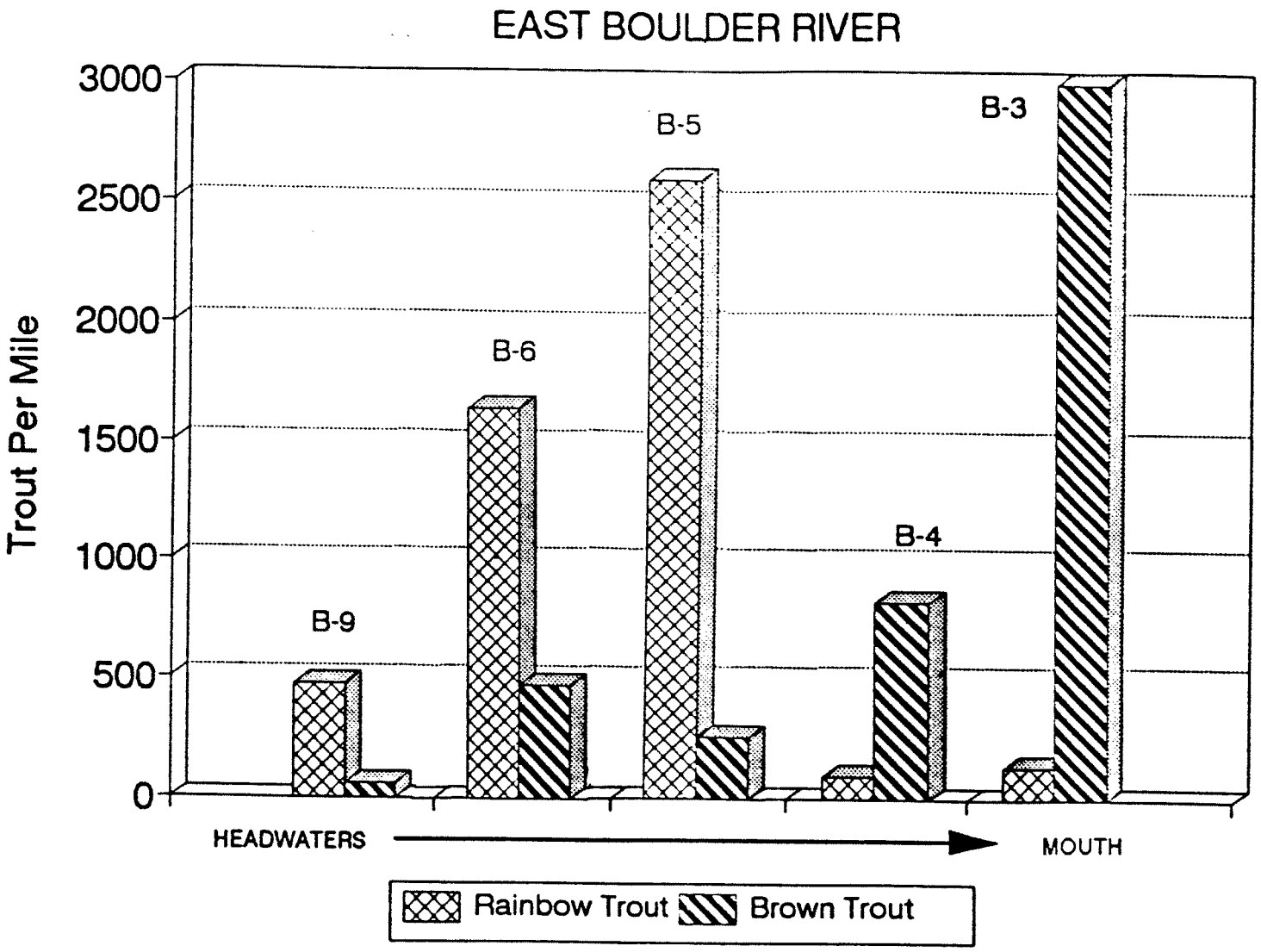


Figure 5. Fish population estimates for 1981 at representative sections along the East Boulder River

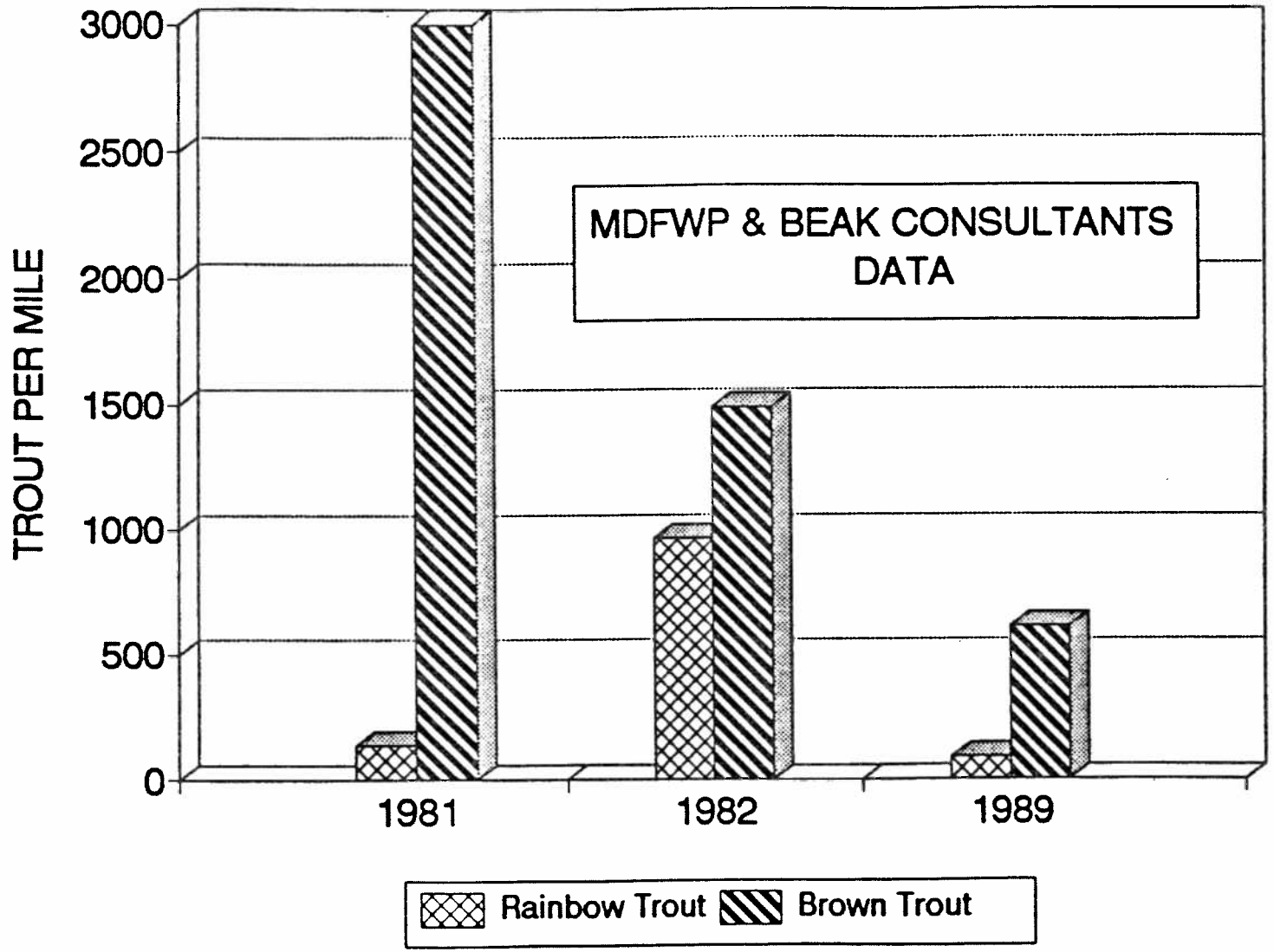


Figure 6. Trout population estimates from the B-3 Section of the East Boulder River

West Boulder River

The West Boulder River is discussed as three reaches, based on habitat changes and composition of fish populations. Because of access problems, there have been few studies on the West Boulder River.

Headwaters to Davis Creek

In 1989 cutthroat trout hybrids were surveyed from Davis Creek at Burnt Leather Ranch to the third falls, approximately eight miles into the forest. The surveys confirmed that the third falls is a barrier to fish movement, and the stream is apparently barren of fish above this point. Relatively high population densities of westslope-Yellowstone-rainbow hybrids were found below the falls. At Davis Creek, Yellowstone-rainbow hybrids were present in moderate densities.

Davis Creek to West Boulder Road Crossing

Electrofishing at the National Forest boundary found only brown trout and mountain whitefish. The private landowner's closely regulated catch-and-release fishing policy and leasing of fishing rights probably contributes to a large population of bigger fish. The brown trout fishery below the USFS West Boulder Campground includes many fish in the 18 to 20 inch range, weighing up to approximately five pounds in this section of the river, which is also bounded by private land.

In 1986 MDFWP personnel assisted a private fisheries consultant with population studies on the river. Electrofishing was done in the Steen section, which is within the Burnt Leather Ranch. This section is located approximately ten miles above the mouth of the West Boulder. Brown trout and mountain whitefish were the only species found. Population of brown trout over five inches in length were estimated at 779 fish per mile and averaged 12.3 inches in length. Fish over 15 inches in length composed over 24 percent of the population. One brown trout tagged in the Yellowstone River above Springdale was recaptured, indicating the importance of this river to the brown trout population in the Yellowstone River system.

West Boulder Road Crossing to Mouth

In 1986, a section of the West Boulder River on the Lower Burnt Leather Ranch was also electrofished. This section is located approximately three miles upstream from the main Boulder River (Figure 1). Brown trout, mountain whitefish, and mottled sculpins were the primary fish species found. A single rainbow trout was collected. Brown trout over five inches long were estimated at 898 fish per mile, averaging 10.5 inches in length. Five percent of the trout were over 15 inches in length.

THE ANGLERS AND OTHER RECREATIONISTS

Anglers and other recreationists have ten access sites to the Boulder River system. There are three MDFWP fishing access sites on the main Boulder River, from Natural Bridge and Falls downstream. The USFS maintains an additional five campgrounds, from Falls Creek above Natural Falls to Hicks Park near the trailhead at Box Canyon. The USFS West Boulder Campground provides access to the West Boulder, and a USFS campground provides access to the East Boulder. In addition, there are several bridge crossings throughout the Boulder River system providing access for anglers and floaters. The degree of access through privately-held land is fairly limited and by permission only.

Members of the local Beartooth Paddler's Society float sections of the main Boulder River from Hells Canyon to Chippy Park Campground, from Chippy Park to Falls Creek Campground, and from McLeod to Eight-mile Bridge. They also float the lower end of the West Boulder River from the West Boulder Road crossing to McLeod. Most members run these sections in kayaks during runoff.

In 1965 the Boulder River had 21,835 angler days of fishing, with the mouth to Boulder Falls section receiving the greatest amount of use. Angler days increased to 27,274 in 1968-69 and then decreased to 14,321 days in 1975-76. In 1982-83 the angler days were 18,841 and remained near that level through 1985.

During the summer of 1989, Weston Inc. conducted a creel survey in the Boulder drainage to collect baseline fishing pressure estimates for the river. The creel survey was concentrated in areas with public access, especially upstream from Natural Bridge (the upper 30 miles of the river). The lower 32 miles of river, downstream from Natural Bridge, only received cursory coverage at two access locations. Fishermen using private land were not interviewed unless they were just leaving the area and the creel clerk knew they had been fishing. Instead, an attempt was made to include the anglers using private land through the use of a landowner survey of a few key people who own riverfront property along the main Boulder and lower East Boulder Rivers.

As pointed out in Weston's report, creel survey information collected during 1989 showed a below-average use of the Boulder drainage by fishermen. Part of the decline in fishing pressure was attributed to the extended period of spring runoff, rainy weather during weekends, and the implementation of two-fish drought limits during 1989. Additional problems resulted from preconceived limitations put on the scope of the survey, inconsistent sampling schedules and effort, and questionable reliability of the landowner survey. Information collected from the 1989 creel survey will be very helpful in designing and implementing a future complete creel survey required to provide the necessary management information. This information should be collected as soon as possible prior to the anticipated influx of people into the area.

Although creel survey results have been limited, it is apparent that fishing pressure is not currently limiting fish populations in most

of the Boulder River drainage. Poor access limits use of much of the system, and dewatering and passage barriers overshadow angling effects. The section from Two-mile Bridge to Natural Bridge, however, is an exception. Angler use of the exceptional fishery in this reach had increased noticeably within the last year. Recent electrofishing estimates (spring, 1991) indicate the rainbow trout population, particularly the larger fish, have declined. Angling may also be suppressing fish populations near access areas and church camps from Two-mile Bridge upstream.

In 1990 MDFWP mailed a survey questionnaire to 171 persons who, over the years, have expressed an interest in the area fisheries. The questionnaire described factors to be considered in the management of the Boulder River system and asked for comments. Ninety questionnaires went to Montanans in 19 towns, 81 to non-residents in 25 states, the District of Columbia and one overseas. Fifty-four (61%) of the Montana mailings went to Big Timber, Billings, and McLeod residents. Forty-seven (58%) of the non-resident mailings went to Colorado, California, Minnesota, and Texas. Twenty-nine (32%) of Montanans responded, and 23 (73%) of those responses were from Big Timber, Billings, Livingston, and McLeod. Seven (9%) non-residents responded, all from Colorado, Massachusetts, Minnesota, and Oregon. Of the 171 questionnaires mailed, 36 individuals (21%) answered the survey by the designated deadline of August 10.

Many of the comments received recommended changes in fishing regulations, generally more restrictive. Catch and release, slot limits, fish size limits, reduced number limits, area closures, seasonal closures, and gear restrictions were some changes mentioned. Access was another issue debated. Some respondents requested more public access to the streams, and others asserted that lack of access is all that has protected the fishery. Low flows and water quality were two issues receiving comments, as well as general concerns about the cumulative effects that increased human population can cause. All these concerns were considered in drafting strategies for meeting the goal and objectives of the draft management plan.

Current MDFWP regulations allow a daily stream limit for brown, rainbow, and cutthroat of five fish, only one of which may exceed 18 inches. For lakes, the daily limit is ten fish. The current daily limit for brook trout is ten pounds, not to exceed 20 fish. For mountain whitefish, the daily limit is 100 fish, including those caught for sale. The mainstem Boulder River is open year-round.

THE FISHERIES MANAGEMENT GOAL

To meet public demand for high quality recreation and wild trout fishing, maximizing the opportunity to catch trout longer than 13 inches, while protecting remaining populations of purestrain Yellowstone cutthroat trout.

OBJECTIVES

Trout Population Densities:

I. Main Boulder River

A. Headwaters to Hilleary Bridge

1. Cutthroat trout: Maintain current populations of purestrain Yellowstone cutthroat in the drainage above Box Canyon. Expand distribution where possible.

B. Hilleary Bridge to Two-mile Bridge

1. Rainbow Trout: Maintain approximately 1,500 age one and older rainbow trout per mile.

2. Brook Trout: Maintain viable populations, especially in spring-fed tributaries.

C. Two-mile Bridge to Natural Bridge

1. Rainbow trout: Maintain approximately 1,500 age one and older trout per mile, and at least 500 13-inch and larger trout per mile.

2. Brook trout: Maintain at least 600 trout per mile.

D. Natural Bridge to Mouth

1. Rainbow trout: Maintain approximately 400 resident age one and older trout per mile.

2. Brown trout: Maintain approximately 1,100 age one and older trout per mile.

II. East Boulder River

A. Headwaters to Dry Fork

1. Cutthroat trout: Maintain current populations of purestrain Yellowstone cutthroat trout.

2. Rainbow trout: Maintain approximately 400 age one and older trout per mile.

3. Brown trout: Maintain approximately 50 age two and older trout per mile.

B. Dry Fork to Forest Boundary

1. Rainbow trout: Maintain approximately 1,200 age one and older trout per mile at station B-6.

2. Brown trout: Maintain approximately 800 age one and older trout per mile at station B-6.

C. Forest Boundary to Mouth

1. Rainbow trout: Maintain approximately 100 age one and older trout per mile at station B-4.

2. Brown Trout: Maintain approximately 800 age one and older trout per mile at station B-4.

III. West Boulder River

A. Headwaters to Davis Creek

1. Cutthroat trout: Enhance purestrain Yellowstone cutthroat trout populations, especially upstream from the third falls.

B. Davis Creek to West Boulder Road Crossing

1. Brown trout: Maintain approximately 700 age one and older trout per mile.

C. West Boulder Road Crossing to Mouth

1. Brown trout: Maintain approximately 900 age one and older trout per mile.

Angler and other Recreational Use:

1. Improve existing fishing access sites along the Boulder River and its tributaries. Seek more recreational access.

2. Annually review the effectiveness of regulations to ensure that the objectives of the trout populations are met and maintained.

3. Continue to conduct creel, recreation, and angler opinion surveys to monitor fishing pressure and identify concerns among user groups.

4. Maintain or improve recreational opportunities while seeking to minimize conflicts among user groups and impacts upon recreational and other habitat resources within the Boulder River system.

STRATEGIES

Fish Habitat:

Continue to:

1. Maintain emphasis on the need for quality fish habitat through education, cooperation, and enforcement. Cooperate with and advise landowners on the fragility of floodplain riparian zones. Enforce applicable laws and regulations.

2. Maintain stream flows in the Boulder River and its tributaries by promoting water conservation and through the MDFWP instream flow reservation process.

3. Maintain present water quality by monitoring potential point and non-point sources of water pollution via the Water Quality Bureau of the Montana Department of Health and Environmental Sciences.

4. Encourage the use of alternative irrigation diversion structures and promote incremental shut-down procedures for water flow to irrigation ditches to minimize off-stream fish loss.

5. Evaluate the individual and cumulative effects of mining, highway and road construction, subdivision and other development in the Boulder River drainage by reviewing permit applications, participating in the preparation of environmental assessments and impact statements, and cooperating with all other interested agencies.

Fish Populations:

1. Continue monitoring fish populations throughout the Boulder River drainage in anticipation of the SPGM mining development.

2. Continue cutthroat inventory and assessment work in the Boulder drainage in cooperation with the USFS. Participate in the development of an interagency management guide for purestrain Yellowstone cutthroat trout in the upper Yellowstone River drainage.

3. Continue monitoring fishing pressure and angler success through statewide creel survey and periodic drainage-wide surveys. Institute voluntary mine employee surveys.

4. Increase public information and education on the status of the Boulder fishery. Encourage catch and release of trout during spawning, and increase information to anglers on the least harmful methods of releasing fish.

5. Adopt and enforce regulations to protect spawning trout and to achieve trout population objectives. The following options are being considered:

a. Retain the present limits. Current regulations allow a daily stream limit for brown, rainbow, and cutthroat trout of 5 fish, only 1 of which may exceed 18 inches. The current daily limit for brook trout is 10 pounds, not to exceed 20 fish. The mainstem Boulder River is open year-round. This option recognizes that low stream flows and barriers to passage presently have a greater effect on fish populations than does harvest. Where the fishery within the reach from Two-mile Bridge to Natural Bridge is being affected by harvest, a further decline in rainbow trout population would be expected. Spawning trout using the lower end of the Boulder River would continue to be subject to harvest.

b. Retain the present limit on all reaches except the reach from Two-mile Bridge to Natural Bridge. A more restrictive regulation, such as 5 fish, only 1 rainbow trout over 13 inches, or catch-and-release only for rainbows would reduce harvest on this declining population. Brook trout would still be available for harvest. Harvest of spawning trout in the remainder of the drainage would continue.

c. Allow 5 fish, only 1 rainbow trout over 13 inches, drainage-wide. This option would reduce harvest of spawning rainbow trout throughout the mainstem Boulder River and its tributaries, and in particular in the reach from Two-mile Bridge to Natural Bridge. (In this reach, several years of sampling have revealed strong year classes of 4 to 6-inch fish and 13 inch and larger fish, with intermediate sizes conspicuously absent. Therefore, this regulation would effectively limit harvest to 1 rainbow, because few anglers will keep a 6-inch fish.) Harvest of spawning brown trout would continue.

d. Revert to a general season for the mainstem Boulder River above Natural Bridge, closing this section from November 30 to the third Saturday in May. This option would continue to allow anglers to fish the lower Boulder during winter while protecting spawning rainbow trout above the falls. Summer harvest of larger rainbows would continue.

e. Allow 2 fish, only 1 over 13 inches, on the mainstream Boulder River. This option would parallel the regulation adopted for the neighboring Stillwater River. Harvest of spawning rainbow and brown trout would be reduced. Given that low stream flows and barriers to passage presently have a greater effect on fish populations than does harvest, this option may be unnecessarily restrictive for all but the reach from Two-mile Bridge to Natural Bridge. This regulation may be more appropriate if angling effects are demonstrated after population increases associated with mine production are realized, i.e. 1994 at the earliest.

Angler and Other Recreational Use:

1. Protect and develop existing fisheries access sites along the Boulder River and its tributaries. Seek more recreational access.

2. Annually review the effectiveness of regulations to ensure trout harvest does not prevent attainment of trout population objectives.

3. Continue to conduct creel, recreation, and angler opinion surveys to monitor fishing pressure and identify conflicts among user groups.

RESPONSE TO THE DRAFT PLAN

During May, 1991 approximately 200 copies of the five-year *Draft Boulder River Fisheries Management Plan* were distributed. Comments were solicited through mailings, newspaper articles, and visits with sportsmen's groups. A questionnaire attached to the draft plan asked for opinions regarding proposed goals, objectives, and strategies.

A total of 100 people (50%) responded. Those responding had fished the Boulder River an average of 20 years, 14 times per year. Half were from Montana and half were from out of state. Respondents' opinions about goals and strategies are summarized:

Respondents' Opinions On:	Agree	Neutral	Disagree	No Opinion
Fisheries management goal...	89	5	6	0
Fish habitat strategies.....	92	2	5	1
Fish population strategies..	61	4	33	2
Angler use strategies.....	68	7	24	1

An unfortunate confusion with the language used in requesting opinions about fish population strategies led to low agreement. Many respondents read "Do you agree with the fish population strategies that don't involve adopting new regulations?" to mean that no change in regulations would be considered. The intent was for them to comment on regulations separate from the other population strategies. Angler use disagreement centered around whether more recreational access was desirable.

Participants were also asked to rank the following five fishing regulation options for Limit A:

a. Retain the present limit of 5 trout, only one over 18 inches.

b. Retain the present limit in all but the reach from Two-mile Bridge to Natural Bridge. In this reach allow (circle one):

   5 trout, only 1 rainbow over 13 inches, or catch and release

c. Allow 5 trout, only 1 rainbow over 13 inches drainage-wide.

d. Revert to a general season for the mainstem Boulder River above Natural Bridge.

e. Allow 2 trout, only 1 over 13 inches, on the mainstem Boulder River.

Of these, options b. (catch and release) and e. were preferred. In addition, most respondents in favor of b. were not in favor of retaining the present limit outside the reach from Two-mile Bridge to

Natural Bridge. Rather, they wanted catch and release drainage-wide.

Other concerns included potential water pollution from mining operations, dewatering by agricultural withdrawals, too much access, the need for stricter enforcement (especially during spawning), encouraging fish stocking, and educating anglers about fish handling and harvest.

DECISION BY THE MONTANA FISH, WILDLIFE & PARKS COMMISSION

The following recommendation was submitted to the Montana Fish, Wildlife & Parks Commission:

Combining the two most preferred regulations, options b. and e., can be supported biologically. Reducing the present limit for cutthroat, rainbow and brown trout (Limit A) from 5 fish (1 over 18 inches) to 2 fish (1 over 13 inches) would better protect generally declining populations while still allowing some harvest. In addition, establishing a catch-and-release section from Natural Bridge to Two-mile Bridge would offer more protection for rainbow trout concentrated within key spawning habitat. Improvements accompanying self-imposed catch-and-release fishing in this area during the 1970's and 1980's have demonstrated that these restrictions enhance the spawning rainbow population that provides young to seed other areas.

The recommended regulation for the Boulder River drainage (including the tributaries) is therefore:

- Open entire year.
- Limit A: 2 trout, only 1 may be over 13 inches.
- Natural Bridge to Two-mile Bridge, catch and release only for rainbow trout, artificial lures only.

On September 12, 1991, the Commission adopted the five-year *Boulder River Fisheries Management Plan*. The recommended regulation was adopted as part of the Montana Fishing Regulations on November 8, 1991 and will be in effect for the Boulder River drainage as of March 1, 1992.