MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION

JOB PROGRESS REPORT

State: Montana

Project Number: F-46-R-3
Job Number: I-e

Project Title: Statewide Fisheries Investigations
Study Title: Survey and Inventory of Cold Water streams
Title: Southwest Montana Cold Water Stream Investigations
Period Covered: July 1, 1989 through June 30, 1990

JOB OBJECTIVES

1. Insure within hydrologic constraints that flows do not fall below levels identified in the Yellowstone Reservation and the Upper-Missouri Reservation Application.

   Flows for the Yellowstone and Upper-Missouri Rivers were monitored via U.S.G.S. river gauges to determine if they were within levels designated by the reservations and reservation application.

2. Maintain existing populations of native Yellowstone and west slope cutthroat at present or increasing levels.

   Conducted electrofishing surveys on some of the smaller tributary streams of the Yellowstone River to identify which have populations of native Yellowstone and westslope cutthroat, plus determining baseline numbers.

   Data will be presented in a future report.

3. Maintain fish populations and habitat in streams affected by resource development activity at levels no worse than present condition.

   U.S. Forest Service plans were monitored to determine if plans and goals maintained existing quality of fisheries and riparian vegetation.

4. Encourage USFS to redistribute grazing allotments to encourage recovery and stabilization of streambanks and riparian areas.

   Worked with the Beaverhead National Forest to implement changes in pasture and grazing systems. (State Project)

5. Document response of Bison Creek trout population to removal

of granitic sands.

Three sections of Bison Creek were electrofished to determine trout populations levels. (State Project)

6. Collect baseline fisheries data on Deep Creek to assist in determining impacts of highway construction.

   No activity on this objective. (State Project)

7. Maintain the region's streambanks and channels in their present or improved condition.

   Approximately 200 proposed and planned SB 310 and 30 Streambed Preservation Act streambed and channel alteration projects were processed with recommendations being made to minimize damage to or maintain the existing the fisheries resource.

8. Maintain water quality levels as near to baseline as possible.

   Fish kills were documented, when located with any water quality violations being reported to the Montana Water Quality Bureau.

9. Maintain wild trout fishery in the East Gallatin River that supports 20,000 angler days of use annually.

   A section of the East Gallatin River located both above and below the City of Bozeman sewage effluent was electro-fished to obtain wild trout population estimates in the spring and fall to determine the effect of the existing sewage treatment on the wild trout population. Data will be presented in a future report.

10. Maintain densities of at least 1000 age II and older brown trout per mile in the Ruby River downstream from Ruby Dam supporting 7500 angler days of use annually.

    One section of the Ruby River were electrofished to obtain wild brown trout population estimates of numbers, age structure and total biomass.

11. Maintain densities of a least 2500 age I and older brown trout permile in Poindexter Spring Creek.

    Two sections of Poindexter Spring Creek were electrofished to obtain wild trout population estimate to determine the status of the population.

12. Improve habitat conditions in spring creeks of the region.

    Worked with local county-city planning agencies to protect the quality of the spring creek fisheries habitat, to insure no further degradation of the fisheries habitat and possibly improve existing conditions.

13. Maximize potential of unique small streams capable of producing large trout by utilizing special regulations on selected reaches subject to intense fishing pressure.

    Electrofishing was done on Jacobson Creek, which has the potential to produce a quality large westslope cutthroat trout population. MDFWP enacted a special catch and release, artificial lures only angling regulation on this stream to encourage more large cutthroat trout.

14. Gather population data on reaches of the upper Ruby and Red Rock rivers.

    Wild trout population estimates were made via electrofishing on one section of the upper Ruby River and on two sections of the Red Rock River.

15. Gather population and habitat condition data on small streams as need arises. Completed.

VARIANCE

6. No work was done on this objective in 1990.

PROCEDURES

The study area consisted of trout streams in southwestern Montana included in the upper Missouri and Yellowstone River drainages, excluding the major rivers of the Beaverhead, Big Hole, Gallatin, Jefferson, Madison, Missouri and Yellowstone rivers.

Electrofishing gear was used to sample fish populations on study sections of Ruby River, East Gallatin River, selected tributaries of the Yellowstone River, Poindexter Slough, Bison Creek and the Red Rock River. Population estimates were made using the Peterson-type mark and recapture method described by Vincent (1971).

Streambanks and channels were protected from poorly designed projects through FWP participation in administration of the Stream Protection Act and Natural Land and Streambank Protection Act of 1975 (SB 310).

Water discharge permits issued by EPA and the Montana WQB will be reviewed and comments offered. Timber sales, grazing allotment plans, EAs and EISs will be reviewed to insure adequate protection, mitigation and compensation of fisheries resources.

Spawning populations of Yellowstone cutthroat trout were monitored via fish traps and electrofishing in selected spawning tributaries of the Yellowstone River to determine the success of spawning and recruitment into the Yellowstone River.

FINDINGS

Red Rock River

Fish Populations. The resident trout populations of upper reaches of the Red Rock River had not been substantially investigated prior to 1987. Studies began in September, 1987, with the establishment of the Wellborn Section. The Wellborn Section begins at the county bridge on Wellborn Lane near the town of Dell, Montana (T12S/ R9W/ SW1/4 Sec. 28) and proceeds downstream for a distance of one mile to a ranch access bridge immediately upstream from the county bridge on Wolfe Lane (T12S/ R9W/ NE1/4 Sec. 29). The Dell Section was sampled in April of 1989 due to severe streamflow reductions within the reach. The Dell Section originates at the confluence of the two river channels downstream from the Sage Creek Road (T13S/ R9W/ NE1/4 Sec. 4) and proceeds downstream for a distance of 1.44 miles to the county bridge on Wellborn Lane. The downstream boundary of the Dell Section is continuous with the upstream boundary of the Wellborn Section.

Stream habitat within the reach is characterized by a relatively narrow channel and a riffle - pool alternation. Pools are short and deeply incised from abrupt slip faces on angular gravel shears. This configuration generally results in undercut bank type habitat along pools. The stream reach is bordered by a narrow riparian area dominated by cottonwood and willow. Streamflow within the reach is dominated by release regimes from Lima Reservoir and inflows from numerous small springs. Most other tributaries are very small and seasonal in nature. In 1988, abnormally low storage in Lima Reservoir, severe drought conditions, and upstream irrigation demand combined to result in a total dewatering of the Red Rock River between Lima and Dell, Montana; a reach of more than ten river miles. Flow within the reach ceased in early July of 1988 and did not resume until late May of 1989. A minimal flow was maintained through the Dell Section throughout this period but flow ceased in the Wellborn Section on several occasions during the summer of 1988. Flows were continuous from the lower boundary of the Wellborn Section downstream to Clark Canyon Reservoir due to inflows from several large springs.

Brown trout were the dominant gamefish collected in both study sections during the 1987-90 period. Other trout species collected included rainbow, brook and cutthroat trout. Mountain whitefish, burbot, longnose and white sucker, and mottled sculpin were also observed within the sections. The estimated number and standing crop of brown trout over the 1987-90 period is presented in Figure 1. The data clearly demonstrate a dramatic decline in brown trout numbers and biomass associated with the severe dewatering within the reach in 1988 and 1989. Numbers and biomass declined 80 and 86% between 1987 and 1990 in the Wellborn Section. It is possible that slightly stronger populations observed in the Dell Section in 1989 were due to the fact that a minimal flow was maintained through the reach in 1988 while flow was interrupted in the Wellborn section on several occasions. This continued decline from 1989 to 1990 might also be due to persistent low flows during the non-irrigation season which were associated with low storage pools in Lima Reservoir. These differences are probably not due to differences between the two study sections because of similar patterns of angler use on the private lands, similar habitat, and their close proximity. The 1987 survey of the Wellborn Section also revealed the presence of a small rainbow trout population that was estimated to be 21 per mile. Subsequent samples in 1989 and 1990 found rainbow trout present in numbers too low to estimate.

Length distribution of brown trout within the study sections is presented in Figure 2. The 1987 sample revealed a strong brown trout population with ample recruitment and relatively high densities of large fish. Numbers of thirteen inch and larger fish were estimated at 543 per mile while numbers of eighteen inch and larger fish were estimated to be 164 per mile. Because this estimate was conducted in the fall, it is subject to error from spawning movements. While some of the point estimates of larger fish were inflated due to in migration of spawners, this inflation can be accounted for and does not account for a dramatic drop from 543 to 99 thirteen inch and larger brown trout per mile in the Wellborn Section between 1987 and 1990. Similarly the large difference between the samples in densities of brown trout less than thirteen inches would indicate a loss due to dewatering because these younger fish are not subject to spawning movements of the magnitude of the mature fish.

Severe dewatering in the Red Rock River has resulted in major declines in the trout populations which have persisted for a minimum of two years. These populations should be subject to future monitoring to document the time required to effect recovery under existing and future flow regimes.

<u>Poindexter Slough</u>

Fish Populations. <u>Brown trout.</u> Poindexter Slough is a spring-fed meadow tributary which enters the Beaverhead River south of Dillon, Montana. Trout populations were most recently described by Oswald (1986) from data collected in Section Three (3,200 ft.) and the Gary Section (3,168 ft.). Section Three lies within a public fishing access area which sustains heavy angler use, while the Gary Section lies within private land and is lightly fished.

The estimated numbers and standing crops of brown trout in both study sections are presented in Figures 3 and 4. In section Three, numbers of Age I and older brown trout have varied between 322 and 1009 per thousand feet over the last ten years. Densities have ranged between 743 and 1009 since 1986, but the trend appears to be one of an increasing population. Standing crop has not undergone such wide fluctuations over the period ranging between 119 and 309 pounds per thousand feet. The standing crop in Section Three exhibited a general trend to increase or remain stable at approximately 300 pounds per thousand feet from 1983 to the present. Over the 1982-85 period, Section Three had substantially higher brown trout densities than found in the Gary Section.

Standing crop estimated over the same period demonstrated only slight differences between the two sections. Population trends within both sections exhibited similar patterns until 1985 when brown trout density decreased in Section Three while density remained stable in the Gary Section. Standing crop increased in both sections between 1984 and 1985.

Estimated densities of brown trout, by age class, are presented in Figures 5 and 6 for Section Three and the Gary Section. Data provided from both sections indicate a wide variation in recruitment success as exhibited by wide ranging densities of Age I and II fish. Densities of Age III and IV+ fish tend to remain more stable in both sections, however. The higher densities of Age I fish observed in Section Three indicate much better spawning and rearing habitat than that provided in the Gary Section. Most of the difference in brown trout density between the two sections can be accounted for by differences in the recruitment of Age I fish. Over the 1981-90 period, an average of 50.4% of the population of Section Three was accounted for by yearling brown trout. Mean spring lengths of brown trout at Age classes I, II, III, and IV+ in Section Three were 5.7, 9.9, 12.7, and 15.7 inches. Mean lengths of the same age classes averaged somewhat higher in the Gary Section over the 1982-85 period at 5.9, 10.5, 13.3, and 16.2 inches.

Estimated numbers of "catchable" (7.0+ inch) brown trout are presented in Figures 7 and 8 for Section Three and the Gary Section. Densities of sexually mature (12.0+ inch) brown trout remained relatively low over the 1981-85 period reflecting very poor recruitment years in 1982 and 1983. Densities of these larger fish have stabilized during the 1986-90 period at 172 to 188 per thousand feet. This recent stability has been maintained despite a wide variation in the numbers of 7.0 to 11.9 inch fish over the same period and relatively strong recruitment of yearling fish. During the period in which the Gary Section was sampled, numbers of 12.0+ and 15.0+ inch brown trout in the Gary Section were higher than those estimated in Section Three in 1984 and 1985. Numbers of fully mature (15.0+ inch) brown trout in Section Three achieved maximum observed densities of 36 per thousand feet in 1982, 1987 and 1989.

The data indicate that Poindexter Slough supports extremely strong, high density populations of brown trout despite heavy angling pressure. Recent trends indicate that this population is probably at or near carrying capacity at a standing crop of approximately 1585 pounds per stream mile and supporting densities of approximately 190 fully mature (Age V+) brown trout per mile. This is indicative of extremely high productivity in a small stream environment. The data also suggest that recruitment is currently at levels adequate to maintain brown trout populations near carrying capacity and that prolonged periods of poor recruitment such as that observed in the early 1980's are required to produce notable reductions in the population. Data suggest that Section Three is an important spawning and recruitment area for brown trout in the system. Comparative data between the Gary Section and Section Three suggest that angling pressure has little influence on the brown trout populations of Poindexter Slough.

Rainbow Trout. While fall estimates of rainbow trout populations are not conducted in Poindexter Slough, trend information from spring populations is presented in Figures 9 and 10. Data indicating declining rainbow trout populations in both Section Three and the Gary Section were presented for the 1981-84 period (Oswald 1986). This decline has continued (Figure 9) through the present to a point at which rainbow trout numbers in Section Three have become too low to estimate. The 1989 and 1990 samples resulted in collections of only 23 and 12 rainbow trout. The reason for the dramatic decline in rainbow trout density in Section Three is clearly a lack of rainbow trout recruitment since the early 1980's (Figure 10). The reasons behind the lack of rainbow trout recruitment are not fully understood at present. Possibly a competitive advantage for brown trout at their current high densities has caused the virtual elimination of the rainbow trout. It is also possible that large beaver dams in Poindexter Slough have resulted in migration barriers limiting movement of adult spawner rainbow trout from the Beaverhead River into the system. Rainbow trout numbers in the proximal reach of the Beaverhead River have also declined markedly over this same period.

Rainbow trout recruitment data suggest that angling pressure has not been responsible for the decline of this species. It is therefore probable that restrictive regulations would not afford enough protection to result in a substantial increase in rainbow trout stocks. Beaver dam barriers have recently been removed to provide for movement of spawners. If this does not result in increased rainbow trout recruitment, it is probable that competition from brown trout will result in the elimination of a rainbow trout population base in the stream.

Ruby River

Upper Ruby River. The Ruby River originates at the confluence of its East, West and Middle Forks in the mountain valley located between the Snowcrest and Gravelly Mountain Ranges. The river flows approximately 92 miles to its mouth on the Beaverhead River about two miles upstream from Twin Bridges, Montana. The Ruby Reservoir is located about midway in the mainstem drainage, dividing the system into an upper elevation free flowing stream and a lower valley river with flows largely controlled by reservoir releases and irrigation use patterns. The upper Ruby River is subject to periodic high runoff events such as a 200+ year flood which occurred in 1984. The upper river also drains a geologically unstable area prone to earthquakes, faults and slumping activity. The upper river has also come under some controversial scrutiny in the recent past over grazing practices on public lands. Riparian and channel instability and degradation have been linked to grazing practices which tend to concentrate grazing in stream corridors. The upper 14 stream miles of the mainstem as well as the majority of the upper tributaries lie within National Forest grazing allotments. Trout populations of the upper Ruby River were last described in 1976 (Peterson 1979). In order to monitor trout populations prior to and after planned grazing alterations, the Three Forks Section was established in 1987 in the upper Ruby River. The Three Forks Section originates at the confluence of the three forks of the river and proceeds downstream to the mouth of Elk Creek for a distance of 1.2 miles. This section is sampled in fall due to a species composition of spring spawners.

The major game fish collected in the Three Forks Section include rainbow, cutthroat, and rainbow x cutthroat hybrid trout and mountain whitefish. Two brown trout have been collected in the section representing the uppermost recorded distribution of the species in the drainage. Non-game species collected include long nose and white sucker and mottled sculpin. Because of the difficulty of separating the rainbow, cutthroat and hybrid trout by visual observation, population characteristics of the three species are calculated individually and in combination. Documentation of the existence of pure westslope strain cutthroat trout in upper Ruby tributaries has been accomplished through electrophoretic analysis (Beaverhead National Forest Data Files, 1989). Stocking of hatchery rainbow trout into the upper Ruby River ceased after 1970 (MDFWP Hatchery Records 1985).

Standing crop and density estimates for the combined populations of rainbow, cutthroat, and hybrid trout are presented in Figure 11. Observed density has ranged between 241 and 511 per mile while standing crop has ranged between 81 and 142 pounds per mile. Maximum observed density and standing crop occurred in 1988. The data, particularly that collected in 1988, suggest that some estimate inflation due to trout migration into and out of the section may be occurring during the fall sampling period. Peterson (1979) sampled a section approximately two miles downstream from the end of the Three Forks Section in 1976. His data revealed a density of 99 per mile and a standing crop of 48 pounds per mile. Data from the Three Forks Section suggest that trout populations have increased at least 2.5 times over the past 15 years in the upper Ruby River.

The trout population estimates of the Three Forks Section have also been segregated into discreet estimates for the three component species (Figure 12). This method is subject to the errors associated with visual classification under conditions of hybridization. Over the 1987-89 period, rainbow trout composed 32% of the population with cutthroat trout amounting to 45% and hybrids accounting for 23% of observed densities. Data from 1976 (Peterson 1979) revealed a population heavily dominated by rainbow trout with only minor collections of cutthroat and hybrid trout in the sample. Mean density of rainbow trout over the sample period was 105 per mile. This closely approximates the 99 per mile observed by Peterson in 1976. The 1988 estimate exhibited a high density of cutthroat trout which was not observed in 1989. This estimate may be inflated due to movement of cutthroat in and out of the section. It is possible that this migration represents a movement of cutthroat from upper tributary reaches to winter habitat downstream. This tendency has been much more apparent for cutthroat and hybrid trout than has been evidenced for rainbow trout.

Distributions of the estimated trout population by length groups are presented in Figure 13. The data indicate that the upper Ruby River provides a fishery for small to mid-sized trout. Fish in excess of 12 inches in length account for an average of about 6% of the population. Relatively high numbers of small fish, largely Age I, in 1987 and 1988 suggest successful recruitment in 1986 and 1987. Lowered densities of all size groups of trout, particularly those of the small length group, suggest influence from low streamflows of the 1988 drought. Mean length at age of the Three Forks population is presented in Figure 14. The data indicate that growth of cutthroat trout lags slightly behind that of the rainbow and hybrids at Age I but surpasses that of the other species beyond age III. Mean length at age for the entire population was 8.0" at Age I, 9.9" at Age II, 12.1" at Age III, and 13.9" at Age IV in 1987.

Trout populations in the upper Ruby River have increased markedly since 1976. Most of this increase can be attributed to numbers of cutthroat and rainbow x cutthroat trout. This increase might be due to a combination of factors including changing land use patterns, scouring effects from the 1984 flood event, and the cessation of the planting of hatchery rainbow trout in 1971. While trout density and standing crop have increased, their numbers are not reflective of a very productive system. This may be due to marginal habitat conditions, harsh winter conditions, short growing season, and limited productivity associated with high elevation, steep gradient watersheds in general. Continued monitoring of the section should reveal if changes in riparian grazing management result in increases in the trout populations of the upper Ruby River.

<u>Lower Ruby River</u>. Trout populations in the lower Ruby River were last described for the Sailor Section in 1982 near the mouth of the Ruby (Oswald 1984) and the Alder Section in 1984 in the tailwater of Ruby Reservoir (Oswald 1986). Since that time, a major flood event in 1984 produced profound habitat changes in some reaches of the river and flow release management errors resulted in fish kills due to dewatering in May 1985 and 1987 in a reach of river near Sheridan, Montana. The flow management errors were the result of a combination of unusually dry climatic conditions, limited releases from the Reservoir, and large withdrawals of flow into major irrigation canals. In addition to the aforementioned problems affecting trout habitat and populations, angler access and recreational use in the lower Ruby River has become increasingly restricted as private lands along the stream have entered into fee fishing enterprises or withdrawn from angler access under new

ownership.

Two new study sections have been added to the sampling regime in the recent past. The Silver Spring Section originates upstream from the mouth of Silver Spring at T5S, R5W, SE1/4, SE1/4, Sec. 14 and proceeds downstream 2.84 miles to a point upstream from a county road bridge at T5S, R5W, NW1/4, SE1/4, Sec. 10. This section was added to monitor brown trout populations in the reach of river that sustains the most stable and ample flow conditions, provides excellent habitat, and supports relatively heavy angling pressure due to an open access policy provided by the landowner. The Silver Spring Section was sampled in 1989 and 1990 and will be used as a long term monitoring section. The Sarge Section was sampled in 1990 to evaluate the fishery as a possible public fishing access acquisition. The section is also located in the reach of river affected by low spring flow regimes in 1985 and 1987 and has been subject to major habitat changes since the 1984 flood. The Sarge Section originates at the intake of the Sarge Hall irrigation ditch (T4S, R6W, SE1/4, NE1/4, Sec. 36) and continues downstream 1.7 miles to the Todd ranch access bridge (T4S, R6W, NW1/4, SE1/4, Sec. 25). In addition to the two new study sections, the Sailor Section was resampled in 1986 to determine if low flows in that portion of the river had depleted the fishery.

Estimated brown trout populations of the Silver Spring and Sarge Sections are presented in Figure 15. The Silver Spring Section supported densities of Age II and older brown trout in excess of 1400 per mile and a standing crop of about 900 lbs. per mile in both sample years. Population estimates for both sample years were nearly identical. The Sarge Section supported a density of about half that observed in the Silver Spring Section and a standing crop that was about 40% of that of the Silver Spring Section. Because the estimates occurred in the same time period and angling pressure has been restricted in the Sarge Section, it is logical to assume that differences in population are due to differences in habitat. Analysis of the populations of the two study sections by length group (Figure 16) indicates that all length groups and hence, all age groups were more abundant in the Silver Spring Section. This was particularly true of the 13 inch and larger segment of the population.

The 1986 sample collected in the Sailor Section (Figure 17) suggested that the temporary dewatering of the lower river in 1985 did not result in substantial depletions of the brown trout population. Estimated density of brown trout in 1986 compared favorably with the highest observed numbers over the sample period. Standing crop was not as high as that observed in 1980 because much of the density, 49%, was accounted for by smaller Age II fish. This would also suggest that recruitment of juvenile brown trout was not substantially hampered by the temporary flow reduction.

Comparative data for the length of the lower Ruby River are presented in Figures 18 and 19. While the samples were collected in different years, some of the points of comparison are probably valid giving a rough estimate of the relative brown trout productivity of different reaches of the river. The most productive sections of stream appear to be the Silver Spring and Alder Sections. Both sections receive ample flow regimes and the channel and bank habitats are relatively stable. The Silver Spring Section provides the most stable flow regime on an annual basis but also probably receives the most angling pressure. This section has recorded the highest brown trout standing crop and density as well as the highest numbers of larger (13 inch or 15 inch plus) fish in the lower Ruby system. The Alder Section due to its proximity to the dam also benefits from ample streamflow through most of the year. While the Sailor Section has recorded high brown trout densities, it has also recorded relatively low densities as depicted in Figure 18. The range between the highest and lowest observed standing crops within the section is much lower than the standing crops observed for the Alder and Silver Spring Section. Standing crop and density observed in the Sarge Section were the lowest observed in the lower Ruby system. While the brown trout density in the Sarge Section falls within the range of that observed in the Sailor Section, standing crop was the lowest observed in the lower Ruby River. Numbers of 13 inch and larger brown trout were comparable to those observed in the Sailor Section.

High densities and standing crops of brown trout, as well as high numbers of larger brown trout, have been observed in the Silver Spring Section. It is believed that the strong populations are due to ample streamflow and stable habitat conditions. The stable streamflow conditions are due to subterranean recharge in the form of natural springs and irrigation return flow. The section is also located upstream from the major irrigation withdrawals of the lower river. Low densities and standing crops of brown trout in the Sarge Section are believed due to limited streamflow, particularly in early summer, because this section and the Sailor Section are located downstream from the major irrigation canals of the lower river. In addition to unstable flow regimes, the Sarge Section suffers from habitat instability. A large meander loop was cut off within the reach during the 1984 flood event. This cutoff has resulted in headcutting and a degrading of the streambed with concomitant bank erosion and loss of riparian vegetation. Future monitoring of the populations of this reach should be used to chronicle the time required for the habitat to stabilize.

<u>Mill Creek Slough</u>

Mill Creek Slough is a little known spring creek tributary of the Ruby River located north west of Sheridan, Montana. The spring creek habitat is formed from the tailwaters of Mill Creek, a Ruby drainage tributary of the Tobacco Root Mountains, and numerous valley floor springs. A portion of the annual flow of Mill Creek Slough originates from irrigation tailings and subterranean recharge due to the proliferation of valley irrigation systems in the vicinity. During the irrigation season, most of the flow of

Mill Creek Slough is diverted into a large irrigation canal immediately upstream from the juncture of the slough with the Ruby River. During the remainder of the year, Mill Creek Slough is a direct tributary of the Ruby River. Riparian and stream channel habitats are typical of valley spring creeks in southwest Montana. Flows fluctuate due to incorporation of the stream into an irrigation system. The streambed consists largely of fine materials due to low gradient and a lack of flushing flow and supports a lush growth of aquatic vegetation in summer. Riparian vegetation bordering the stream is dominated largely with dense growths of willow however winter concentrations of cattle have resulted in areas of bank degradation. In the interest of acquiring Mill Creek Slough as a public fishing access area, fish populations of the slough were sampled in February 1990. A study section was established at T4S, R6W, NE1/4, NE1/4, Sec. 25 in the lower reaches of the slough. The First Section originates at the point at which the ranch access road first approaches the stream and proceeds downstream for a distance of 3,350 feet to a ranch access bridge.

The fish populations of Mill Creek Slough are dominated by brown trout. Other species observed included mountain whitefish, longnose and white sucker, and mottled sculpin. The estimated population of Age I and older brown trout was 395 per thousand feet representing a standing crop of 141 lbs. per thousand feet in the First Section. This data can be compared with data collected in Poindexter Slough, a similar valley spring creek located near Dillon, Montana (Figure 20). Data from Poindexter Slough include the 1990 sample representative of a strong population and the 1983 sample representative of weak population conditions in Section Three and a similar pair of samples from the Gary Section. The data indicate that Mill Creek Slough brown trout populations were comparable to a low population condition in Section Three which provides extremely high recruitment in the system and were quite similar to populations observed in the Gary Section both in terms of density and standing crop. The length distribution of brown trout within the population of the First Section is presented in Figure 21. The data indicate that the section does not provide exceptional rearing habitat for juvenile fish. This may be indicative of a lack of suitable habitat within the section, poor reproduction in the system in general, or may merely be the result of seasonal use patterns. Numbers of 7.0 to 11.9 inch fish were high, closely approximating those observed in Poindexter Slough (Figures 7 and 8). Numbers of 12 inch and larger fish were about 55% of average values for that size fish in Poindexter Slough while 15 inch and larger fish were present in very low densities in Mill Creek Slough.

The data suggest that Mill Creek Slough provides a very productive environment for brown trout. Population density and standing crop was comparable to that observed in upper reaches of Poindexter Slough. The population in 1990 was dominated by fish in the 7.0 - 11.9 inch range. Because no long term sampling record has been established in Mill Creek Slough, it is not known if this is the result of an exceptional year class or if the sample is indicative of normal conditions in the stream. The 1990 sample also indicated that numbers of larger fish (> 12.0") are much lower than those observed in Poindexter Slough sections. Due to the current lack of age analysis on the Mill Creek Slough population, it is unknown if this condition is indicative of growth limitations, harvest patterns, seasonal distribution patterns, or habitat distributions within the stream system. The First Section was located near the mouth of Mill Creek Slough and represents a first attempt to collect information on the brown trout populations of the stream. It is possible that better habitat for juvenile as well as larger trout may be provided in upstream reaches. The 1990 sample was also collected in February under winter conditions which may have resulted in a seasonal distribution pattern quite different from that of the late March and April period under which the stream would normally be sampled.

STREAM PROTECTION

This objective falls under the responsibilities of the Natural Streambed and Land Preservation Act of 1975. Duties implementing this law are shared with local Soil Conservation Districts. Stream projects were inspected in the following Soil Conservation Districts: Beaverhead, Broadwater, Gallatin, Jefferson Valley, Madison, Mile High and Park. During the July 1, 1989 to June 30, 1990 period, approximately 200 small stream alteration projects (SB 310) were mitigated. Approximately 30 SPA projected were also inspected and mitigated.

LITERATURE CITED

Oswald, R.A. 1984. Inventory and survey of the waters of the Big Hole and Ruby River drainages. Montana Dept. Fish, Wildlife and Parks, Job Progress Report, Proj. No. F-9-R-31 and 32, Job No. 1b 23pp.

Oswald, R.A. 1986. Inventory and survey of the waters of the Big Hole and Ruby River drainages. Montana Dept. Fish, Wildlife and Parks, Job Progress Report, Proj. No. F-9-R-34, Job 1b 35 pp.

Peterson, N.W. 1979. Inventory of the waters of the project area. Job Progress Report Federal Aid Project No. F-9-R-25, Job Ib. Montana Dept. of Fish and Game, 23pp.

Vincent, E.R. 1971. River Electrofishing and Fish population estimates. Prog. Fish Cult. 33(3):163-167.

Prepared by: Richard Vincent, Wade Fredenberg, Dick Oswald and Brad Shepard.

Date: August 16, 1990.

Waters Referred to:	Ruby River, Section 01	03-01-6360-01
	Poindexter Slough	03-01-9320-01
	Mill Creek Slough	03-01-5020-01

Figure 1. Estimated numbers and biomass (lbs.) of brown trout collected in the Wellborn Section (1.0 mi.) and the Dell Section (1.76 mi.) of the Red Rock River in September 1987 and April 1989 and 1990.

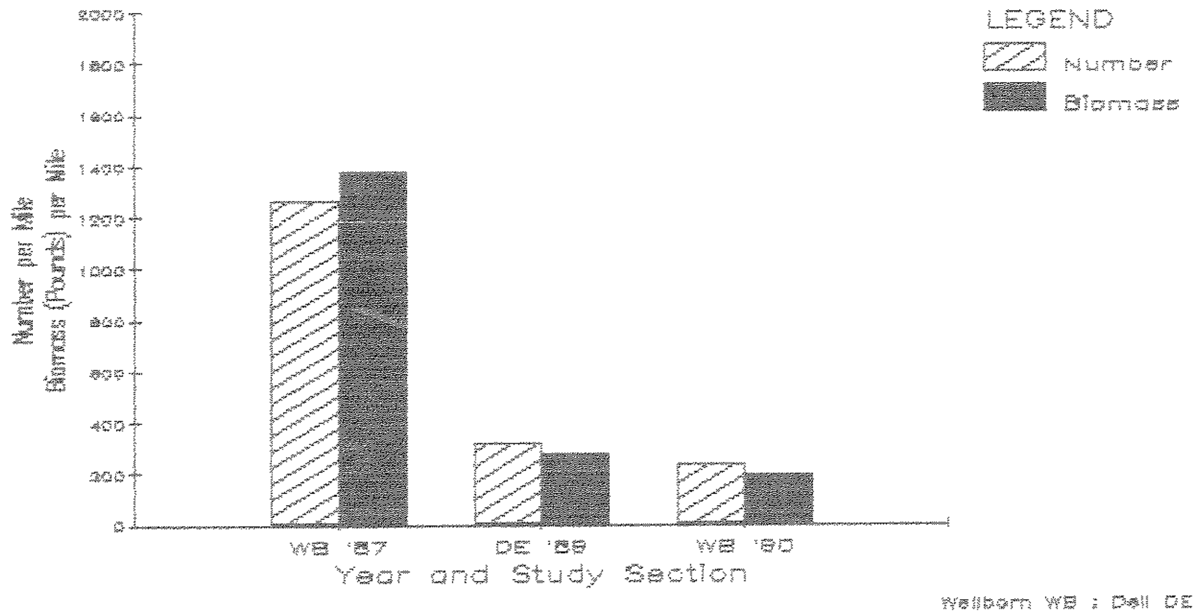

Figure 2. Estimated populations, by length group, of brown trout collected in the Wellborn Section (1.0 mi.) and Dell Section (1.76 mi.) of the Red Rock River in September 1987 and April 1989 and 1990.

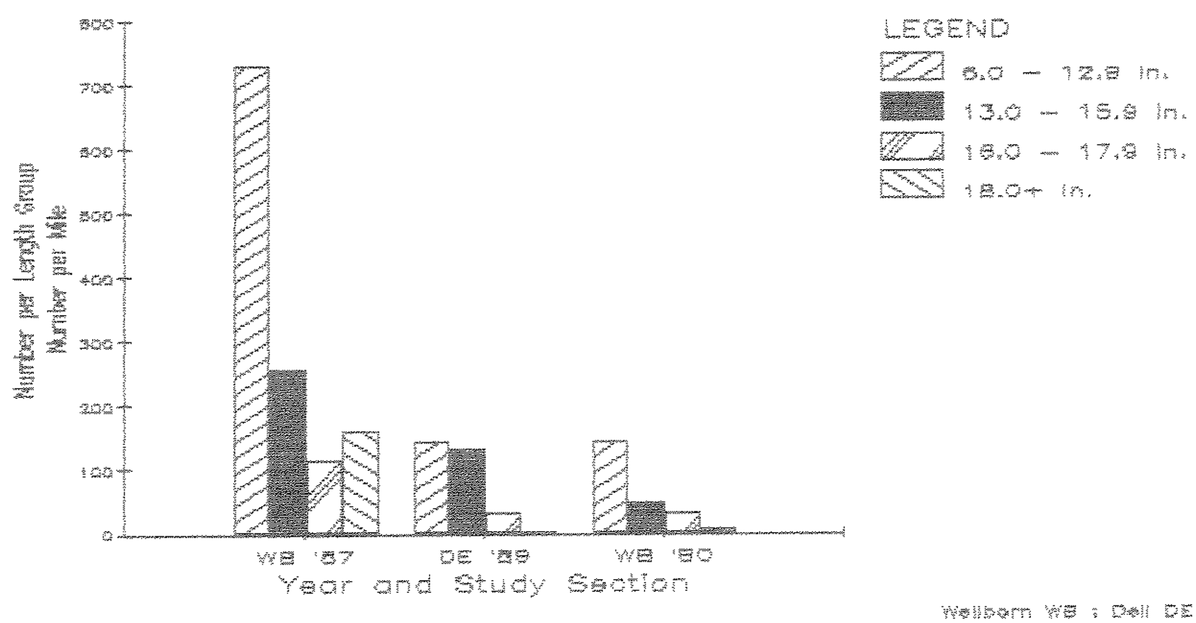

Figure 3. Estimated numbers and biomass (lbs.) of brown trout per 1,000 feet of stream in Section Three (3,200 ft.) of Poindexter Slough from March and April samples collected 1981 — 1990.

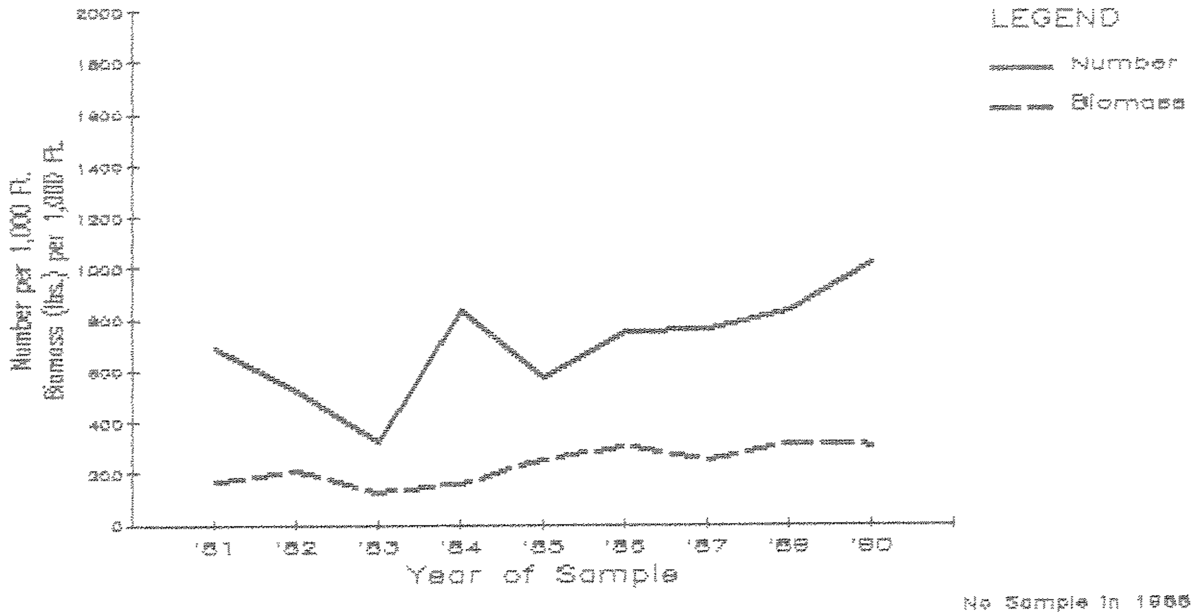

Figure 4. Estimated numbers and biomass (lbs.) of brown trout per 1,000 feet of stream in the Gary Section (3,168 ft.) of Poindexter Slough from March and April samples collected 1982 1985.

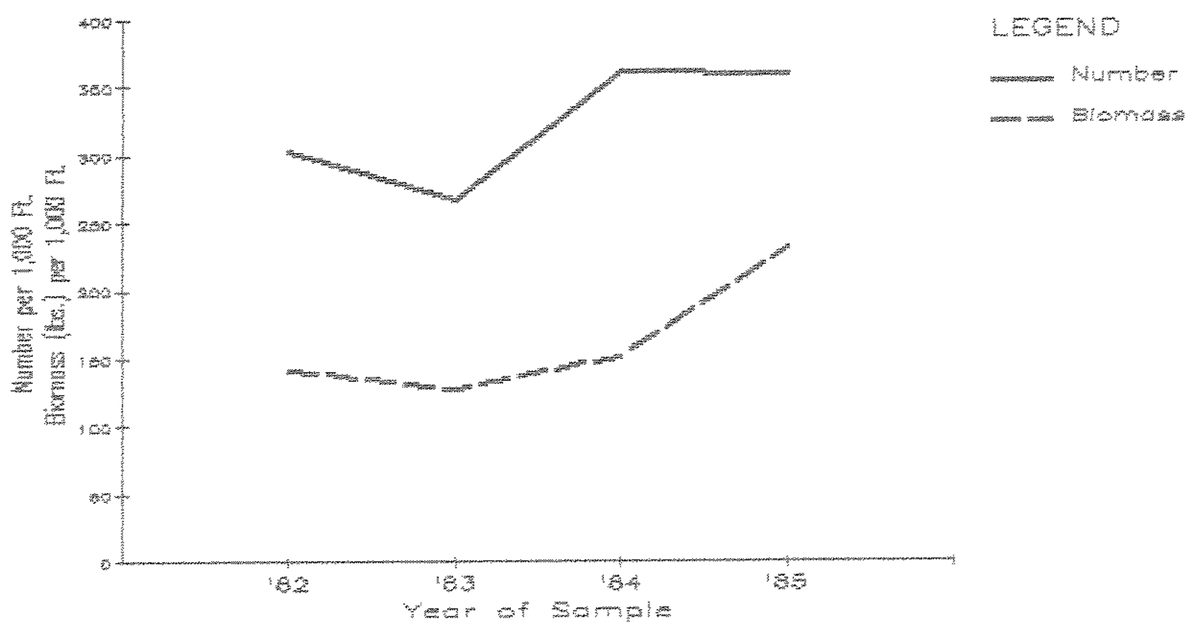

Figure 5. Estimated numbers, by age class, of brown trout per 1,000 feet of stream in Section Three of Poindexter Slough from March and April samples collected 1981 — 1987.

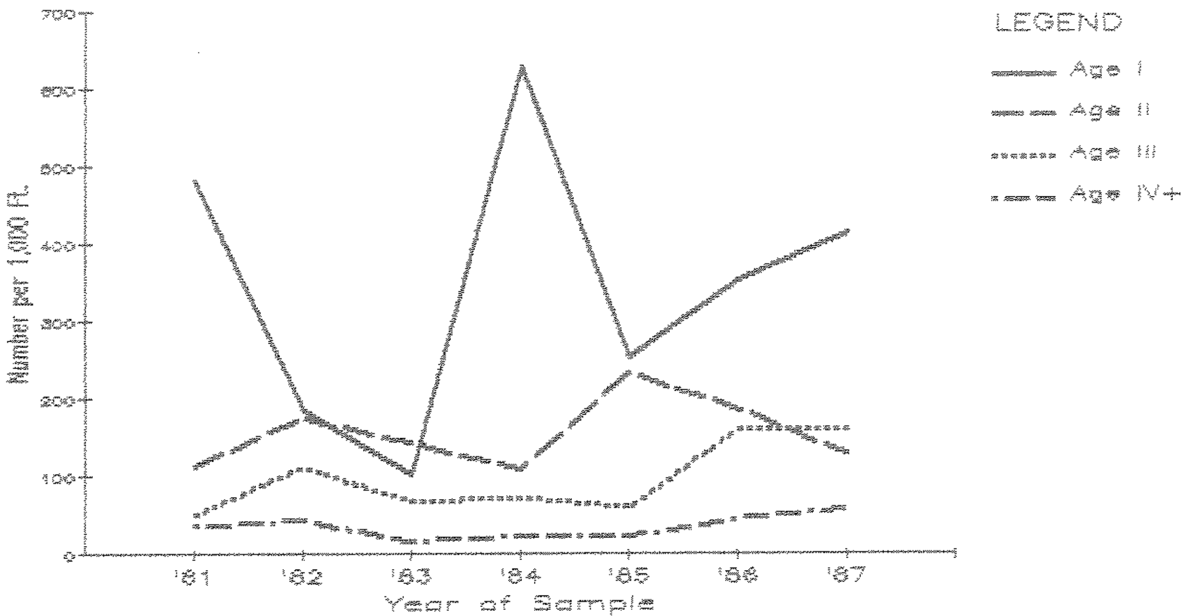

Figure 6. Estimated numbers, by age class, of brown trout per 1,000 feet of stream in the Gary Section of Poindexter Slough from March and April samples collected 1982 — 1985.

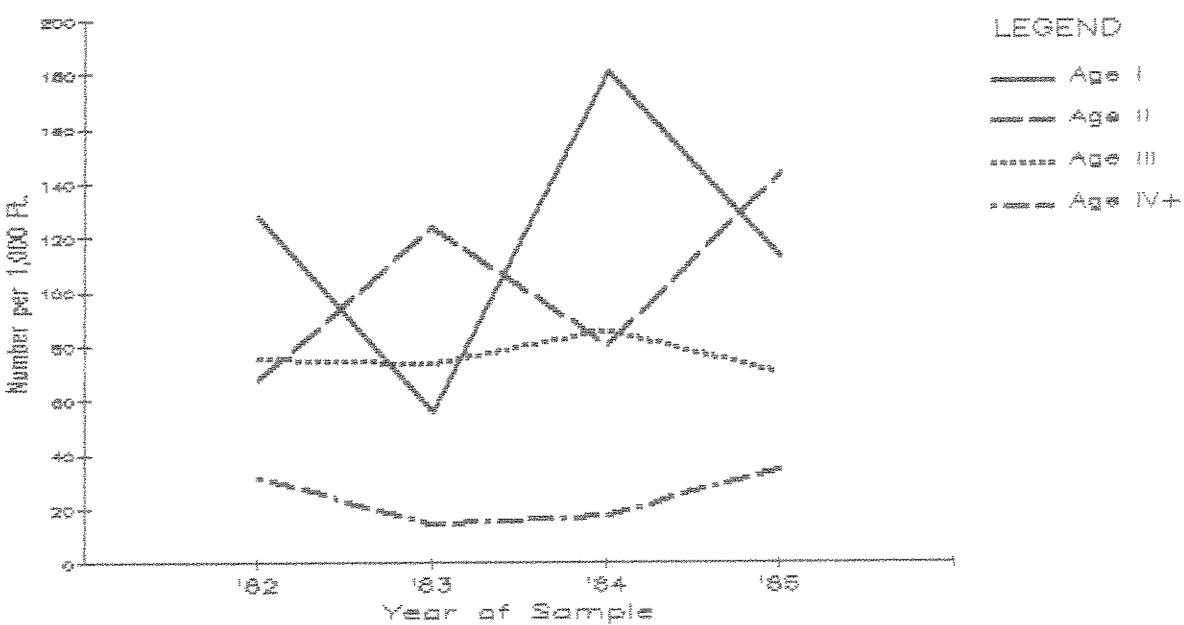

Figure 7. Estimated numbers, by length group, of brown trout per 1,000 feet of stream in Section Three of Poindexter Slough from March and April samples collected 1981 — 1990.

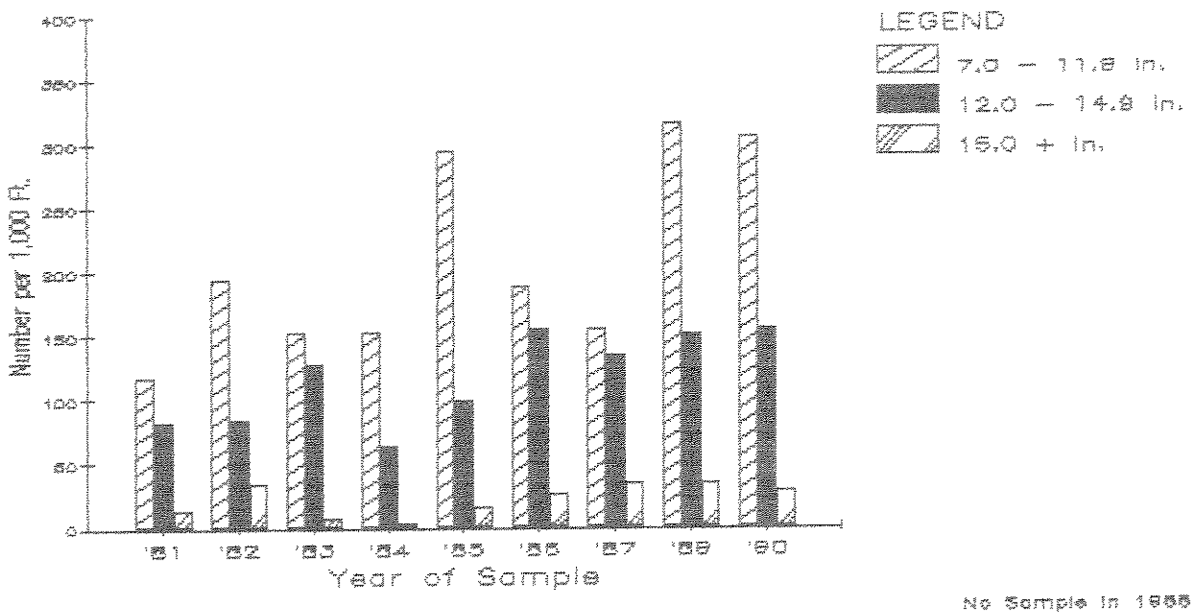

Figure 8. Estimated numbers, by length group, of brown trout per 1,000 feet of stream in the Gary Section of Poindexter Slough from March and April samples collected 1982 — 1985.

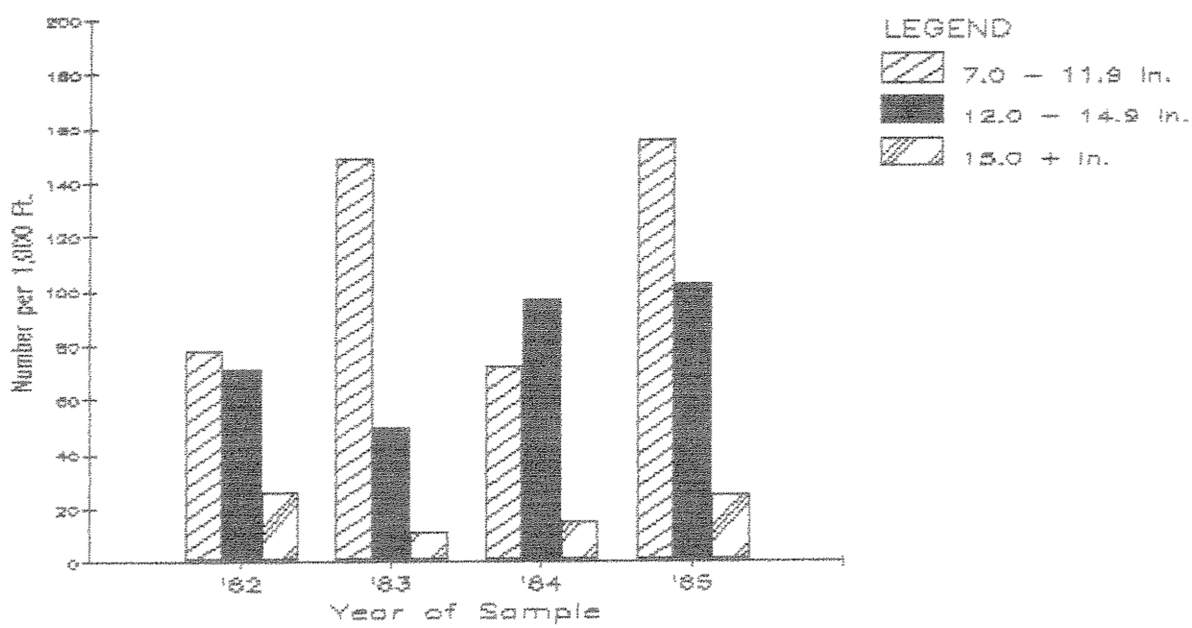

Figure 9. Estimated numbers and biomass (lbs.) of rainbow trout per 1,000 feet of stream in Section Three of Poindexter Slough from March and April samples collected 1981 — 1987.

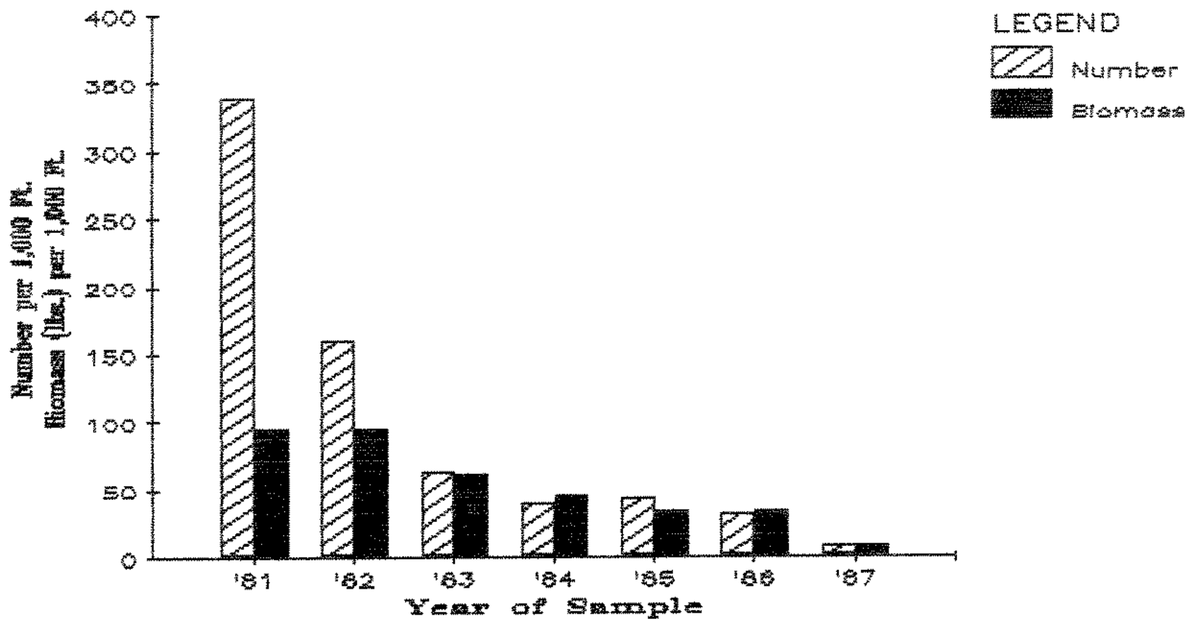

Figure 10. Estimated numbers, by age class, of rainbow trout per 1,000 feet of stream in Section Three of Poindexter Slough from March and April samples collected 1981 — 1987.

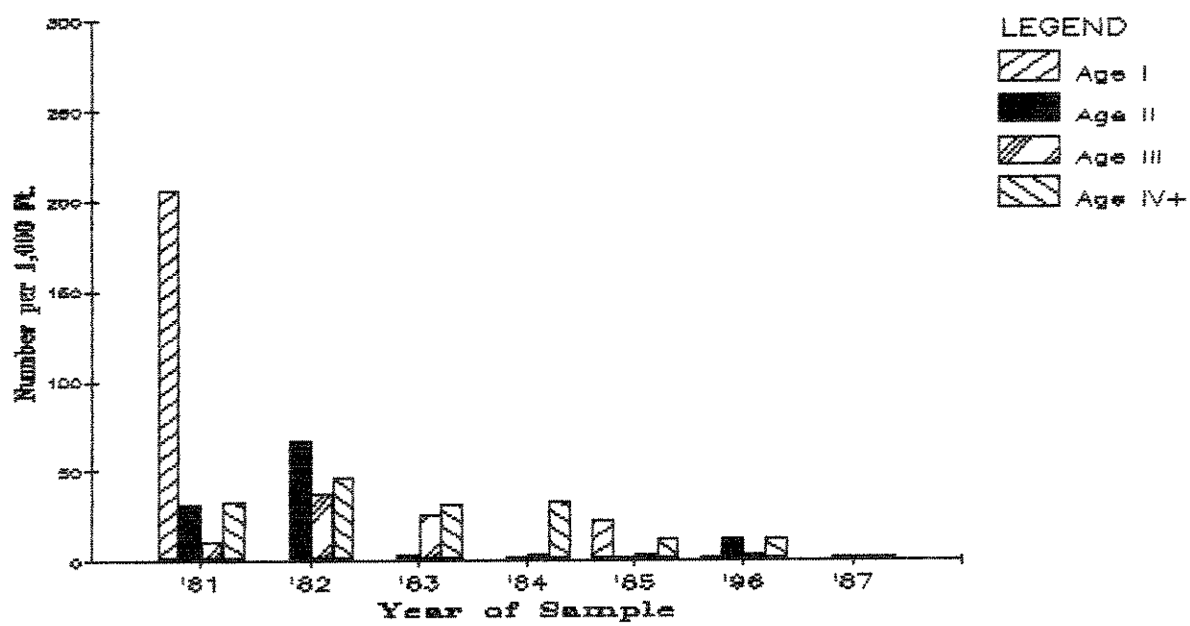

Figure 11. Estimated numbers and biomass (lbs.) of rainbow, cutthroat, and rainbow x cutthroat hybrid trout collected in the Three Forks Section (1.2 mi.) of the Ruby River in September and October 1987 - 1989.

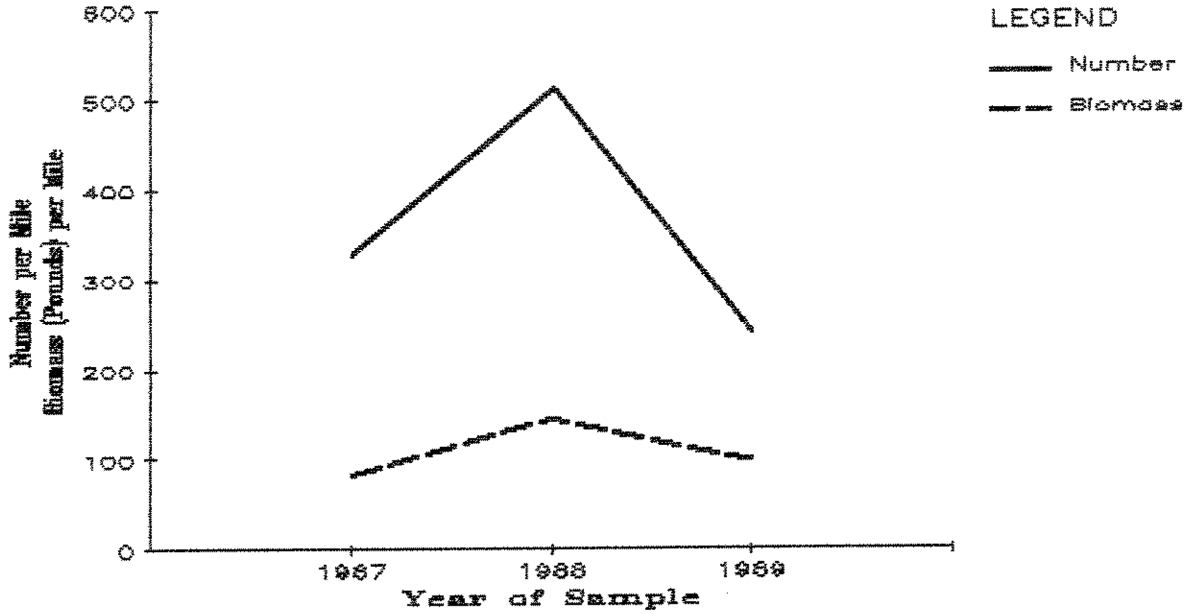

Figure 12. Estimated numbers per mile of rainbow, cutthroat, and rainbow x cutthroat hybrid trout, by species, collected in the Three Forks Section of the Ruby River in Sept. and Oct. 1987 - 1989.

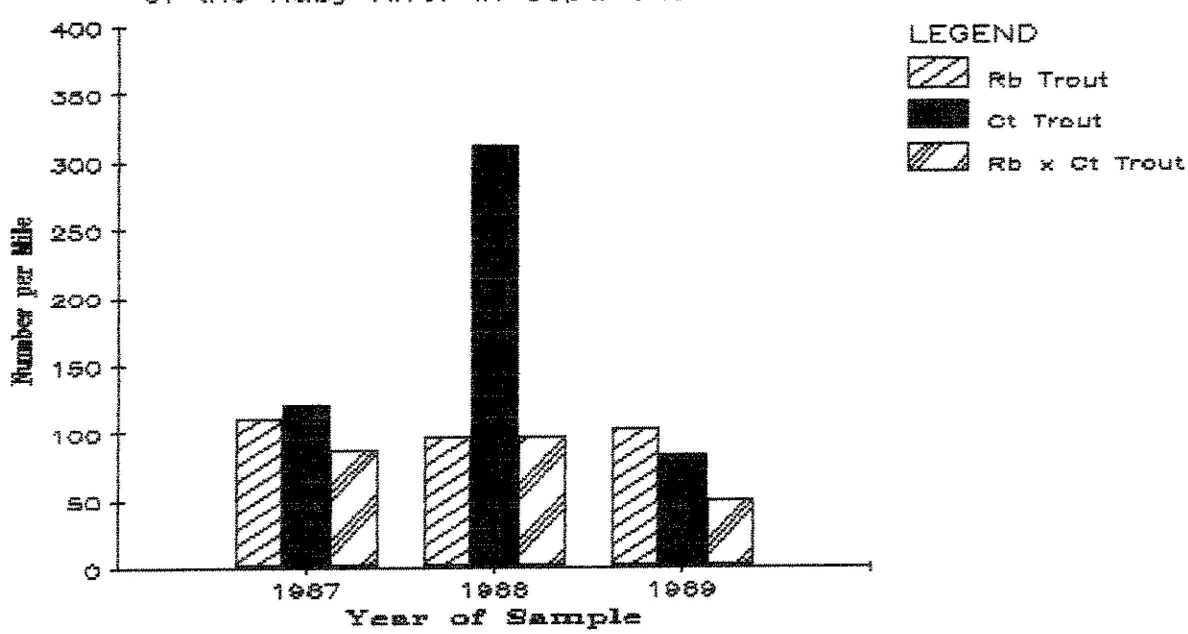

Figure 13. Estimated population, by length group, of rainbow, cutthroat, and rainbow x cutthroat hybrid trout collected in the Three Forks Section of the Ruby River in September and October 1987 — 1989.

Figure 14. Mean length at age of rainbow, cutthroat, and rainbow x cutthroat hybrid trout collected in the Three Forks Section of the Ruby River in September and October 1987.

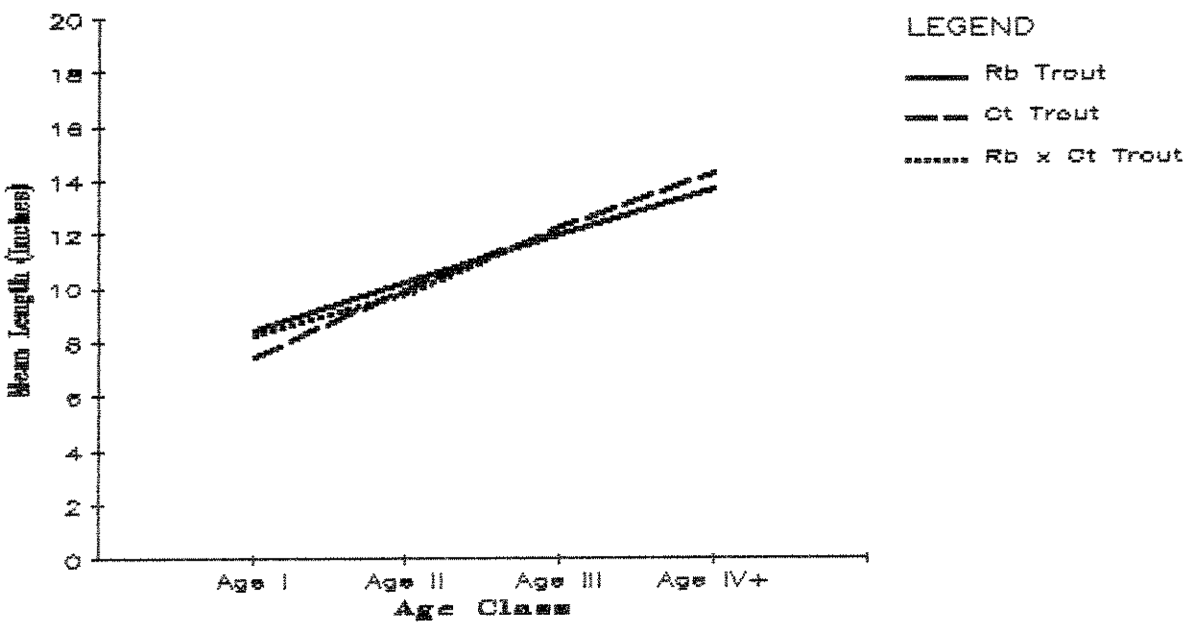

Figure 15. Estimated numbers and biomass (lbs.) of brown trout collected in the Silver Spring (2.84 mi.) and Sarge (1.70 mi.) Sections of the Ruby River in March and April 1989 and 1990.

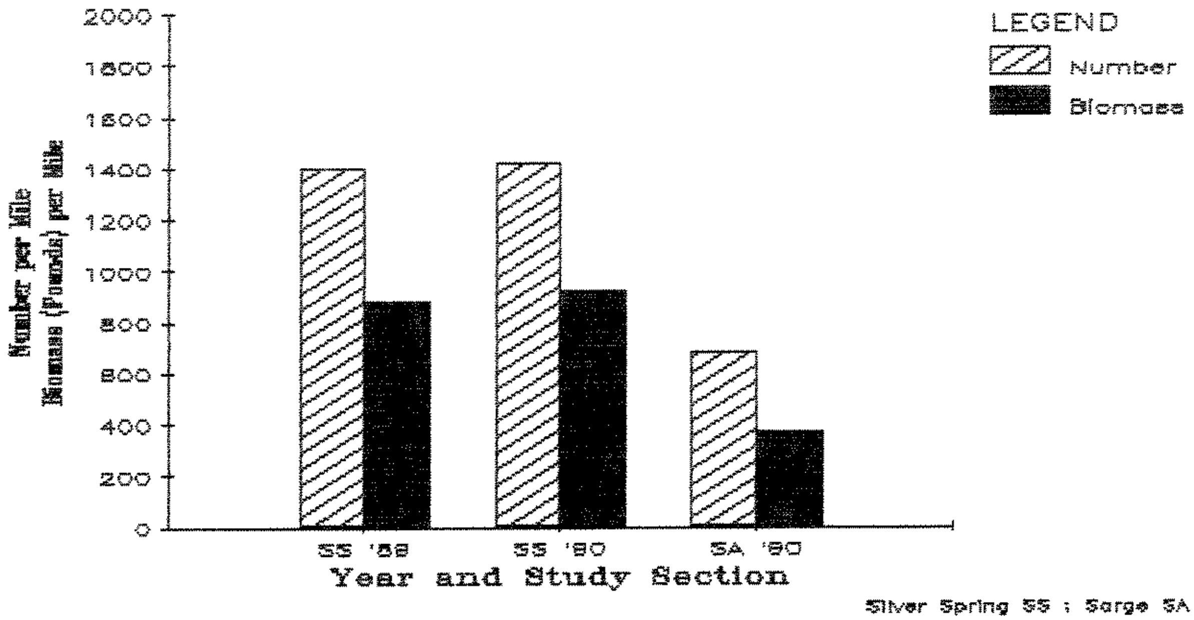

Figure 16. Estimated populations, by length group, of brown trout collected in the Silver Spring and Sarge Sections of the Ruby River 1989 — 1990.

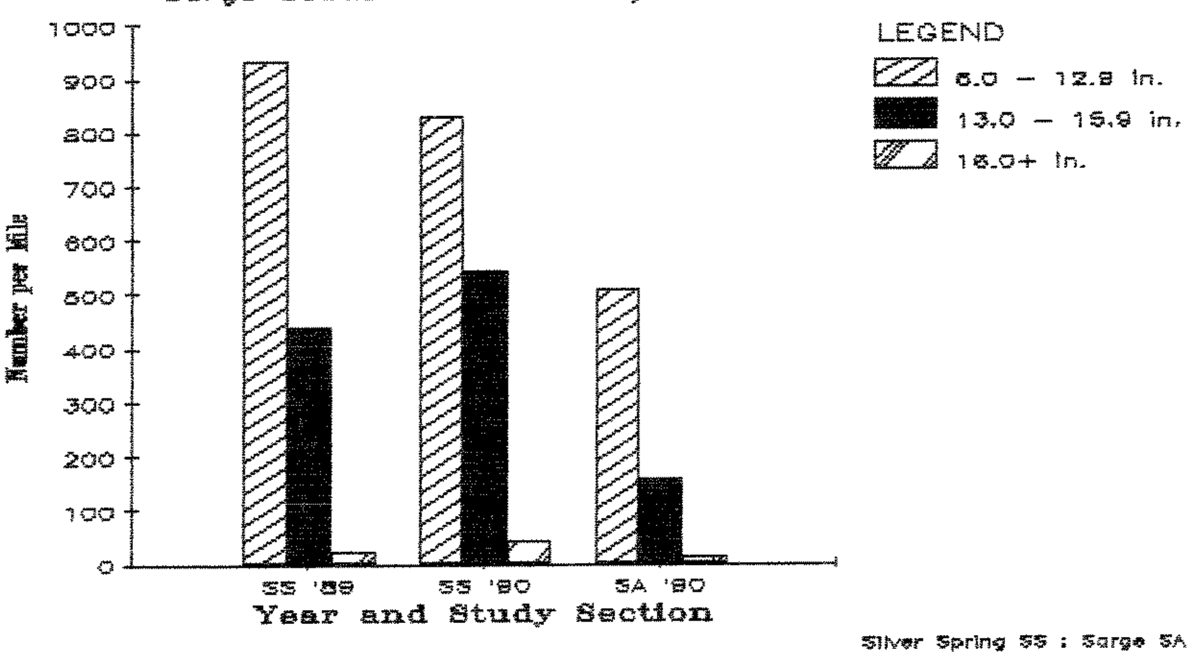

Figure 17. Estimated numbers and biomass (lbs.) of brown trout collected in the Sailor Section (2.28 mi.) of the Ruby River in March and April 1979 — 1986.

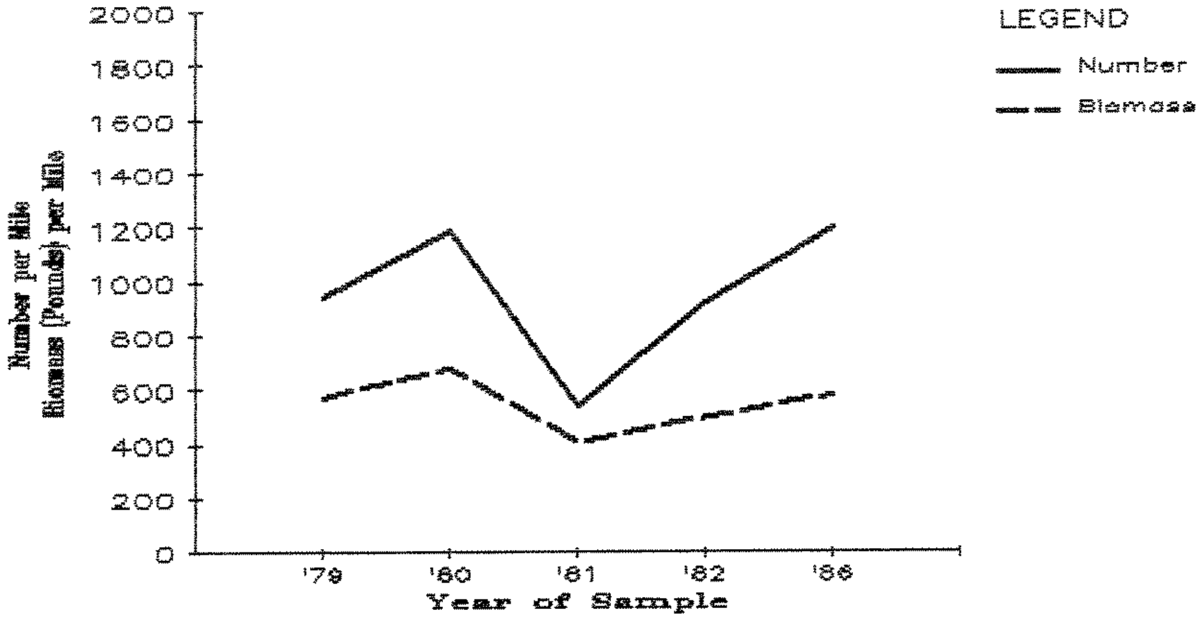

Figure 18. Estimated numbers and biomass of brown trout collected in spring samples in the Alder (AL), Silver Spring (SS), Sarge (SA), and Sailor (SR) Sections of the Ruby River.

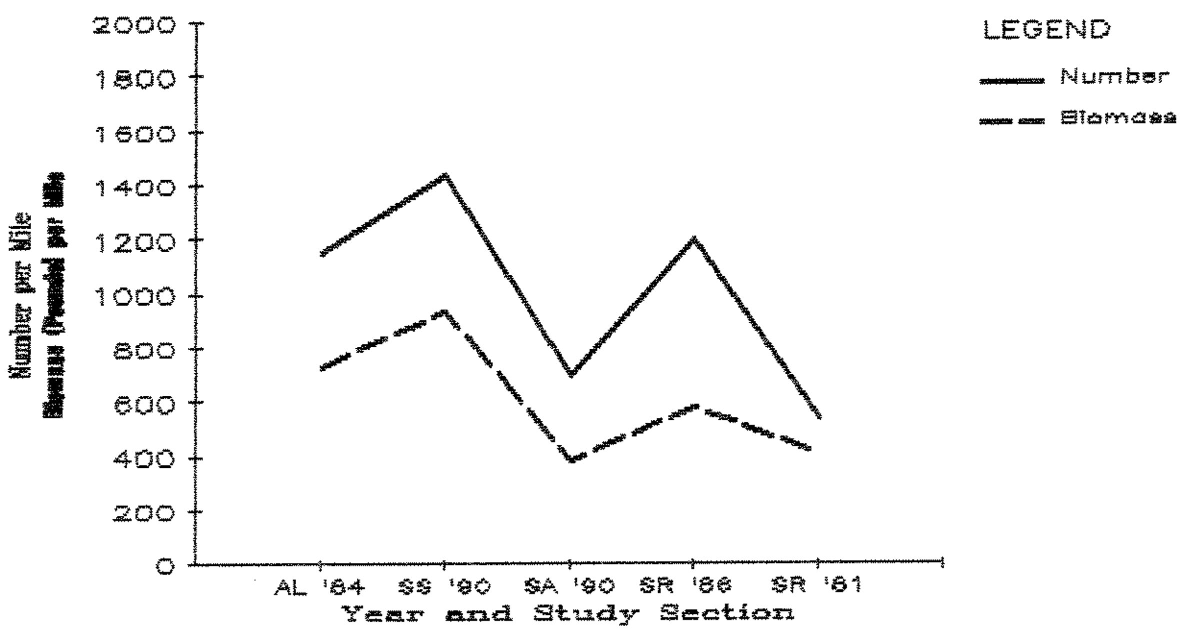

Figure 19. Estimated numbers of 13 inch and larger and 15 inch and larger brown trout from spring samples collected in the Alder (AL), Silver Spring (SS), Sarge (SA), and Sailor (SR) Sections of the Ruby River.

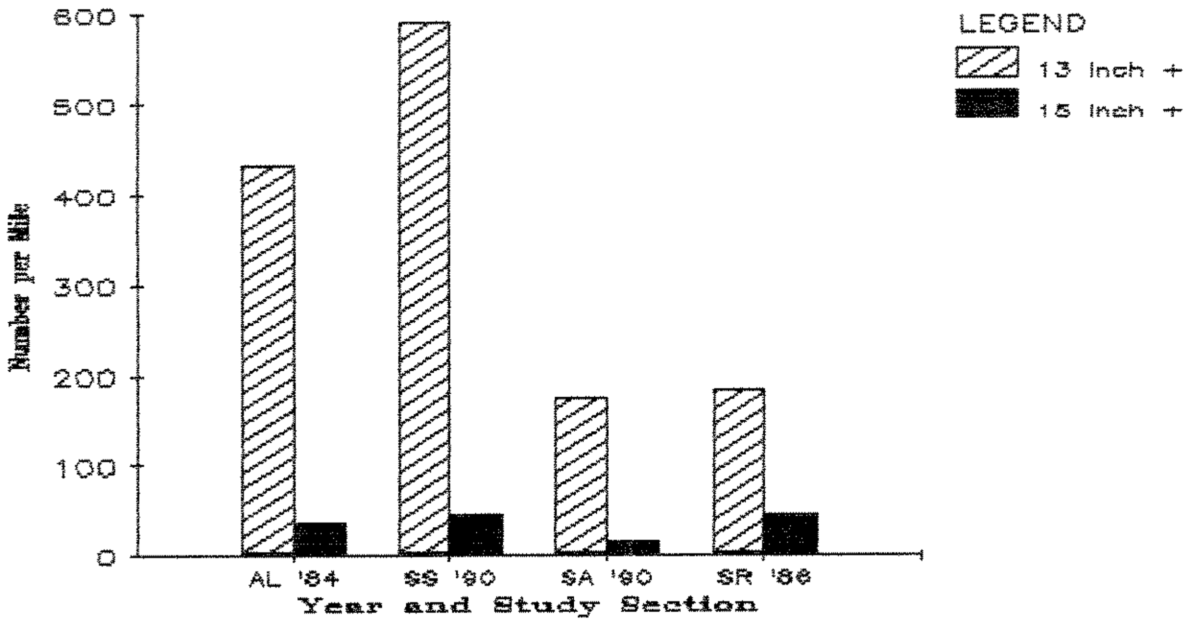

Figure 20. Estimated numbers and biomass (lbs.) of brown trout collected in the First Section of Mill Creek Slough (MS) and Section Three (P3) and the Gary Section (PG) of Poindexter Slough.

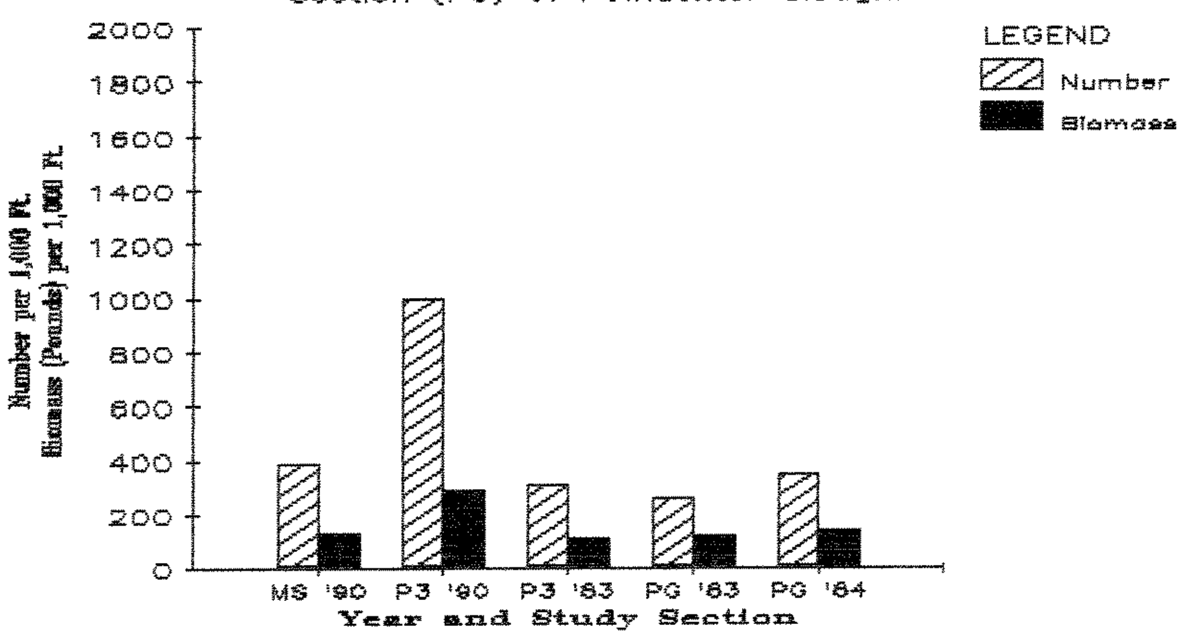

Figure 21. Estimated numbers of brown trout, by length group, collected in the First Section of Mill Creek Slough in February 1990.