MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION

JOB PROGRESS REPORT

State: Montana

Project Number: F-46-R-2
Job Number: II-d

Project Title: Statewide Fisheries Investigations
Study Title: Survey and Inventory of Cold Water Lakes
Job Title: Southwest Montana Major Reservoirs Investigations
Period Covered: July 1, 1988 through June 30, 1989.

JOB OBJECTIVES

Clark Canyon Reservoir

1. Maintain shoreline in a state of minimal development to satisfy access needs of recreationists and maintain shoreline integrity and water quality.

Discussed waste disposal and weed control programs with the U.S. Bureau of Reclamation.

2. Maintain wild brown trout populations at densities reflected by an average sample of $\geq$2.0 adult brown trout per surface 125 ft. gill net set.

Spring gill net sets were made to determine the relative densities of wild brown trout. Gill net data has yet to be analyzed.

3. Maintain successful stocking program of Arlee rainbow trout to attain densities reflected by an average spring sample of 4.0 per 125 ft. surface gill net set. Maintain growth rates that produce 15 inch rainbow trout at age I+.

Data included in this report.

4. Establish the wild, spring spawning DeSmet strain of rainbow trout to augment the planting program of Arlee rainbow and provide a longer lived, reproducing segment to the rainbow fishery.

Data included in this report.

5. Evaluate the comparative success of the DeSmet and Arlee strains of rainbow regarding catchability, longevity, survival, growth and recruitment to the Clark Canyon fishery.

All data except creel data included in this report.

6. Maintain fishery for large (20-25 inch) wild burbot sustaining a catch rate of 0.25 fish/hr.

No activity was scheduled for this objective until 1991.

Hebgen Reservoir

1. Maintain shoreline in a state of minimal development while providing sufficient access for anglers. Protect spawning streams from impacts of development.

Reviewed U.S. Forest Service timber management and grazing allotments plans in areas where there may be impacts on the lake shore and/or the spawning tributaries fisheries habitat and water quality.

2. Establish wild, self-sustaining rainbow populations at densities reflected in a sample of ≥10 adults per 125 foot surface gill net set in spring of year.

Data included in this report.

3. Maintain wild brown trout populations at densities reflected in a sample of ≥18 adults per 125 ft. bottom gill net set in spring of year. Maintain averages of 16 inches in creel with opportunity of catching large, trophy brown trout (≥3 pounds).

Data included in this report.

4. Collect the information necessary to accurately assess fishing pressure, catch rates and harvest (State Project).

No activity occurred with this objective due to the lack of state funds for a creel and angler census.

5. Provide rainbow to anglers without jeopardizing the establishment of self-sustaining populations.

Creel limits for the 1988-89 fishing season reduced the daily possession limits from 10 trout or 10 lbs. and one trout to a 5 trout limit. In addition an extended fishing closure was placed on all the spawning tributaries to protect the spawning rainbow trout.

Willow Creek Reservoir

1. Attempt to reduce magnitude of reservoir drawdown in fall of year.

Numerous visits with the dam operator were made to try to minimize fall drawdown.

2. Determine time of out-migration of rainbow trout fry from spawning streams (State Project).

A total of 2000 young rainbow trout were electrofished in Willow Creek during the fall of 1988 to determine quantity and timing of fry movement out of the stream. Data has not been fully analyzed.

3. Maintain a spawning run of at least 2500 adult wild rainbow trout in Willow Creek as the state brood stock of DeSmet rainbow.

The 1989 spawning run of approximately 4500 DeSmet rainbow trout was observed with a total egg take of 850,000 for the state hatcheries.

Canyon Ferry Reservoir

1. Maintain densities of rainbow trout reflected in average samples of ≥15 yearling and older rainbow per 125 ft. surface gill net set in the spring.

Spring 1989 surface gill net sets were made with data to be reported in job IIf.

2. Identify spawning areas successfully used by trout in reservoir system tributaries (State Project).

Spring electrofishing was done in various spawning tributaries. Data to be reported at a later date.

3. Provide a consistent rainbow fishery with an annual average catch rate of ≥0.3 fish/hour.

Monthly creel census was conducted on the reservoir with results to be reported in job IIf.

4. Provide an average winter catch rate of at least 2.0 yellow perch per hour with an average size of 8.5 inches and an annual harvest of 300,000.

Data to be included in this report.

5. Minimize incidence, magnitude and duration of reservoir spill through radial gates at dam to minimize escapement of trout.

All rainbow trout stocked were either marked through fin clips or fluorescent dyed to determine the extent movement through reservoir spill.

PROCEDURES

Clark Canyon, Hebgen and Canyon Ferry Reservoirs were sampled with 125 foot surface and bottom set experimental gill nets to determine fish population trends. Spawning tributaries of the three reservoirs will be electrofished to determine use and year class strength of the wild trout strains. Recruitment will be monitored using fry traps.

Willow Creek Reservoir will be sampled via a spawning trap which will be maintained annually enabling the magnitude of the run to be determined. Eggs necessary to meet state requirements will be taken at this trap.

FINDINGS

Clark Canyon Reservoir

Clark Canyon Reservoir supports wild fisheries for brown trout and burbot and receives an annual plant of hatchery rainbow trout. The reservoir is extremely productive and supports rapid growth for all three major sport species. The strain of rainbow that was planted in the reservoir prior to 1982 was the Arlee, a domestic strain developed within the hatchery system. The Arlee rainbow trout were characterized by rapid growth in Clark Canyon with age 1 fish averaging 14.9 inches and 1.57 pounds in early May after spending one year in the reservoir.The Arlee rainbow were also characterized by a short life span with few fish living to age 3. Beginning in 1982, Clark Canyon received plants of DeSmet strain rainbow trout in addition to the annual Arlee strain plant. The DeSmet is a wild strain of rainbow trout adapted to lacustrine environments, capable of rapid growth, greater longevity than the Arlee, and natural reproduction. Rainbow trout stocking data for Clark Canyon are presented in Table 1 for the 1979-88 period. Because DeSmet rainbow are spawned in the wild, age 0 fish are not available for planting until late summer or fall. Arlee rainbow, which are spawned from hatchery broodstock in fall, can be planted as 4 to 5 inch age 0 fingerlings in May or June. In 1986, a group of DeSmet rainbow were held over to age 1 in the hatchery and planted as yearlings in May.

Rainbow Trout. Spring numbers of rainbow trout collected in experimental gill nets (5 to 15 sets per year, 10 since 1985) are shown in Figure 1 for the 1980-89 period. From 1980 through 1985, the catch per net remained quite stable averaging 4.6 per net. This was a marked improvement over the prior 15 years (Wells 1980). In 1986, the catch per net began to rise rapidly to a maximum of 17.7 per net in 1988. This was due to two important factors, the addition of DeSmet rainbow into the population and increased survival of Arlee rainbow plants. These factors are graphically demonstrated in Figures 2 and 3 which show spring net sample results for the two strains. Prior to 1985, Arlee plants were made in early May, as soon as surface water temperature reached 50 F. Delays forced planting dates later into May in 1984 and 1985 resulting in warmer water temperatures and better survival. Using this information, a June plant was attempted in 1987 and 1988 resulting in the highest observed survival of Arlee rainbow in Clark Canyon sampling history. A June plant results in water surface temperatures of about 60 F, the normal hatchery temperature to which the fingerlings are acclimated. The June plant also coincides with the exponential growth phase of the zooplankton populations in the lake and probably provides for better dispersal of older predacious fish. The downturn of Arlee survival in 1989 was due to severe drawdowns in the reservoir associated with drought. Numbers of DeSmet rainbow (Figure 4) indicate low survival rates for fall age 0 plants. Although the reservoir received DeSmet plants in 1982 and 1983, no confirmed survivors of these plants were collected in subsequent samples. The 1984 plant met with some measure of success which was probably due to an early August plant of larger than average fish. The 1987 sample yielded high numbers of age 2 DeSmet which composed the bulk of the DeSmet sample. It is interesting to note that the comparative data for the two strains suggest that some competitive interaction may occur. When DeSmet numbers peaked in 1987,

Arlee numbers were low. When Arlee numbers peaked in 1988, however, high numbers of DeSmet rainbow observed as age 2 in 1987 dropped dramatically in 1988 as age 3 fish. Some of the decline in DeSmet numbers in 1988 may be due to the spring sampling regime following closely upon the spawning period. A fall sample has been added to the program to better follow trends in DeSmet populations.

Table 1. Recent stocking history of Arlee and DeSmet strains of rainbow trout into Clark Canyon Reservoir.

Year	Month	Strain	Number
1979	May	Arlee	217,000
1980	May	Arlee	201,000
1981	May	Arlee	196,000
1982	May	Arlee	193,000
	Nov	DeSmet	36,000
1983	May	Arlee	154,000
	Sep	DeSmet	248,000
1984	May	Arlee	150,000
	Aug - Oct	DeSmet	254,000
1985	May	Arlee	208,000
1986	May	Arlee	212,000
	May	DeSmet*	103,500
	Aug	DeSmet	10,000
1987	Jun	Arlee	222,000
	Aug	DeSmet	102,000
1988	Jun	Arlee	201,000

* Yearling plant

Survival of fall plants of age 0 DeSmet has been poor in Clark Canyon and not nearly as successful as the yearling plant of 1986. This is further demonstrated by very low numbers of age 2 fish, from the 1987 fall plant, captured in the 1989 sample. Overall survival of the 1984 age 0 plant and 1986 yearling plant, which largely compose the DeSmet rainbow population of the lake, appears to be relatively stable to ages 4 and 5 with the unexplainable loss suffered by the yearling plant between age 2 and age 3. This may be due to angler harvest or the previously suggested competition between the two strains. The data suggest that a program designed to increase DeSmet numbers in the reservoir would include the use of yearling fish and an increase in the numbers of age 0 fish planted. The data further indicate that DeSmet rainbow planted as yearlings had a survival rate 16.9 times greater than that of the 1984 age 0 plant to age

2 which strongly supports the use of yearling plants.

A comparison of growth between Arlee and DeSmet rainbow is given in Figures 5 and 6. While all points of comparison are not equal due to age and size differences as well as time of plant, some valid points of comparison can be made. For DeSmet rainbow planted as age 0 fish in fall, the rate of gain in both length and weight is inferior to that of the Arlee however, the ultimate size of the Desmet after one full growing season in the lake is greater for the DeSmet than the Arlee. This is probably due to the time spent in the lake between the August planting date of the DeSmet and the May planting date of the Arlee. For DeSmet planted as yearlings however, the rate of gain in both length and weight is more similar to that of the Arlee rainbow. The ultimate size reached after one growing season in the lake however is nearly identical between the two strains. This is due to the fact that the DeSmet rainbow had crowded hatchery facilities in holding them over to yearling status to the point at which they were placed on restricted diets prior to stocking.

One of the reasons for introducing DeSmet rainbow into Clark Canyon Reservoir was the hope of establishing a naturally reproducing population of rainbow trout in the lake. To monitor the DeSmet rainbow trout spawning potential, the Roe section of the Red Rock River was electrofished in March and April of each year since 1986. The Roe section is 2.4 miles in length and is located immediately upstream from the reservoir. Numbers of spawning DeSmet rainbow captured per run through the section are presented in Figure 7. The length frequency composition of each year's spawning run is depicted in Figures 8, 9, 10, and 11. In 1986, numbers were low as a few precocious age 2 fish from the 1984 plant made a migration. In 1987, numbers of spawning fish increased markedly as the 1984 plant reached age 3 and large numbers of age 2 males from the yearling plant of 1986 entered the migration. By 1988, numbers of spawning fish reached the observed maximum as age 3 and 4 fish. The number of fish captured per sample run in 1989 showed a decrease from 1988 which may in part be due to mortality within the population but is also due to a late migration associated with cold ambient temperatures that spring. Due to the late timing of the migration in 1989, the first three sample trips resulted in lower than average capture rates while the last sample run on April 18 yielded a capture total similar to those observed in 1988. The length frequency analysis shows a clear partitioning of age classes in 1986 and 1987. By 1988 the age 3 and 4 fish began to join in length range and by 1989 formed one length class. The 1989 histogram also shows the entry of a few age two fish which may be survivors from the 1987 plant and also may include wild progeny. It is hoped that scale analysis of the fish will provide further information. The extent of natural reproduction of DeSmet rainbow in the Clark Canyon - Red Rock River system has yet to be determined. The two major surviving plants just reached full maturity (age 4) in 1988 and 1989. Redd counts in the Roe section have shown 107 to 278 redds per electrofishing trip. In September of 1988, the Roe section was electrofished for young of the year rainbow trout. Within the inefficiency of electrofishing on very small fish and the peripheral habitats occupied by these small fish in a large river, a sample of 189 young of the year rainbow ranging from 1.7 to 5.9 inches and averaging 2.7 inches in length was collected suggesting that natural reproduction had occurred in 1988. Future sampling will be required to determine the extent to which natural reproduction and rearing will be successful within the lake's population.

Pertinent statistics on the DeSmet spawning migrations of 1986-88

are presented by age group and sex in Table 2. Mean lengths and weights of the fish show the rapid growth rates due to the productivity of Clark Canyon. The difference in mean length at age 2 for the 1984 age 0 plant and the 1986 yearling plant shows the previously discussed limitations on the yearlings due to the restricted hatchery diet. The data show that Clark Canyon Reservoir can produce DeSmet rainbow which average nearly four pounds at age 4. The data show a strongly skewed sex ratio toward males at age 2 which suggests that this is merely a precocious run of males and does not constitute true sexual maturity. Because the Red Rock River spawning migration has been dominated by two age classes of fish (ages 4 and 5 in 1989), future spawning migration density will be dependant upon natural reproduction from within the system as well as adequate survival of future plants of DeSmet rainbow.

Table 2. Statistical composition of the DeSmet rainbow trout spawning migrations in the Red Rock River. Samples collected in the Roe section (2.4 mi.) in March and April 1986 - 1988.

1986

Age 2 DeSmet Rainbow

	Males	Females
Number	59	24
Length Rng.	16.0 - 19.9"	15.2 - 19.3"
Mean Length	17.7"	18.0"
Weight Rng.	1.70 - 2.81 lbs.	1.53 - 3.04 lbs.
Mean Weight	2.28 lbs.	2.41 lbs.
Sex Ratio	2.5 : 1.0	

1987

Age 2 DeSmet Rainbow

	Males	Females
Number	241	22
Length Rng.	11.6 - 18.0"	14.8 - 17.8"
Mean Length	16.0"	16.4"
Weight Rng.	0.70 - 2.74 lbs.	1.17 - 2.36 lbs.
Mean Weight	1.73 lbs.	1.90 lbs.
Sex Ratio	11.0 : 1.0	

Age 3 DeSmet Rainbow

	Males	Females
Number	49	22
Length Rng.	18.7 - 22.5"	18.5 - 22.6"
Mean Length	20.4"	20.2"
Weight Rng.	2.22 - 4.12 lbs.	2.66 - 4.78 lbs.
Mean Weight	3.32 lbs.	3.55 lbs.
Sex Ratio	2.3 : 1.0	

Table 2 cont.

1988

Age 3 DeSmet Rainbow

	Males	Females
Number	234	263
Length Rng.	15.8 - 21.7"	17.0 - 22.2"
Mean Length	19.1"	20.2"
Weight Rng.	1.55 - 3.63 lbs.	1.83 - 4.96 lbs.
Mean Weight	2.85 lbs.	3.54 lbs.
Sex Ratio	0.9 : 1.0	

Age 4 DeSmet Rainbow

	Males	Females
Number	148	266
Length Rng.	19.2 - 23.5"	19.7 - 24.3"
Mean Length	21.3"	21.7"
Weight Rng.	2.42 - 4.60 lbs.	2.66 - 5.50 lbs.
Mean Weight	3.61 lbs.	4.00 lbs.
Sex Ratio	0.6 : 1.0	

Brown Trout. The wild brown trout population of Clark Canyon Reservoir is marked by rapid growth and the potential to produce trophy (5 to 10 lb.) sized fish. Average spring length is 13.6 inches at age 2, 18.2 inches at age 3, 20.0 inches at age 4, and 22.9 inches at age 5 and older. The data suggest that the brown trout population (Figure 12) has experienced a decline over the years in the reservoir. The mean number of brown trout captured per gill net over the 1966-80 period was 2.9 while the take per net over the 1981-89 period dropped to a mean of 1.7. This decline appears to be fairly gradual over the period and may be associated with a process of aging in the reservoir which was filled in 1964. The brown trout population may be in the process of coming to a stable equilibrium after experiencing a rapid population growth in the new environment. The decline in brown trout numbers may also be associated with the increased numbers of rainbow trout as rainbow numbers began to build in the 1980's. Examination of the age structure of the brown trout samples over the 1979-89 period (Figure 13) does not indicate any strong trends in recruitment or year class strength or weakness upon which to base the population decline. This, however, may be a limitation of the data due to small sample size. Examination of the mean length of brown trout within the samples as well as the length range (Figure 14) shows an overall decline in mean length over the 1966-89 period. This decline in mean length is not substantiated by growth rates for brown trout which have been maintained over the period and is associated, rather, with an over all increase in length range within the samples.

Hebgen Reservoir

Spring and fall gill netting of Hebgen Reservoir was conducted in

1987 and 1988. A previous report (Vincent, 1987) discussed the positive response of the cutthroat population to annual spring stocking of approximately 100,000 overwintered (Age 1) cutthroat (Fig. 15). Numbers of cutthroat in spring surface nets peaked in 1985 (Fig. 16) and have shown a steady downward trend since as stocking of cutthroat was terminated following the 1987 plant. For unknown reasons, the cutthroat population has failed to establish a self-sustaining population despite the fact that spawning runs have been observed in several streams. Because of this failure, cutthroat stocking was terminated and by the spring of 1989 cutthroat were only a minor component in the net catch (Fig. 17).

The rainbow trout population appears to be responding favorably to annual fall plants of 300,000 to 500,000 2-inch fingerlings (Fig. 18). Gill net catches of rainbow trout have approximately doubled in the reservoir since heavy stocking of wild strains began in 1986. Analysis of marked fish has shown that survival of fish stocked in the spring as overwintered subcatchables is several times better than for young of the year fingerlings stocked in the fall. However, both groups are making substantial contributions to the overall population.

Spot checks of tributary streams conducted in 1985 through 1989 found increasingly larger runs of spawning rainbow trout occurring. In 1989, spawning rainbow were located in Trapper, Rumbaugh, Watkins, Duck and Grayling Creeks and emigrating fry were found in these streams (with the exception of Rumbaugh Creek) as well as in the South Fork of the Madison and Cougar Creek. A more detailed discussion of these observations will appear in the next progress report.

Willow Creek Reservoir

Data will be included in next progress report.

Canyon Ferry Reservoir

Yellow Perch. The popularity of winter perch fishing appeared to increase dramatically between 1983 and 1987. The harvest of yellow perch on Canyon Ferry Reservoir was estimated at 96,471 in 1983 (Rehwinkel, 1986). The apparent increase in angler interest coupled with 79% of the winter fishing pressure focused on one location (Lere,1987) was adequate stimulus to begin collecting early life history and movement information.

The main concern to be addressed was directed at whether the Canyon Ferry yellow perch population was a single population or comprised of smaller separate discrete sub-populations. Work done by Mraz, 1950 suggests yellow perch may move very little while Priegel, 1982 documented substantial migration.

The initial focus of this work was on the timing and temperature of spawning. Spawning activity was documented by the use of submerged Limber Pine and Douglas Fir trees as an artificial spawning medium. Periodic inspection of these substrate was made and egg skeins were counted. The eventual objective of doing this was to locate spawning areas and measure the conditions needed for success. The second intention of the perch

investigation was to understand movements as they applied to management.

Trap nets were employed to obtain a sample of perch. Perch 7.0 inches and larger were affixed with color coded "Floy" filament tags for future movement study. Work done by Stobo (1972) cautioned about use of "Floy" number coded tags with yellow perch in lakes with extensive vegetation. Since Canyon Ferry Reservoir does not have much aquatic vegetation, these tags were felt to be a satisfactory marking technique.

The first ripe male yellow perch was sampled on March 31, 1988 when the surface water temperature was 39.0 F. The first spent female perch was taken on April 13,1988 at a surface water temperature of 48 F. Spawning activity peaked (as indicated by 50% of the sampled female perch being spent) between April 17 and April 23, 1988.

The total number of yellow perch sampled between March 30 and April 23,1988 was 1828 (2 trap nets were used). The sex ratio was 93.7% males and 6.3% females. Generally, the composition of female yellow perch in the trap net catch was twice as great on the east shore as on the west shore. Since the winter fishery is concentrated on the west shore and the angler creel is dominated by females, this difference is thought to be harvest related.

Data collected from the artificial spawning substrate (conifer trees) at different depths and at different shoreline configurations, was intended to narrow the possibilities for documenting natural perch reproduction. Past efforts to locate perch spawning sites were unsuccessful (Bando,1968),therefore any information based on preferred physical features would be an assistance. Clady (1976) showed a negative correlation between wind and resulting cohort size. The artificial substrate located at abrupt shoreline shapes or where wind action was usually intense, went unused. Sites of very gradually increasing depth where wind action was minimized were heavily colonized.
Subsequent random egg sampling proved to be unsuccessful in locating naturally used spawning sites.

A total of 764 yellow perch were affixed with "Floy" filament tags. Between June 20 and June 29, 1988 twenty-one (21) traditionally duplicated bottom gill net sets were made. A total of 2845 yellow perch were sampled averaging 7.5 inches in length. These sets covered the entire reservoir and resulted in no tagged perch.

Brown Trout. Work done between 1978 and 1985 on the Missouri River indicated a very limited amount of usable salmonid spawning habitat (Rehwinkel, 1986). Population estimates conducted on the Missouri River resident brown trout suggested that recruitment of young fish might be inadequate. In spite of these concerns, the catch-per-unit-effort on the fall brown trout run has not shown a decline (Rehwinkel, 1986). Similarly, the gill net catch of browns in Canyon Ferry Reservoir (the source of the fall run) has remained stable.

In an attempt to quantify this recruitment concern, a plant of 27,017 wild two inch plus brown trout was made into Canyon Ferry in 1986. All these fish were marked with an adipose clip to allow analysis of their contribution to the year class. During June 1988, seventeen (17) historic

and four (4) new bottom gill net sets were made to document the contribution of this plant. Age-growth information previously collected showed that age II brown trout in June will range between 6.2 and 12.5 inches in length. A total of forty (40) brown trout were sampled with only two (2) from the desired length group. Neither of these had an adipose clip. Sampling will continue in the reservoir and river in the future to verify this plant's importance.

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Date: September 5, 1989

Figure 1. Spring numbers of rainbow trout per 125 foot experimental gill net set overnight in Clark Canyon Reservoir 1980 - 1989.

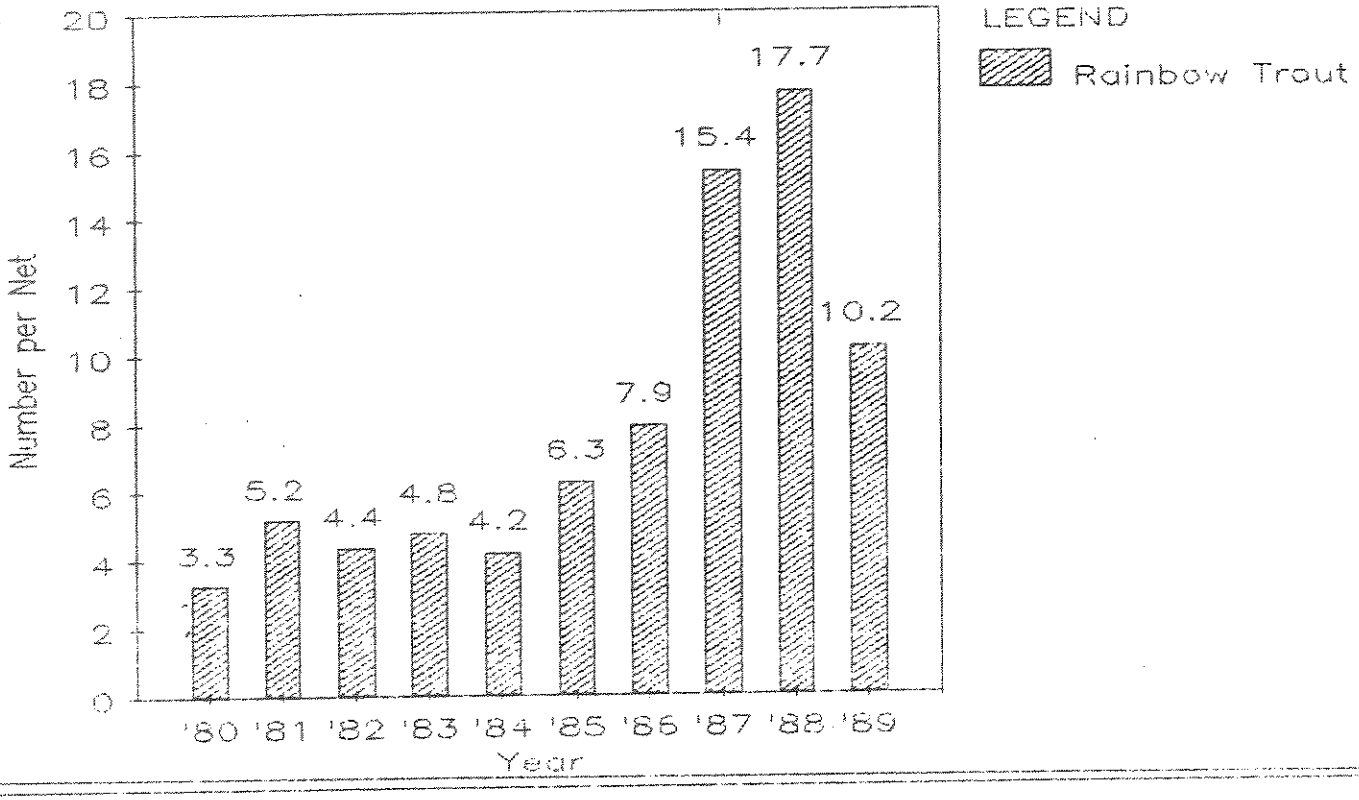


Figure 2. Spring numbers of Arlee strain rainbow trout per 125 foot experimental gill net set overnight in Clark Canyon Reservoir 1980 - 1989.

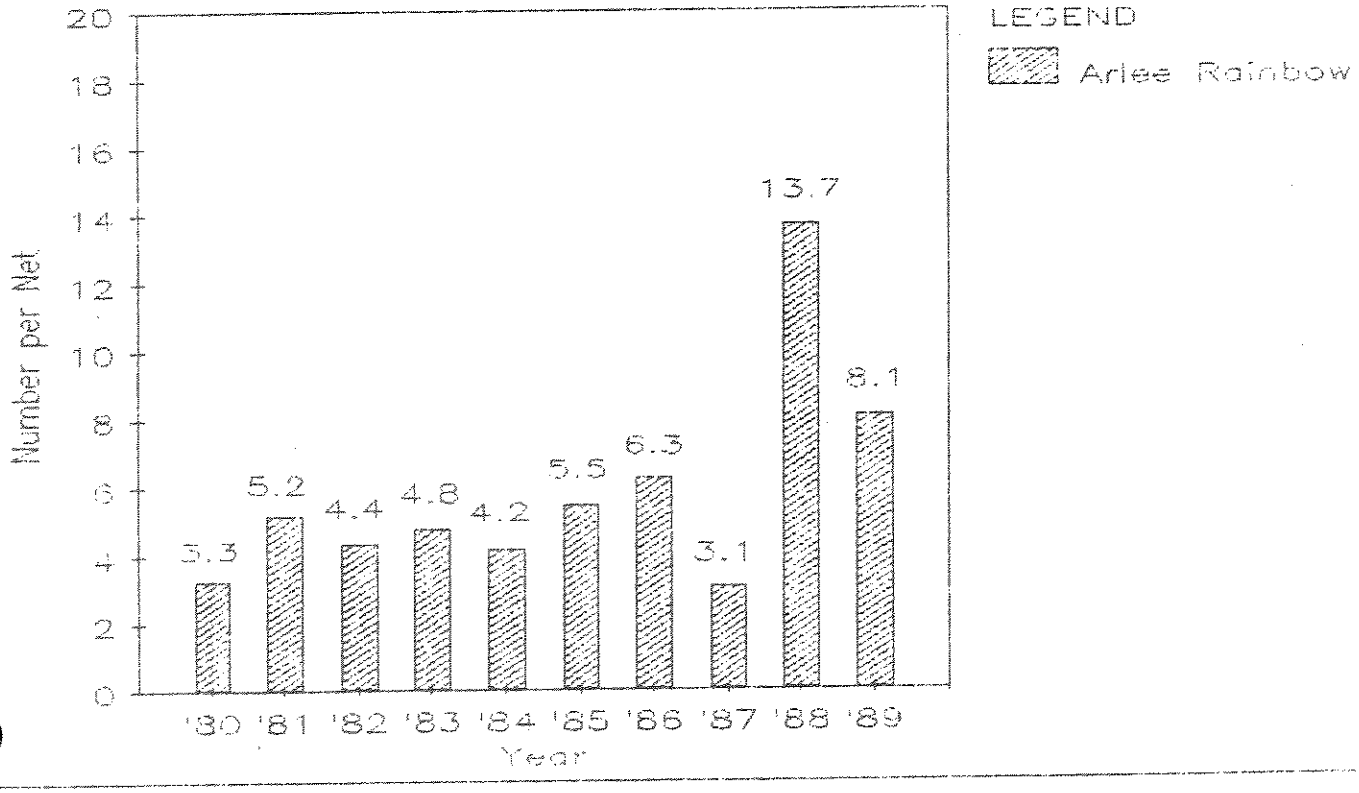


Figure 3. Spring numbers of DeSmet strain rainbow trout per 125 foot experimental gill net set overnight in Clark Canyon Reservoir 1985 - 1989.

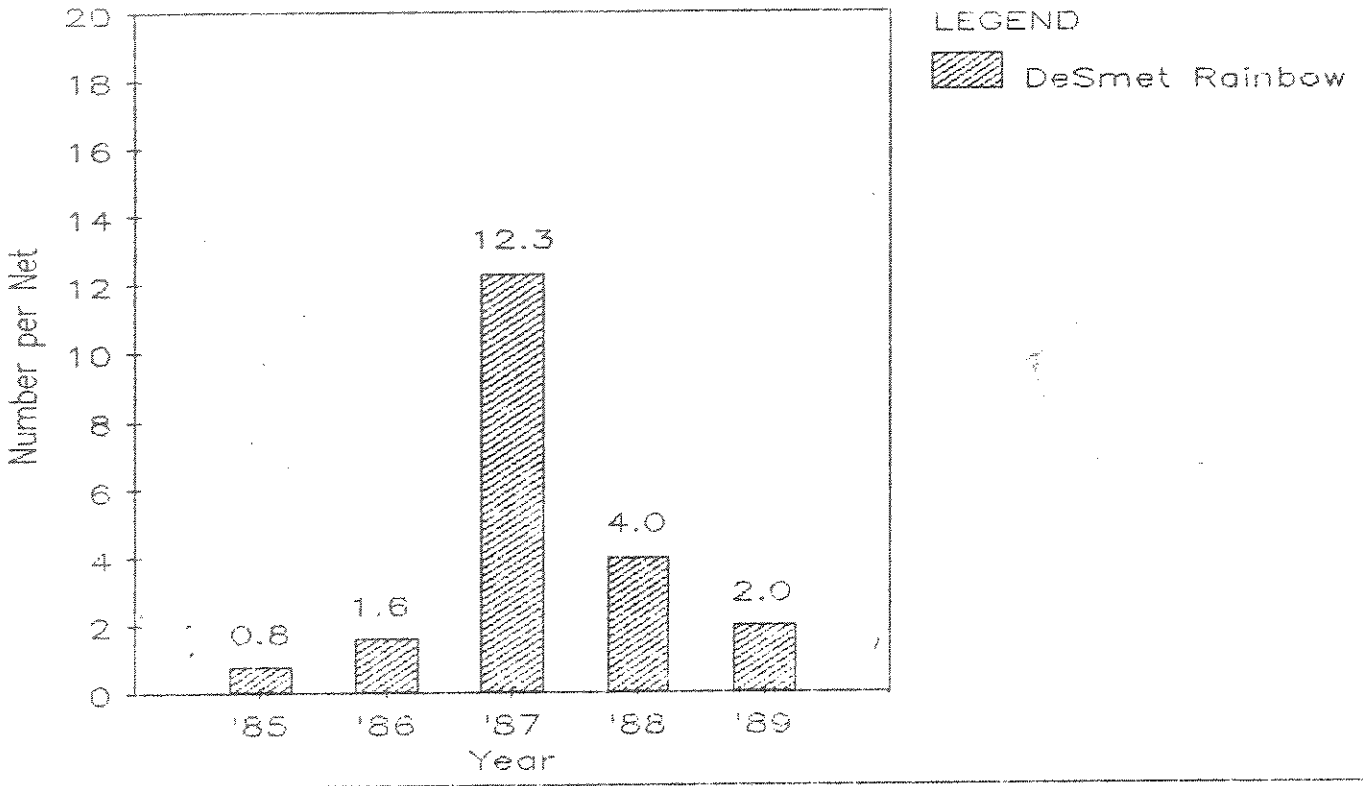


Figure 4. Spring numbers of DeSmet strain rainbow trout, by age class, per experimental gill net set overnight in Clark Canyon Reservoir 1985 - 1989.

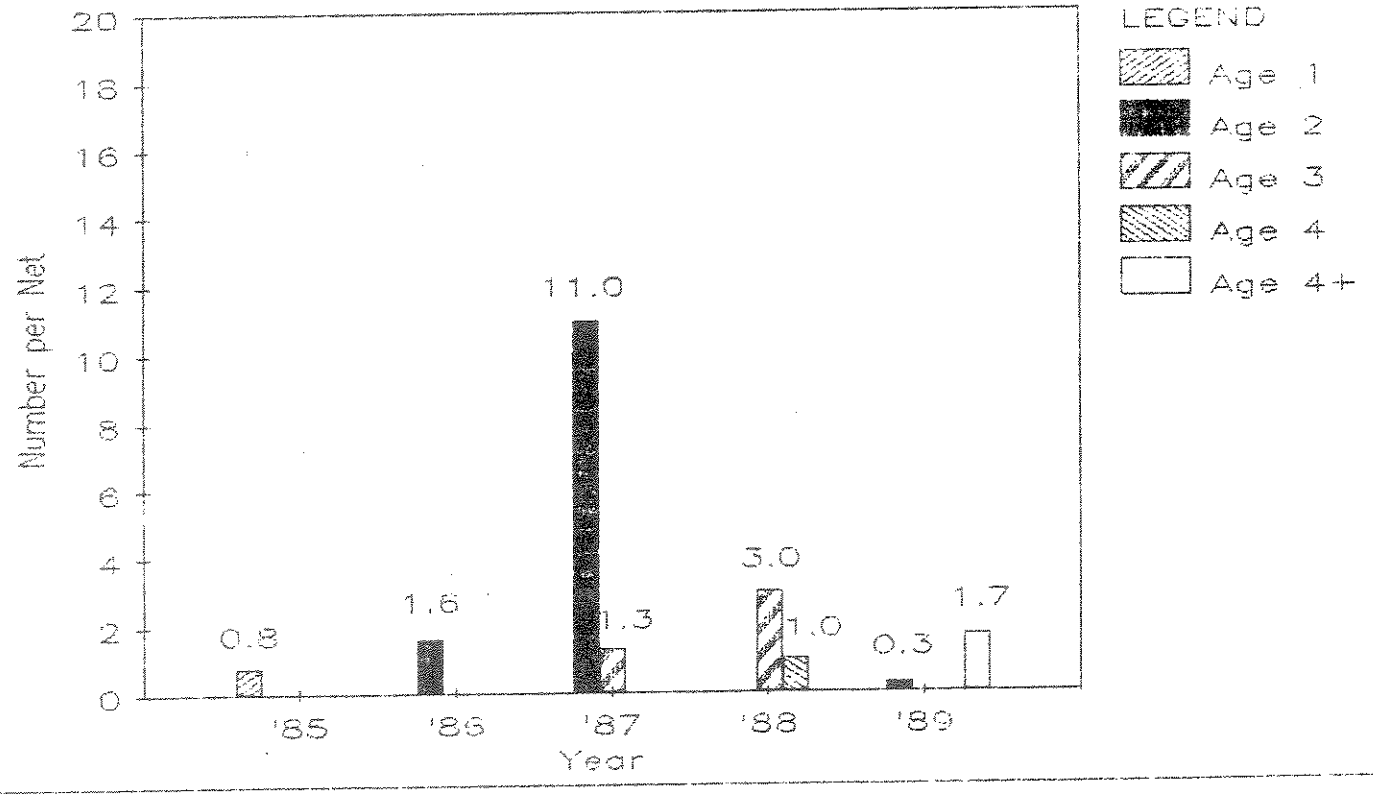


Figure 5. Mean length of DeSmet and Arlee rainbow trout from 1984, 1985 and 1986 plants sampled approximatly on May first. The '84 DeSmet were planted as Age 0, the '86 DeSmet as Age 1, and the Arlee as Age 0.

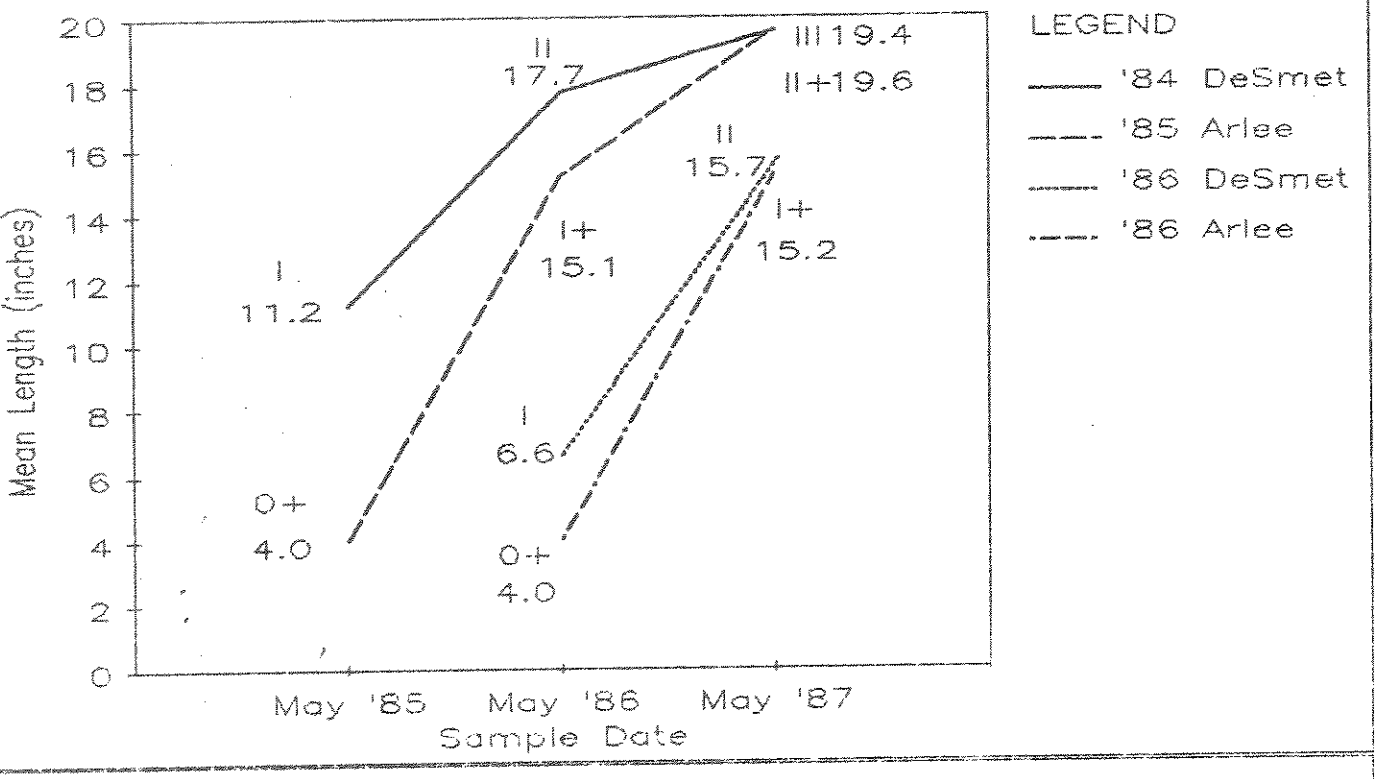


Figure 6. Mean weight of DeSmet and Arlee rainbow trout from 1984, 1985, and 1986 plants sampled approximatly on May first. The '84 DeSmet were planted as Age 0, the '86 DeSmet as Age 1, and the Arlee as Age 0.

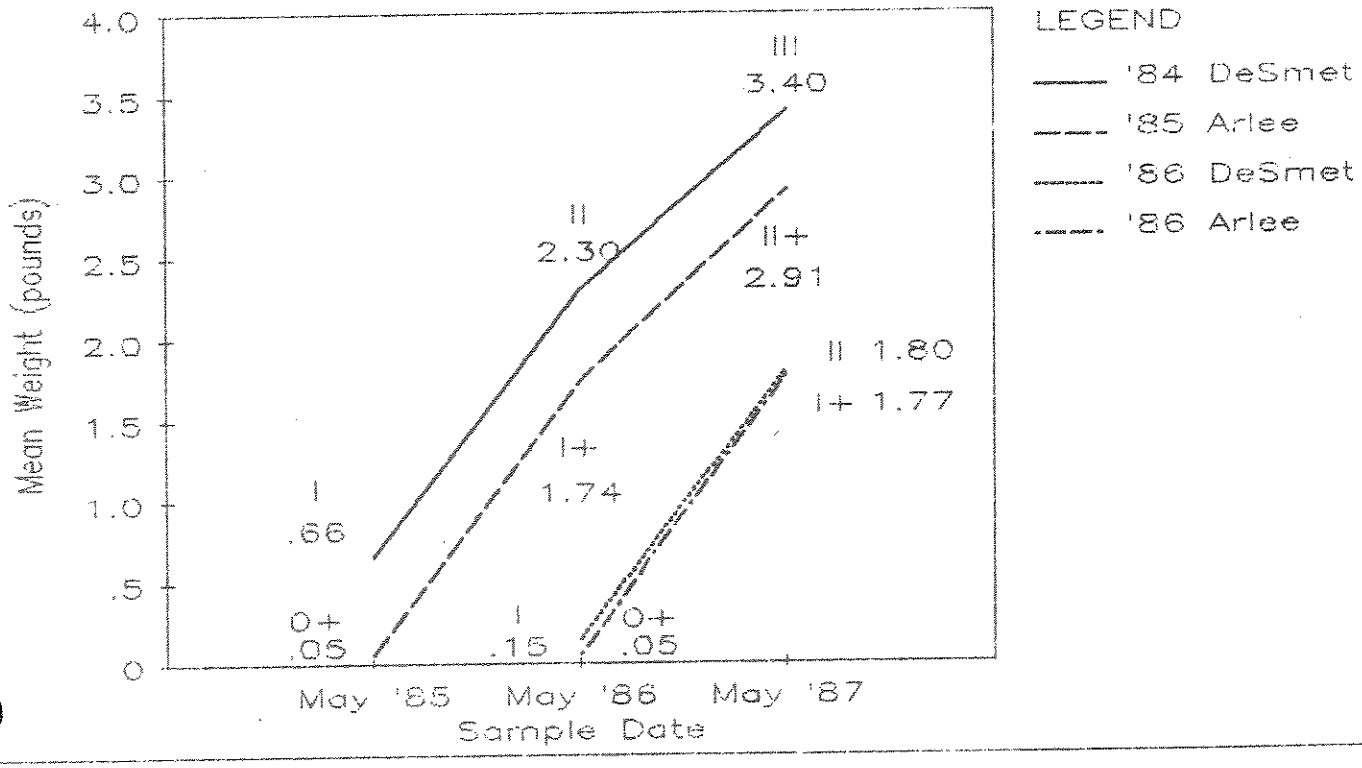


Figure 7 . Numbers of DeSmet rainbow trout captured per sampie trip by electrofishing the Roe section of the Red Rock River (2.4 mi.) during spring spawning migrations from Clark Canyon Reservoir 1986 - 1989.

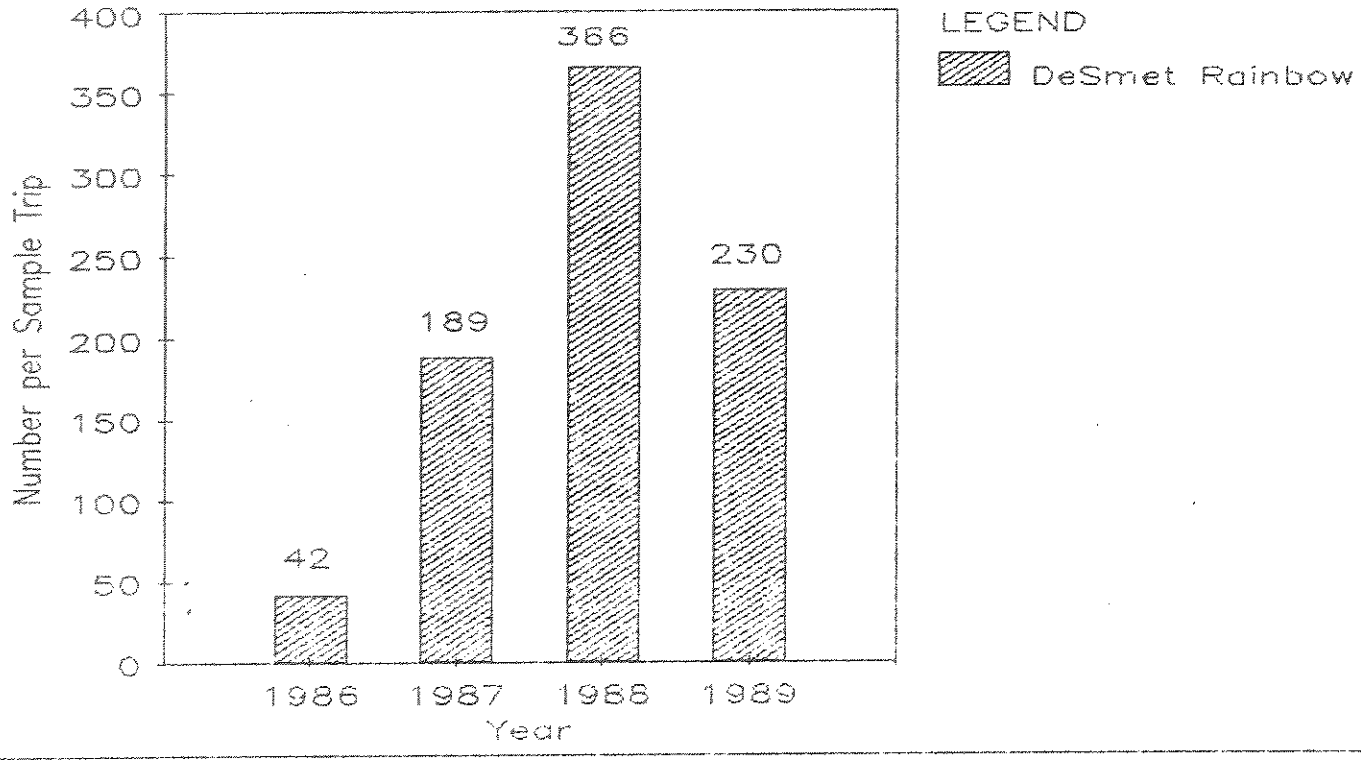


Figure 8 Length - frequency of known DeSmet rainbow trout captured by electrofishing the Roe section of the Red Rock River (2.4 mi.) during the spring spawning migration from Clark Canyon Reservoir in 1986.

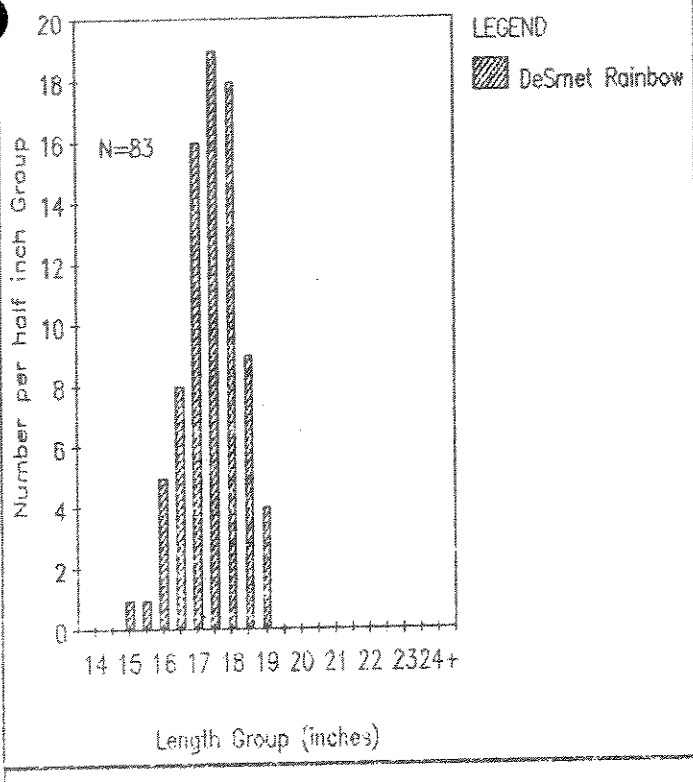


Figure 9. Length - frequency of known DeSmet rainbow trout captured by electrofishing the Roe section of the Red Rock River (2.4 mi.) during the spring spawning migration from Clark Canyon Reservoir in 1988.

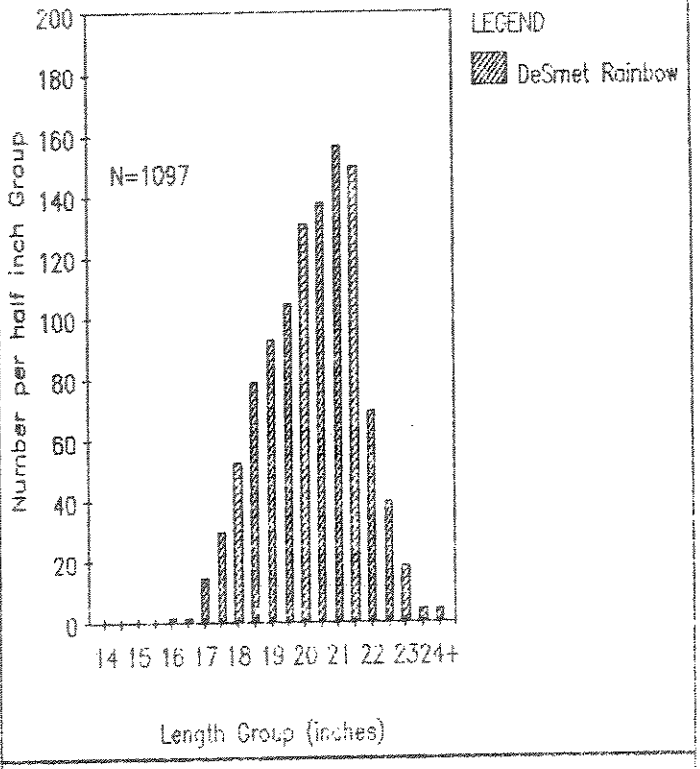


Figure 10 Length - frequency of known DeSmet rainbow trout captured by electrofishing the Roe section of the Red Rock River (2.4 mi.) during the spring spawning migration from Clark Canyon Reservoir in 1987.

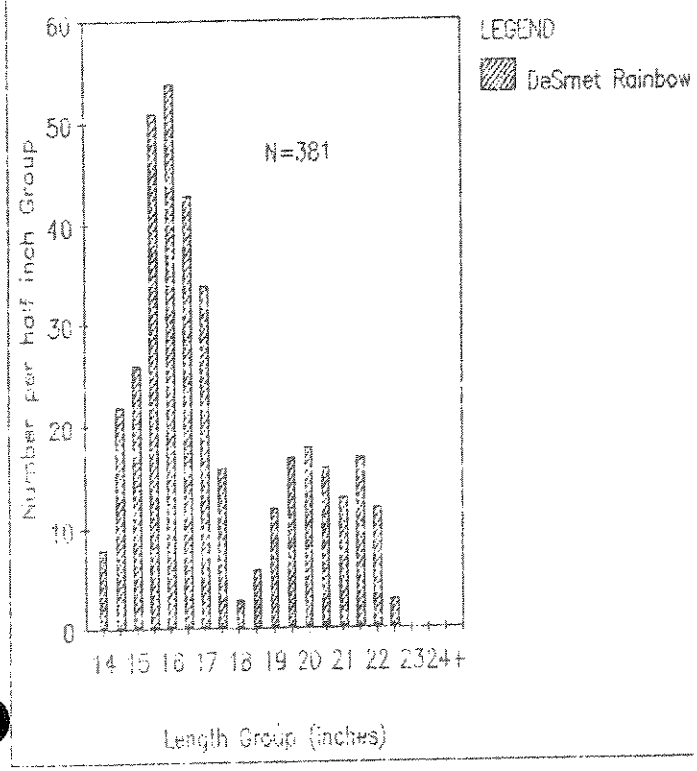


Figure11. Length - frequency of known DeSmet rainbow trout captured by electrofishing the Roe section of the Red Rock River (2.4 mi.) during the spring spawning migration from Clark Canyon Reservoir in 1989.

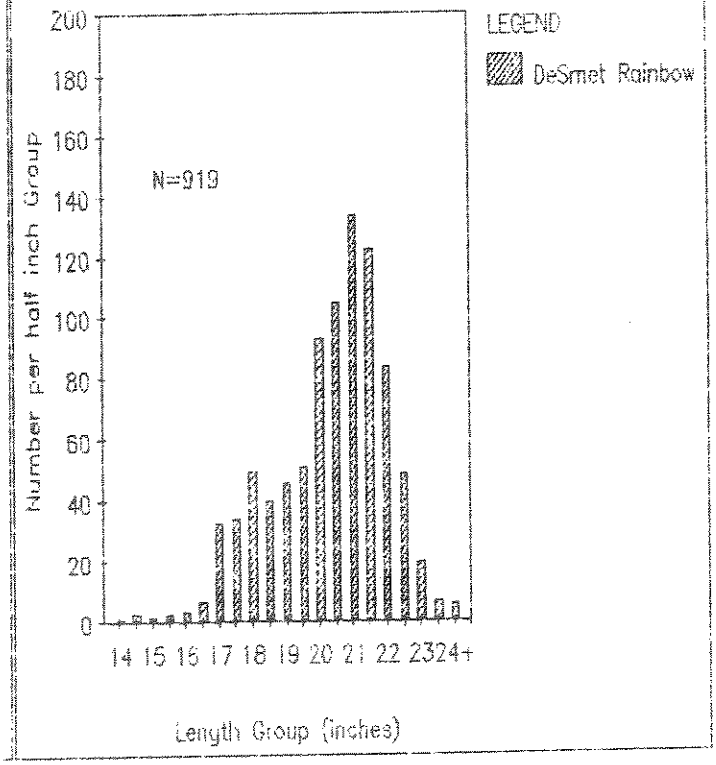


Figure 12 . Spring numbers of brown trout per 125 foot experimental gill net set overnight in Clark Canyon Reservoir 1966 - 1989.

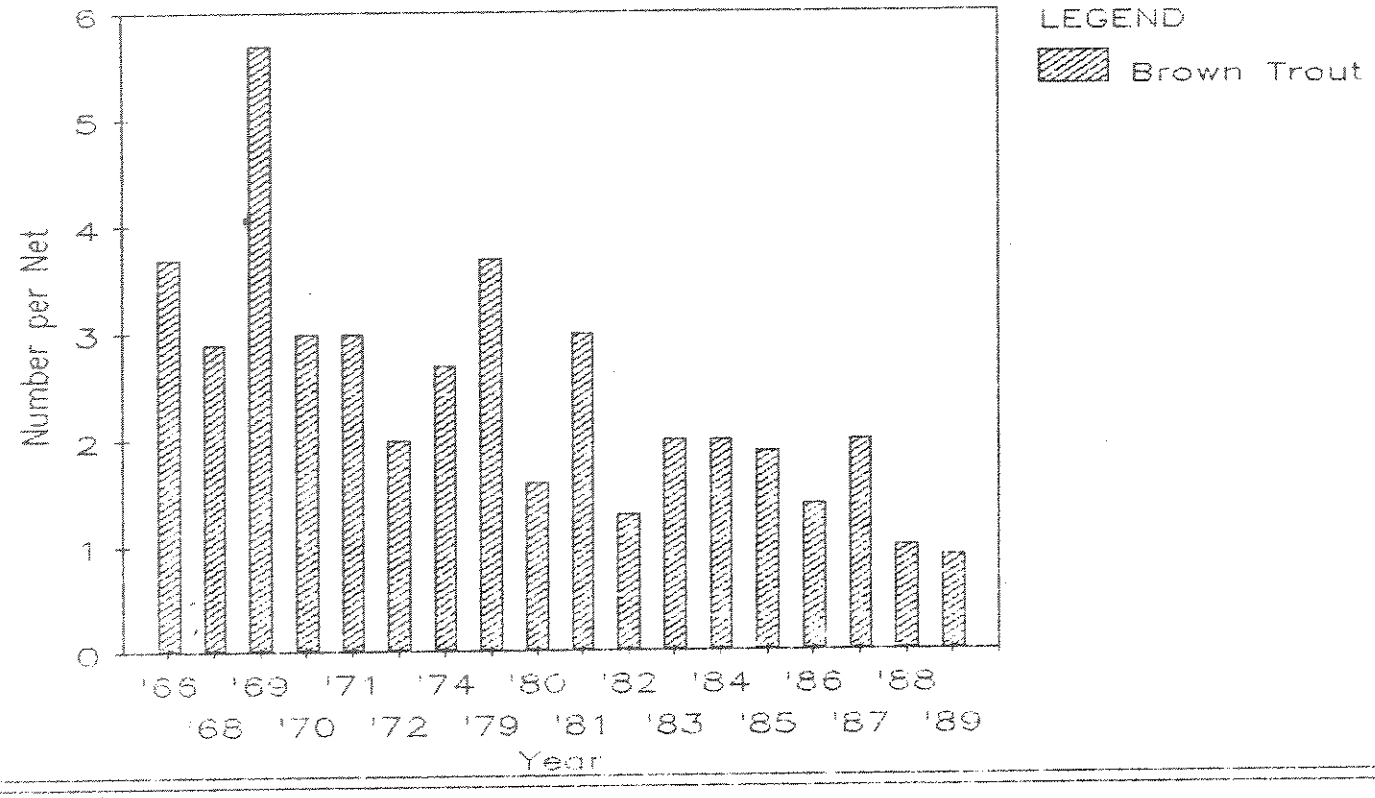


Figure 13 . Spring numbers of brown trout, by age class, collected in 125 foot experimental gill nets set in Clark Canyon Reservoir 1979 - 1989.

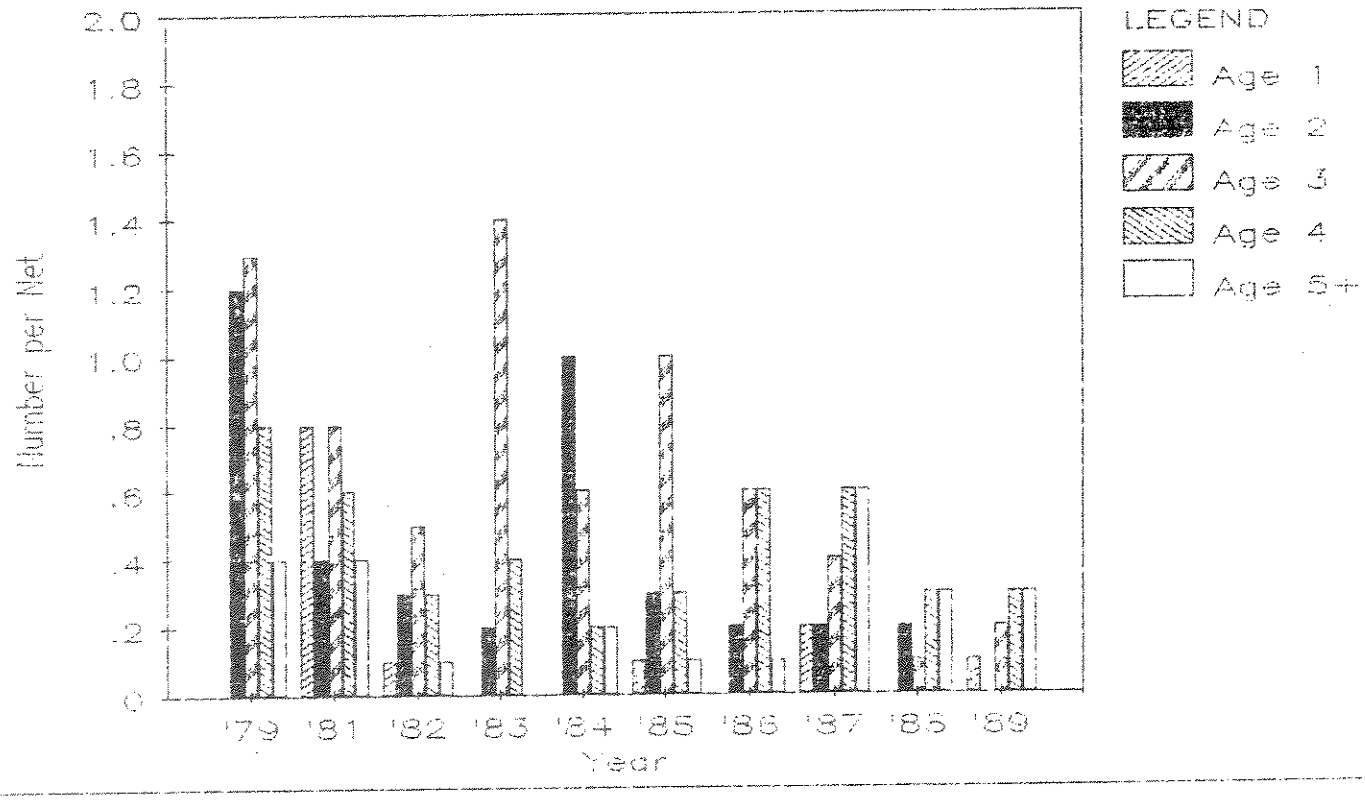
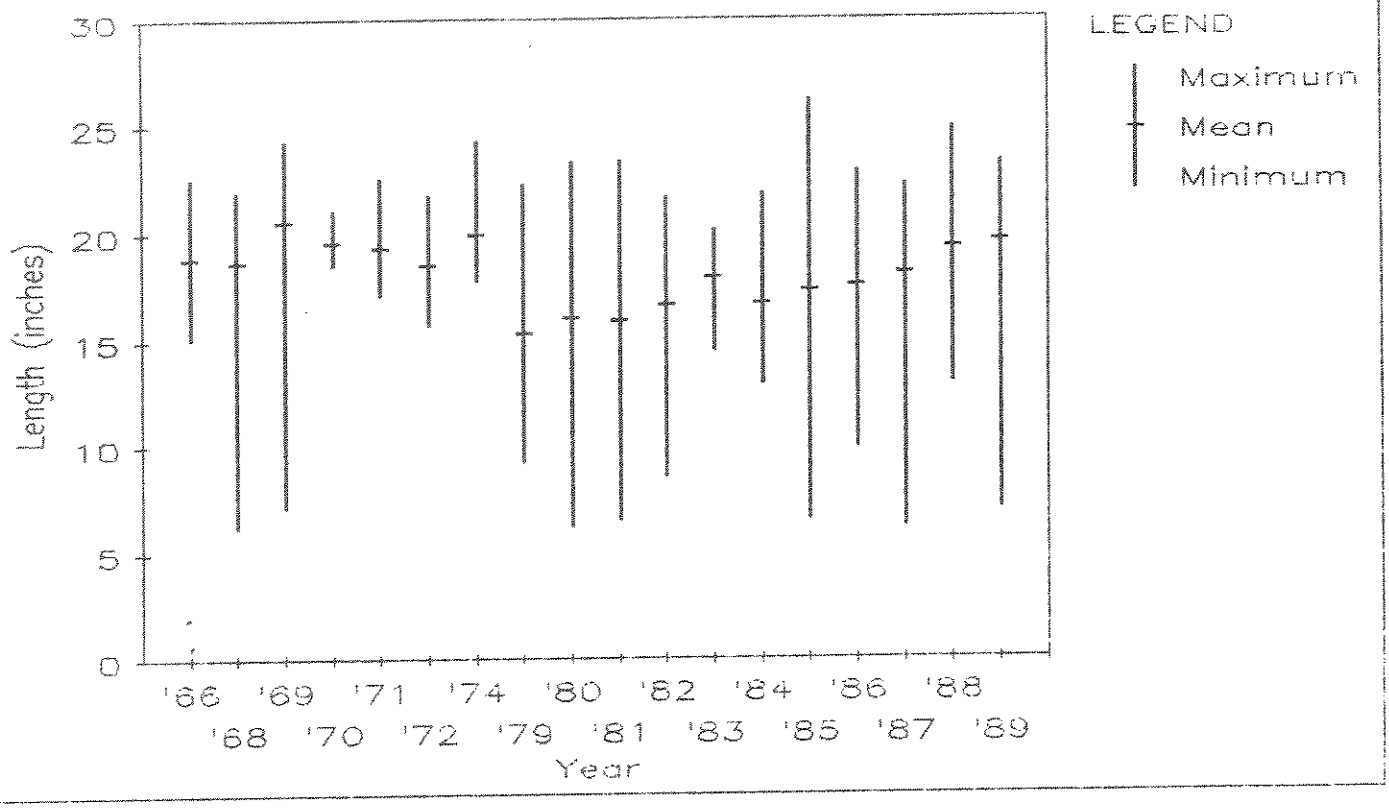


Figure 14 . Length range and mean length of brown trout collected from spring samples using 125 foot experimental gill nets in Clark Canyon Reservoir 1966 - 1989.



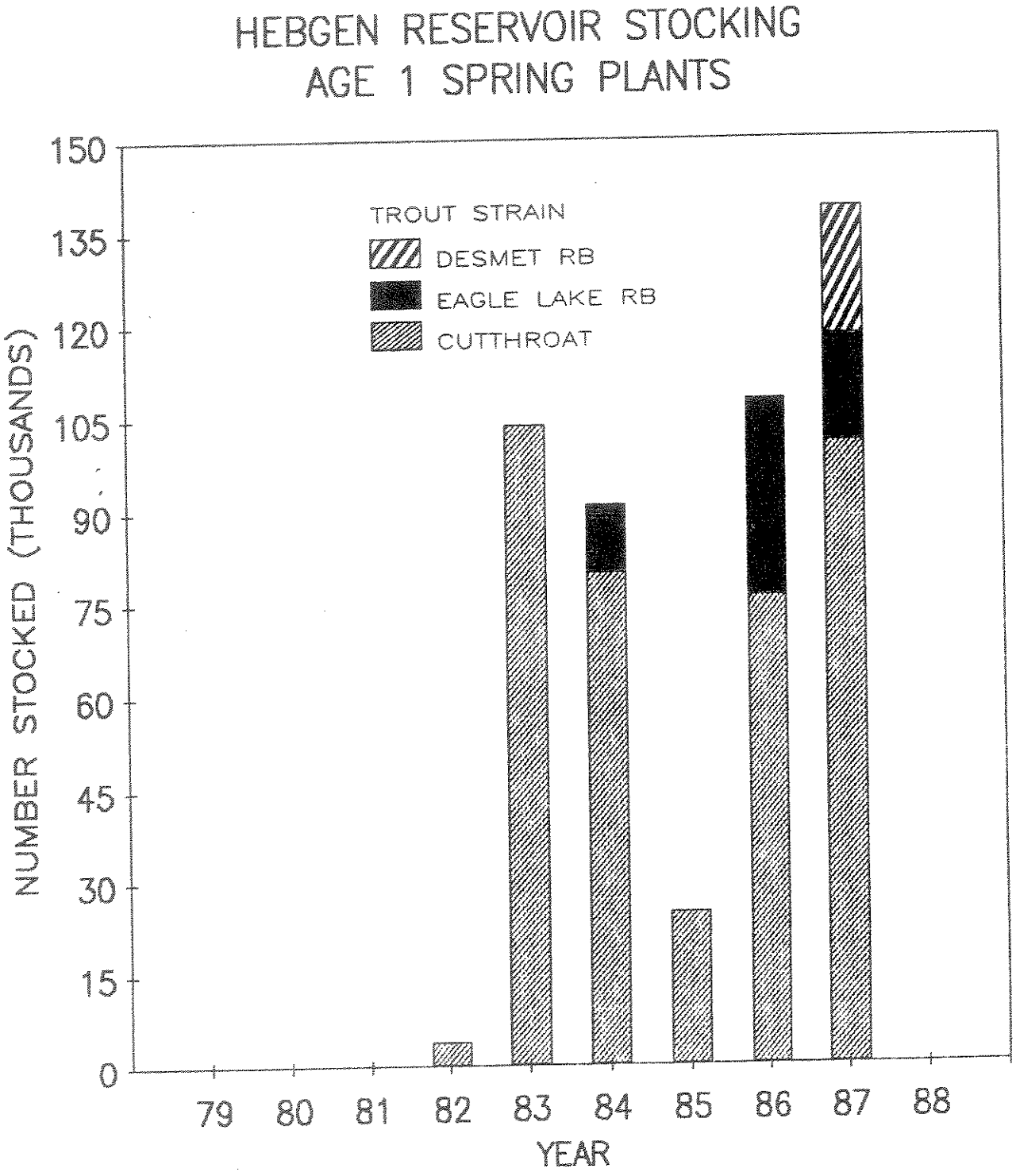


Figure 15. Stocking levels of three strains of wild trout in Hebgen Reservoir during 1979 through 1988. All fish held overwinter and planted as four to nine inch subcatchables in spring or early summer.

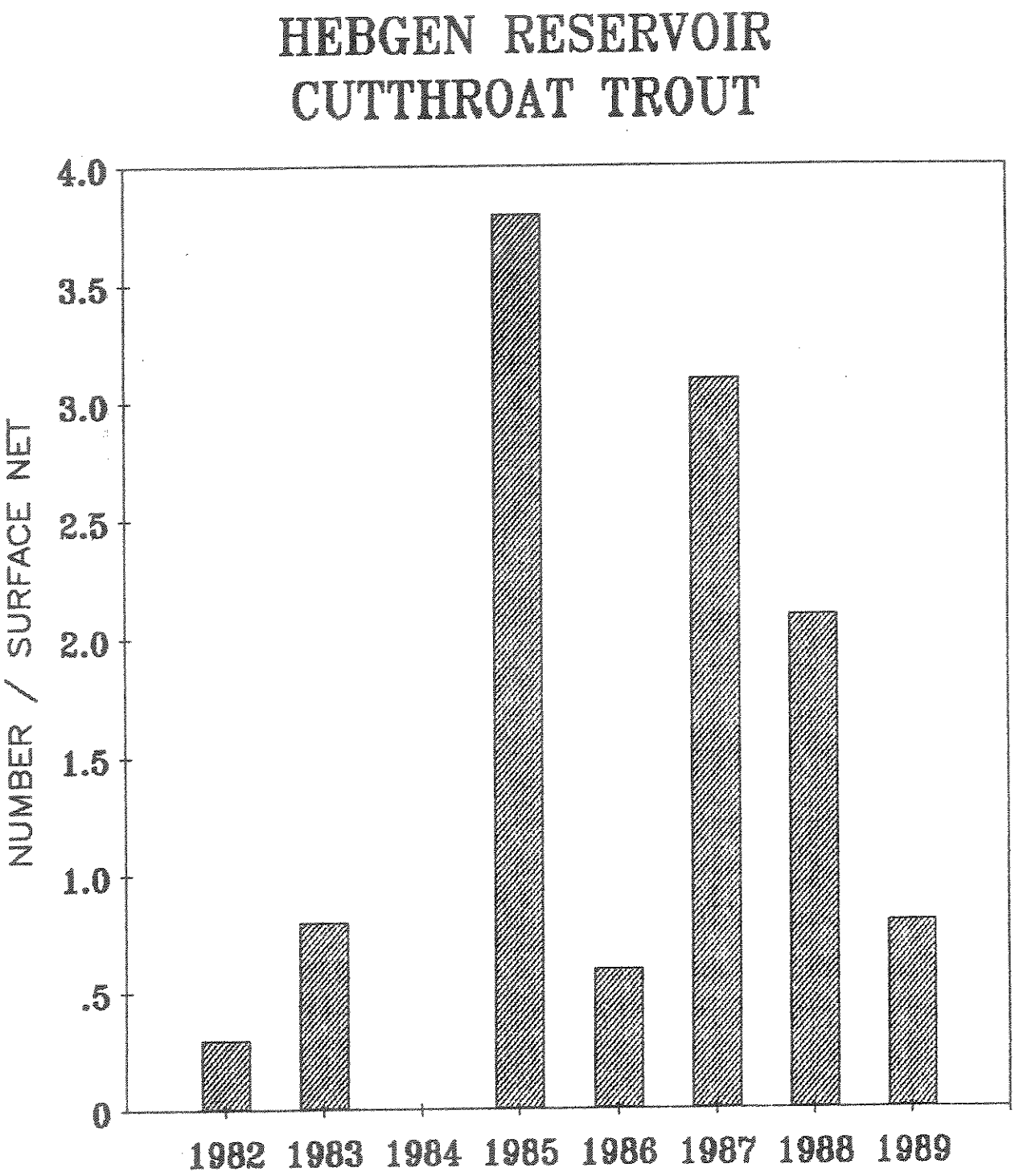


Figure 16. Gill net catches of cutthroat trout in Hebgen Reservoir during 1982 through 1989. All samples were floating 125-foot experimental mesh nets set during May or June.

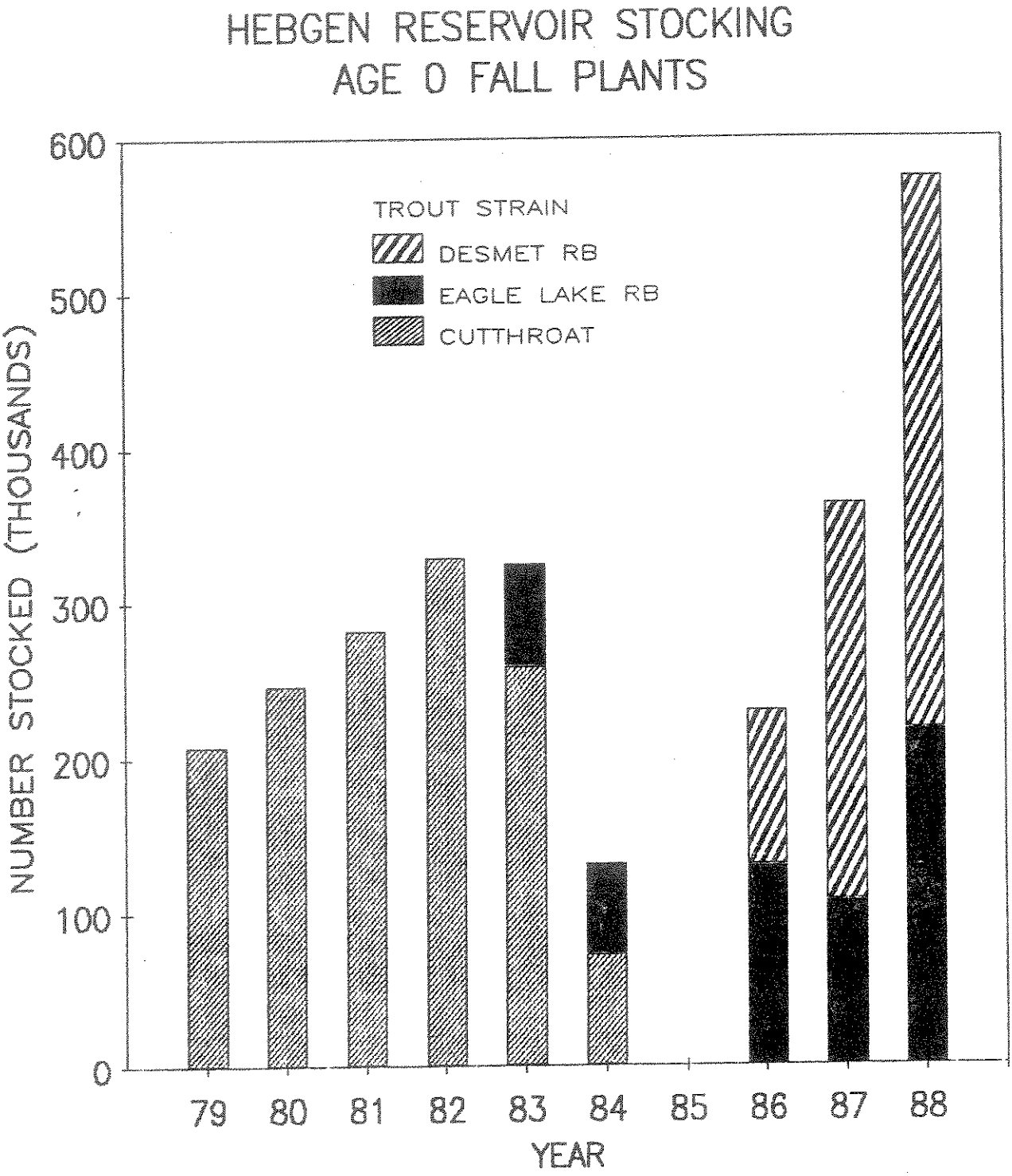


Figure 17. Stocking levels of three strains of wild trout in Hebgen Reservoir during 1979 through 1988. All fish planted as one to four inch fingerlings in summer or fall.

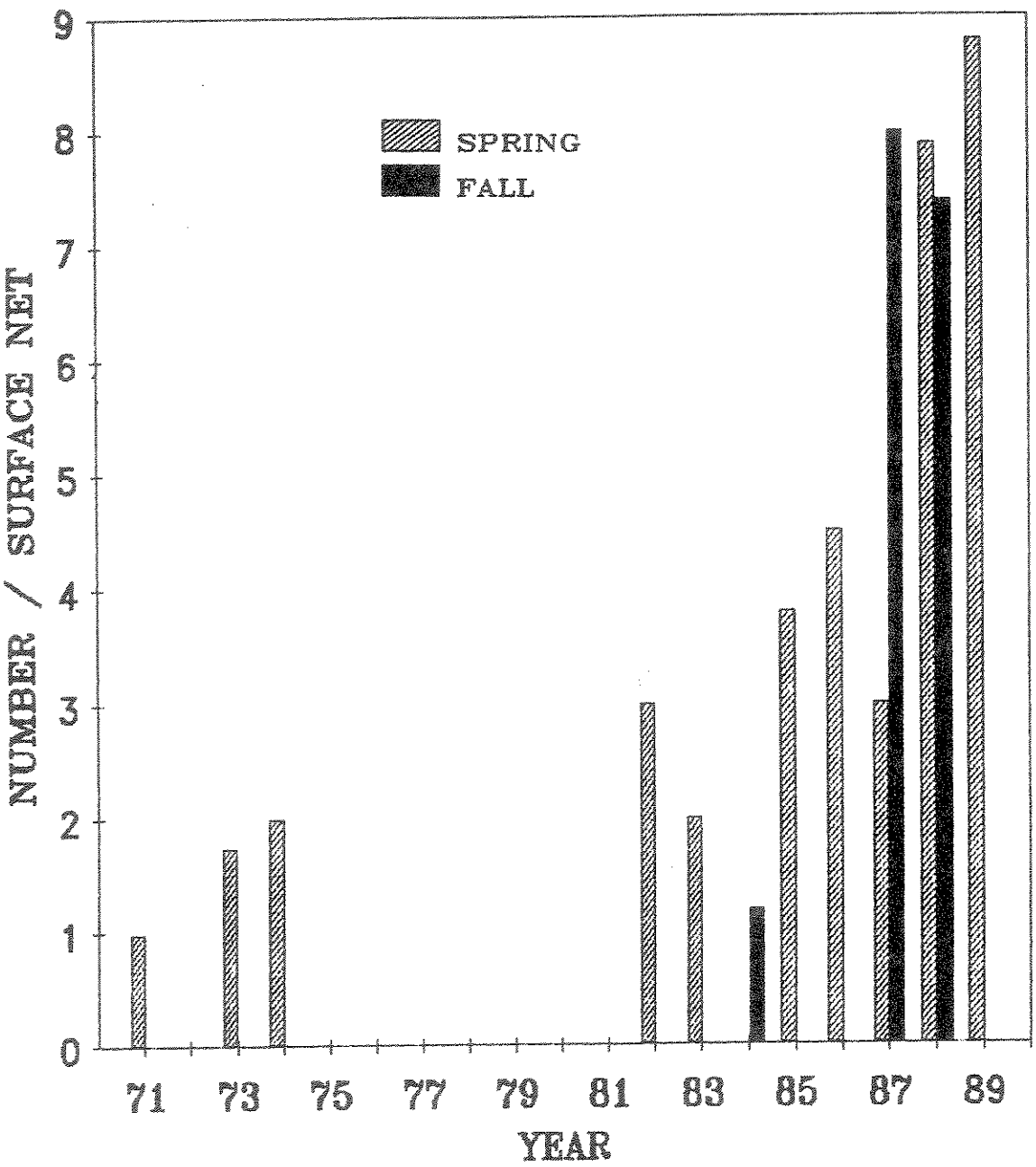


Figure 18. Gill net catches of rainbow trout in Hebgen Reservoir during 1971 through 1989. All samples were floating 125-foot experimental mesh nets set during spring or fall.