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FINAL REPORT

RESEARCH AND SURVEYS

FEDERAL AID GRANT NO. F-50-R

FISH RESEARCH FOR OKLAHOMA WATERS

PROJECT NO. 5

EVALUATION OF THE BROWN TROUT STOCKING SUCCESS IN THE LOWER MOUNTAIN FORK RIVER BELOW BROKEN BOW RESERVOIR

MARCH 1, 1991 through FEBRUARY 29, 1996

FINAL REPORT

State: Oklahoma Grant Number: F-50-R

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Project Title: Evaluation of the brown trout stocking success in the lower section of the Mountain Fork River below Broken Bow Reservoir.

Contract Period: From: March 1, 1991 To: February 29, 1996

ABSTRACT

A year-round rainbow trout (*Oncorhynchus mykiss*) fishery was developed in the Lower Mountain Fork River below Broken Bow Reservoir, McCurtain County, in 1989. The Designated Brown Trout (*Salmo trutta*) Area was established in 1991 when 575 brown trout were stocked. A total of 39,330 brown trout have been stocked to date. This project was developed to evaluate the success or failure of the brown trout introductions. Additional information on rainbow trout was also collected. Sampling techniques were developed that allowed most of the Lower Mountain Fork to be surveyed. Survival and growth of the brown trout has been excellent. The new Oklahoma state record (7 lbs 12 oz) was caught in January 1996. Techniques to survey the remaining portions of the trout fishery need to be developed. A minimum of 10,000 brown trout should be stocked annually in the Lower Mountain Fork. Coordination with Southwest Power Administration should continue on providing permanent adequate water releases to keep temperatures below the lethal limit for trout and to allow efficient sampling. A focus group of interested constituents should be developed to ensure they are kept informed on the progress of the lower Mountain Fork trout fishery and for the Department to be responsive to anglers interests.

I. Problem or Need:

Whenever exotic species are introduced into a new environment their progress and effects on the surrounding fauna must be monitored to evaluate their success or failure. Through this research we hoped to provide the angling public

and fisheries managers with information that will enable them respectively, to utilize and manage the trout fishery in the Mountain Fork River below Broken Bow Reservoir more effectively.

II. Background:

A rainbow trout fishery (*Oncorhynchus mykiss*) was established in a 19.5 km section of the lower Mountain Fork River in January 1989 with biweekly stockings of 3850 rainbow trout (Harper 1990). In January 1991, a 6.4 km section of the trout stream was designated as the Brown Trout Area (Sections 1-8, Figure 1). This area is characterized as riffle-pool habitat with water depths of less than 3.2 m in the upper two-thirds of the area and a 100-150 ha lake (maximum depth of 12 m) resulting from a Reregulation Dam in the lower section (Figure 1). When this project was proposed, the Brown Trout Area was scheduled to initially receive approximately 20,000 brown trout (*Salmo trutta*). However, due to disease problems at the Norfork National Fish Hatchery in Mountain Home, Arkansas, only 575 brown trout (275 mm TL) were stocked. We decided not to expend a substantial effort to meet the 1991 segment objectives with such a limited stocking. As a result, more emphasis was placed on developing sampling techniques, appropriate tag types, and food habit collection methods which could be used following substantial brown trout stockings.

Regulations imposed on the entire trout area were a daily creel limit of six rainbow trout per angler, with a two day possession limit. Catch and release was required on all brown trout. An additional regulation allowing only artificial lures

with barbless hooks only pertained to the Brown Trout Area (Section 1-8) from the Park Dam to the Reregulation Dam (Figure 1). Regulations which went into effect 1 January, 1996, were a twenty inch minimum size and one fish per day creel limit for brown trout for the entire stream and on rainbow trout from the Park Dam to Highway 70. A total of 39,330 brown trout ($\bar{x}$ length=201 mm) were stocked in the lower Mountain Fork River from 1991 through 1996 (Table 1).

The biweekly stockings of catchable size rainbow trout in the Brown Trout Area were discontinued in the summer of 1993. An additional stocking of 40,000+ fingerling rainbow trout were released in the Brown Trout Area and from the Reregulation Dam to Highway 70 during the winters of 1993-1995 to enhance survival of stocked rainbows (Table 2). Miller (1958) and Vincent (1987) noted that larger hatchery raised trout rarely survive longer than one year in the wild, therefore contributing little to the trophy potential of the fishery.

Coordination with Southwest Power Administration during 1993-1995 provided adequate water releases to allow efficient sampling of all sections of the 19.5 km trout area except three. These sections include the spillway shoot, the lower portion of Section 9 downstream from the boat ramp below the Reregulation Dam to the upstream side of Presbyterian Falls, and a 0.5 km stretch in Section 10 between Presbyterian Falls and Highway 70 (Figure 1).

III. Project Objectives:

To evaluate the stocking success, growth rates, and calculate relative abundance of brown trout year-classes through 1995, by electrofishing in the lower

Mountain Fork River below Broken Bow Reservoir.

IV. Approach:

A. Sampling:

During 1991, electrofishing surveys with a Smith-Root 5.0 GPP pulsed DC electrofisher were conducted at the same location during daylight, dusk, and after dark to determine if time of day had any effect on efficiency. Brown and rainbow trout were sampled March through November during 1992-1994 and in the Summer and Fall of 1995. During 1994 and 1995 most of the electrofishing surveys were conducted in sections 1-6, and sections 9 and 10 (Figure 1). Sections 9 and 10, the area between the Reregulation Dam and Highway 70, still presented difficulties in sampling. When water levels were sufficient to allow sampling, these areas become too dangerous to navigate in the dark. Electrofishing surveys were conducted in 1993 and 1994 to evaluate the predator populations (other than trout) in the lower Mountain Fork (Table 8). Forage populations were evaluated in 1993 (Table 9).

B. Growth:

Individual growth of brown trout could not be calculated due to lack of accurate age information but length frequencies were plotted and growth patterns noted.

C. Habitat

The habitat preferences of brown trout were evaluated through observations describing various parameters such as depth, substrate type, and water velocity in

areas of high occurrence during 1992-95.

D. Tagging Procedures:

In March 1991, 18 rainbow trout were held in tanks at the Oklahoma Fisheries Research Lab (OFRL) for 8 weeks to determine the MS-222 concentration necessary to sedate trout and evaluate tagging procedures. Retention of visible implant (V.I.) tags implanted in the post-occipital tissue behind the eye was also evaluated at this time.

Following the 1991 tank evaluation, 1000 brown trout in 1992 were anesthetized with MS-222, weighed, measured, and tagged with sequentially numbered V.I. tags (Fletcher et al. 1987, and Haw et al. 1990) at the Holdenville State Fish Hatchery. These fish were released at four locations in the Brown Trout Area. Expected benefits from the tagging efforts included information on migration and growth of individual fish.

E: Food Habits:

Also in March 1991, the use of glass tubes to evacuate the stomach contents of trout and describe their efficiency was evaluated at the OFRL. After these techniques were perfected, trials were conducted in 1992 to evaluate food habits of trout collected in the field.

F: Predators and Forage:

Preliminary information on predator and forage populations were collected while electrofishing in Sections 1-10 during 1993 to evaluate their abundance. This information could prove particularly valuable when stocking fingerling trout

during the Winter. Predator evaluation in these sections continued in 1994.

V: Results and Discussion:

A: Trout Sampling, Distribution, and Abundance:

Daytime electrofishing proved futile. Therefore, nighttime electrofishing was selected as the primary collection method. Nighttime electrofishing showed the highest overall catch rates (34/hr) followed by dusk (20/hr) and daylight (2/hr). Other experiments included the evaluation in efficiency between the Wisconsin ring (Novotny and Priegel, 1974) electrode arrangement and an Electrosphere (Coffelt Manufacturing)[1]. The Wisconsin Ring and the Electrosphere appeared similar in efficiency but the Wisconsin Ring was preferred due to its maneuverability.

Due to the variation in water releases for power generation from Broken Bow Reservoir, limited access, and the requirement of nighttime sampling, a significant portion of the 1992 sampling season was devoted to the familiarization of personnel with the most efficient sampling regime.

During this study most of the electrofishing surveys were conducted in the upper two thirds of the Brown Trout Area. Mean catch rates (no./hr) were 17.5, 11.8, 8.7, 21.9, and 17.5, 14.3, 17.5, 10.4, for brown and rainbow trout respectively, 1992-1995 (Tables 3 and 5). These sections were more conducive to sampling by electrofishing during the various water releases from Broken Bow Reservoir. Sections 1-4 (Figure 1) had the fewest predators (Table 8), the best

[1]References to trade names of manufactures do not imply government endorsement of commercial products.

apparent habitat for trout, and the highest trout catch rates by section (Tables 3 and 5). Mean catch rates outside of the Brown Trout Area (not including the sections above the Power House) were 0.8, 2.0, 0.7, 1.8, and 9.8, 4.3, 4.7, 1.8, for brown and rainbow trout respectively, 1992-1995 (Tables 4 and 6). Inability to adequately sample portions of the stream outside the Brown Trout Area may have been responsible for these low catch rates. Reports from anglers indicated a higher abundance of trout in these inaccessible areas than the sampling efforts have shown. An explanation for the decline in C/f during 1993 for both brown and rainbow trout within the Brown Trout Area may have been the increase in effort expended in the lower lake (Sections 7 and 8) portion of the Brown Trout Area. No electrofishing was performed in Sections 7 or 8 (Figure 1) of the Brown Trout Area in 1992, 1994, or 1995.

Catch rates of brown trout in 1992-1995 compared favorably with those reported by other authors. Hess (1980) collected 8.9 brown trout/hr and 11.3 rainbow trout/hr in the Chattahoochee River. Biagi (1992) averaged 20.3 and 5.9 brown trout/hr in 1988 and 1989 in the same reach of the Chattahoochee River.

Brown and rainbow trout catch rates by month were combined for all surveys from 1992-1994. The catch rates were highest for brown and rainbow trout in August and November, respectively, but fluctuated between species for all months except June and September where they were similar (Figure 2). One explanation for the peak in November for rainbow trout (Figure 2) could be the release of approximately 49,900 six-inch rainbows just prior to electrofishing.

Twenty and thirty-six percent of the rainbow trout collected during 1994 and 1995, respectively, had complete pectoral, pelvic, and anal fins which is unusual for hatchery produced fish. These fish may have been some of the fingerlings stocked in 1993 and 1994, indicating long term survival.

None of the 575 brown trout stocked in 1991 were collected. One explanation may have been that most were harvested in 1991 by anglers who were unable to distinguish brown trout from rainbow trout. During 1994, an angler reported the catch of a brown trout in Section 9 that was approximately 700 mm long (27.5 inches) and weighed about eight pounds. If accurate, this fish was probably one of the brown trout stocked in 1991.

Electrofishing injuries and mortality may be occurring on brown and rainbow trout. Injuries in the form of fractured vertebrae, burn marks, hemorrhaging, and altered feeding behavior have been reported in 60-90% of all trout captured by electrofishing (Sharber et. al. 1994; Dwyer and White 1995; and McMichael 1993). No verified evidence of injuries on trout have been observed due to electrofishing in the lower Mountain Fork. A few trout have exhibited discolored spots, possible burn marks, in the pigment of their skin.

B Growth:

Estimated growth rates of brown trout during 1992-1995 compare favorably with those reported by Biagi (1992) in the Chattahoochee River, Georgia and John Stark (Arkansas Game and Fish, personal communication) in the White River below Norfork Dam, Arkansas.

The lack of actual age information plus a small sample size prohibits accurate estimates of annual growth by year class for brown or rainbow trout. Therefore, all brown and rainbow trout length data collected during 1992-1995 were pooled in 25 mm length groups, by year, to illustrate estimated growth patterns (Figure 3 and 4). With significant overlap between year class length (especially in the 3 and 4 year olds) and no age information, actual growth by year class for brown trout was not possible. Annual fall sampling should provide sufficient data to determine the relative size structure for brown and rainbow trout. Size distribution for rainbow trout will be monitored in the future to evaluate the progress of trophy rainbow trout production. Prior to the twenty inch minimum length limit on rainbow trout (1 January, 1996) in the lower sections (1-10) and the stocking of various sizes of rainbows (prior to 1993), no estimates of growth could be made. Stocking only fingerling rainbows in the lower sections plus the additional protection of the regulation will allow more accurate estimates of growth for rainbow trout in the future.

C. Habitat:

During the first collection of brown trout in June 1992, most of the small (<210 mm) brown trout were collected from shallow (<1 m) riffle areas or directly adjacent to these areas. Heggenes et al. (1990) reported that age-0 brown trout preferred shallow water near the rivers edge. This pattern continued until late February when deeper run areas with moderate flow, were preferred by the larger (>300 mm) individuals. Habitat preferences for brown trout observed

during 1993-1995 were similar to those reported in 1992. One exception was that the smaller brown trout appear to prefer lower velocity water run areas as compared to the shallow riffles.

D. V.I. Tagging:

At MS-222 concentrations of 22 mg/l, fish were sedated within 5 minutes but could not be tagged with V.I. tags. At 44 mg/l sedation occurred in 4 minutes and all fish were easily tagged. At 66 mg/l all fish appeared to be over-anesthetized and there was a significant increase in their rate of respiration. All fish showed signs of recovery immediately after being placed into untreated water and full recovery occurred within 4 minutes.

The V.I. tag, a product developed by Northwest Marine Technology[2] in Shaw Island, Washington, was available in two sizes, 2.5 mm and 3.0 mm. The smaller tag was recommended for fish under 12 inches while the larger tag was designed for fish larger than 12 inches. The tags were available in 6 standard colors and several neon colors. Tags were injected into the transparent adipose eyelid with a syringe type injector having a flat needle. In other species, tags have been injected into fins, foreheads, and opercles.

Through experimentation with the standard tag colors, black tags with white letters were the most visible on trout. Tag cost was $0.60/tag and the syringe

[2]References to trade names of manufactures do not imply government endorsement of commercial products.

injectors were $75.00 each. The tags were injected into the fishes left eye as it proved to be the most efficient for a right-handed person. With practice, the tagging procedure was very easy and moderately swift, (2 to 3 fish tagged per minute when weights and lengths of each fish were recorded) in an assembly line situation.

Tag retention of V.I. tags was 98% for the first 6 weeks of the experiment, but during the 7th week, it declined to 72% where it remained for the duration. Northwest Marine Technology noted that trout raised in concrete raceways often do not possess enough post-occipital tissue. This resulted in loss of tags, although shedding usually occurred within 8 weeks. When implanting the tags, care should be taken not to inject it too shallow because it may be shed, or too deep as it may become obscured.

Ten of the brown trout tagged with V.I. tags were collected during 1992. Fifty percent of the tagged fish collected were in the same area where the fish were stocked, while 33 % moved upstream, and 17 % moved downstream. Only three tagged brown trout were collected during 1993. Two moved upstream and one moved downstream from the point of stocking. No brown trout with V.I. tags were collected during 1994 or 1995. Overall, tagging has only provided limited, short-term information.

There were locations downstream from the Brown Trout Area and downstream from Highway 70 that are inaccessible by electrofishing and it has not been confirmed if any brown trout moved to this area. It is likely, as a result of

high water releases, brown trout will emigrate above and below the designated Brown Trout Area in time. Reports from anglers fishing these inaccessible areas indicate the presence of both brown and rainbow trout. Hulbert and Heg (1982) reported that fall-stocked brown trout consistently dispersed upstream in Canajoharie Creek a few days after their release. Using biotelemetry, adult brown trout were observed migrating upstream in Arkansas tailwater areas (J. Stark, Ark. Game and Fish personal communication).

E. Food Habits:

During the 1991 laboratory tag experiment, 18 rainbow trout were also subjected to food evaluation experiments. After sedation (44 mg/L), the rainbow trout ($\bar{x}$ length = 280 mm) stomachs were evacuated with a glass tube (15 mm in diameter) for food habit evaluation. Glass tubes with polished edges were used as they were less susceptible to scratching and more easily inserted than those made of plexiglass. Six trout were placed in separate tanks each containing 3 different enumerated forage items: fathead minnows, earthworms, and wasp larvae. At timed intervals of 2, 4 and 6 hours, fish were removed and their stomach contents evacuated with the glass tube. One-hundred percent of all forage items were removed in 5 of the 6 fish sampled for all time periods. Eighty-seven percent (27 of 31 wasp larvae) of the food items consumed by the other fish were removed by tubing. All fish survived and were in good condition following food removal.

Stomach contents were evacuated from 32 brown trout and 18 rainbow trout in the field using glass tubes in August of 1992. Both species appeared to feed on

a wide variety of items with 12 different families of insects, 2 species of crustaceans, zooplankton, and detritus present in stomachs (Table 7).

The predominant food items of both rainbow and brown trout were *Daphnia magna*, mayflies, chaobrids, and stoneflies (Table 7). These were similar to food items reported by Webster and Little (1942). Rainbow and brown trout also showed a preference for crayfish as suggested by Turner (1974), Scott and Crossman (1973), and Jonsson and Gravem (1985). Jonsson and Gravem (1985) also reported that stoneflies, in addition to crayfish and fish, were significant in the diet of large brown trout in New York.

F. Predators and Forage:

The primary predators collected using electrofishing (other than trout) during 1993 were largemouth (*Micropterus salmoides)*, spotted *(Micropterus punctulatus)*, and smallmouth (*Micropterus dolomieui)* bass (Table 8). In addition to bass, walleye (*Stizostedion vitreum)* (n=19), white bass (*Morone chrysops)* (n=12) and channel catfish (*Ictalurus punctatus)* (n=35) were also collected. Very few bass were collected in the upper portion (Sections 1-6, Figure 1) of the Brown Trout Area (Table 8). The highest catch rates for largemouth bass occurred in the lake area, lower lake, and below the Reregulation Dam (Table 8). Spotted bass abundance was highest below the Power House (Section 11, Table 8), an area known for angler catches of spotted bass. Smallmouth bass abundance was highest in the upper lake area (Section 6, Table 8).

Largemouth, spotted, and smallmouth abundances were similar by section to those observed during 1993 (Table 8). Mean catch rates (no./hr) for all species declined in 1994 because Sections 7 and 8 were not sampled due to the absence of trout in 1993. No surveys were conducted in section 10 due to difficulties in sampling during 1994. The predator evaluation was not continued in 1995.

A total of 498 sunfish (*Lepomis spp.)* were collected during the 1993 (Table 9). As with bass, sunfish C/f's were highest in Sections 6 through 9 (lake portion, Figure 1) in the Brown Trout Area (Table 9). Sunfish size structure in all sections was predominated by 102-152 mm fish, followed by fish >152 mm, then fish <102 mm (Table 9). Sunfish species composition was longear, bluegill, and green. A significant number of threadfin shad (*Dorosoma petenense)* and skipjack herring (*Alosa chrysochloris)* were observed during one sampling effort in November 1993, but no density estimates were calculated.

VI. Recommendations:

A. Conclusions and Evaluations:

When this project was initiated, significant effort was required to sample the Brown Trout Area due to the various water level requirements to allow safe access. Through water release manipulation, efficiency improved. As a result, electrofishing frequency was reduced in the Mountain Fork Trout Area to minimize any negative impacts.

Through continued coordination with Southwest Power Administration, we hope to be able to sample all portions of the trout fishery safely and efficiently.

Future efforts may be necessary to evaluate the degree of downstream migration below Highway 70. Angler reports indicate high fishing success as far as 4.8 km downstream in the early spring. Further electrofishing surveys and/or biotelemetry studies may be necessary to determine the migration tendencies of the larger brown and rainbow trout to ensure their proper management.

Brown trout stocking success, survival and growth have been excellent in the lower Mountain Fork River. Relative abundance (catch rates) and year class growth were good to excellent for brown trout during all sample years. Trout habitat preferences were riffle/run areas in the upper half of the Designated Brown Trout Area, directly downstream from the Reregulation Dam, and at Presbyterian Falls. No reproduction has been confirmed. One gravid female and two flowing males were collected while sampling in 1993. Additional electrofishing during the spawning season may provide more information on reproduction. No detailed estimates of growth have been done on rainbow trout. The annual fingerling rainbow trout stockings appear to be surviving better that the previous biweekly stockings and should continue. The additional protection on rainbows from the Old Park Dam to Highway 70 should allow more accurate growth estimates in the future.

B: Recommendations:

1. Stock a minimum of 10,000 178-mm minimum-length brown trout and 40,000 100-mm minimum-length rainbow trout in the lower Mountain Fork from the Old Park Dam down to the Highway 70 bridge annually.

2. The sections of the lower Mountain Fork most conducive to electrofishing for trout (Sections 1-5, and portions of 9 and 10) should be sampled annually during the Fall. Additional sampling in suspected spawning areas may be done in late November or December for reproduction verification if needed. Water release requirements that will allow portions of Sections 9 (downstream from the reregulation dam) and 10 (Presbyterian Falls, Figure 1) to be sampled in a safe and efficient manner should also be investigated.

3. Additional surveys could be conducted below Highway 70 to evaluate the degree of downstream migration of both brown and rainbow trout. If migration is substantial, significant losses could result during the summer months due to excessive water temperatures.

4. Continue coordination with U.S. Army Corps of Engineers and Southwest Power Administration to ensure permanent water releases that maintain temperatures and allow efficient sampling.

5. Organize and conduct periodic focus groups consisting of trout organizations, local tackle and canoe rental dealers, local businesses, Southwest Power, regional law enforcement, plus others, to ensure they are kept informed on the progress of the lower Mountain Fork Trout Area and retain their support.

VI. Location of Work:

Oklahoma Fishery Research Laboratory, Cleveland Co., Oklahoma

Lower Mountain Fork River, McCurtain Co., Oklahoma

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VIII. Date: April 24, 1996

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Table 1. Number and size of brown trout stocked in the lower Mountain Fork River, 1991 through 1996.

Year	No. Stocked	Size (mm)
1991	575	279
1992	7200	152
1993	9775	178
1994	7697	229
1995	6683	178
1996	7400	191
Total	39330	$\bar{x}=201$

Table 2. Number and size of rainbow trout fingerlings stocked in the lower Mountain Fork River, 1993 through 1996.

Year	No. Stocked	Size (mm)
1993	50000	152
1994	49900	152
1995	17000	152
1996	33000	152
Total	149900	$\bar{x}=152$

Table 3. Brown trout catch and catch per unit effort from electrofishing in the designated Brown Trout Area of the lower Mountain Fork River below Broken Bow Reservoir from 1992 through 1995.

	No. Caught				C/f			
Section	1992	1993	1994	1995	1992	1993	1994	1995
1.Below Park Dam	64	58	39	21	24.3	16.8	14.2	42.0
2.Below Second Riffle	82	47	36	25	28.6	23.5	16.0	33.3
3.Stocking Site	66	26	16	16	13.3	14.9	12.8	32.0
4.Eppler's Camp	2	19	16	1	3.2	12.7	8.0	1.0
5.Below Eppler's	7	4	1	0	14.0	3.2	1.0	0.0
6.Upper Lake	0	1	0	0	0.0	1.0	0.0	0.0
7.Lake Area	0	0	0	0	0.0	0.0	0.0	0.0
8.Lower Lake	0	0	0	0	0.0	0.0	0.0	0.0
Totals	221	155	108	63	$\bar{x}$=17.5	$\bar{x}$=11.8	x=8.7	$\bar{x}$=21.9

Table 4. Brown trout catch and catch per unit effort from electrofishing above and below the designated Brown Trout Area of the lower Mountain Fork River below Broken Bow Reservoir from 1992 through 1995.

	No. Caught				C/f			
Section	1992	1993	1994	1995	1992	1993	1994	1995
9.Below Rereg. Dm	0	4	1	0	0.0	2.7	2.0	0.0
10.Presb. Falls	1	2	0	3	0.9	2.0	0.0	1.8
11.Below Pwr.house	1	1	0	0	1.3	0.7	0.0	0.0
Totals	2	7	1	3	$\bar{x}$=0.8	$\bar{x}$=2.0	$\bar{x}$=0.7	$\bar{x}$=1.8

Table 5. Rainbow trout catch and catch per unit effort from electrofishing in the designated Brown Trout Area of the lower Mountain Fork River below Broken Bow Reservoir from 1992 through 1995.

	No. Caught				C/f			
Section	1992	1993	1994	1995	1992	1993	1994	1995
1.Below Park Dam	68	84	102	14	25.8	24.4	37.1	28.0
2.Below Second Riffle	36	51	75	6	12.6	25.5	33.3	8.0
3.Stocking Site	157	28	21	3	31.6	16.0	16.8	6.0
4.Eppler's Camp	1	17	29	4	1.6	11.3	14.5	8.0
5.Below Eppler's	2	6	2	1	4.0	4.8	2.0	2.0
6.Upper Lake	0	1	1	0	0.0	1.0	1.0	0.0
7.Lake Area	0	0	0	0	0.0	0.0	0.0	0.0
8.Lower Lake	0	0	0	0	0.0	0.0	0.0	0.0
Totals	264	187	230	28	$\bar{x}=17.5$	$\bar{x}=14.3$	$\bar{x}=17.5$	$\bar{x}=10.4$

Table 6. Rainbow trout catch and catch per unit effort from electrofishing above and below the designated Brown Trout Area of the lower Mountain Fork River below Broken Bow Reservoir during 1992 through 1995.

	No. Caught				C/f			
Section	1992	1993	1994	1995	1992	1993	1994	1995
9.Below Rereg. Dm	7	10	4	0	8.4	2.7	2.0	0.0
10.Presb. Falls	3	0	0	3	2.8	0.0	0.0	1.8
11.Below Pwr.house	16	5	3	0	21.3	3.3	3.0	0.0
Totals	26	15	7	3	$\bar{x}=9.8$	$\bar{x}=4.3$	$\bar{x}=4.7$	$\bar{x}=1.8$

Table 7. Food habit results from preliminary 1992 field evaluation of 32 brown and 18 rainbow trout.

Food Item	Frequency of occurrence in percentage	
	Brown Trout	Rainbow Trout
Aquatic Insects		
Chaoboridae	69	82
Ephemeroptera	84	82
Plecoptera	69	41
Trichoptera	19	6
Zooplankton		
Daphnia	79	94
Calanoid	3	6
Terrestrial Insects		
Diptera	53	12
Coleoptera	56	35
Hemiptera	16	18
Hymenoptera	63	19
Lepidoptera	0	6
Odonata	6	6
Orthoptera	6	0
Thysanura	6	0
Other		
Crayfish	25	65
Freshwater Shrimp	0	6
Debris	6	41

Table 8. Largemouth, spotted and smallmouth bass catch and catch per unit effort from electrofishing in the lower Mountain Fork River below Broken Bow Reservoir 1993 and 1994.

	Effort (hours)		No. Lmb. collected		No. Spb. collected		No. Smb. collected		C/f Lmb.		C/f Spb.		C/f Smb.	
Section	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
1.Below Park Dam	3.5	2.5	6	1	9	10	0	0	1.7	0.4	2.6	4.0	0.0	0.0
2.Below 2nd Riffle	2.0	1.5	1	1	3	1	1	2	1.3	0.7	1.5	0.7	0.5	1.4
3.Stocking Site	1.8	1.5	5	0	1	0	2	0	2.8	0.0	0.6	0.0	1.1	0.0
4.Eppler's Camp	1.5	2.0	0	1	4	4	2	4	0.0	0.5	2.7	2.0	1.3	2.0
5.Below Eppler's	1.3	1.0	13	0	4	0	3	0	10.0	0.0	3.1	0.0	2.3	0.0
6.Upper Lake	1.0	1.0	9	0	5	0	12	0	9.0	0.0	5.0	0.0	12.0	0.0
7.Lake Area	1.0	0.0	49	0	8	0	0	0	49.0	0.0	8.0	0.0	0.0	0.0
8.Lower Lake	1.0	0.0	44	0	2	0	0	0	44.0	0.0	2.0	0.0	0.0	0.0
9.Below Rereg. Dm.	1.5	0.5	24	4	11	3	1	0	16.0	8.0	7.3	6.0	0.7	0.0
10.Presb. Falls	0.5	0.0	3	0	0	0	0	0	6.0	0.0	0.0	0.0	0.0	0.0
11.Below Pwr. house	1.5	1.0	7	11	29	16	0	0	4.7	11.0	19.3	16.0	0.0	0.0
Totals	16.6	10.3	161	18	76	34	21	6	$\bar{x}$=9.7	$\bar{x}$=1.8	$\bar{x}$=4.6	$\bar{x}$=3.3	$\bar{x}$=1.3	$\bar{x}$=0.6

Table 9. Sunfish catch and catch per unit effort from electrofishing in the lower Mountain Fork River Below Broken Bow Reservoir, 1993.

Section	Effort (hours)	No. Sunfish collected	C/f of Sunfish	Length (mm) <102	102-152	>152
1.Below Park Dam	0.50	34	68	5	17	13
2.Below 2nd Riffle	0.25	6	24	1	2	3
3.Stocking Site	0.75	32	43	0	22	10
4.Eppler's Camp	0.25	14	56	2	8	8
5.Below Eppler's	0.50	26	52	0	18	8
6.Upper Lake	0.50	112	224	14	67	31
7.Lake Area	0.50	120	240	21	74	21
8.Lower Lake	0.50	82	164	19	52	11
9.Below Rereg. Dm.	0.25	38	152	6	29	3
10.Presb. Falls	0.25	11	44	1	10	0
11.Below Pwr.house	0.25	23	92	0	8	14
Totals	4.50	498	$\bar{x}=111$	69	307	122

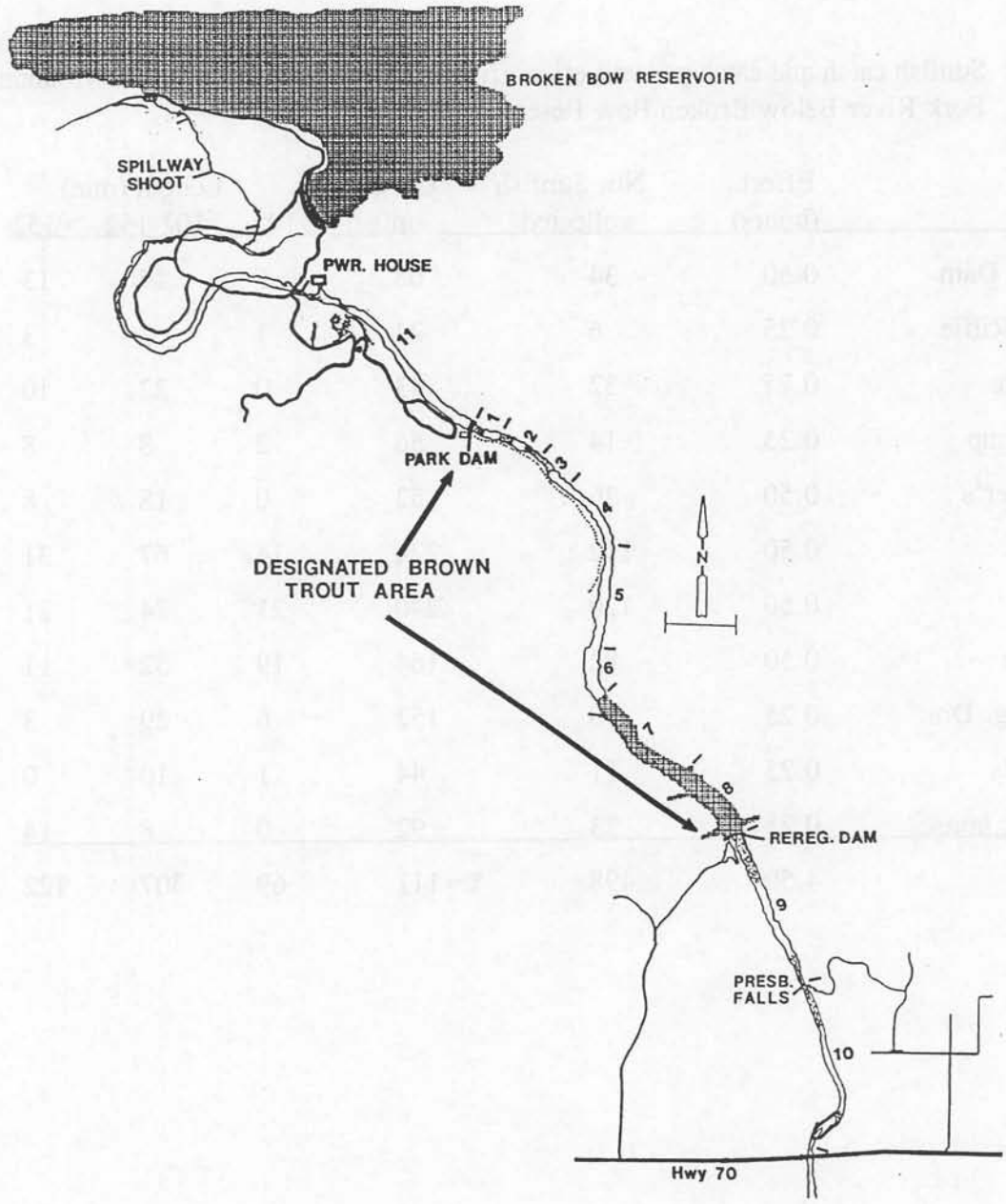

Figure 1. Mountain Fork River trout fishery below Broken Bow Reservoir showing trout sampling locations by section.

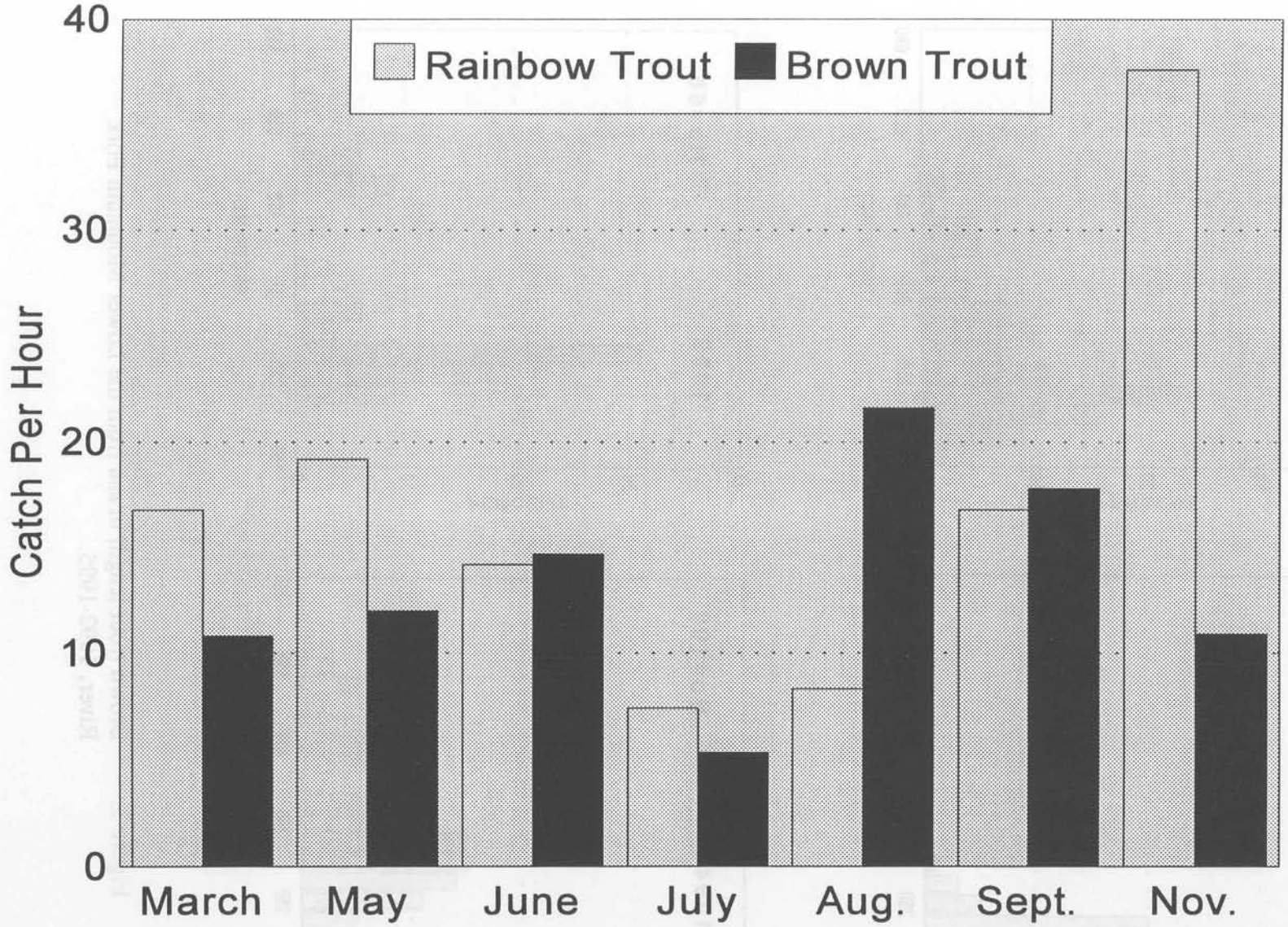

Figure 2. Monthly electrofishing C/f of Rainbow and Brown trout from the lower Mountain Fork River, Oklahoma, 1992 through 1994.

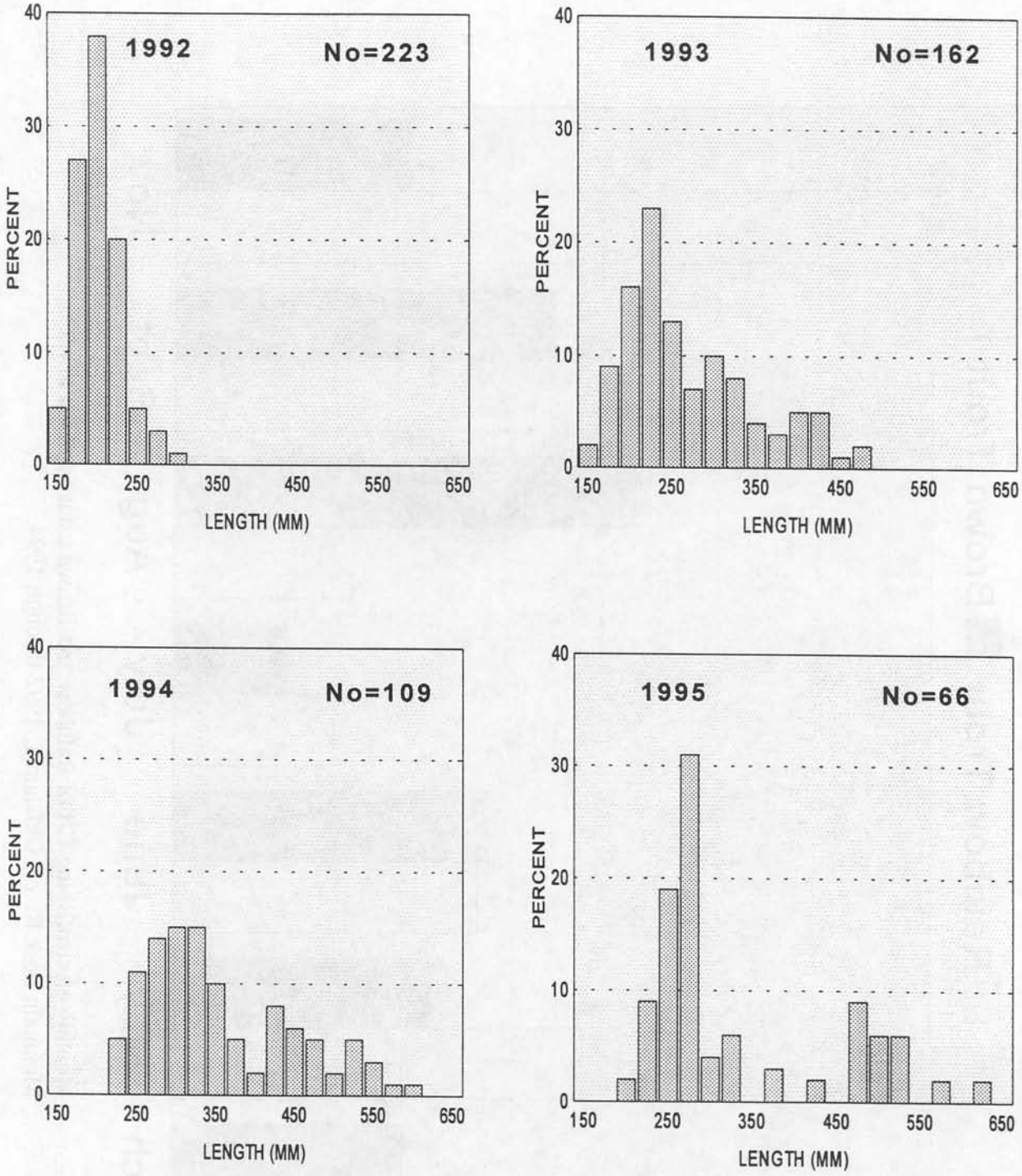

Figure 3. Brown trout length in mm from the Lower Mountain Fork River, 1992-1995.

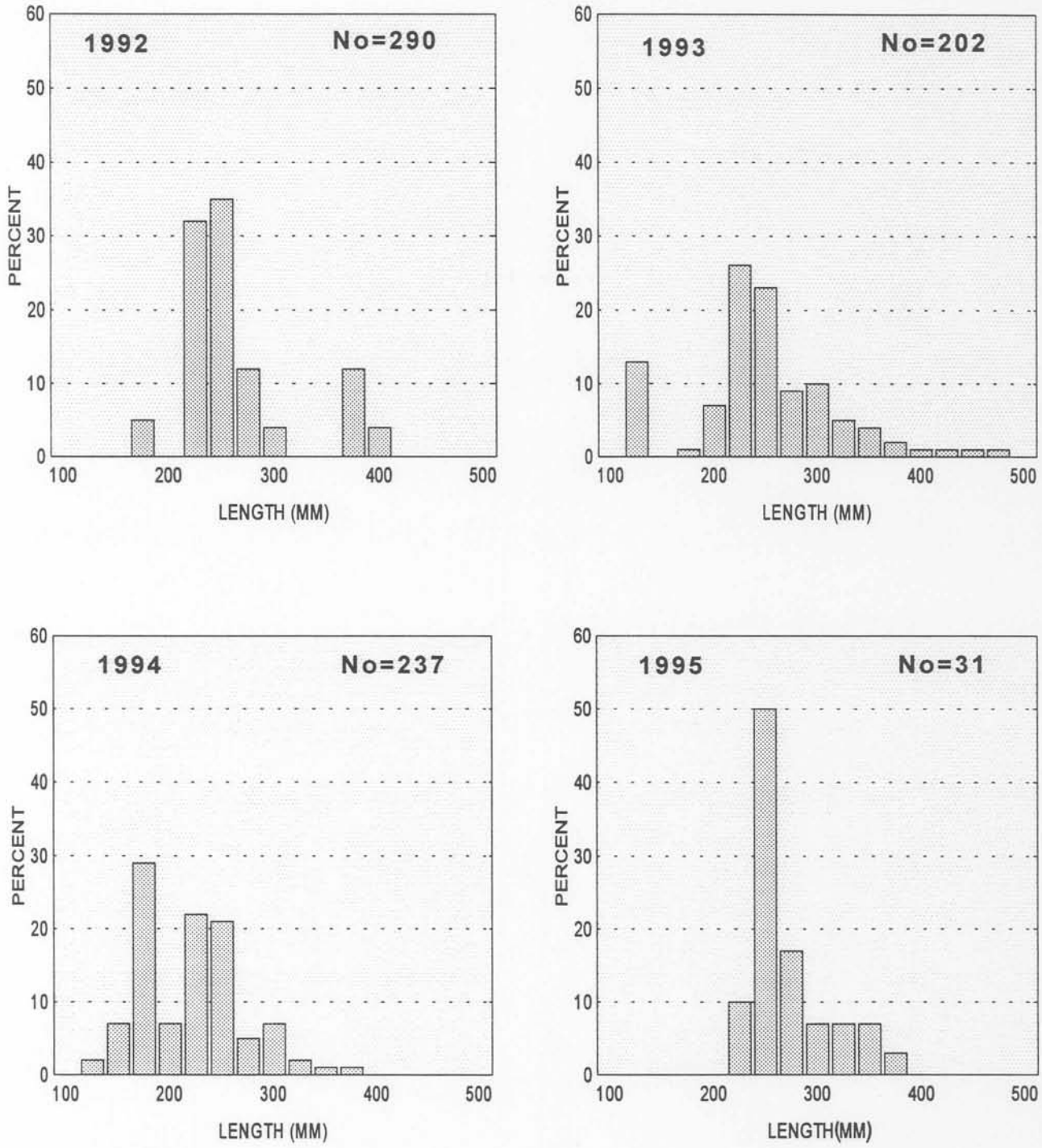

Figure 4. Rainbow trout length in mm from the Lower Mountain Fork River, 1992-1995.

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