# Angler Diary Survey of Flathead Catfish in the Yadkin-Pee Dee River System, North Carolina

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*Abstract*: An angler diary survey of the flathead catfish (*Pylodictis olivaris*) sport fishery in the Yadkin-Pee Dee River system, North Carolina, was conducted (1989–1991) to examine the current fishery and provide a baseline for future comparisons. The objective of the study was to describe the quality of the fishery in terms of fish caught per hour (CPUE), size distribution, and condition (K) of the catch. Forty-four volunteer anglers were recruited to keep records of their fishing trips. Twenty cooperators reported 348 trips. Anglers fished 1,530 hours and caught 338 flathead catfish, a catch rate of 0.22 fish per hour. Eighty-seven percent of the fishing effort was directed at reservoirs, while tailraces received 10% and rivers received 3%. Participants were more successful, however, in tailraces (CPUE = 0.54) than in reservoirs (CPUE = 0.19) or rivers (CPUE = 0.14). Total lengths of captured flatheads ranged from 152 to 1,219 mm. Conditions factors (K) averaged 1.32.

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Sport and commercial fisheries for flathead catfish have developed in the Yadkin-Pee Dee River system of North Carolina (Davidson county to South Carolina state line) since their introduction in 1965. Guier et al. (1980) found that flatheads required only 10 years after introduction into the Cape Fear River, N.C., to expand into a significant fishery and 15 years to become the dominant predator in the mainstream habitat. Interest in fishing for flathead catfish in the Yadkin-Pee Dee system has increased as the population has expanded.

Much of the value of flatheads as sport fish is based on their ability to attain large sizes at maturity. As exploitation of the fishery increases, it is possible that harvest will reduce the number of older, larger individuals. The potential also exists for conflict between sport and commercial fishing interests. Little previous data on the Yadkin-Pee Dee flatheads exist. Increased understanding of flathead catfish population dynamics in the Yadkin-Pee Dee system is necessary to effectively manage the species.

Several sampling techniques were examined. Guier et al. (1980) and Quinn (1988) have successfully sampled flatheads in river environments by electro-

fishing. Much of the Yadkin-Pee Dee River system, however, is impounded and river electrofishing techniques are ineffective. Gill netting requires unnecessary sacrifice of both flathead catfish and many non-target species. The flathead fishery extends over much of the river system which includes 3 river sections and 6 reservoirs and tailraces. The relatively low number of flathead anglers using a variety of habitats limits the utility of creel surveys to provide managers with useful population assessment data.

Green et al. (1986) determined black bass population assessments derived from data collected by angler diary cooperators were generally comparable to assessments based on data collected by a state fisheries management agency. The associated costs were substantially lower and the diary program improved agency relations with anglers. Angler diary studies have been used in North Carolina to collect information on largemouth bass (*Micropterus salmoides*) (Bryant 1991, Chapman et al. 1991) and for difficult to sample species such as muskellunge (*Esox masquinongy*) (Borawa 1990) and reservoir striped bass (*Morone saxatilis*) (Kim Baker, pers. commun.). We chose to use an angler diary survey to overcome sampling problems in a variety of habitats in a cost effective manner. The objective of this study was to describe the fishing success of flathead catfish angler diary cooperators and the size distribution and condition of their catch in the Yadkin-Pee Dee River system.

## Methods

Prior to 1 January 1989, 24 angler diary cooperators were recruited to collect data from their flathead catfish fishing trips on the Yadkin-Pee Dee River system in North Carolina. The volunteers were given diaries and tape measures. They were briefed on the objectives of the study and instructed to complete 1 diary sheet per trip. They were asked to record their name, date, location fished, hours fished, total length for each flathead caught and whether the fish were kept or released. Anglers were asked to include weights when available.

Diary sheets were collected following each fishing year. Results of previously gathered diary data were presented to participants annually to encourage continued interest and cooperation. Additional volunteers were recruited in 1990 to maintain a minimum of 20 contributors.

The number of trips, hours of effort, number of fish caught, and CPUE were calculated for each body of water and by month. Mann-Whitney nonparametric test (Systat 1985) ($P = 0.05$) was used to compare CPUE among habitat types (reservoirs, tailraces, and rivers). We report percent of total hours fished by body of water, average trip length, and percent harvested.

We calculated average length and present the size distribution of the catch reported. Condition factors for each fish were calculated as $K = (W/L^3)100{,}000$, where K is the condition factor, W is weight in grams, and L is total length in mm (Anderson and Gutreuter 1985). The mean and range of K's for the study are presented.

## Results and Discussion

Forty-four anglers were recruited for the study. Twenty submitted records for 1,530 hours of fishing. Participants recorded trips from 10 different areas of the Yadkin-Pee Dee River system representing 3 types of habitat: reservoirs, dam tailraces, and rivers. The 10 areas were High Rock Lake, Tuckertown Lake, Badin Lake, Lake Tillery, Blewett Falls Lake, High Rock Tailrace, Tuckertown Tailrace, Badin Tailrace, Yadkin River just upstream of High Rock Lake near Spencer, N.C., and Pee Dee River between Lake Tillery Tailrace and Blewett Falls Lake.

Cooperators spent 67% of their angling hours on Tuckertown Lake, which may reflect the fact that most volunteers were recruited when interviewed during a creel survey on Tuckertown Lake. Badin Lake, Tuckertown Tailrace, and Blewett Falls Lake received 12%, 8%, and 7% of the total effort. Two percent or less of the total effort was spent on each of the remaining bodies of water.

Cooperators reported 348 fishing trips averaging 4.4 hours for flathead catfish (Table 1). Three hundred thirty-eight flatheads were captured (0.22 fish/hour) of which 31% were kept. By comparison, anglers fishing for flatheads in the Tuckertown Lake creel survey in 1989 and 1990 (N.C. Wildl. Resour. Comm. unpubl. data) reported keeping 51% of their catch. Study volunteers may have been more concerned with conservation of the fishery resource than the average flathead catfish angler.

Catch rates for 1989, 1990, and 1991 were similar at 0.26, 0.22, and 0.21 fish per hour. Success was significantly greater ($P = 0.004$) in tailraces (CPUE = 0.54) than in reservoirs (CPUE = 0.19). River CPUE (0.14) was not significantly different from the tailrace ($P = 0.097$) or reservoir CPUE ($P = 0.492$). Low fishing effort on rivers reduced the power of statistical comparisons with other water types. Tail-

**Table 1.** Number of trips, hours of effort, number of flathead catfish caught, and CPUE by body of water in the Yadkin-Pee Dee River system reported in the 1989–1991 flathead catfish angler diary survey.

| Body of water | Trips | Hours | Fish | CPUE |
|---|---|---|---|---|
| High Rock Lake | 4 | 11.0 | 0 | |
| Tuckertown Lake | 235 | 1,026.5 | 211 | 0.21 |
| Badin Lake | 36 | 177.5 | 11 | 0.06 |
| Lake Tillery | 1 | 6.0 | 0 | |
| Blewett Falls | 18 | 106.0 | 23 | 0.22 |
| All reservoirs | 294 | 1,327.0 | 245 | 0.19 |
| High Rock Tailrace | 10 | 31.0 | 17 | 0.55 |
| Tuckertown Tailrace | 32 | 119.0 | 65 | 0.55 |
| Badin Tailrace | 3 | 10.0 | 5 | 0.50 |
| All tailraces | 45 | 160.0 | 87 | 0.54 |
| Yadkin River | 7 | 27.5 | 3 | 0.11 |
| Pee Dee River | 2 | 15.0 | 3 | 0.20 |
| All rivers | 9 | 42.5 | 6 | 0.14 |
| All waters combined | 348 | 1,529.5 | 338 | 0.22 |

**Table 2.** Number of hours and CPUE by month on the Yadkin-Pee Dee River system reported in the 1989–1991 flathead catfish angler diary survey.

| Month | Hours | CPUE | Month | Hours | CPUE |
|---|---|---|---|---|---|
| January | 0 | | July | 183.5 | 0.20 |
| February | 2.5 | | August | 214.0 | 0.17 |
| March | 16.0 | | September | 217.5 | 0.23 |
| April | 85.0 | 0.14 | October | 212.5 | 0.19 |
| May | 290.5 | 0.35 | November | 73.0 | 0.19 |
| June | 235.5 | 0.20 | December | 10.0 | 0.10 |

race success was high apparently due to seasonal concentrations of flatheads as 84% of tailrace fishing was recorded in May.

Caution should be used when comparing waters sampled by a small number of contributors because there may be differences in the skill of cooperators fishing different waters (Green et al. 1986). Overall CPUE for our individual cooperators were highly variable (<0.10 to >1.00). Tuckertown Lake, Badin Lake, High Rock Tailrace, and Tuckertown Tailrace were the only waters fished by more than 3 cooperator angling parties.

The flathead catfish fishery extends from May to October. Very little fishing was reported from December to March. Catch rates were highest in May (CPUE = 0.35), followed by September (CPUE = 0.23) (Table 2). Summerfelt (1970) described an annual activity cycle including an intensive spring feeding period, summer spawn, and fall feeding period (Hart 1974) which could account for higher May and September catch rates.

Lengths reported for 300 flathead catfish ranged from 152 to 1219 mm (Fig. 1). One hundred seventy-nine flatheads were measured and weighed. They averaged 701 mm and 5.5 kg. Sixteen fish were >1,000 mm. The mode of the size distribution occurred at 551–650 mm.

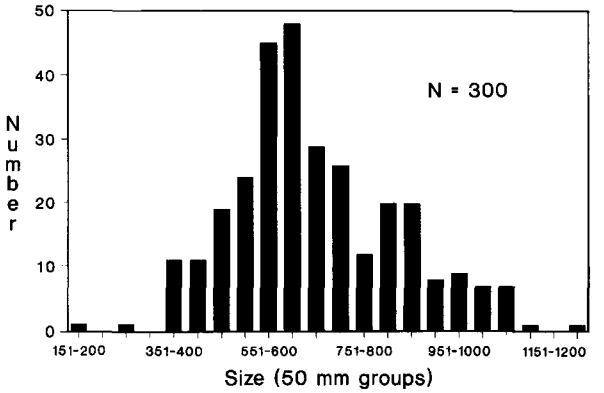


**Figure 1.** Flathead catfish size distribution from angler diaries on the Yadkin-Pee Dee River system, 1989–1991.

Individual condition factors for Yadkin-Pee Dee flatheads ranged from 0.71–2.64 and averaged 1.32. Nine catfish had K > 2.00. By comparison, condition of flatheads ($N$ = 94) obtained in the Tuckertown Lake creel survey in 1989 and 1990 ranged from 0.79–2.82, averaged 1.40, and 5 fish were ≥2.00 (N.C. Wildl. Resour. Comm. unpubl. data).

In summary, the angler diary program established CPUE, size distribution, and condition of flathead catfish caught by cooperators in the Yadkin-Pee Dee River system. These results can be compared to similar data collected in the future to establish trends in the fishery. The present population provides anglers with frequent catches of fish >600 mm (63%) and occasional trophy size fish >1,000 mm (5%). High condition factors suggest that the number of flatheads in the fishery is not excessive for the available forage. The angler diary appears to be a useful method to collect some stock assessment data on an otherwise difficult to sample Yadkin-Pee Dee River system flathead population.

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