Fisheries Bulletin of the Kentucky Department of Fish and Wildlife Resources

Changes in the Fishery of a Flood Control Reservoir During Five Years of Fertilization

Bonny Dale Laflin

Bulletin No. 66

July 1981

Kentucky
Department of Fish and Wildlife Resources
Carl E. Kays, Commissioner

Division of Fisheries
Peter W. Pfeiffer, Director

CHANGES IN THE FISHERY OF A FLOOD CONTROL RESERVOIR DURING FIVE YEARS OF FERTILIZATION

by

Bonny Dale Laflin

Principal Fishery Biologist

This project was financed partially with Federal Aid in Fish Restoration Funds

Kentucky Projects F-33 and F-36

1981

CONTENTS

ABSTRACT

Dewey Lake, an 1,100-acre flood control reservoir, was fertilized from 1967 through 1971 to increase the sport fish harvest. The fertilizer applied in 1967 was a water soluble inorganic fertilizer (20-20-5) applied five times throughout the summer at a rate of 40 pounds per acre. In 1968 through 1971, the fertilizer used was diammonium phosphate (21-53-0) that was applied five times per year at a rate of 17 pounds per acre. Cove-rotenone sampling was done from 1967 through 1971, and a non-uniform probability creel survey was conducted from 1968 through 1971.

The standing crop of fishes increased during the fertilization period with the most beneficial increase to the fishermen being in the population of harvestable panfishes. The number of harvestable panfishes increased from ≤ 52 up to 227 fish per acre, or from ≤ 8.9 up to 35.0 pounds per acre. The population of channel catfish also increased within the survey period, as did the crappie population. The black bass population remained fairly constant, as did the number of shad, except during 1970. The total weight of shad during the fertilization period increased appreciably over the pre-fertilization period.

The sport fish harvest during the 5-year fertlization period increased an average of 130% by numbers and 60% by weight over that recorded during the pre-fertilization period (1965 and 1966). Fishing pressure increased an average of 75%. The catch rate during the fertilization period varied from 0.98 to 1.25 fish per hour; whereas, the catch rate varied from 0.67 to 0.93 fish per hour during 1961 through 1966.

The most pronounced changes in the sport fish harvest were the increased catches of panfishes and crappies. The catch of panfishes increased from 11,700 and 18,690 in 1965 and 1966 before fertilization, to a range of from 30,138 to 75,812 during fertilization. The harvest of crappies increased from 24,868 and 30,990 before fertilization, to a range of from 33,060 to 62,561

during fertilization. Except in 1971, the harvest of crappies during the fertilization period remained above 52,000 fish per year.

The cost of the fertilizer was $12,500 for 20-20-5 in 1967, $7,470 for 21-53-0 in 1968, $7,510 in 1969 and 1970, and $7,724 in 1971, for a total cost of $42,714 for the 5 years. This was an average cost per year of $8,543. Based on the average cost per year and the average sport fishing pressure from 1959 through 1966 versus the average sport fishing pressure for 1968 through 1971, the cost per additional hour of fishing resulting during the fertilization period was approximately $0.20 per hour. Based on the average catch for the pre-fertilization period versus the fertilization period, the average increased number of fish caught cost approximately $0.13 per fish; however, based on additional pounds harvested, they cost approximately $1.29 per pound.

Because of the high cost of each additional pound produced, approximately $1.29 per pound, and the greater weight increase to the creel on smaller lakes near the Dewey Lake area, it is recommended that the fertilization of Dewey Lake be terminated.

INTRODUCTION

Dewey Lake, an 1,100-acre reservoir, was completed by the U. S. Army Corps of Engineers in mid-1949. The dam was constructed across Johns Creek about 5.4 miles upstream from Levisa Fork of the Big Sandy River. The primary function of the reservoir is flood control over 207 square miles of the Big Sandy River Basin; however, because of the few large bodies of water in the eastern part of Kentucky, Dewey Lake soon became a recreational attraction of the area.

Fishing in Dewey Lake has never reached the expectations of the local residents; and, as a result, fishery biologists have been assigned to this lake since 1951 to investigate and manage its fishery. A benefit of the biologist being assigned to the reservoir is that fish population sampling was conducted every year since 1951 (except 1966) and some type of creel survey has been conducted since 1954 (except 1967).

The fertilization of Dewey Lake was a continuation of the effort to improve fishing in this reservoir. Prior management and research activities at Dewey Lake have been summarized by Charles (1967) and will be omitted from this report, except for the work conducted in 1962 and 1964.

Two lake drawdowns were completed during November 1962 and again in November 1964 with the primary objective being the reduction and control of the gizzard shad population. A secondary objective of the 1962 drawdown was the removal of crappies by gill netting (Carter, 1963). During both years the lake was lowered 25 feet, which reduced the surface acreage from 1,100 acres to 225 acres. The 1962 drawdown was completed at one time; i.e., once the gates were opened they were not closed until the desired level was achieved. The 1964 drawdown was achieved by withdrawing in 5-foot decrements over a perod of 34 days.

The 1962 drawdown had the desired effects on the shad population during 1963; however, the 1964 population of shad was greater than the 1962 population.

The 1964 drawdown did not affect the shad population as did the 1962 drawdown. The 1965 population of shad was approximately equal to the 1964 population or the population before the second drawdown. Charles (1967) stated: "The 5-stage drawdown did not achieve the desired results; in fact, gizzard shad were nearly as abundant the following year as they had been before drawdown." Hulsey (1958) believed that in deep clear game fish reservoirs where gizzard shad are the primary rough fish that drawdowns may not be needed but once every 5 or 6 years. Herman et al. (1963) determined the effects of a summer drawdown on the fish population that summer but did not mention any long-term effects. More is known about short-term effects of a drawdown on small lakes than is known about the effects on larger reservoirs (Pierce et al. 1963). In fact, little is known about long-range effects of drawdowns in reservoirs regardless of the size of the reservoir. What effects drawdowns have on reservoirs during the following 5 to 10 years is at best speculative; however, it will be assumed for this report that drawdowns of 1962 and 1964 in Dewey Lake had little effect on the population after 1964.

Annual Water Fluctuation

The annual water level fluctuation in Dewey Lake from summer pool to winter pool is approximately 31% of the lake volume of 17,230 acre feet. The rate of replacement of the total lake volume from the 29-year period before 1970 is approximately one month during the period between January 1 and April 30; however, during June 1 through September 30, the period during which the lake is fertilized, the total volume is never completely replaced during a normal year. It would in fact lack about 30% of the total reservoir volume from replacing the water during that time (Beemer and Stotkin 1970). The slow replacement time during the summer months should have allowed for a fair retention of the fertilizer; however, during the winter months any effect of a storage or recycling of the fertilizer was most likely removed by the rapid and continual replacement

within the reservoir.

In 1967, the Division of Fisheries began fertilizing Dewey Lake with 200,000 pounds of water soluble inorganic fertilizer (N-P-K ratio: 20-20-5). Five applications from June 1 through August 31 of 40,000 pounds each were applied during 1967 at which time tests were being conducted to determine a more suitable fertilizer. Diammonium phosphate, 21-53-0, was consequently substituted for 20-20-5 after tests indicated that this formulation was at least as effective as the 20-20-5. Diammonium phosphate also allowed a reduced application rate of 50 pounds per three surface acres instead of 40 pounds per acre.

To determine the possible effects of the fertilization, fish population studies were conducted from 1967 through 1971 and creel surveys were conducted from 1968 through 1971.

METHODS

Fertilization

Five applications of fertilizer were made from June 1 through August 31 each year from 1967 through 1971. The fertilizer used in 1967 was a water soluble inorganic fertilizer (20-20-5) that was applied at the rate of 40 pounds per acre per application. As a result of tests conducted during the summer of 1967, the fertilizer was changed in 1968 to a diammonium phosphate (21-53-0) that was applied at a rate of 50 pounds per three acres (16.7 pounds per acre) per application.

The change from 20-20-5 to 21-53-0 resulted in a decrease of the total yearly application from 200,000 pounds (20-20-5) to only 83,500 pounds (21-53-0). Not only did the change result in a lower application rate, but it also resulted in a better fertilization formulation for the production of the plankton population. Prosser (1972) stated that, in his evaluation of gross photosynthesis of plankton populations in 2-foot diameter translucent polyethylene tubes, the formulation with the analysis 21-53-0 promoted significantly greater photosynthetic activity

($P_{0.10}$) on the 14th day after initiation than did the commercial fish pond fertilizer 20-20-5.

The fertilizer was applied from a barge by breaking the bags open and dispersing the contents over the side as it was in motion. It was believed that the fertilizer would dissolve before it reached 10 feet in depth.

Population Studies

Cove No. 36 (2.1 acres), Clark's Branch (1.9 acres), and McGuire's Branch (2.2 acres) were used for sampling from 1964 to 1971 (except 1966). These coves were sampled one per month in June, July, and August, except in 1967, when all three coves were sampled in May and again in September. The 1964 and 1965 data (pre-fertilization) were collected by Charles (1967).

The coves were blocked with a 300' by 20' (either 3/4" or 1/2" mesh) block net that was set at approximately 7:30 am on the first day of the study. Emulsifiable rotenone (5%) was then applied with a venturi-type boat bailer at the rate of 1.0 ppm (0.05 ppm actual rotenone). All fish that surfaced within the sampling area during the ensuing 60-hour period were collected, sorted as to species, counted, and measured to the nearest inch group. Fish were weighed on the first day only, excepting those species or size groups which were not represented on the first day. Table 1 gives the breakdown of the inch grouping referred to in this report.

Creel Surveys

Creel surveys were conducted at Dewey Reservoir both before and after the initiation of this study. A non-uniform probability creel survey was conducted at Dewey Reservoir from April 1 to October 31 in 1965 and 1966; the March 1966 survey employed the systematic startified creel survey method. A non-uniform probability creel survey was conducted from March 1 through October 31 during the 4-year period from 1968-1971. The methodology of the non-uniform probability creel survey used on this study was the same as that described by Pfeiffer (1966),

except that a 4-hour time period was used instead of a 2-hour time period.

FINDINGS

Population Studies

The 1964 and 1965 population data is referred to as control data; however, this assumption may not be accurate because of the effects of the two drawdowns in 1962 and 1964. What effects these drawdowns could have on the population after 1962 and 1964 can only be theorized. Charles (1967) did, however, state that the 1964 drawdown did not have the desired effect on reducing the gizzard shad population and was not as effective as the 1962 drawdown.

The 1967 fish population data were collected at a different time interval than during the remaining years of this study and its value for comparative purposes is limited.

The standing crop of fishes in Dewey Reservoir has fluctuated yearly since it was impounded in 1949. The highest biomass recorded before initiation of the fertilization was in 1964 when the weight per acre was 245 pounds. There were only 4 years before fertilization when the biomass exceeded 200 pounds per acre. These were 1959 (208 pounds), 1961 (240), 1964 (245), and 1965 (218). The three lowest biomass recordings were in 1952 (60 pounds per acre) 1955 (73), and 1963 (81).

During the two years preceding fertilization (1964 and 1965) the fish biomass was estimated at 245 pounds and 218 pounds, respectively. The number of fish per acre decreased also, but this was a decrease of only 98 fish per acre: 4,124 fish to 4,026 fish (Table 2). The combined summary of the 1967 population data the first year of fertilization yielded a standing crop of only 127 pounds per acre (2,704 fish). The May studies averaged only 85 pounds per acre (1,110 fish) and the September studies averaged 169 pounds per acre (4,298 fish).

The standing crop increased to 253 pounds per acre (3,952 fish) in 1968, then to 425 pounds (5,649 fish) in 1969. The 1970 fish population studies, which were

conducted in the same coves as previously sampled, increased the average standing crop to 1,191 pounds per acre or 26,638 fish per acre. The 1971 fish biomass was between that of 1968 and 1969 and averaged 347 pounds per acre or 5,102 fish per acre.

The most clearly-defined increase during the fertilization period was in the sunfish population. The black bass population remained very constant throughout the fertilization period, but the crappie population tended to fluctuate widely. The numerical population of shad decreased the first 2 years but increased the final 3 years of fertilization.

The main change in the largemouth bass, *Micropterus salmoides* (Lacepede), and spotted bass, *M. punctulatus* Rafinesque, populations was in the fingerling-size fish. This size group varied from a low of 27 fish per acre in 1969 to a high of 521 in 1970; however, the weight of fingerling bass remained more constant: 0.4 to 0.6 pound per acre. Intermediate-size bass numbers also fluctuated widely, varying from 10 to 19 fish per acre. Although the number per acre nearly doubled, they increased in size as more of them tended to be in the upper limits of the intermediate-size group. Their weight increased from 1.3 pounds to 2.8 pounds. The number of harvestable bass also remained fairly constant as far as numbers per acre; however, their weight per acre varied from 1.5 pounds to 6.3 pounds. This appears to be a substantial increase in weight, but if the 1964 value is compared to the values during the fertilization period, only two years exceeded the 1964 weight, 1970 and 1971. The weight of harvestable bass in 1964 was 4.9 pounds per acre; however, the weight of harvestable bass during the fertilization years varied from 2.7 to 6.3 pounds per acre (Tables 3, 4, 5, 6, 7, and 8).

The abundance of fingerling-size black crappie, *Pomoxis nigromaculatus* (Lesuerer), and white crappie, *P. annularis* Rafinesque, fluctuated without regard to the fertilization program. The high survival in 1968 and 1969 may have been a result of an increased supply of food those 2 years. The intermediate-

size crappies increased in 1969 and 1970 as a result of the 1968 and 1969 spawns. The weight of the intermediate size crappies increased from pre-fertilization weights of 5.4 and 5.6 pounds per acre to 20.9 pounds per acre in 1970, but in 1971 their total weight decreased to the lowest level in the 7 years surveyed. The number of harvestable-size crappies increased from 6 and 2 fish per acre in 1964 and 1965 to 11 in 1970 and 1971. This increase in the number per acre was also reflected in the weight; it increased from 1.2 to 0.3, to 3.0 and 2.7 pounds per acre (Tables 9 and 10).

Fingerling bluegill, *Lepomis macrochirus* Rafinesque, fluctuated from 120 per acre (1967) to 5,266 per acre (1970). The weight of the fingerling bluegill increased from 0.9 and 0.8 pound per acre the 2 years before fertilization, to 5.1 pounds per acre in 1970, but decreased in 1971 to only 0.4 pound. Intermediate-size bluegill fluctuated from 179 to 538 fish per acre, but no pattern of continual increase was established as far as numbers were concerned. However, their size increased as evidenced by the increase in weight. The weight of intermediates increased from 12.0 and 7.9 pounds per acre before fertilization to 21.5 pounds per acre in 1969. Excepting 1967, harvestable bluegill utilized the increased fertility better than any other sport fish since they increased in numbers from 52 and 44 fish per acre in 1964 and 1965 to 98 in 1968, 106 in 1969, 197 in 1970, and 225 in 1971. The weight of harvestable bluegill increased from 6.6 to 34.8 pounds per acre (Tables 11 and 12).

An unexpected benefit resulting during the fertilization period was an increase in the population of channel catfish, *Ictalurus punctatus* Rafinesque. Prior to the initiation of the fertilization program, less than one channel catfish was collected per acre; however, even as early as 1967, four channel catfish were collected per acre. They increased to 43 fish per acre in 1968 and 87 in 1969, but they decreased to 48 in 1970 and 16 in 1971. The weight of channel catfish increased from less than a pound per acre to almost 19 pounds per acre in 1970 (Tables 13 and 14).

It was theorized at the beginning of fertilization that the largest increase in the fish population would be in the population of the shad, primarily the gizzard shad, *Dorosoma cepedianum* (Lesueur). Although threadfin shad, *D. petenense* Gunther, have been introduced into the lake and a few were collected early in the project, they did not survive the winters and were not collected after 1967. The number of shad actually decreased during the first 2 years of the fertilization; whereas, the third year their numbers equaled that of the pre-fertilization period. The weight of the shad in 1969 in the third year of fertilization, however, increased more than 100 pounds per acre over and above the level of the pre-fertilization period. The average for the 1970 population data contained a high number of shad which weighed almost 1,000 pounds per acre. The 1971 shad population approximated the pre-fertilization level as far as numbers per acre, but the weight indicated the fish were of larger size within primarily the intermediate size group. The weight of shad considered above forage size (8" or greater) showed the largest increase in 1968, 1969, and 1970, but, by 1971 this weight had decreased to the pre-fertilization level (Tables 15 and 16).

Creel Surveys

The results of creel survey data collected since 1959 at Dewey Reservoir are summarized in Table 17. Due to mechanical failures and various other reasons, surveys were not made on several of the scheduled days during the last 4 years of the study. This was especially true in 1971 when scheduled surveys were completely omitted and it rained on every survey day in September. The rain and missed day in September lowered the expanded September fishing pressure from over 10,000 hours in 1968, 1969, and 1970 to less than 4,000 hours in 1971. This in turn lowered the catch from over 12,000 fish to only 2,563 fish. Before fertilization (1959-1966), the fishing pressure varied from a low of 40 to a high of 60 man-hours per acre. The harvest varied from 33 to 78 fish per acre or from 7.6 to 16.7 pounds per acre. The catch rate (number of fish harvested per hour) varied from 0.70 to

1.30 fish per hour. During fertilization, the fishing pressure ranged from 80 to 100 hours per acre, which is an average increase of approximately 75% over the pre-fertilization period in 1965 and 1966. The number of fish harvested ranged from 81 to 125 fish per acre, which is an average increase of 130%. The weight of fish harvested ranged from 9.0 to 20.7 pounds per acre, which is approximately a 60% increase. The number of fish harvested per hour of fishing ranged from 0.98 to 1.25 fish per hour (Table 17), which is greater than the harvest rates of 0.67 to 0.93 fish per hour in 1961 through 1966.

The 1965 and 1966 data collected by Charles (1967) will be used as examples of the sport fish harvest before fertilization. What effects the drawdowns of 1964 may have had on this data cannot be assessed; but, for this report, it will be assumed that it was minimal.

Dewey Lake does not contain a large population of white bass, *Morone chrysops* (Rafinesque), and this is reflected in the harvest of this species. Although the 1964 creel survey did not include the month of March, there was a total harvest of 231 white bass that year. The 1966 white bass harvest, when March was surveyed, was only 27 fish. In 1968, the largest harvest of white bass occurred with 2,032 being harvested. The number creeled decreased in 1969 to only 66; they were not reported during the survey in 1970 or 1971. White bass were harvested these years, but not during a creel census.

The number of black bass harvested remained fairly constant in 1965, 1966, and 1968, with the number harvested varying from 1,068 in 1965 to 1,328 in 1966. The harvest in 1969, the year the size limit on black bass was lowered from 12 to 10 inches, was 4,310 bass. An additional 2,083 bass were harvested in 1970, but the number creeled decreased to 872 fish in 1971 despite the apparent stable numbers per acre of harvestable bass in the population studies. The weight of the bass harvested after 1968 fluctuated from 1,027 pounds in 1971 to 5,356 in 1969. The pre-fertilization weight of bass fluctuated from 1,902 to 3,302 pounds despite the fairly stable number harvested.

The crappie harvest increased during the fertilization period. The crappie harvest was 24,868 fish in 1965 and 30,990 fish in 1966. From 1968 through 1971 the annual crappie harvest ranged from 33,060 to 62,561 fish. Excluding 1971, the crappie harvest was over 52,000 fish per year during the fertilization period. The average weight of the crappie harvested ranged from 0.15 pound in 1968 and 1969 to 0.08 pound in 1980.

The most pronounced improvement in sport fishing was the increased harvest of panfishes. The panfish harvest increased from 11,700 in 1966 and 18,690 fish in 1965 to a range of from 30,138 to 75,812 panfishes in 1968 through 1971. The total weight harvested increased from 1,422 and 1,731 pounds to a range of from 2,940 to 7,913 pounds. The percentage of the total harvest composed of panfishes exceeded 50% from 1969 through 1971, which is a change from the preceeding years when the crappie harvest exceeded only 50%. The increase in the panfish harvest was correlated by an increase in the harvestable panfishes collected in the population studies. The number of harvestable panfishes in the population studies progressively increased from 1968 to 1971.

The annual sport fish harvest of channel catfish increase from 704 (1965) and 166 (1966) fish before fertilization, to 638 (1968), 2,473 (1969), 6,048 (1970), and 1,254 (1971) fish. The total weight harvested during the fertilization period varied from 667 to 3,882 pounds.

Flathead catfish, *Pylodictis olivaris* (Rafinesque), were harvested in 1968 and 1969, but were not recorded in the creel in 1970 or 1971. Bullheads, *Ictalurus* species, accounted for 1,681 fish in 1970 and and 544 in 1971. Carp, *Cyprinis carpio* Linneaus, were also part of the 1968, 1969, and 1970 harvest, accounting for 714, 185, and 121 fish, respectively. Carp accounted for 3,407 pounds in the 1968 harvest, 280 in 1969, and 1,052 in 1970.

The largest percent of the fishing pressure was recorded in April of 1969 and in July in 1980. The bulk of the fishing pressure during the survey periods was in May and June (Tables 18, 19, 20, and 21). The bulk of the harvest occurred in

April and May, with over 45% of the weight being harvested then. March was the lowest harvest month followed by August.

Each of the interviewed anglers was asked which species he sought to catch; from these interviews the expanded data revealed that over the 4 years of the fertilization the man-hours fished for crappies decreased while the man-hours fished for panfishes increased. The man-hours fished for "anything" also increased, as did those hours fished for catfish. The percent of the man-hours fished for sunfishes increased from 5% in 1968 to 15% of the total hours in 1969 and 1970, while the man-hours fished for crappies decreased from 25% in 1968 to only 10% in 1970 and 11% in 1971. The percent of the total hours fished for black basses gradually decreased from 16% in 1968 to 8% in 1971. These changes occurred even though there were no significant changes in the catch rate for any of these species (Table 22).

The crappie fishermen were the most successful since they caught from 1.9 to 2.3 fish per hour. Panfish fishermen followed, catching from 1.7 to 2.1 fish per hour. The least successful fishermen were the black bass fishermen because they caught only 0.1 to 0.2 fish per hour (Table 23). Crappie fishermen caught from 48% to 80% of the crappie harvested, or from 50% to 82% of the weight of the crappie. Black bass fishermen caught from 59% to 84% of the bass harvested, or from 76% to 84% of the weight. The panfish fishermen creeled from 24% to 39% of the panfish harvested (Table 24).

The typical fisherman at Dewey Reservoir was a male resident who was still fishing. Fishing success varied annually from 37 to 48%. The number of bank fishermen exceeded boat fishermen every year (Table 26).

SUMMARY

Dewey Lake, an 1,100-acre flood control reservoir, was fertilized from 1967 through 1971 to increase the sport fish harvest. Cove population studies and creel surveys were conducted to measure any changes in the fish population and sport fishing harvest during this period.

The total number of fish per acre and the weight per acre during the fertilization period increased over the pre-fertilization period. The most beneficial increase in the fish population to the sport fisherman was the increased number of harvestable panfish. The number of harvestable panfish increased from 22 to 52 fish per acre before fertilization to as much as 227 fish per acre or from 8.9 pounds per acre or less to as much as 35.0 pounds per acre after fertilization in 1971. The number of channel catfish increased from less than 1 per acre before fertilization to as much as 87 per acre in 1969. Except in 1970, the population of shad increased very little numerically, but their weight increased, indicating larger average fish. The crappie population increased in all size groups as the number of harvestables increased from 6 (1964) and 2 (1965) fish per acre to 11 in 1970 and 1971. The population of black basses remained relatively stable and did not fluctuate appreciably.

The sport fishing pressure at Dewey Reservoir increased approximately 75% over the pre-fertilization period. The average harvest increased approximately 130% by numbers and 60% by weight. The catch rate during the fertilization period varied from 0.98 to 1.25 fish per hour, compared to 0.67 to 0.93 fish per hour from 1961 through 1966.

The sport fish harvest of white bass in Dewey Reservoir was unaffected by the fertilization of the reservoir. The harvest of black bass increased during the fertilization period; however, this may have been the result of the size limit being lowered during the fertilization period. What effects either had on the harvest of black bass is speculative. The harvest of crappies increased from 24,868 and 30,990 fish (1965 and 1966) to a range of 33,060 to 62,561 fish during fertilization. Except in 1971, the annual harvest of crappies during the fertilization period remained over 52,000 per year.

The most beneficial increase in the total harvest during the fertilization period was the increased harvest of panfishes. The number of panfishes harvested increased from 11,700 and 18,690 before fertilization, to a range from 30,138 to

75,812 during fertilization. The percent of the total harvest of channel catfish increased from 704 and 166 before fertilization, to a high of 6,048 in 1970.

May and June were the two months when the heaviest fishing pressure occurred, but the greatest number of fish were caught in April and May. The number of anglers specifying that they were seeking panfish increased, while those seeking crappies and black basses decreased.

The catch rate for any of these species did not change appreciably during the fertilization period. The crappie fishermen caught the most fish per hour when they harvested from 1.9 to 2.4 fish per hour. The catch rate of panfish fishermen ranged from 1.8 to 2.3 fish per hour.

Conclusions

When this study was initiated in 1968, two variables were already present which tended to obscure the effects of the fertilization program. One was the difference in the population sampling schedule in 1967 (May and September, instead of June, July, and August as was done in all other years) and the second was the lack of reliable control data. The data collected prior to this study was data that was collected to evaluate the drawdowns in 1962 and 1964. What effects these two drawdowns had on the years that the lake was fertilized is unknown.

Obvious reasons such as harvest of present resources, cost benefit analysis, number of fishermen, availability of other water, fertilization of smaller bodies of water, interest, natural fertility, new lakes and other factors will normally dictate whether it is feasible to fertilize any reservoir. The fertilization of a reservoir like Dewey Lake should result in an increased production of fishes; however, any decision to fertilize any reservoir should receive considerable thought. Although the harvest increased during the fertilization period, the harvest per acre remained below 21 pounds.

The cost of the fertilizer was $12,500 for 20-20-5 in 1967, $7,470 for 21-53-0 in 1968, $7,510 in 1969 and 1970, and $7,724 in 1971 for a total cost of $42,714

for the 5 years. This was an average cost per year of $8,543. Based on the average cost per year and the average sport fishing pressure from 1959 through 1966 versus the average sport fishing pressure for 1968 through 1971, the cost per additional hour of fishing resulting during the fertilization period was approximately $0.20 per hour. Based on the average catch for the pre-fertilization period versus the fertilization period, the average increased number of fish caught cost approximately $0.13 per fish; however, based on additional pounds harvested, they cost approximately $1.29 per pound.

The harvest of smaller fertilized lakes in this area is from 2 to 3 times greater per surface acre than the harvest from Dewey Lake. For this reason and many others, the fertilization of this size or larger reservoir should be weighed against the fertilization of smaller lakes in the area.

RECOMMENDATIONS

Because of the high cost of each additional pound produced, approximately $1.29 per pound, and the higher return on smaller lakes that are fertilized in the same area, it is recommended that the fertilization of Dewey Lake be terminated.

Literature Cited

Beemer, Harold W. and Meyer S. Stotkin. 1970. U. S. Corps of Engineers. Personal communications.

Carter, James P. 1963. Experimental Crappie Removal. Final Report. Ky. Proj. F-21-R. 18 pp.

Charles, James R. 1967. The Dewey Lake (Reservoir) Fisheries During the First Seventeen Years of Impoundment. Ky. Fish. Bull. No. 47. Ky. Dept. of Fish and Wildl. Res. 63 pp.

Herman, M. Leroy, Campbell, Robert S., and Lee C. Redmond. 1969. Manipulation of Fish Populations Through Reservoir Drawdown. Trans. Am. Fish Soc. Vol. 98, No. 2, pp. 293-304.

Hulsey, Andrew H. 1958. A Proposal for the Management of Reservoirs for Fisheries. Proc. Twelfth Ann. Conf. S. E. Association of Game and Fish Commissioners, pp. 132-143.

Pfeiffer, Peter W. 1966. The Results of a Non-uniform Probability Creel Survey on a Small State-Owned Lake. Proc. 20th Ann. Conf. S. E. Assoc. of Game and Fish Commissioners, pp 409-412.

Pierce, P. C., J. E. Frey, and H. M. Yawn. 1963. An Evaluation of Fishery Management Techniques Utilizing Winter Drawdowns. Proc. 17th Ann. Conf. S. E. Association of Game and Fish Commissioners, pp. 347-363.

Prosser, Norville S. 1972. Public Fishing Lakes Fertilization Survey. Va. Comm. Game and Inland Fish. F-20-2. (Study I, Job 1). Job Progress Report. 71 pp.

ACKNOWLEDGMENTS

I wish to thank the Assistant Leader Ray Renaker for both his aid in the field and office. Special thanks are also extended to my past fishery aide, Billy Ellis, and to Summer Aides Ken Davis and Ron Hutchinson. I am grateful to Dalton Conley, Conservation Officer of Floyd County, for conducting the creel survey. I would like to thank the U. S. Corps of Engineers personnel (especially Dean Murray, Reservoir Manager) for their assistance and the use of their barge; they, along with William Broughton, applied the fertilizer. Last, but not least, I would like to thank staff members of the Fisheries Division for their assistance and cooperation throughout the project.

Table 1. Length range in inches for each fish species group within the fingerling, intermediate, and harvestable size groups.

Species	Fingerling	Intermediate	Harvestable
Largemouth bass	0 - 4	5 - 9	10[a]
Spotted bass	0 - 4	5 - 9	10[a]
Black crappie	0 - 4	5 - 7	8
White crappie	0 - 4	5 - 7	8
White bass	0 - 4	5 - 8	9
Channel catfish	0 - 4	5 - 9	10
Flathead catfish	0 - 4	5 - 9	10
Bluegill	0 - 2	3 - 5	6
Longear sunfish	0 - 2	3 - 5	6
Suckers	0 - 4	5 - 11	12
Carp	0 - 4	5 - 11	12
Bullheads	0 - 4	5 - 8	9
Gizzard shad	0 - 3	4 - 7	8
Threadfin shad	0 - 3	4 - 7	8
Forage	0 - 3	4 - 7	8

[a]The minimum length limit of harvestable black bass was reduced from 12 to 10 inches in 1968.

Table 2. Yearly fluctuation in standing crop from 1951 through 1971.

Year	Sample area	Number/acre	Weight/acre	A_{tl} [a]	A_{ts} [b]
1951	2.0	1,778	95	75.9	7.0
1952	5.0	976	60	61.0	9.1
1953	3.5	1,644	99	44.6	17.1
1954	6.6	3,470	181	29.9	14.8
1955	6.6	1,976	73	48.7	30.0
1956	2.5	637	89	72.0	45.9
1957	1.5	1,079	95	65.2	24.3
1958	4.1	3,731	94	24.0	9.4
1959	6.8	4,317	208	27.0	12.3
1960	8.2	2,996	150	24.0	16.0
1961	7.0	3,516	240	35.8	30.0
1962	4.0	3,419	191	32.4	22.7
1963	5.3	1,772	81	70.5	34.0
1964	6.2[c]	4,124	245	26.6	16.7
1965	6.2[c]	4,026	218	21.9	17.5
1966	(No studies were conducted in 1966)				
1967	12.4[c]	2,704	127	41.4	27.6
1968	6.2	3,952	253	51.4	24.0
1969	6.2	5,649	425	56.9	14.9
1970	6.2	26,638	1,191	17.2	11.3
1971	6.2	5,102	347	33.5	28.9

[a] A_{tl} - percentage of the biomass comprised of all fish of harvestable size.

[b] A_{ts} - that portion of the A_t value comprised by species that are normally harvested.

[c] Area size adjusted to 1968 surveyed area.

Table 3. Numbers and weight (lb) of each size group of fish - fingerling (F), intermediate (I), and harvestable (H) - collected during the fish population (rotenone) studies in 1964, 1965, 1967, 1968, 1969, 1970, and 1971 in three coves. Per acre values are for all three coves combined each year.

Size group		Fish per acre							Weight per acre						
		1964	1965	1967	1968	1969	1970	1971	1964	1965	1967	1968	1969	1970	1971
Black bass	F	64	127	42	40	27	521	72	0.4	0.6	0.5	0.5	0.6	0.5	0.4
	I	11	10	13	12	19	14	12	1.3	1.8	2.2	2.8	2.6	2.6	1.8
	H	5	1	3	2	4	6	6	4.9	1.5	2.7	2.7	3.2	6.0	6.3
Crappie	F	38	20	27	182	302	70	29	0.7	0.1	0.3	2.8	7.2	0.7	0.7
	I	92	70	78	106	317	197	48	5.4	5.6	6.1	12.1	16.1	20.9	3.8
	H	6	2	6	12	3	11	11	1.2	0.3	1.9	3.1	0.9	3.0	2.7
Bluegill	F	139	290	120	242	129	5,266	464	0.9	0.8	0.6	1.5	2.2	5.1	0.4
	I	334	179	199	393	538	428	362	12.0	7.9	6.4	20.0	21.5	19.9	19.0
	H	52	44	23	98	106	197	225	8.9	6.6	3.9	16.9	17.1	31.5	34.8
Channel catfish	F	0	0	t	21	1	1	2	0.0	0.0	t	0.4	t	0.1	t
	I	t	0	3	16	81	28	4	0.1	0.0	0.2	1.5	9.3	2.4	0.5
	H	t	1	1	5	5	19	10	0.3	0.9	0.2	4.2	2.5	16.3	6.4
Shad	F	1	45	35	9	32	t	70	t	0.2	0.5	0.2	0.2	t	0.3
	I	3,113	3,028	1,879	2,272	1,749	18,510	2,802	154.5	149.9	54.6	77.8	118.8	930.3	201.1
	H	77	26	84	342	1,372	484	90	24.2	9.6	17.6	69.6	178.5	69.9	16.0
White bass	F	t	1	5	t	0	0	0	t	t	0.1	t	0.0	0.0	0.0
	I	11	t	2	1	2	t	0	1.5	t	0.1	0.2	0.2	t	0.0
	H	1	3	t	1	1	1	t	1.1	2.2	0.2	0.3	0.3	0.9	0.4

Table 3 (continued)

Size group		Fish per acre							Weight per acre						
		1964	1965	1967	1968	1969	1970	1971	1964	1965	1967	1968	1969	1970	1971
Flathead catfish	F	t	t	1	0	0	t	1	t	t	t	0.0	0.0	t	t
	I	t	t	t	1	1	1	t	t	t	t	0.1	0.1	0.2	0.1
	H	t	1	t	1	2	2	2	0.2	0.7	0.2	2.9	2.6	4.7	4.7
Longear sunfish	F	1	0	4	3	4	0	1	t	0.0	t	t	t	0.0	t
	I	16	11	11	21	39	36	34	0.8	0.6	0.5	1.1	2.0	2.4	1.7
	H	t	0	t	1	1	1	2	t	0.0	t	0.1	0.1	0.1	0.2
Suckers	F	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	I	2	2	2	2	2	t	1	0.7	0.9	0.3	0.9	0.9	0.1	0.3
	H	2	4	3	6	2	3	2	1.1	3.8	3.7	6.6	2.6	4.7	2.3
Carp	F	0	0	0	0	0	0	t	0.0	0.0	0.0	0.0	0.0	0.0	t
	I	0	2	t	1	t	t	0	0.0	1.0	0.1	0.1	0.1	0.1	0.0
	H	6	8	6	6	8	12	8	22.1	21.7	21.8	24.0	34.0	67.8	42.1
Bull-heads	F	2	1	0	1	809	805	805	t	t	0.0	t	0.2	0.3	0.1
	I	1	2	t	t	t	0	1	t	0.2	t	t	t	0.0	0.1
	H	1	1	t	0	0	0	1	0.6	0.3	t	0.0	0.0	0.0	0.4
Misc. forage	F	90	116	142	62	30	14	16	0.5	0.5	0.9	0.6	0.2	0.1	0.2
	I	59	33	17	43	28	12	23	1.0	0.5	0.4	0.1	0.7	0.6	3.5
	H	t	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

t < 0.5 fish per acre or 0.05 pounds per acre.

Table 4. Percent of total number and biomass (lb) of each size group of fish - fingerling (F), intermediate (I), and harvestable (H) - collected during the fish population (rotenone) studies conducted in 1964, 1965, 1967, 1968, 1969, 1970, and 1971 in three coves combined.

Size group		Percent of total population							Percent of total biomass						
		1964	1965	1967	1968	1969	1970	1971	1964	1965	1967	1968	1969	1970	1971
Black bass	F	1.6	3.1	1.6	1.0	1.1	2.0	1.4	0.2	0.2	0.4	0.2	0.2	t	0.1
	I	0.3	0.3	0.5	0.3	0.3	0.1	0.2	0.5	0.8	1.7	1.1	0.6	0.4	0.5
	H	0.1	t	0.1	t	0.1	t	0.1	2.0	0.7	3.2	1.1	0.7	0.5	1.8
Crappie	F	0.9	0.5	1.0	4.6	5.3	0.3	1.0	0.3	0.1	0.2	1.1	0.2	0.3	0.2
	I	2.2	1.8	2.9	4.0	5.6	0.7	0.7	2.2	2.5	4.8	4.8	3.8	1.8	1.1
	H	0.1	t	0.2	t	0.1	t	0.2	0.5	0.2	1.5	1.2	0.2	0.2	0.8
Bluegill	F	3.4	7.2	4.4	6.2	2.3	19.8	9.1	0.4	0.4	0.5	0.6	0.5	0.4	0.1
	I	8.1	4.4	7.4	10.0	9.5	1.6	7.1	4.9	3.6	5.0	7.9	5.1	1.7	5.5
	H	1.3	1.1	0.8	2.5	1.9	0.7	4.4	3.6	3.0	3.1	6.7	4.0	2.6	10.0
Channel catfish	F	0.0	t	t	0.5	t	t	t	0.0	t	t	0.1	t	t	t
	I	t	t	0.1	0.4	1.4	0.1	0.1	t	t	0.2	0.6	2.2	0.2	0.1
	H	t	t	t	0.2	0.1	0.1	0.2	0.1	0.4	0.2	1.6	0.6	1.4	1.8
Shad	F	t	1.1	1.3	0.2	0.6	t	1.4	t	0.1	0.3	0.1	t	t	0.1
	I	75.5	75.2	69.5	57.5	31.0	69.5	54.9	63.0	68.7	43.1	30.7	29.7	78.1	57.9
	H	1.9	0.6	3.1	8.7	24.3	1.8	1.8	9.9	4.4	13.9	27.5	42.0	5.9	4.6
White bass	F	t	t	0.2	t	0.0	0.0	0.0	t	t	t	t	0.0	0.0	0.0
	I	0.3	t	t	t	t	t	0.0	0.6	t	t	0.1	t	t	0.0
	H	t	0.1	t	t	t	t	t	0.2	1.0	0.1	0.1	t	0.7	0.1

Table 4 (continued)

Size group		Percent of total population							Percent of total biomass						
		1964	1965	1967	1968	1969	1970	1971	1964	1965	1967	1968	1969	1970	1971
Flathead catfish	F	t	t	t	0.0	0.0	t	t	t	t	t	0.0	0.0	t	t
	I	t	t	t	t	t	t	t	t	t	t	0.1	t	t	t
	H	t	t	t	t	t	t	t	0.1	0.3	0.1	1.1	0.6	0.4	1.4
Longear sunfish	F	t	0.0	0.1	0.1	0.1	0.0	t	t	0.0	t	0.1	t	0.0	t
	I	0.4	0.3	0.4	0.5	0.7	0.1	0.7	0.3	0.3	0.4	0.4	0.5	0.2	0.5
	H	t	0.0	t	t	t	t	t	t	0.0	t	t	t	t	0.1
Suckers	F	t	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	I	t	0.1	t	t	t	t	t	0.3	0.4	0.3	0.3	0.2	t	0.1
	H	t	0.1	0.1	0.1	t	t	t	0.8	1.7	2.9	2.6	0.6	0.4	0.7
Carp	F	0.0	0.0	0.0	0.0	0.0	0.0	t	0.0	0.0	0.0	0.0	0.0	0.0	t
	I	0.0	0.1	t	t	t	t	0.0	0.0	0.5	t	t	t	t	0.0
	H	0.2	0.2	0.2	0.1	0.1	t	0.2	9.0	9.9	17.2	9.5	8.0	5.7	12.1
Bull-heads	F	t	t	0.0	t	14.3	3.2	15.8	t	t	0.0	t	t	t	t
	I	t	0.1	t	t	t	0.0	t	t	t	t	t	t	0.0	t
	H	t	t	t	0.0	0.0	0.0	t	0.2	0.1	t	0.0	0.0	0.0	0.1
Misc. forage	F	2.2	2.8	5.3	1.6	0.5	t	0.3	0.2	0.2	0.7	0.2	0.1	t	0.1
	I	1.4	0.8	0.6	1.1	0.5	t	0.4	0.4	0.3	0.3	t	0.2	0.1	0.1
	H	t	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	t

t < 0.05%.

Table 5. Number and weight (lb) of each size group of fish - fingerling (F), intermediate (I), and harvestable (H) - collected in 1964, 1965, 1967, 1968, 1969, 1970, and 1971 in three coves combined.

Size group		Fish per acre							Weight per acre						
		1964	1965	1967	1968	1969	1970	1971	1964	1965	1967	1968	1969	1970	1971
Game fish	F	103	147	74	222	364	591	101	1.1	0.7	0.9	3.3	8.1	1.3	1.1
	I	114	80	92	173	338	211	60	8.1	7.3	8.4	15.1	19.0	23.5	5.6
	H	12	6	9	14	8	18	17	6.6	4.0	5.2	6.1	4.3	9.8	9.5
Food fish	F	t	t	1	21	1	1	3	t	t	t	0.4	t	0.1	t
	I	1	t	3	16	82	29	5	0.5	t	0.3	1.6	9.4	2.6	0.5
	H	1	2	1	6	6	21	13	0.8	1.8	0.4	6.9	5.2	21.0	11.0
Panfish	F	140	290	124	244	133	5,266	464	0.9	0.8	0.6	1.6	2.0	5.1	0.5
	I	350	190	210	414	578	463	396	12.7	8.5	6.9	21.0	23.5	22.3	20.7
	H	52	44	23	99	107	197	227	8.9	6.6	3.9	17.0	17.2	31.6	35.0
Commercial fish	F	2	1	0	1	809	805	805	t	t	0.0	t	0.2	0.3	0.1
	I	2	5	2	3	2	1	2	0.8	2.1	0.4	1.0	1.1	0.2	0.5
	H	9	13	9	11	10	15	10	24.7	25.8	25.5	30.6	36.8	72.5	44.7
Forage fish	F	90	161	177	70	62	14	86	0.5	0.7	1.4	0.7	0.4	0.1	0.6
	I	3,171	3,060	1,895	2,315	1,776	18,986	2,824	155.6	150.5	55.0	78.2	119.5	930.9	201.4
	H	77	26	84	342	1,372	484	90	24.6	9.6	17.6	69.6	178.5	69.9	16.0
Total		4,124	4,026	2,704	3,952	5,649	26,638	5,102	245.1	217.9	126.5	253.0	425.2	1,191.2	347.0

t < 0.5 fish per acre or 0.05 pounds per acre.

Table 6. Percent of the total population and biomass (lb) of each size group of fish - fingerling (F), intermediate (I), and harvestable (H) - collected in 1964, 1965, 1967, 1968, 1969, 1970, and 1971 in three coves combined.

Size group		Percent of total population							Percent of total biomass						
		1964	1965	1967	1968	1969	1970	1971	1964	1965	1967	1968	1969	1970	1971
Game fish	F	2.5	3.7	2.7	5.6	6.4	2.2	2.0	0.5	0.3	0.7	1.3	1.9	0.1	0.3
	I	2.8	2.0	3.4	4.4	6.0	0.8	1.2	3.3	3.4	6.6	6.0	4.5	2.0	1.6
	H	0.3	0.2	0.3	0.4	0.1	0.1	0.3	2.7	1.8	4.1	2.4	1.0	0.8	2.7
Food fish	F	t	t	t	0.5	t	t	t	t	t	t	0.1	t	t	t
	I	t	t	0.1	0.4	1.4	0.1	0.1	t	t	0.2	0.6	2.2	0.2	0.1
	H	t	t	t	t	0.1	0.1	0.2	0.2	0.8	0.3	2.7	1.2	1.8	3.2
Panfish	F	3.4	7.2	4.6	6.2	2.4	19.8	9.1	0.4	0.4	0.5	0.6	0.5	0.4	0.1
	I	8.5	4.7	7.8	10.5	10.2	1.7	7.8	5.2	3.6	5.4	8.3	5.5	1.9	6.0
	H	1.3	1.1	0.8	2.5	1.9	0.7	4.4	3.6	3.0	3.1	6.7	4.0	2.6	10.1
Commercial fish	F	t	t	0.0	t	14.3	3.0	15.8	t	t	0.0	t	t	t	t
	I	t	0.1	0.1	0.1	t	t	t	0.2	1.0	0.3	0.4	0.3	t	0.1
	H	0.2	0.3	0.3	0.3	0.2	t	0.1	10.1	11.9	20.2	12.1	8.7	6.1	12.9
Forage fish	F	2.2	4.0	6.6	1.8	1.1	0.1	1.7	0.2	0.3	1.1	0.3	0.1	t	0.2
	I	76.9	76.0	70.1	58.6	31.4	69.5	55.4	63.5	68.9	43.4	30.9	28.1	78.2	58.0
	H	1.9	0.6	3.1	8.6	24.3	1.8	1.8	10.0	4.4	13.9	27.5	42.0	5.9	4.6

t < 0.05%.

Table 7. Number of black bass collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

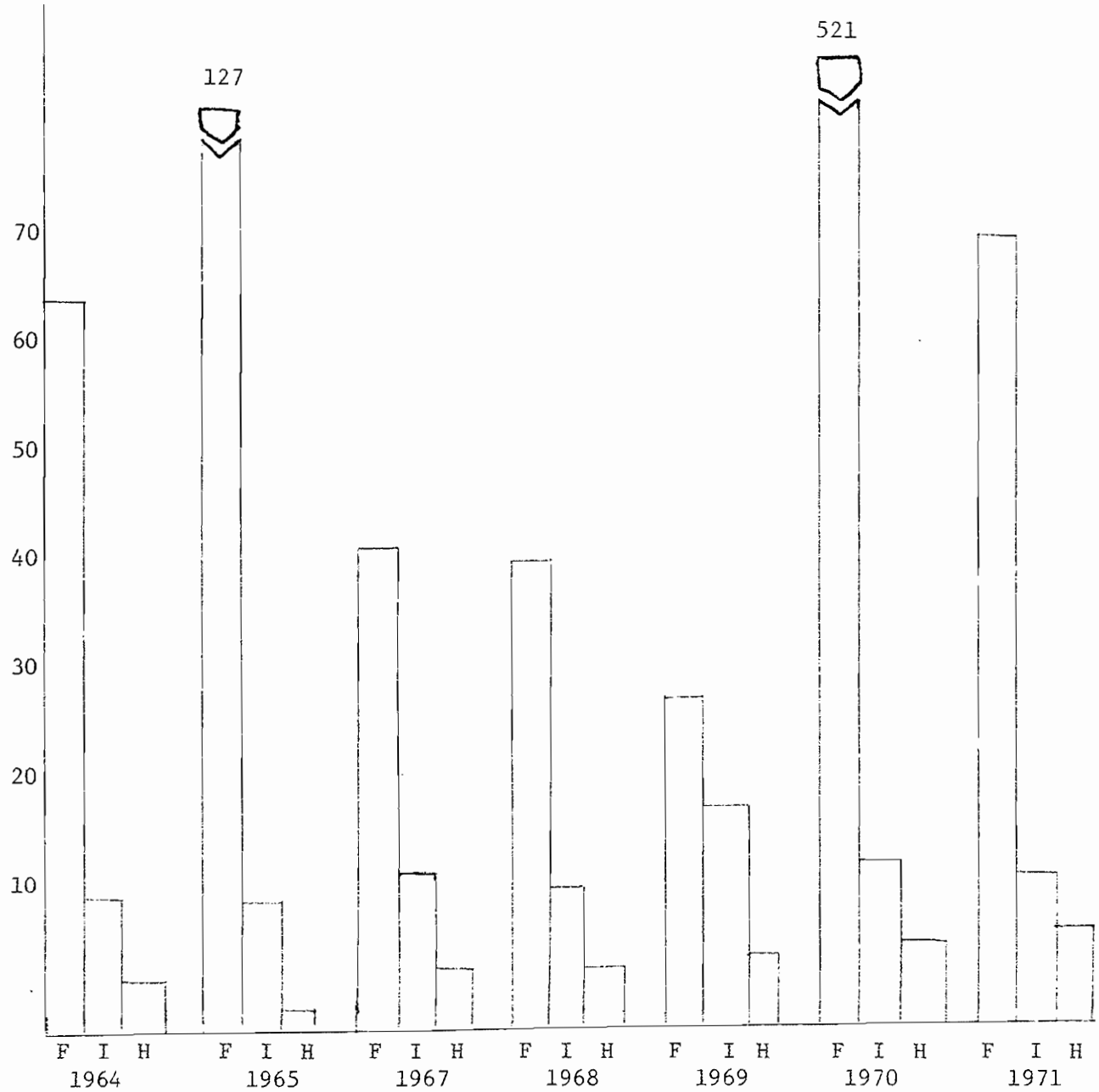

Table 8. Weight (lb) of black bass collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

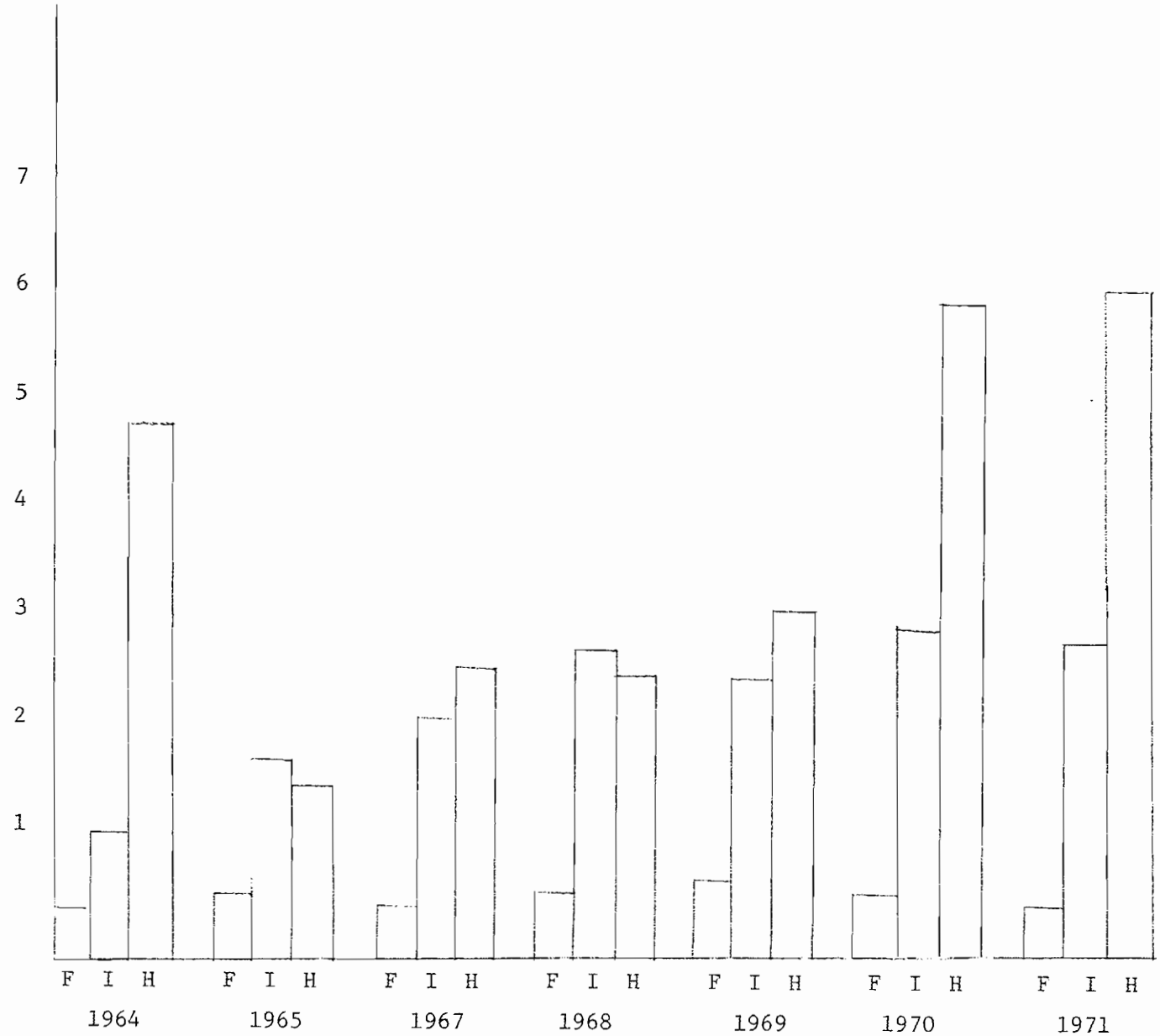

Table 9. Number of crappie collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

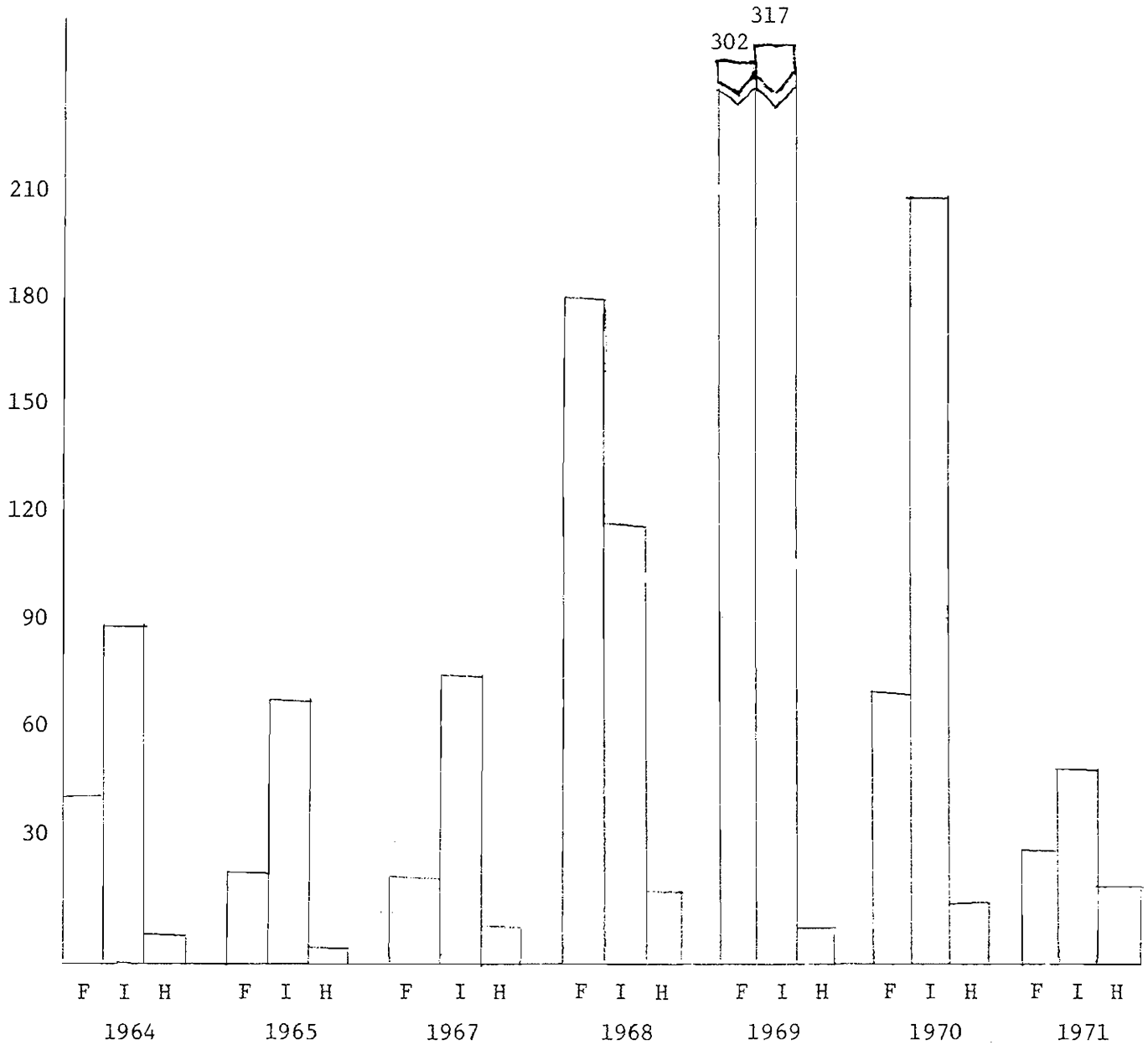

Table 10. Weight (lb) of crappie collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

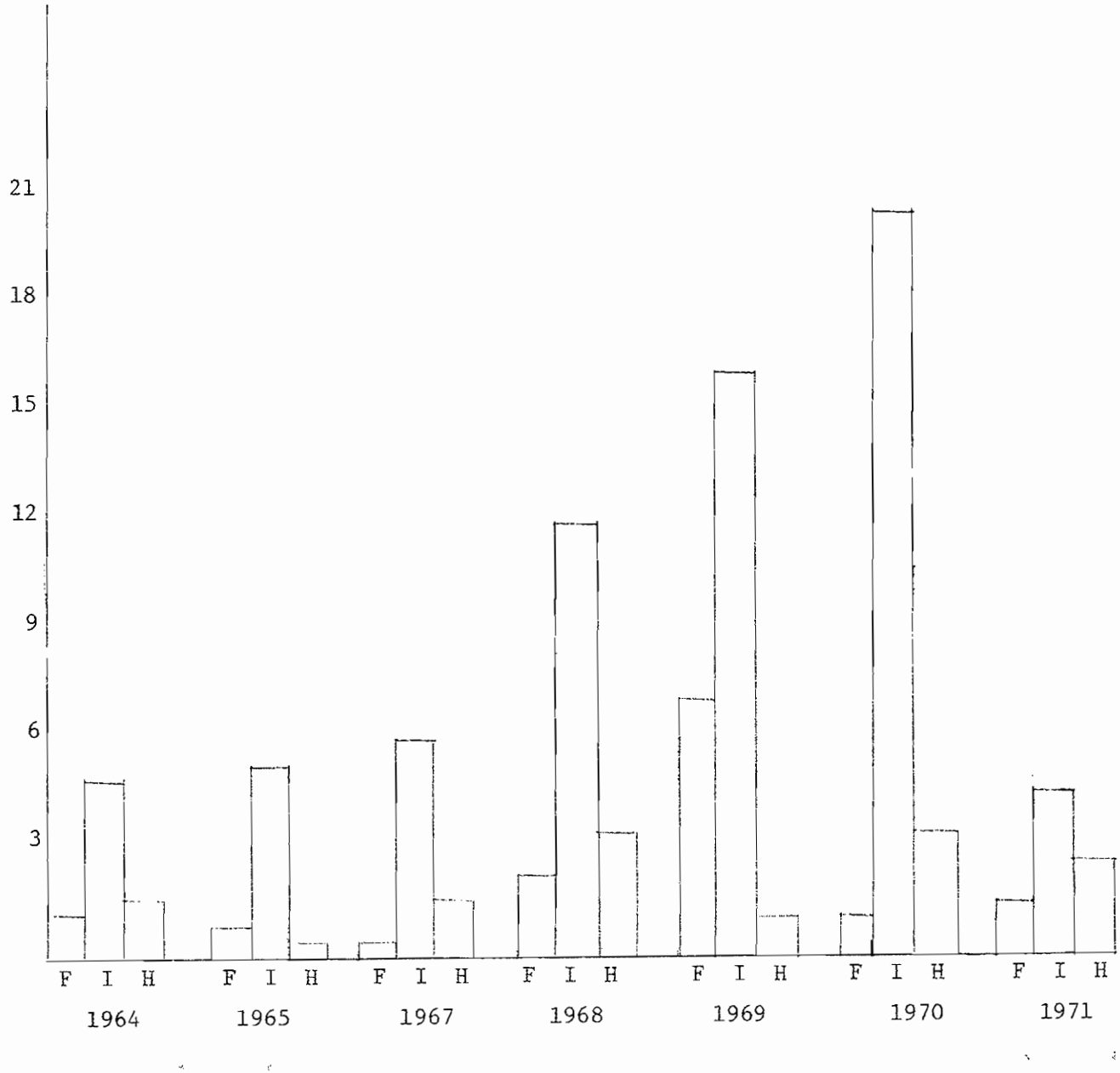

Table 11. Number of sunfish collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

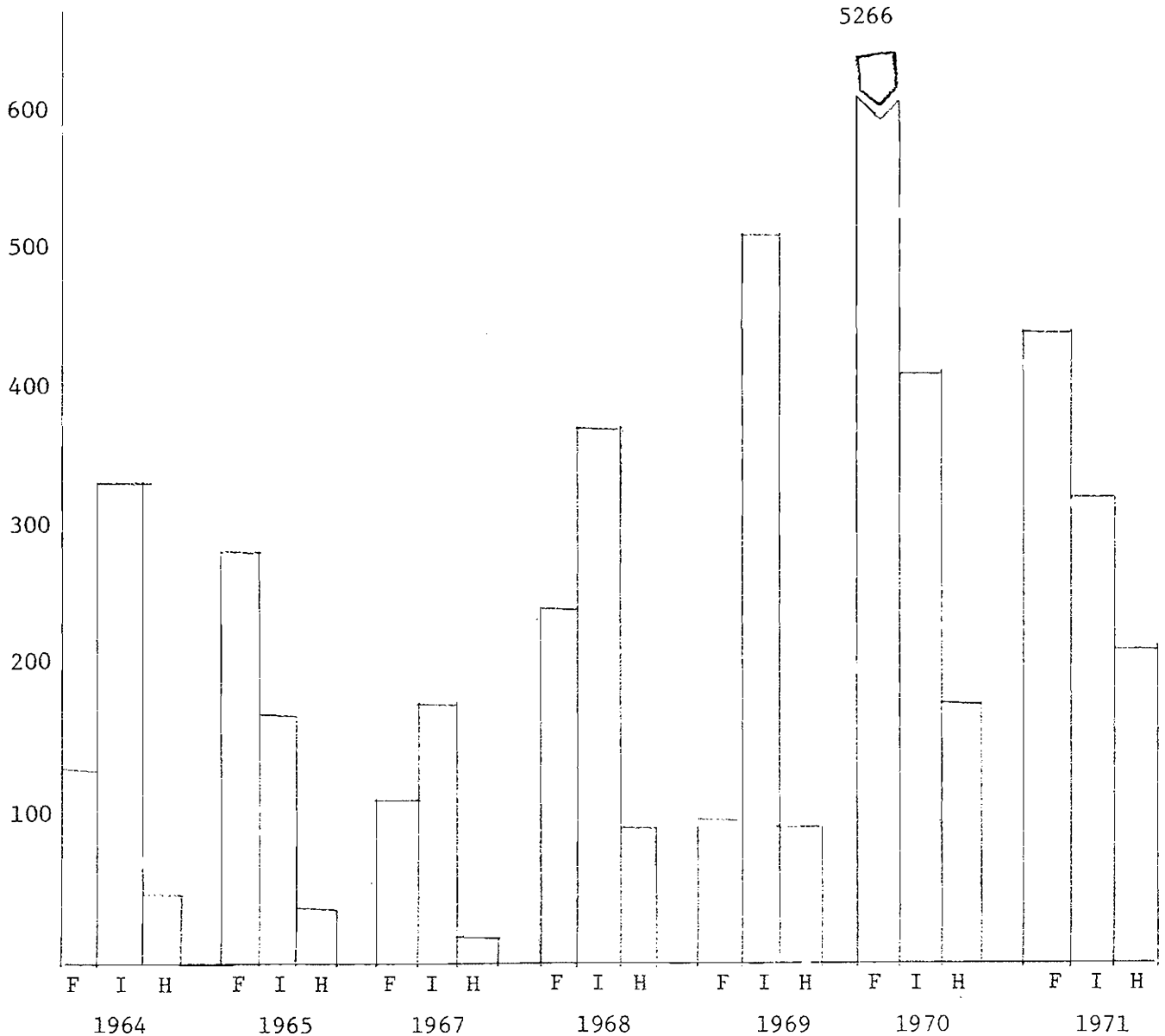

Table 12. Weight (lb) of bluegill collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

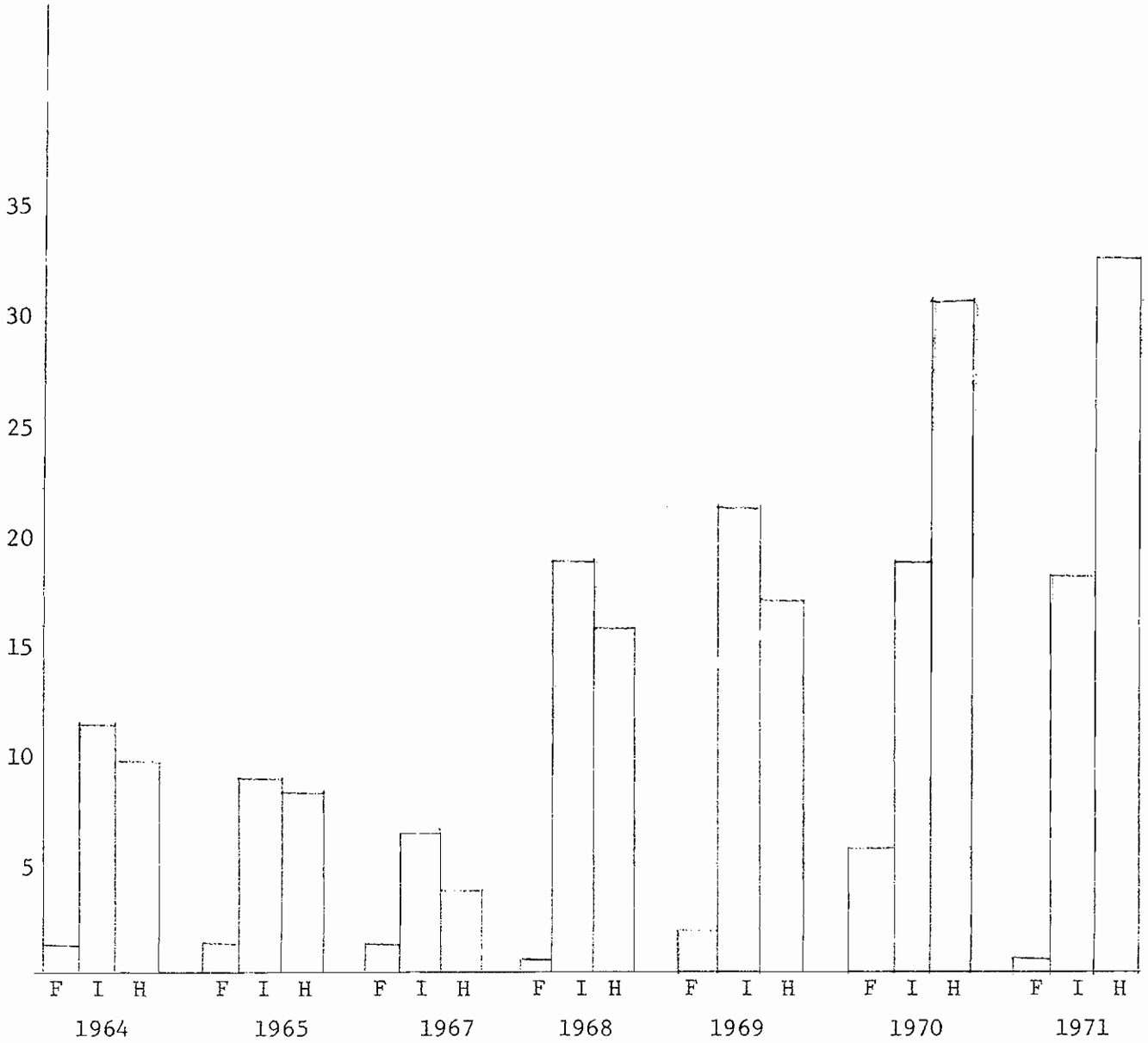

Table 13. Number of channel catfish collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

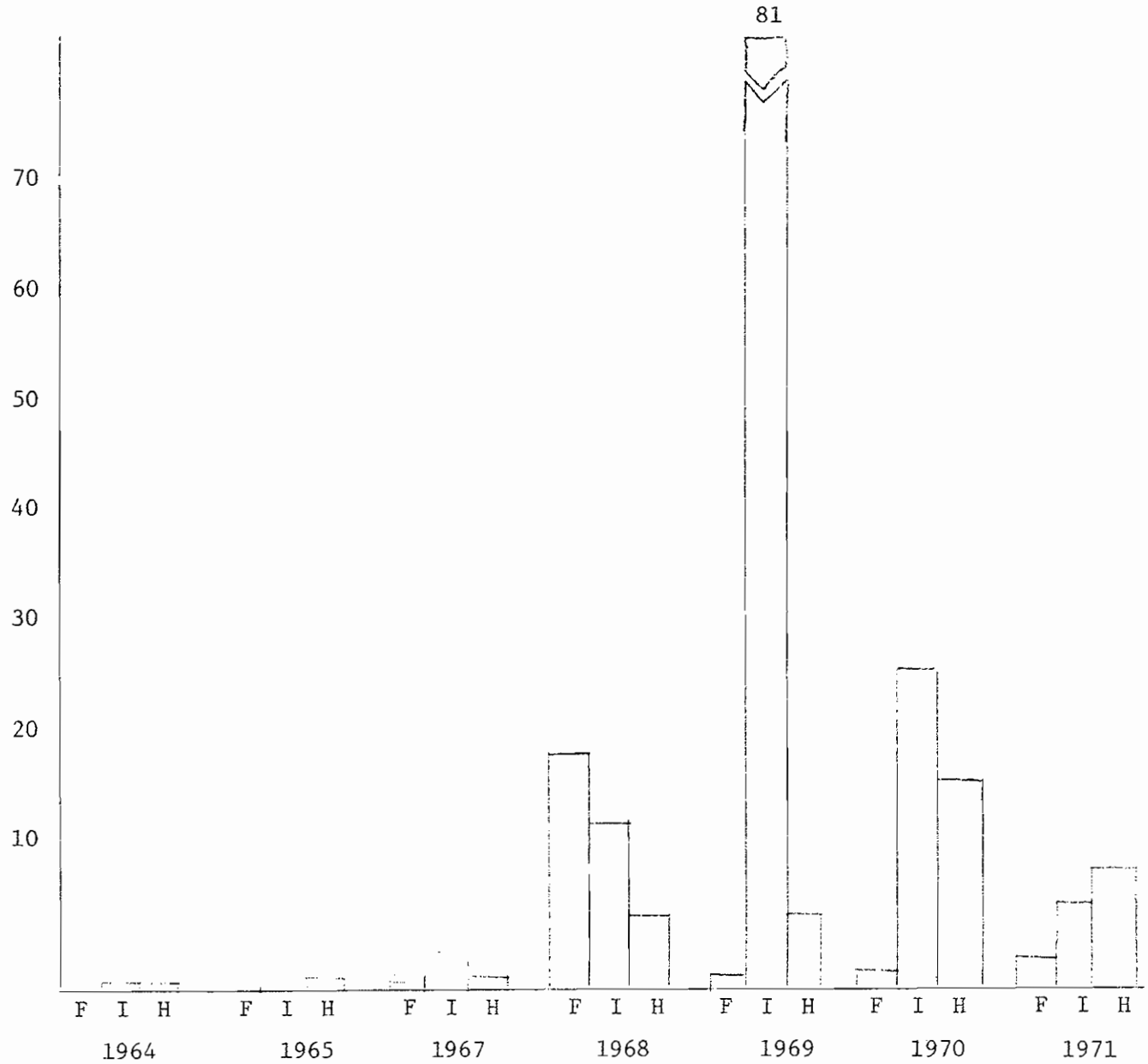

Table 14. Weight (lb) of channel catfish collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

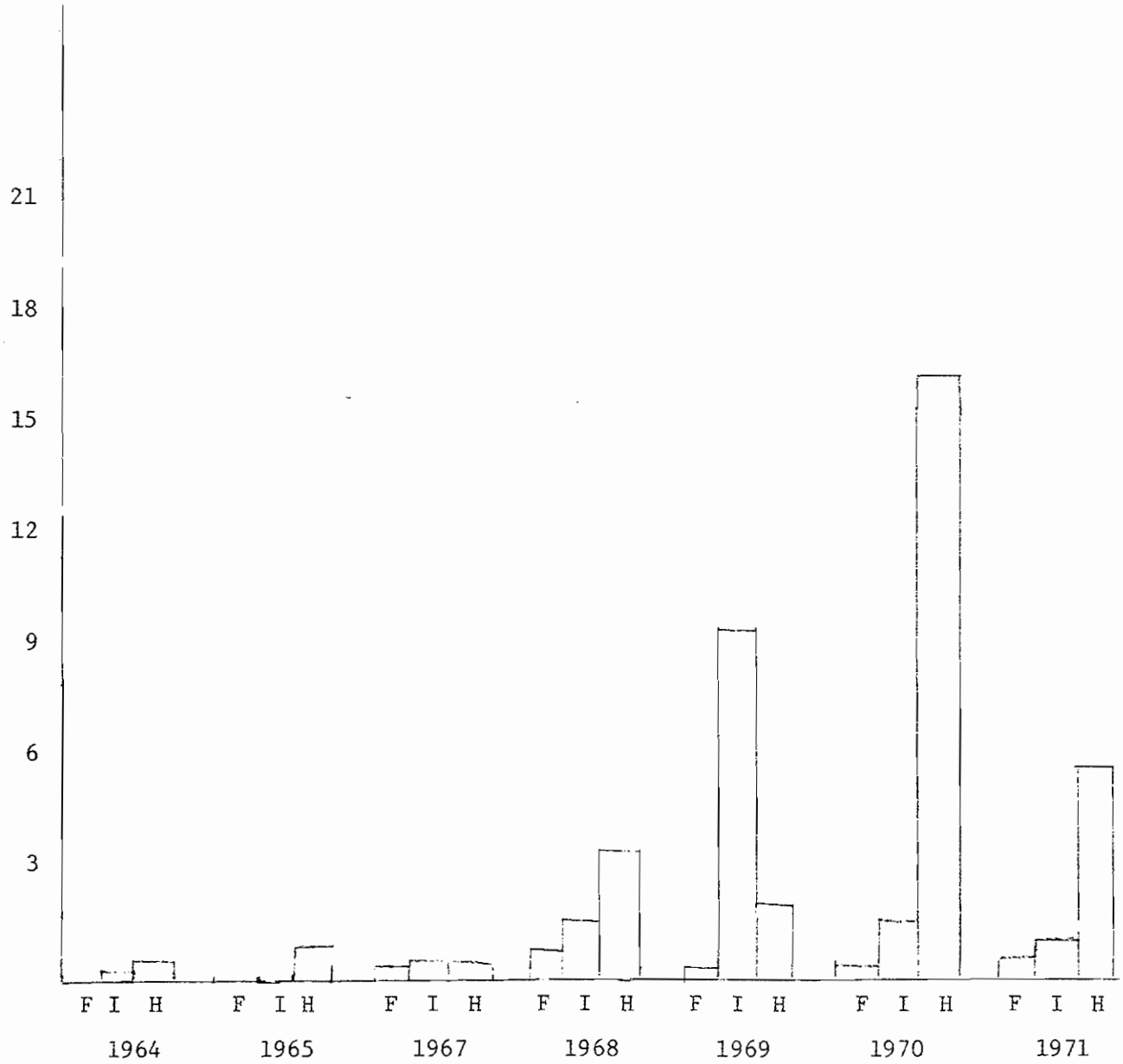

Table 15. Number of gizzard shad collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

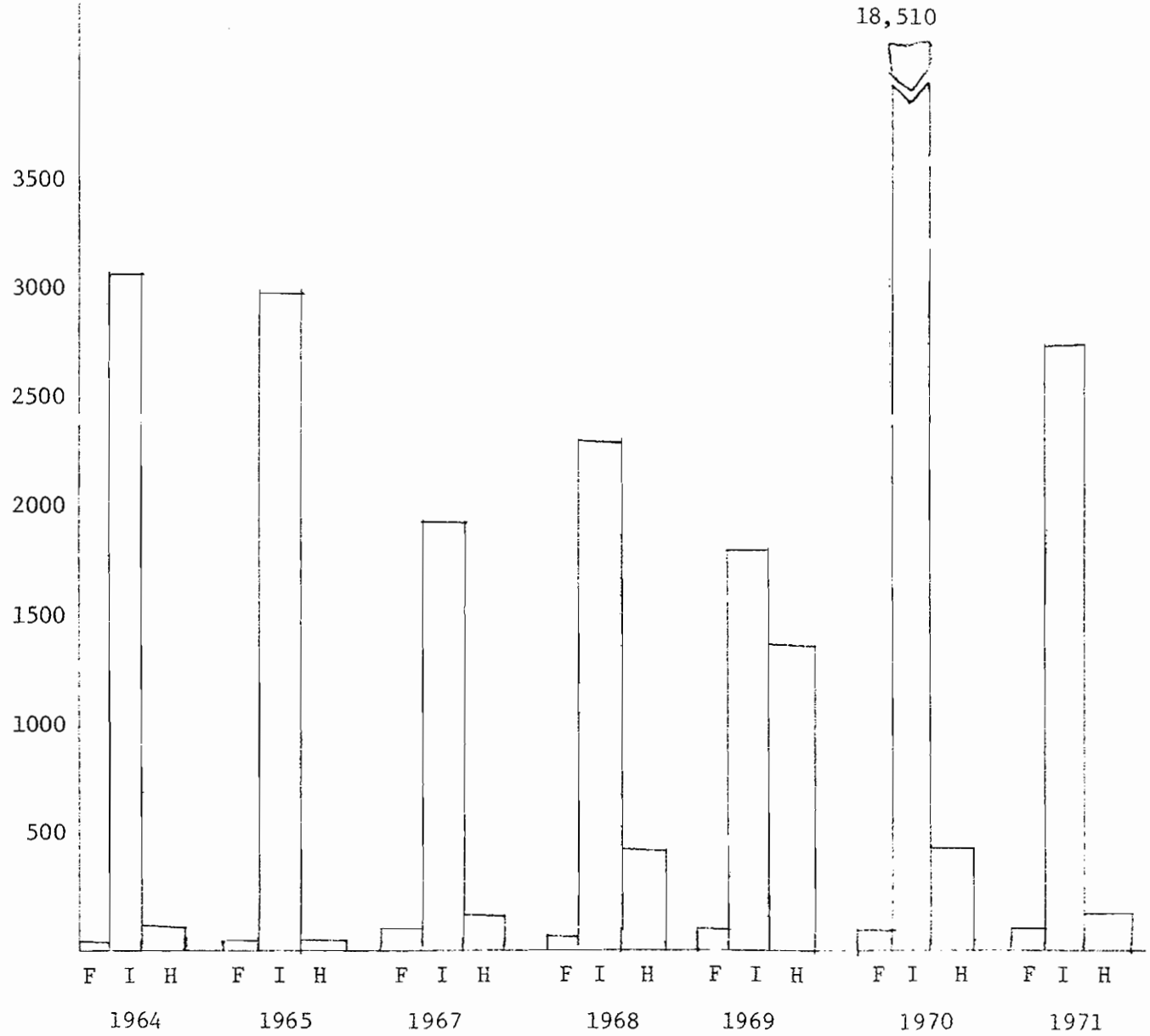

Table 16. Weight (lb) of gizzard shad collected per acre each year in fingerling (F), intermediate (I), and harvestable (H) size groups.

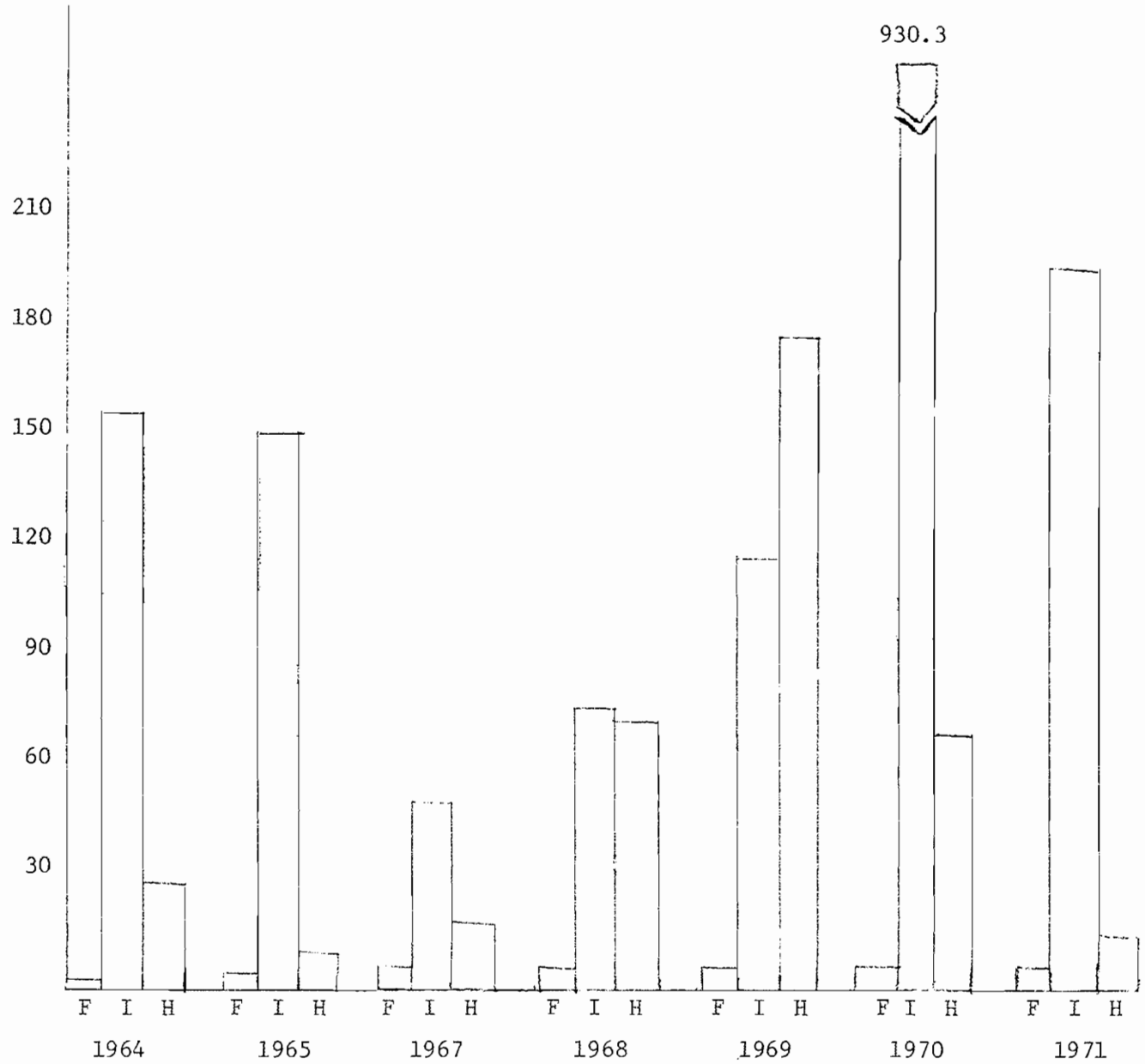

Table 17. Sport fishing pressure and harvest at Dewey Reservoir from April through October from 1959 through 1971.

Year	Fishing trips	Pressure per acre	Harvest				
			Fish	No/acre	Pounds	Lbs/acre	Fish/hour
1959	64,210	58	49,850	45	10,212	9.3	0.76
1960	65,644	60	85,337	78	18,379	16.7	1.30
1961	43,866	40	36,847	33	9,519	8.7	0.84
1962	62,958	57	54,773	50	11,272	10.2	0.87
1963	55,512	50	37,193	34	11,966	10.9	0.67
1964	61,190	56	42,833	39	10,402	9.5	0.70
1965	57,475	52	53,493	49	11,170	10.2	0.93
1966	45,008[a]	41	38,619	35	8,323	7.6	0.86
1968	87,482	80	97,293	88	19,612	17.8	1.11
1969	110,547[a]	100	131,391	119	22,784	20.7	1.19
1970	110,362[a]	100	137,930	125	19,941	18.1	1.25
1971	90,670[a]	82	88,846	81	9,868	9.0	0.98

[a]Includes month of March.

Table 18. Monthly sport fishing harvest at Dewey Reservoir from March through October 1968.

Month	Man-hours	% of total hours	Fish	% of total fish no.	Pounds	% of total weight	Wt/fish	Catch/hr
March	3,311	3.8	12,179	12.5	2,338	11.9	0.19	3.68
April	10,586	12.1	15,200	15.6	3,912	20.0	0.26	1.44
May	16,293	18.6	26,349	27.1	5,504	28.1	0.21	1.62
June	22,114	25.3	18,986	19.5	2,850	14.5	0.15	0.86
July	12,945	14.8	3,045	3.1	465	2.4	0.15	0.24
August	4,633	5.3	1,971	2.0	532	2.7	0.27	0.43
September	10,940	12.5	12,179	12.5	2,781	14.2	0.23	1.11
October	6,660	7.6	7,384	7.6	1,229	6.3	0.17	1.11
Total	87,482	100.0	97,293	100.0	19,612	100.0	0.20	1.11

Table 19. Monthly fishing pressure and sport fishing harvest at Dewey Reservoir during 1969.

Month	Man-hours	% of total hours	Fish	% of total fish no.	Pounds	% of total weight	Wt/fish	Catch/hr
March	966	0.87	1,816	1.38	134.05	0.59	0.07	1.88
April	28,639	25.91	50,652	38.55	6,719.66	29.49	0.13	1.77
May	25,984	23.50	42,857	32.62	7,334.08	32.19	0.17	1.65
June	24,646	22.29	23,379	17.79	5,238.14	22.99	0.22	0.95
July	7,355	6.65	1,625	1.24	804.73	3.53	0.50	0.22
August	5,481	4.96	1,378	1.05	457.68	2.01	0.33	0.25
September	11,224	10.15	7,109	5.41	1,592.10	6.99	0.22	0.63
October	6,252	5.66	2,575	1.96	503.29	2.21	0.20	0.41
Total	110,547	100.00	131,391	100.00	22,783.73	100.00	0.17	1.19

Table 20. Monthly fishing pressure and sport fishing harvest at Dewey Reservoir during 1970.

Month	Man-hours	% of total hours	Fish	% of total fish no	Pounds	% of total weight	Wt/fish	Catch/hr
March	1,485	1.4	737	0.5	119.98	0.6	0.16	0.50
April	11,506	10.4	10,989	8.0	1,568.10	7.9	0.14	0.96
May	22,307	20.2	44,732	32.4	4,928.72	24.7	0.11	2.01
June	17,073	15.5	20,630	15.0	3,539.55	17.8	0.17	1.21
July	22,442	22.2	25,262	18.3	4,129.26	20.7	0.16	1.03
August	10,356	9.4	7,813	5.7	2,000.82	10.0	0.26	0.75
September	10,375	9.4	12,926	9.4	2,032.30	10.2	0.16	1.25
October	12,818	11.6	14,841	10.8	1,622.51	8.1	0.11	1.16
Total	110,362	100.0	137,930	100.0	19,941.24	100.0	0.15	1.25

Table 21. Monthly fishing pressure and sport fishing harvest at Dewey Reservoir during 1971.

Month	Man-hours	% of total hours	Fish	% of total fish no	Pounds	% of total weight	Wt/fish	Catch/hr
March	2,662	2.9	2,265	2.5	231.57	2.3	0.10	0.85
April	14,746	16.3	27,005	30.4	2,592.27	26.3	0.10	1.83
May	21,487	23.7	21,714	24.4	1,851.74	18.8	0.09	1.01
June	15,430	17.0	22,021	24.8	2,297.03	23.3	0.10	1.43
July	9,986	11.0	4,694	5.3	630.60	6.4	0.13	0.47
August	7,590	8.4	4,256	4.8	779.76	7.9	0.18	0.56
September	3,785	4.2	2,563	2.9	488.87	5.0	0.19	0.68
October	14,984	16.5	4,328	4.9	996.34	10.1	0.23	0.29
Total	90,670	100.0	88,846	100.0	9,868.18	100.0	0.11	0.98

Table 22. Sport fishing harvest by fish species or group specified by anglers, including hours fished, specific species harvest, total harvest, and percent of the yearly total.

Angler preference		1968		1969		1970		1971	
		Harvest	%	Harvest	%	Harvest	%	Harvest	%
White bass (WB)	Hr	158	0.18	152	0.14	26	0.02	0	0.00
	WB	51	0.05	0	0.00	0	0.00	0	0.00
	Wt	19.76	0.10	0.00	0.00	0.00	0.00	0.00	0.00
	Total fish	51	0.05	0.00	0.00	0	0.00	0.00	0.00
	Wt	19.76	0.10	0.00	0.00	0.00	0.00	0.00	0.00
Black bass (BB)	Hr	14,331	16.38	16,768	15.18	14,100	12.78	7,149	7.88
	BB	988	1.02	2,863	2.18	1,223	0.89	593	0.67
	Wt	1,965.84	10.02	4,481.80	19.68	1,835.01	9.20	827.28	8.38
	Total fish	2,641	2.71	3,273	2.49	4,101	2.97	980	1.10
	Wt	2,697.36	13.75	4,642.32	20.38	2,719.83	13.64	858.62	8.70
Crappie (CR)	Hr	21,480	24.55	17,992	16.28	11,567	10.48	9,559	10.54
	CR	47,749	49.08	42,091	32.03	25,128	18.22	17,884	20.13
	Wt	7,588.33	38.69	5,586.97	24.52	2,318.02	11.62	1,598.50	16.20
	Total fish	48,635	49.99	42,546	32.38	25,657	18.60	17,974	20.23
	Wt	7,650.93	39.01	5,798.52	25.45	2,424.48	12.16	1,608.37	16.30

Table 22 (continued)

Angler preference		1968		1969		1970		1971	
		Harvest	%	Harvest	%	Harvest	%	Harvest	%
Panfish (PF)	Hr	4,355	4.98	16,168	14.63	16,124	14.61	10,136	11.18
	PF	7,223	7.42	26,878	20.46	27,118	19.66	20,861	23.48
	Wt	958.91	4.89	2,913.93	12.79	3,394.17	17.02	1,936.03	19.62
	Total fish	7,906	8.13	27,572	20.98	28,518	20.68	22,807	25.67
	Wt	1,116.04	5.69	3,358.56	14.74	4,011.01	20.11	2,235.71	22.66
Catfish (CF)	Hr	0	0.00	713	0.64	1,339	1.21	1,236	1.36
	CF	0	0.00	73	0.06	148	0.11	62	0.07
	Wt	0.00	0.00	176.28	0.77	87.82	0.44	6.52	0.07
	Total fish	0	0.00	73	0.06	413	0.30	284	0.32
	Wt	0.00	0.00	176.28	0.77	109.07	0.55	22.04	0.22
Anything	Hr	46,640	53.31	58,736	53.13	67,065	60.77	61,872	68.24
	Fish	38,060	39.12	57,927	44.09	79,241	57.45	46,801	52.68
	Wt	8,127.91	41.44	8,808.05	38.66	10,676.85	53.54	5,143.44	52.12
Total	Hr	87,482		110,547		110,362[a]		90,670	
	Fish	97,293		131,391		137,930		88,846	
	Wt	19,612.00		22,783.73		19,941.24		9,868.18	

[a]Includes 108 hours fished for carp with no catch.

Table 23. Catch per hour for fish species or group sought by anglers and catch per hour of all fish caught by anglers seeking specified fish (in italics).

Species	1968	1969	1970	1971
White bass	0.32	0.00	0.00	0.00
	0.32	*0.00*	*0.00*	*0.00*
Black bass	0.07	0.17	0.09	0.08
	0.18	*0.20*	*0.29*	*0.14*
Crappie	2.22	2.34	2.17	1.87
	2.26	*2.36*	*2.22*	*1.88*
Panfish	1.66	1.66	1.68	2.06
	1.82	*1.71*	*1.77*	*2.25*
Catfish	0.00	0.10	0.11	0.05
	0.00	*0.10*	*0.31*	*0.23*
Anything	0.82	0.99	1.18	0.76
Total	1.11	1.19	1.25	0.98

Table 24. Percent of the total harvest of each species caught by those anglers specifiying that species, including numbers and weight (in italics) of each group.

Species	1968	1969	1970	1971
White bass	2.51	0.00	0.00	0.00
	1.94	*0.00*	*0.00*	*0.00*
Black bass	84.44	64.43	58.71	68.00
	83.06	*83.68*	*75.51*	*80.59*
Crappie	76.32	80.27	48.15	54.10
	82.39	*72.65*	*56.16*	*49.87*
Panfish	23.97	37.42	35.77	39.27
	32.62	*37.26*	*42.89*	*41.75*
Catfish	0.00	2.85	1.91	3.45
	0.00	*10.94*	*1.99*	*0.65*

Table 25. Total sport fishing harvest for 1965, 1966, 1968, 1969, 1970, and 1971, including number and weight (lb) of each group harvested and the percent of the total (in italics) of each group.

Fish species or group	1965		1966		1968		1969		1970		1971	
	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt	No	Wt
White bass	231 *0.4*	194 *1.7*	27 *0.1*	7 *0.1*	2,032 *2.1*	1,018.75 *5.2*	66 *0.1*	25.74 *0.1*	0 *0.0*	0.00 *0.0*	0 *0.0*	0.00 *0.0*
Black bass	1,068 *2.0*	1,902 *17.0*	1,328 *3.4*	3,302 *39.7*	1,170 *1.2*	2,366.84 *12.1*	4,310 *3.3*	5,356.09 *23.5*	2,083 *1.5*	2,430.27 *12.2*	872 *1.0*	1,026.51 *10.4*
Crappie	30,990 *57.9*	3,780 *33.8*	24,868 *64.4*	2,486 *29.9*	62,561 *64.3*	9,209.73 *47.0*	52,435 *39.9*	7,690.18 *33.8*	52,185 *37.8*	4,127.83 *20.7*	33,060 *37.2*	3,205.21 *32.5*
Panfish	18,690 *34.9*	1,731 *15.5*	11,700 *30.3*	1,422 *17.1*	30,138 *31.0*	2,939.99 *15.0*	71,834 *54.7*	7,820.34 *34.3*	75,812 *55.0*	7,913.23 *39.7*	53,116 *59.8*	4,637.10 *47.0*
Channel catfish	704 *1.3*	599 *5.4*	166 *0.4*	154 *1.9*	638 *0.7*	666.95 *3.4*	2,473 *1.9*	1,600.38 *7.0*	6,048 *4.4*	3,882.00 *19.5*	1,254 *1.4*	901.18 *9.1*
Bullheads	0 *0.0*	0 *0.0*	50 *0.1*	18 *0.2*	0 *0.0*	0.00 *0.00*	0 *0.00*	0.00 *0.00*	1,681 *1.2*	535.84 *2.7*	544 *0.6*	98.18 *1.0*
Flathead catfish	128 *0.2*	58 *0.5*	73 *0.2*	44 *0.5*	40 *t*	3.23 *t*	88 *0.1*	11.38 *0.1*	0 *0.0*	0.00 *0.0*	0 *0.0*	0.00 *0.0*
Carp	1,589 *3.0*	2,819 *25.2*	377 *1.0*	861 *10.3*	714 *0.7*	3,406.51 *17.4*	185 *0.1*	279.62 *1.2*	121 *0.1*	1,052.07 *5.3*	0 *0.0*	0.00 *0.0*
Other	93 *0.2*	87 *0.8*	30 *0.1*	29 *0.3*	0 *0.0*	0.00 *0.0*	0.0 *0.0*	0.00 *0.0*	0 *0.0*	0.00 *0.0*	0 *0.0*	0.00 *0.0*
Total	59,493	11,170	38,619	8,323	97,293	19,612.00	131,391	22,783.73	137,930	19,941.24	88,846	9,868.18

Table 26. Angler characteristics, fishing methods, and angler success expressed in percent of the total.

	1965	1966	1968	1969	1970	1971
Male	87.3	8.26	87.2	86.9	82.2	80.9
Female	12.7	17.4	12.8	13.1	17.8	19.1
Resident	91.4	92.4	93.0	94.2	92.3	97.5
Non-resident	8.6	7.6	7.0	5.8	7.7	2.5
Still fishing	74.8	76.7	74.6	67.8	78.8	83.1
Casting	19.6	19.9	14.5	24.3	14.2	12.8
Fly fishing	0.2	0.2	3.7	3.5	4.4	3.0
Trolling	4.5	1.7	6.4	3.6	2.0	0.8
Jig fishing	0.8	1.5	-	0.4	0.4	0.3
Trotline	-	-	0.8	0.4	0.2	-
Successful	41.5	37.4	42.2	43.1	48.4	40.7
Unsuccessful	58.5	62.6	57.8	56.9	51.6	59.3
Bank	-	43.1	40.4	54.4	53.4	65.4
Boat	-	56.9	59.6	45.6	46.6	34.6