Fishery Management Report

Mathes Lake
Iowa Army Ammunition Plant
Middletown, Iowa

Louise Mauldin and Jim Milligan
US Fish and Wildlife Service
Columbia Fishery Resources Office

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INTRODUCTION

The US Fish and Wildlife Service has worked cooperatively with IAAP for over 25 years providing a sound resource management program for the IAAP fishery. The role of the Columbia Fishery Resources Office (CFRO) includes the collection and analysis of data and fisheries management technical assistance. CFRO provides recommendations on fish regulations, habitat management, and fish stocking, to continue to maintain, conserve, and develop fishery resources at IAAP.

Fishery surveys were conducted annually from 1992 to 1997 at Mathes Lake and thereafter conducted semi-annually. Sample periods were one or two days in duration and conducted usually in April or May, although sampling has been conducted in June and July. The most recent fishery survey was conducted in April of 2001. The following report describes the results of the 2001 survey, discusses the aspects of the fishery over the past decade and outlines recommendations for improvement of the IAAP fishery.

Over the last decade nineteen species have been documented in Mathes Lake at one time or another from stocking, angler harvest, or by CFRO collection (Table 1). The lake provides an excellent sport fishery for bluegill, white crappie, largemouth bass, channel catfish, and occasionally large walleye and trophy flathead catfish are caught.

Tabel 1. Mathes Lake fish community list arranged phylogenetically by family and species.

Code	**Species**	**Scientific name**
GZS	Gizzard shad	*Dorosoma cepedianum*
GRC	Grass carp	*Ctenopharyngodon idella*
RES	Red shiner	*Cyprinella lutrensis*
CAP	Common carp	*Cyprinus carpio*
GOS	Golden shiner	*Notemigonus crysoleucas*
WHS	White sucker	*Catostomus catostomus*
YLB	Yellow bullhead	*Ameiurus natalis*
CCF	Channel catfish	*Ictalurus punctatis*
FCF	Flathead catfish	*Pylodictus olvaris*
STB	Striped bass	*Morone saxatillis*
GSF	Green sunfish	*Lepomis cyanellus*
PKS	Pumpkinseed	*Lepomis gibbosus*
BLG	Bluegill	*Lepomis macrochirus*
RDS	Redear sunfish	*Lepomis microlophus*
BLGxGSF	Hybrid	*Lepomis macrochirus x cyanellus*
SMB	Smallmouth bass	*Micropterus dolomieu*
LMB	Largemouth bass	*Micropterus salmoides*
WHC	White crappie	*Pomoxis annularis*
BLC	Black crappie	*Pomoxis nigromaculatus*
WAE	Walleye	*Stizostedion vitreum*

METHODS

Gill nets, electrofishing, and 2x4 ft fyke nets have been used in the past to survey the Mathes Lake fish community. In 2001, the inshore community of Mathes Lake was sampled using a Pulse DC, boom mounted electrofishing boat (500 volts, 10 amps, 60 pulses/second). Four electrofishing runs were made throughout the lake on April 24, 2001(Figure 1). Fyke nets and gill nets were not deployed in this survey. All fish collected in the survey were identified, weighed (g) and measured (mm). Scale samples have been removed from crappie in previous surveys to provide information on age structure and growth of the population. Scale samples were removed from 7 black crappie and 44 white crappie in the current survey.

Several indices were used to determine the predator:prey balance and health of the Mathes Lake fish community. Proportional stock density, relative stock density and average relative weight for each size class were determined (Flickinger and Bulow, 1993) for largemouth bass, bluegill, white crappie, and common carp. The three indices are described below:

Proportional Stock Density (PSD) is a measure of the size structure of a population. It is an index of community balance based upon rates of reproduction, recruitment, growth, and mortality. It also represents the percentage of fish that are attractive to an angler. The higher the percentage, the greater the proportion of large fish. PSD is calculated by dividing the number of fish $\geq$ quality size by the number of fish $\geq$ stock size X 100. Sizes are based on percentages of world record length. This standardization allows for the discussion of different water bodies from different regions. The maximum lengths for minimum stock (S), quality (Q), preferred (P), memorable (M), and trophy (T) sizes are identified for individual fish species in graphs found further in this report.

Relative Stock Density (RSD) is the proportion of fish of any designated size group of fish. RSD is generally followed by a subscript indicating the size group (P,M,T) or by the minimum length considered in parentheses. All references to RSD in this report are RSD_P, or relative stock density of fishes in the preferred size groups unless otherwise specified.

Relative Weight (Wr) is a measure of body condition. The measured weight of a fish is compared to an established standard weight of a fish the same length. Wr values greater than 100 indicate the individual fish weighs more than the standard weight. The preferred or target range of Wr values is 90-110. Mean Wr values close to 100 indicate fish populations or cohorts are in balance with their food supply. Fish with Wr values less than 85 are underweight, while fish with Wr values greater than 110 are overweight. Either of these extremes indicates that predator:prey ratios are not balanced and that there may be a problem with food supply or water quality.

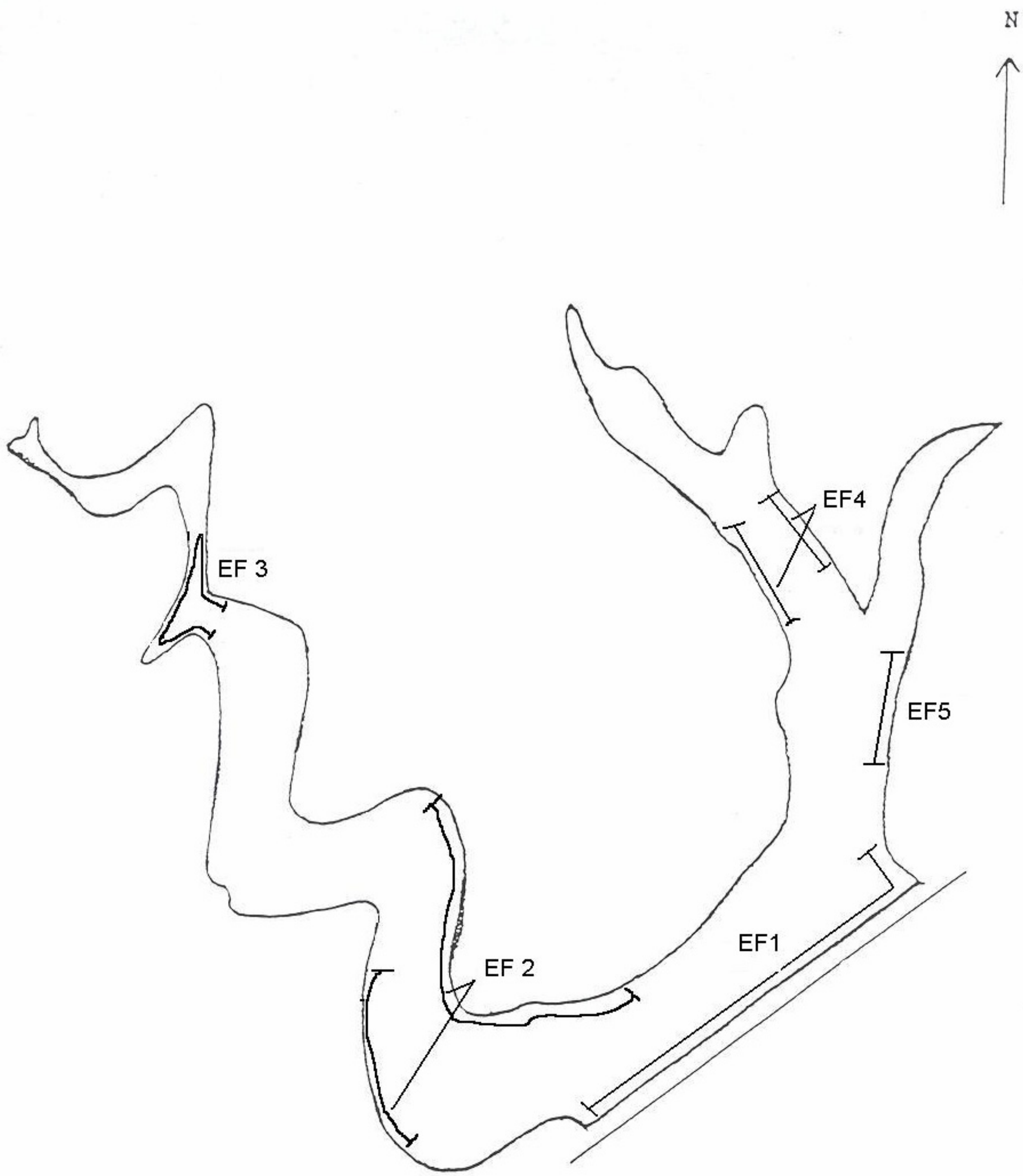


Figure 1. Electrofishing locations at Mathes Lake, Iowa Army Ammunition Plant, April 24, 2001.

RESULTS AND DISCUSSION

A total of 369 fish representing 10 species were collected in community sampling in 2001. Bluegill and largemouth bass were the most abundant species making up 40.1% and 25.7% of the catch (Table 2). White crappie made up 7% of the catch, which was a slight increase from 1999 (6.4%). Twenty-three walleye were caught in the April survey. Walleye tend to inhabit the deeper part of the lake during the day therefore they are not particularly susceptible to day electrofishing. Channel catfish and flathead catfish are also caught in small numbers. Our electrofishing settings are not selective towards catfish, consequently numbers caught do not reflect true catfish abundance in the lake. Gizzard shad, an important forage fish, were absent from the 2001 survey most likely due to a winter die-off of the shad. Gizzard shad have been generally abundant in past years, including 1999.

Largemouth bass and common carp continue to constitute the majority of the total sample biomass at 44.0% and 41.6%, respectively. Walleye and bluegill made up smaller percentages of the biomass at 5.0% and 4.3%.

Red shiners, grass carp, pumpkinseeds, and striped bass hybrids have all been caught in previous surveys, but the two former species have not been collected in our sampling since 1992 and the two latter species have not been collected since 1994. Redear sunfish are stocked in the lake, but only a few are reported harvested in volunteer-creel surveys. It is possible that redear sunfish are preyed upon by bass and/or other predators in the lake and never reach abundant numbers.

Table 2. Fish species collected in 2001 using pulse DC current (community sampling = 1.11 hours, total sampling effort for walleye, black crappie and white crappie=1.39 hours).

Species	Total Number	Percent Species	Ave. Length (mm)	Length Range (mm)	Total Weight (kg)	Ave. Weight (g)	Percent Total Weight	CPUE No./Hr	Number Harvestable
BLC	16(8)	2.2%	219.4	157-273	2.5(1.1)	156.8	0.7%	11.5	7 (75.0%)
BLG	148	40.1%	123.1	50-176	7.1	48	4.3%	133.3	21 (14.2%)
CAP	43	11.7%	491.4	385-662	68.6	1596	41.6%	38.7	43 (100%)
CCF	6	1.6%	346.8	238-415	2.6	441.3	1.6%	5.4	5 (83.3%)
FCF	1	0.3%	450.0	450-450	0.9	939	0.50%	0.9	1 (100%)
GOS	4	1.1%	119.3	85-156	0.1	31.8	0.01%	3.6	N/A
GSF	24	6.5%	108.2	75-180	1	42.4	0.60%	21.6	N/A
LMB	95	25.7%	344.2	80-500	72.6	764.2	44.0%	85.6	12 (12.6%)
WAE	23(14)	3.8%	364.4	165-579	13.4(8.2)	580.9	5.0%	16.5	13 (55.0%)
WHC	42(26)	7.0%	207.3	146-274	4.6(2.7)	109.6	1.6%	30.2	29(69%)
***total**	**369**	**100%**			**165.0**		**100%**		

*total= number of fish in community sampling only. There were 402 fish in 1.39 hours of sampling

Number in parenthesis were number of walleye, black crappie and white crappie collected from community sampling. These numbers were used to calculate total number, percent species, total weight, and percent total weight.

Harvestable size Bluegill & other sunfish - ≥150mm Bullhead & Crappie - ≥200mm Flathead catfish - ≥400mm
Channel catfish - ≥250mm Walleye - ≥381mm Carp - ≥300mm Largemouth bass - ≥457mm

Relative abundance and catch per unit effort

It is beneficial to look at trends in relative abundance and catch per unit effort over time. Catch per unit effort (CPUE) is the number of fish caught per period of sampling. CPUE from electrofishing samples are expressed as number of fish/hour. These trends help indicate whether a fish species is increasing or decreasing in numbers from year to year. Although relative abundance data can be used to indicate trends, it must be interpreted cautiously since it can be biased by non-random distribution and gear selectivity. For example, day electrofishing generally under-represents true abundance of a species like walleye and catfishes.

Relative abundance of four commonly collected species in Mathes Lake from 1992 through 2001 is displayed in Figure 2. The figure excludes gizzard shad because of high numbers caught throughout the 1990s. Bluegill and largemouth bass have consistently been the two most common species collected from the lake. CPUE for bluegill, although variable from year to year, were consistently higher than other species collected with exception of gizzard shad (Figure 3).

Relative abundance of largemouth bass and white crappie were near identical in 1993 and 1994. Abundance of the two species decreased from 1993 to 1994 by 15%. The opposite occurred for bluegill and common carp. Low abundance was noted in 1993 and an increase of 28% for bluegill and 10% common carp was calculated in 1994. However, in the same time frame, catch rates for all four species increased from 1993 to 1994 (Figure 3). Increased CPUE may have been a result of the 1993 flood. Severe flooding in spring and summer that year allowed bluegill and carp to take advantage of seasonal spawning and nursery habitat.

In the spring of 2001, a slight increase in relative abundance by white crappie, common carp, bluegill, and largemouth bass was visible in comparison to 1999. Even though there was an increase in abundance of these species, catch rates declined from 1999 to 2001. This may be due to cold spring weather keeping bluegill, crappie, and bass in deeper water. Fishing pressure in winter of 2000 may have also contributed to lower collection of white and black crappie.

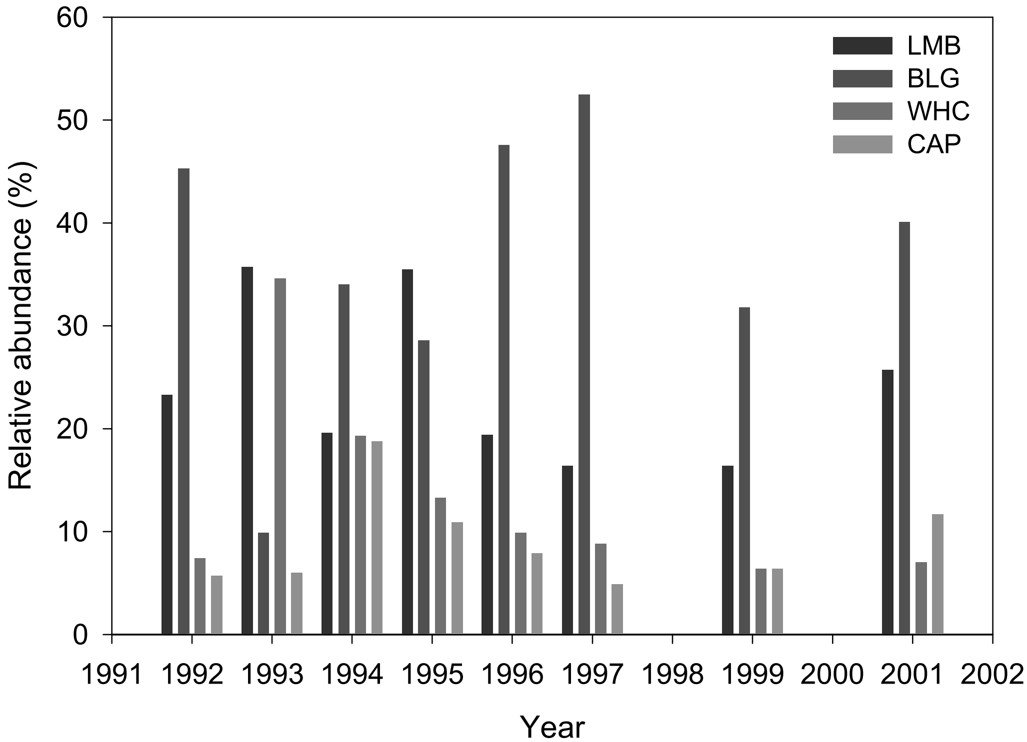


Figure 2. Relative abundance of four fish species collected in Mathes Lake, Iowa Army Ammunition Plant, 1992-2001.

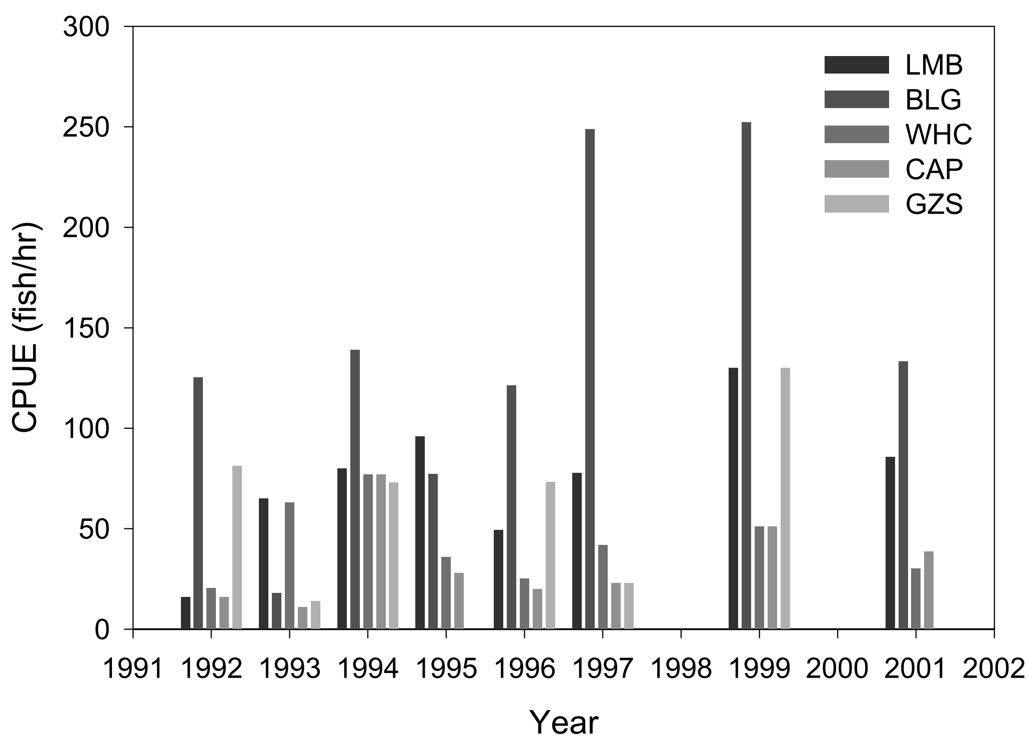


Figure 3. Catch-per-unit-effort (CPUE) of five fish species collected in Mathes Lake, Iowa Army Ammunition Plant, 1992-2001.

Largemouth Bass

Ninety-five largemouth bass were collected from Mathes Lake in 2001. Bass size classes were distributed more evenly from 1997 to 2001 (Figure 4). A few Age 1 bass were collected in this survey as in previous surveys. This continues to indicate that natural reproduction is occurring and that some attained a large enough size to survive their first winter in the lake. Although higher numbers of Age 1 bass are present in the lake, CFRO sampling did not effectively capture them. Bass falling into the 8 to 12 inch and 12 to 15 inch ranges made up 24.2% each of the total bass collected in 2001. These percentages were a little lower in 1999 at 27% and 26%, respectively. In 1999, a higher CPUE was determined for bass in the 15 to 18 inch range (Figure 5). This was not seen in 2001. The percentage of bass in this range decreased from 39% in 1999 to 28% in 2001. This decrease may be due in part from more bass entering the next size range (18 inches and greater). Percentage of bass over 18 inches in 2001, the minimum size limit on the lake, was 12.6%, up from 5.4% in 1999. Overall, CPUE of largemouth bass for individual size classes in 2001 were lower than 1999, but should not cause any concern because of large numbers of bass observed while sampling specifically for white crappie.

Prior to 1997, a slot length of 15 to 18 inches was imposed on bass and it was suggested that many largemouth bass in that slot length were being removed from the population. An 18-inch minimum length limit was placed on bass in 1997 to satisfy anglers' desire for a trophy fishery with a bag limit of 3. Too early to detect changes, few largemouth bass greater than 18 inches were collected in 1997 (Milligan and Grady, 1998). However, by 2001, the largemouth bass fishery has slowly progressed towards a trophy fishery (Figure 4) as evident through PSD and RSD levels. The desirable PSD range for largemouth bass is 40-60%. PSD of this sample was 74.1%. This exceeds the preferred range, but because of the 18-inch limit, this is desirable.

In the past, RSD has been measured as the proportion of bass greater than 15 inches or preferred size (harvestable size). The desirable range is 20-30%. RSD for preferred size fish in the 2001 survey was 45.9%. This was higher than the RSD in the 1999 survey (11.8%). RSD calculated for memorable size (18 inches) fish in 2001 was 14.1%. This increased from 6.0% in 1999.

Condition (Wr) of Mathes Lake bass has dropped from an average Wr of 108 in 1999 to 95.9 in 2001, however they are still in good condition. A drop in body condition may be due to the presence of higher numbers of larger bass, increasing intraspecific competition for bluegill (3-7 inches) and gizzard shad (4-9 inches). It is likely the gizzard shad population will rebound and no measurable effects will be seen on the bass population because of the variety of forage fishes available in the lake. However, increased predation on bluegills of all sizes will occur until gizzard shad return in large numbers.

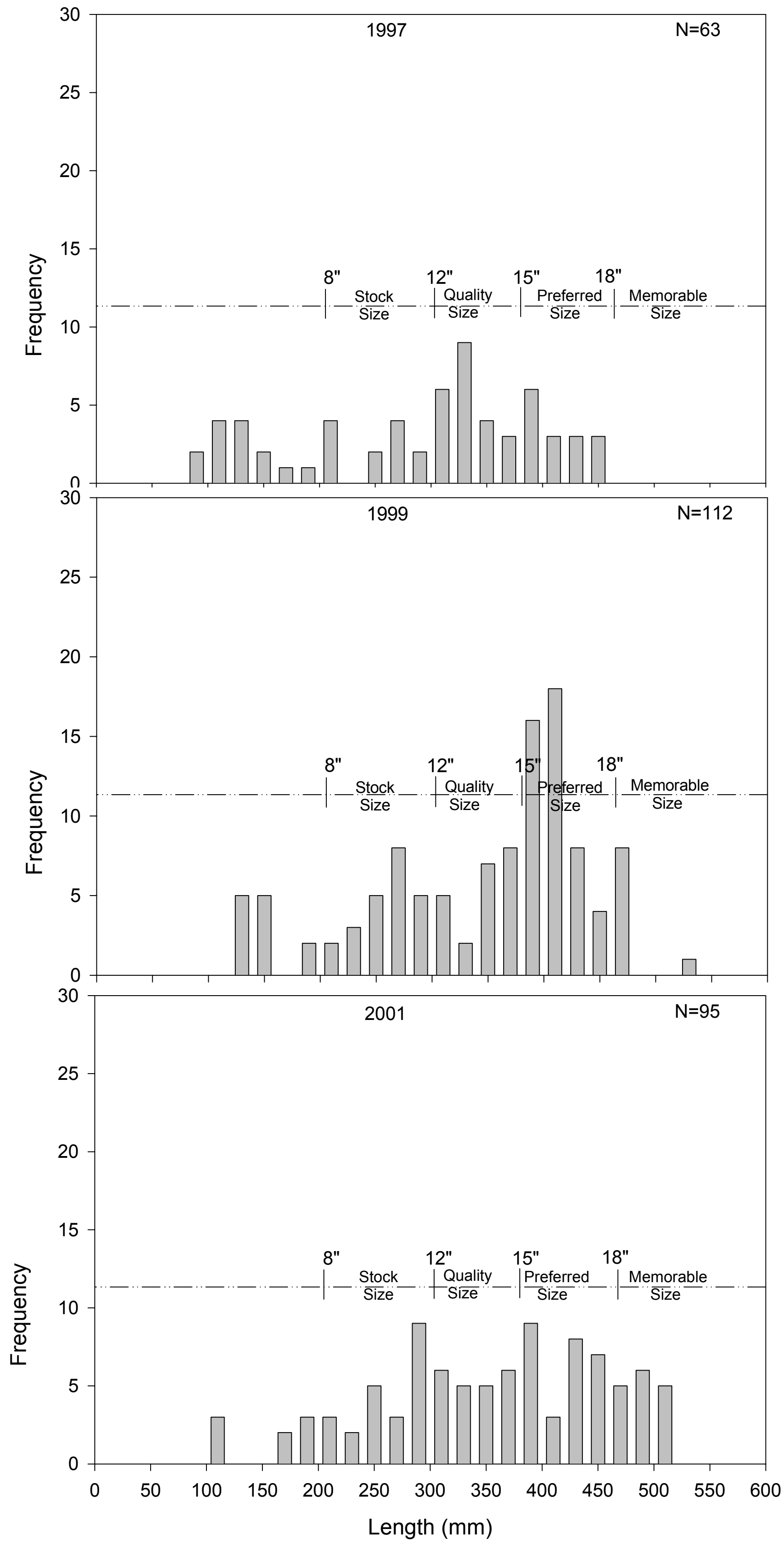


Figure 4. Length frequency histograms of largemouth bass collected from electrofishing samples at Mathes Lake, Iowa Army Ammunition Plant in 1997,1999, and 2001.

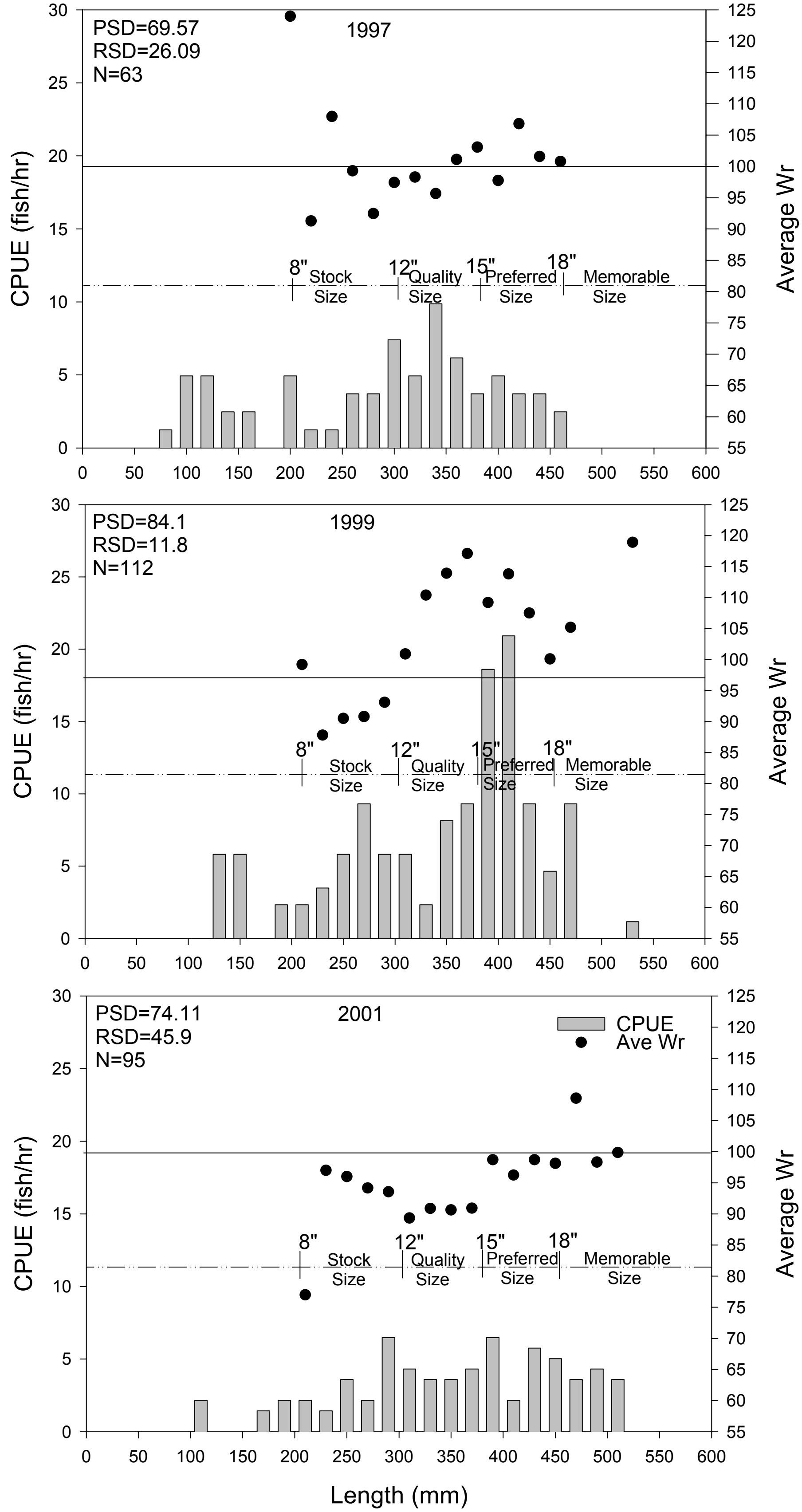


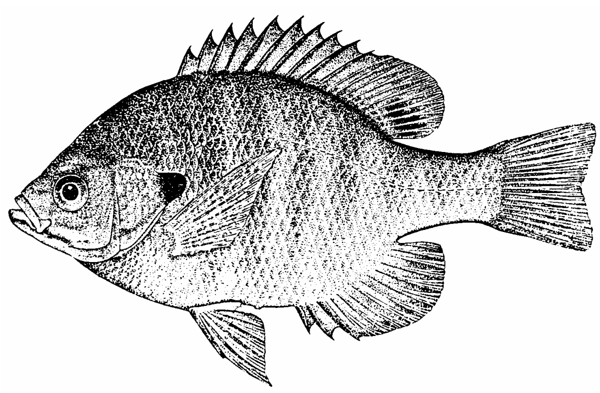
Figure 5. CPUE of Largemouth bass collected by electrofishing at Mathes Lake, Iowa Army Ammunition Plant in 1997,1999, and 2001.

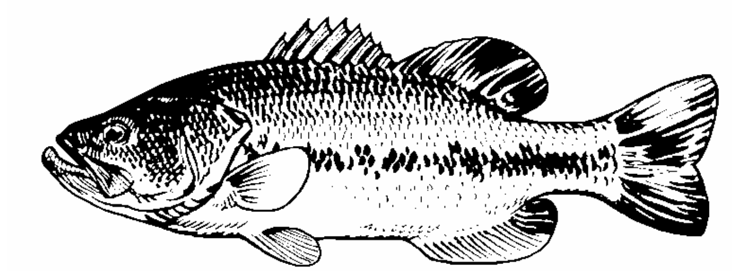
Bluegill

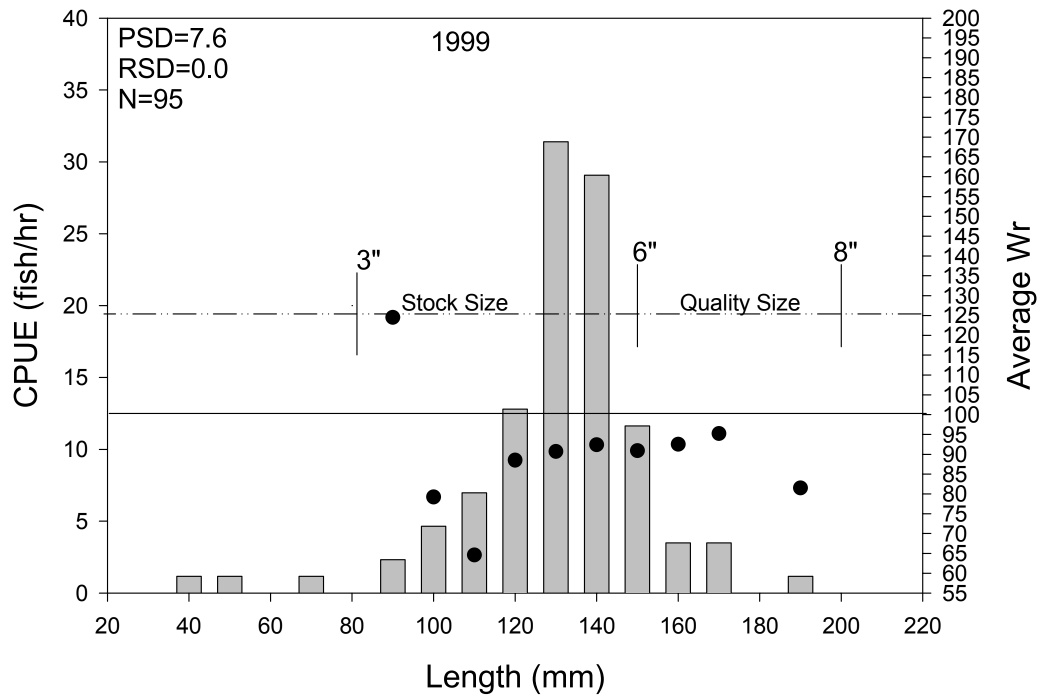
Relative abundance of bluegill increased since our last survey. CPUE, however, decreased from 252.3/hr in 1999 to 133.1/hr in 2001. The bluegill population has been described as small and stunted in the past, stockpiling in the 3 to 6 inch range (Milligan, 1989; Milligan and Grady, 1997). Eighty-seven percent of bluegills caught in this survey fell between 3 and 6 inches. Voluntary creel information on the lake, although under-estimated, appeared to be constant in the 1990s with anglers harvesting bluegills in the 6 to 8 inch range. Bluegills still seldomly exceed 7 inches because of angler harvest and competition for food with gizzard shad. Although the majority of bluegills are in the stock size range, more quality size fish (≥6 inch) were collected from our survey compared to recent years (Figure 6). Quality size (PSD) bluegill increased from 7.6% in 1999 to 13.8% in 2001, still below the desirable 20-40% range. Desirable PSD ranges have not been reported for bluegill since1994 (Milligan and Grady, 1994). Over the last 10 years RSDs have not been calculated because bluegill of preferred (8 inches), memorable (10 inches), or trophy size (12 inches) have not been collected by CFRO sampling.

A noticeable difference was seen in the average condition of the individual bluegill compared to 1999. Average condition of all bluegill collected in 1999 was 90, rising to 128.3 in 2001. The average shift in higher body condition stems from smaller bluegills. In Figure 6, as bluegills increased in size, body condition lowered. This may be due to habitat and diet overlap with other species in the lake, primarily gizzard shad.

Large gizzard shad numbers in the lake have been suspected in the suppressed growth of bluegill. If gizzard shad numbers in the lake remained low throughout 2001, bluegill had less competition for food, but faced heavier predation by largemouth bass. If gizzard shad numbers rebounded in 2001 it was likely that heavy competition for food resources resumed.







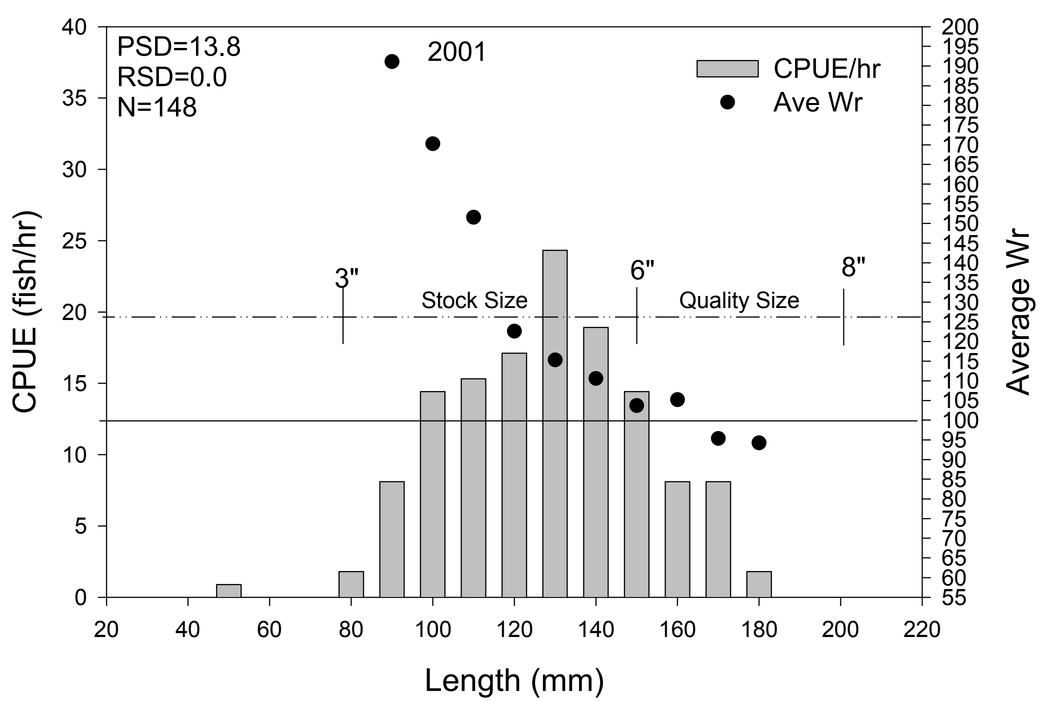


Figure 6. CPUE of bluegill collected by electrofishing at Mathes Lake, Iowa Army Ammunition Plant in 1999 and 2001.

White Crappie

White crappie are the dominant crappie species of Mathes Lake. They prefer warmer, more turbid waters than their cousin the black crappie. White crappie are an important part of the fish community and popular among anglers as shown through voluntary creel surveys. Relative abundance of white crappie over the last decade has dropped from 34.6% in 1993 to 6.4% in 1999. In 2001, however, relative abundance increased to 10%.

Voluntary-creel information on crappie harvest over the last decade provided a good indication that harvest was quite heavy. Data collected in 1995 showed that crappie were harvested when a length of 10 inches was attained (Milligan and Grady, 1996). This was corraborated by creel surveys in which anglers reported harvesting 9 to12 inch crappies that year (Milligan and Grady, 1996). This was also demonstrated by CFRO collected data in 1996 showing a significant drop at 10 inches and confirmed by significant numbers of 10-12 inch fish reported harvested in 1996 (Milligan and Grady, 1997). Heavy fishing pressure continued through 2000.

Length frequencies of white crappie shown in Figure 7 showed a shift from larger to smaller sized fish. Length frequency histograms developed from electrofishing data in 1997, 1999, and 2001 depicted a noticeable shift from 10 to 12 inch fish in 1997 to 8 to 10 inch fish by 2001. Thirty-four white crappies were collected by electrofishing in 1997 and 44 crappie in both the 1999 and the 2001 survey. Average lengths dropped from 10.8 inches (274 mm) in 1997 to 9.1 inches (230 mm) in 1999 to 8.1 inches (207 mm) in 2001. The drop in average size in 2001 draws attention because of an 8-inch minimum length limit that that was imposed in 2000. The regulation was imposed in part from claims by fisherman that crappies were stunted.

PSD and RSD levels did not accurately reflect the size structure of crappie collected in 1997 and 1999 due to few if any fish collected in the stock size range (6 to 8 inches), shifting levels higher than what they should have been (Figure 8). Higher catch rates of stock size fish than preferred size fish in 2001 resulted in a lower PSD (65.9%) and a lower RSD of preferred size at 9.09%.

Smaller sized crappies collected in 2001 were in fair body condition with an average Wr of 87.2. Lower body condition may be the result of a harsh winter of 2001 and/or intense competition for prey in 2000.

CFRO has suggested in the past that the 8-9 inch size range needs to be protected. If this minimum length limit remains in effect for a prolonged period of time, eventually natural reproduction and recruitment will be severely limited. This is because crappies do not successfully spawn until they are 8 to 10 inches or Age 2 or Age 3 in the Midwest. Age 2 and Age 3 crappies in Mathes Lake have been determined to be around 8 or 9 inches (Figure 9). Continued removal of 8-inch crappie will deplete crappie broodstock and could have devastating effects on the fishery.

A regulation change to a 10-inch (254 mm) minimum length limit suggested in the past should be imposed for the 2002 season or when the plant reopens for fishing. This should allow Age 2 and Age 3 crappies to mature and allow experienced spawners to

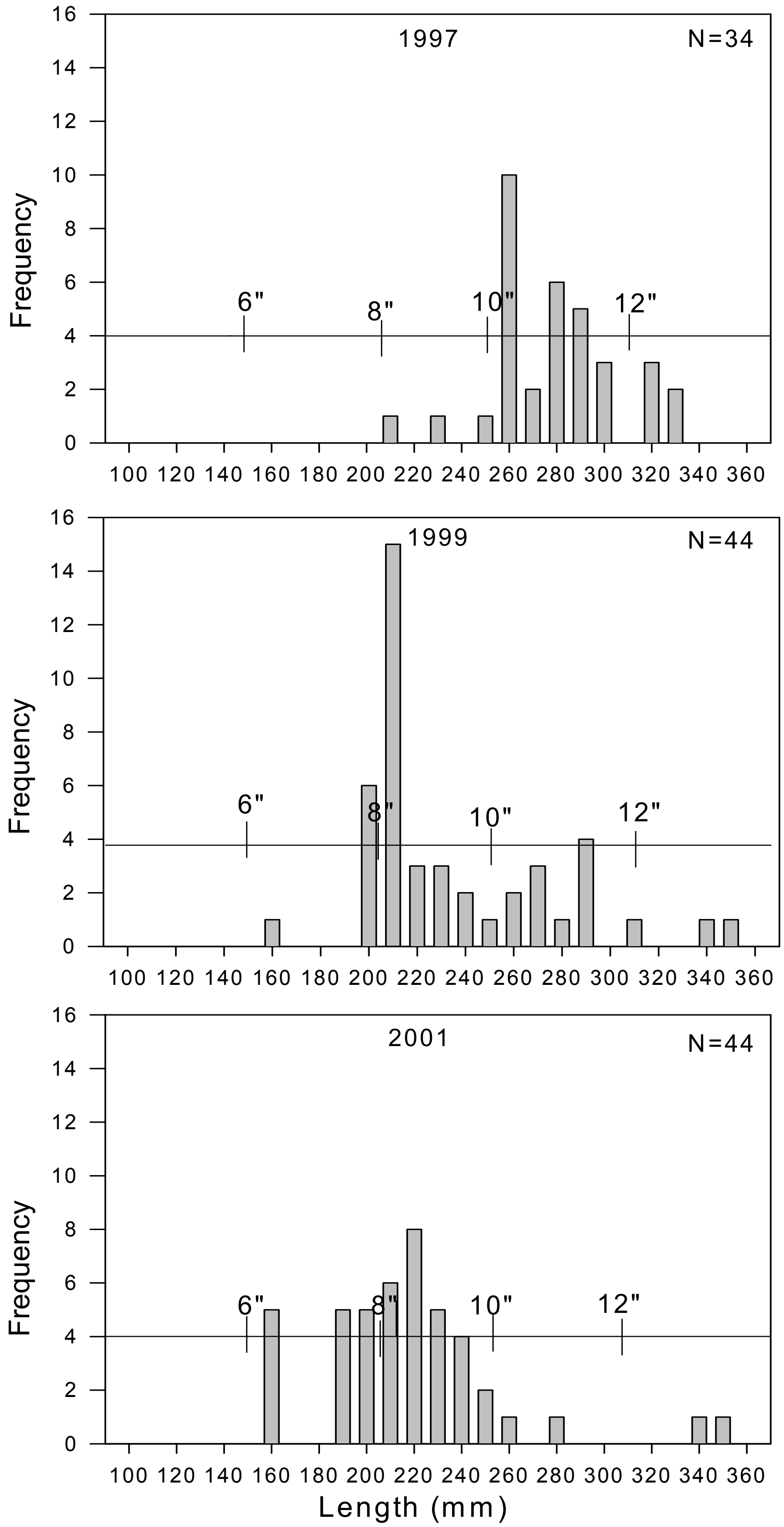


Figure 7. Length frequency histograms of white crappie obtained from electrofishing samples at Mathes Lake, Iowa Army Ammunition in 1997, 1999, and 2001.

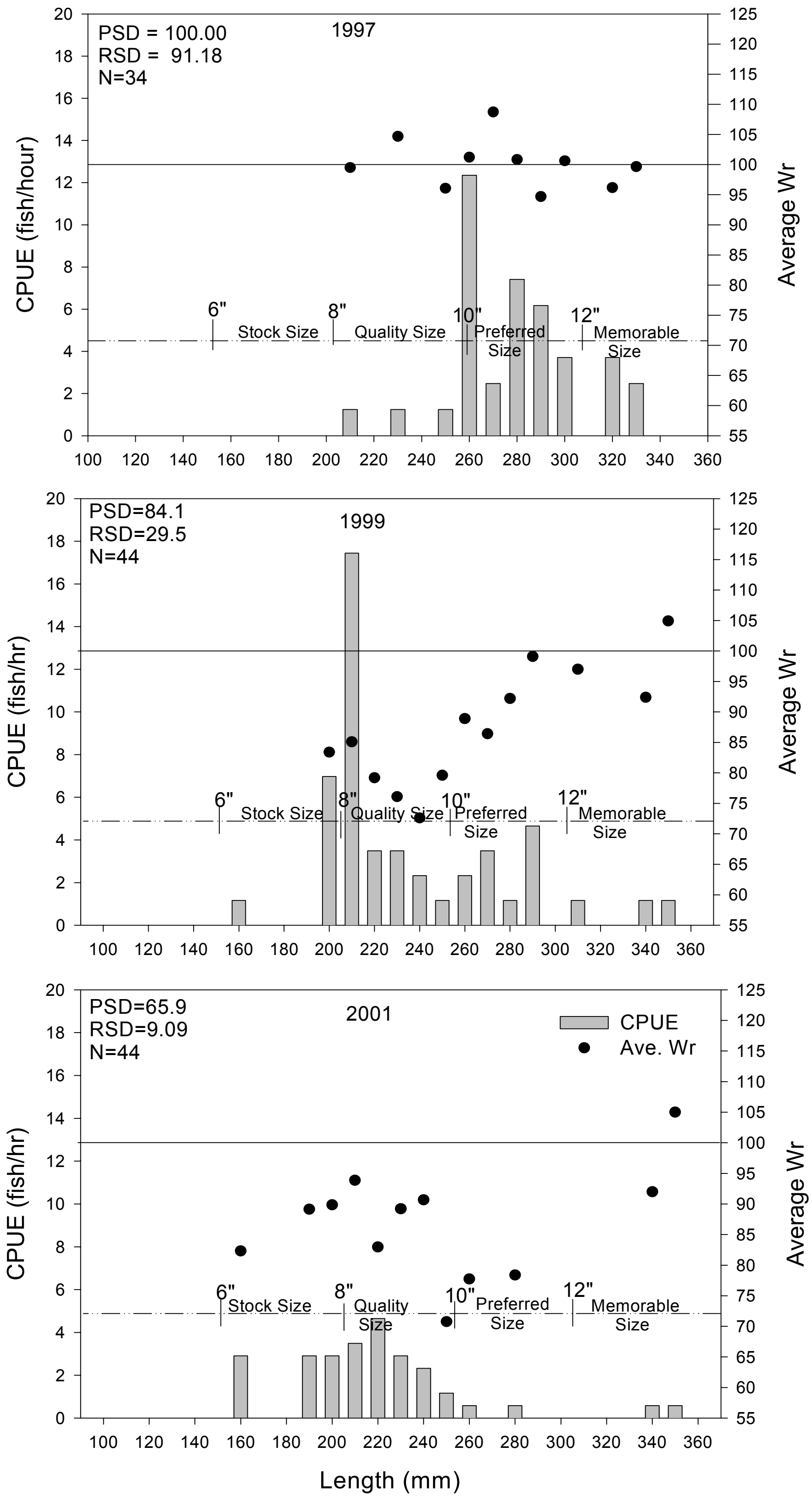


Figure 8. CPUE of white crappie collected by electrofishing at Mathes Lake, Iowa Army Ammunition in 1997, 1999, and 2001.

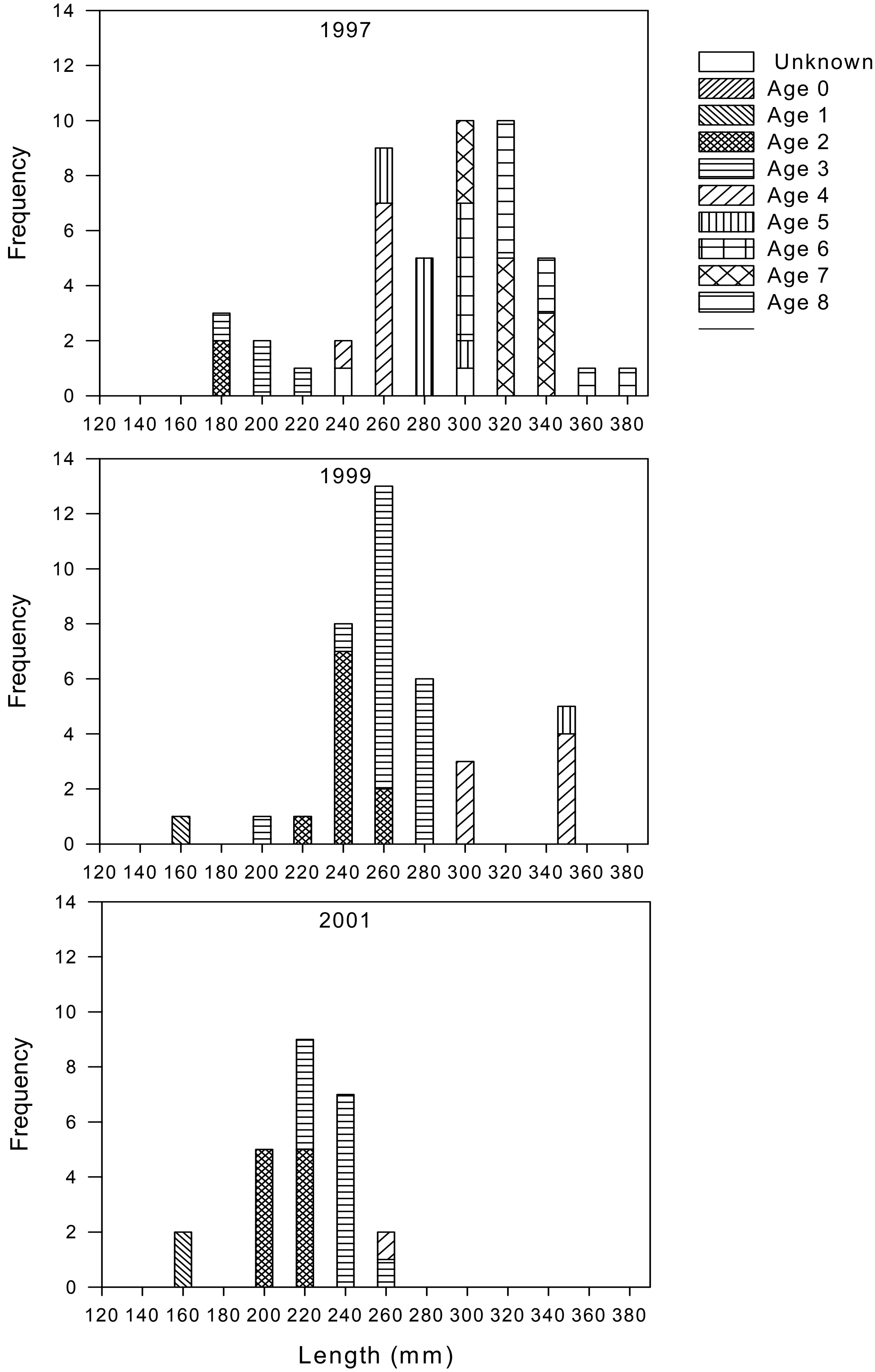


Figure 9. Age structure of white crappie collected from Mathes Lake, Iowa Army Ammunition in 1997, 1999, and 2001.

remain in the lake, which will ensure reproduction and recruitment of the species as well as enhance fishing. The majority of the white crappie aged from the 2001 and 1999 surveys were primarily Age 2 and Age 3 fish, ranging 7.1 to 8.7 inches (180-220 mm) in length (Figure 9).

Mathes Lake crappie collected in the past few years have shown that young crappie grow faster than average in the area, however older crappies grow slower and fall in upper half of the range (Carlander, 1977). Slow growth in crappie is symptomatic of impoundments with abundant gizzard shad numbers.

Black Crappie

Small numbers of black crappie exist in the lake. Sixteen black crappie were collected by electrofishing in 2001. Average length of black crappie slightly increased from 8.1 inches (206 mm) in 1999 to 8.6 inches (219.4mm) in 2001. Using the 8-inch or greater standard size, 75% of the 16 black crappie caught were harvestable. Black crappie ranged from 6.18 to 10.7 inches (157-273 mm) in size. Fifty-six percent of black crappie fell into the 8 to 10 inch (200-254 mm) range in 2001. The majority of black crappie caught by fyke nets in 1999 also fell into the 8-10 inch range (Mauldin 2000). A minimum length limit of at least 10 inches will also benefit reproduction and recruitment in black crappie.

RSD's for preferred sizes (>10 inches) have been used in the past. RSD for the 2001 sample was 12.5. RSD for quality size fish (>8 inches) in 2001 was 62.5. The RSD level increased due to smaller sizes that anglers were harvesting.

Older black crappies were in fair condition (Figure 10). As with white crappie, competition for food resources was likely the reason for lower body condition. Seven black crappies were aged from the survey: 2 were Age 2, 3 were Age 3, 2 were Age 4 and one was Age 5.

Catfishes

Channel catfish are a major component of the Mathes Lake sport fishery. Channel catfish fingerlings continue to be stocked in the lake to supplement naturally produced catfish. According to voluntary creel surveys, anglers commonly catch channel catfish from May though October. Nine channel catfish were collected by the CFRO in 2001. All nine catfish were in excellent condition and just under half were of harvestable size.

Flatheads are also present in the lake in small numbers. They provide an occasional trophy for anglers. In 1994, one flathead weighing 40 lbs was caught and in 1996 and 1997 several flathead catfish weighing over 40 lbs were caught. Few flatheads, though, are reported caught from the lake. These predators are believed to help control young bullhead and common carp in the lake. One 17.7-inch (450 mm) flathead catfish weighing 2.1 lbs. (939g) was collected in the 2001 survey.

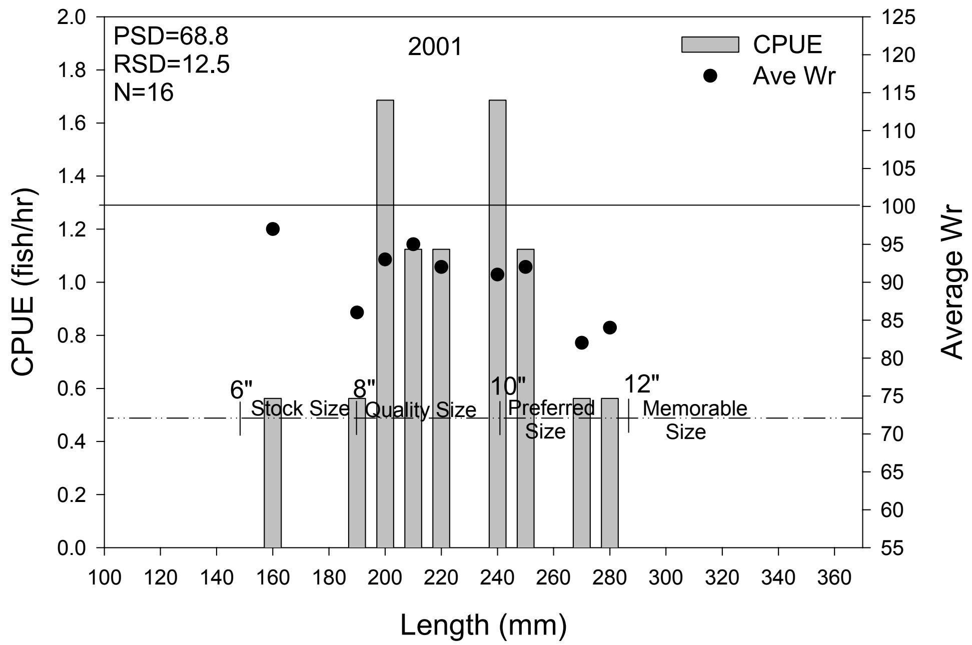


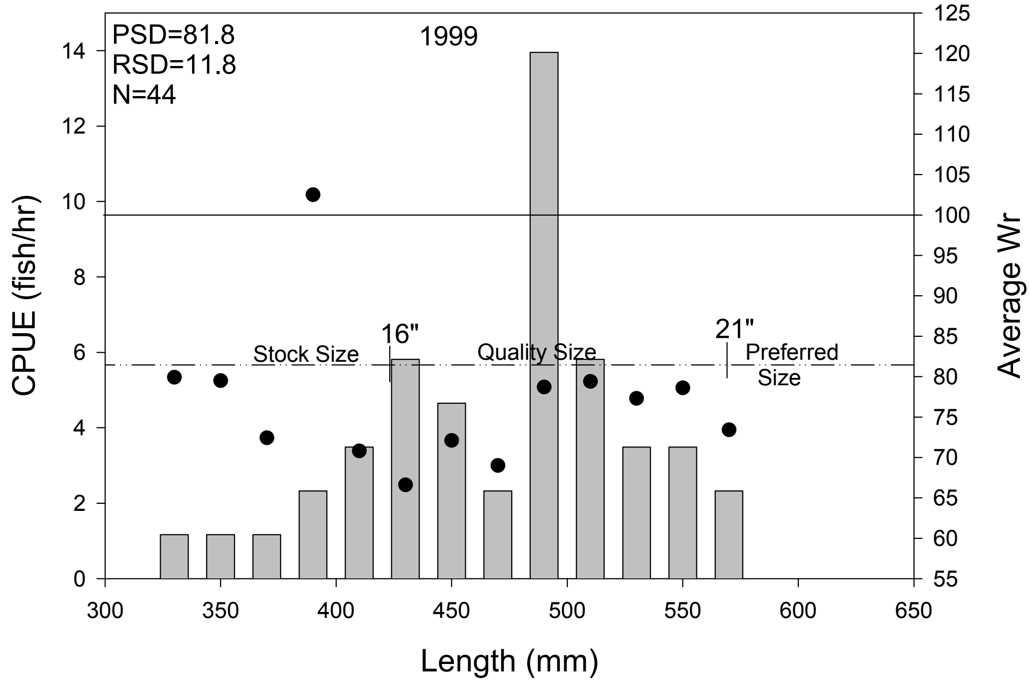
Figure 10. CPUE of black crappie collected by electrofishing at Mathes Lake, Iowa Ammunition Plant, 2001.

Walleye

Fingerling walleye are stocked in Mathes Lake annually. The stocking program was initiated in 1982 in hopes that walleye would help control gizzard shad numbers, reducing competition for the panfish. About 500 5-inch fingerlings were stocked in August 2000. Twenty-three walleye were caught in the 2001 survey. Several Age 1 walleye were caught measuring 6-7 inches in length assuring some stocked fingerling walleye survived their first winter. Length of walleye caught ranged from 6.5 to 21.0 inches (165 mm to 533 mm). The largest walleye weighed 3.1 lbs (1415 g). Although our sampling produces few walleye, small numbers have been reported caught by anglers throughout the 1990s. A 14-inch minimum length limit with a daily limit of 3 fish is currently in effect on the lake. Fifty-five percent of the walleye caught in 2001 were of harvestable size.

Common Carp

Relative abundance and CPUE of common carp have generally been at acceptable levels with highest levels in 1994. Relative abundance of common carp increased from 6.4% in 1999 to 11.7% in 2001. CPUE of carp however, dropped from 51.2/hr in 1999 to 38.7/hr in 2001. All carp collected were harvestable (>12 inches), yet these fish were in poor condition (average Wr=79.8) (Figure 11). Carp have been in average to poor condition throughout the 1990s. Poor condition in carp may be the result of a lack of needed nutrients in the lake resulting from a possible shift in diet of gizzard shad



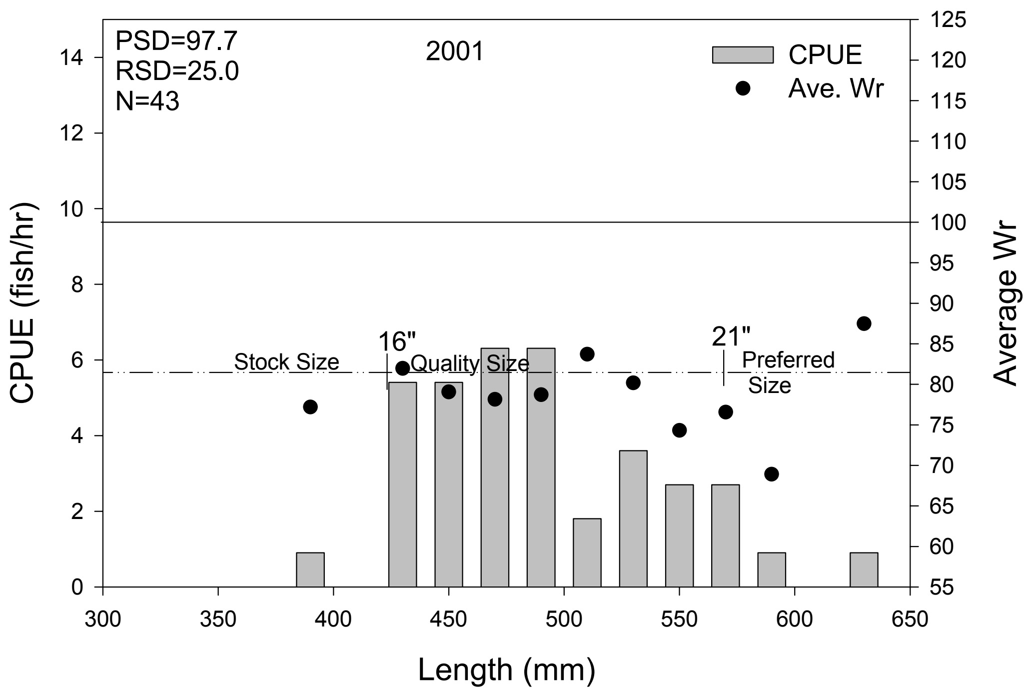


Figure 11. CPUE of common carp collected by electrofishing at Mathes Lake, Iowa Army Ammunition Plant in1999 and 2001.

(zooplankton to detritus). A high PSD level of 97.7 was calculated for carp, but this is deceiving because only two carp less than 16 inches (stock size) were caught in the survey. This could be result of poor reproduction last year or the winter die-off affecting gizzard shad also affected smaller size carp.

Gizzard shad

Gizzard shad in midwestern reservoirs are usually not regulated by predators. As we have seen in Mathes Lake for more than a decade, walleye, striped bass and largemouth bass have had little effect on the gizzard shad population.

Although diet may be density dependent, it appears that gizzard shad grow fast in Mathes Lake mainly feeding on zooplankton and shifting to benthic detritus when zooplankton abundance is low. CFRO sampling of gizzard shad showed that the average size was about 7-10 inches in the lake. With such large sizes of gizzard shad, this has had some negative impacts on sport fish in the lake. Swingle (1950) found that when gizzard shad became overpopulated at sizes larger than that readily vulnerable to predators, they reduced or prevented production of forage-size bluegill and gizzard shad and reduced growth of young largemouth bass. Other studies have also shown that gizzard shad influence the recruitment of other fishes (Guest et al., 1990; DeVries et al., 1991). They are highly fecund and usually spawn before many sportfish like bluegill and crappie. They can dramatically reduce zooplankton resources in spring creating a bottleneck such that young-of-the-year fishes that rely on zooplankton face unfavorable conditions for growth and survival (Dettmers and Stein, 1992).

A reduction in gizzard shad numbers whether large or small may not show a measurable effect in one season and because gizzard shad are so prolific a large forage-fish year class the following year could return the population to its original size (DeVries and Stein, 1990). Although no gizzard shad were collected in the 2001 survey, we expect a small, remnant population remains, which would be capable of re-populating the lake.

Summary

Since the inception of the 18-inch largemouth bass minimum length limit in 1997, the lake has moved towards a trophy bass fishery. Intermediate and large size bass have had an adequate supply of forage size bluegill, gizzard shad and other fish to feed on. Fishing for trophy size bass should continue to improve.

Angler harvest of bluegills has been relatively constant since the mid 1990s. From CFRO sampling over the last decade, bluegills in general are abundant in the lake with higher catch rates than any other species collected. Bluegill length frequency histograms dating back to the early 1990s have shown sharp declines at about 6 or 7 inches, indicating that fish are harvested at 6 inches and greater. Numbers of bluegills 6 inches and greater will not likely increase in the near future due to steady harvest, strong competition for food resources with other species in the lake, and predation.

Crappie fishing is popular on Mathes Lake and it has supported crappies up to Age 8. Harvest has been particularly strong since the mid 1990s. Minimum length limits have decreased from 9 inches in 1999 to 8 inches in 2000. Average lengths of CFRO collected white crappie decreased from 10.8 inches in 1997 to just over 8 inches in 2001. To reiterated what was previously mentioned, continued removal of 8-inch crappie could have devastating effects on the fishery leaving the dwindling white crappie population with very few individuals that will reach maturity. The minimum length limit needs to be raised to at least 10 inches to ensure reproduction and recruitment of crappie in the lake and will provide a larger and higher quality fish for angler harvest and enjoyment. A creel limit of 12 or 15 fish also should be included.

Harvest of channel catfish, walleye, flathead catfish, redear sunfish, and striped bass reported from voluntary creel surveys gives a good indication that small fishable populations exist in the lake providing different experiences for anglers.

RECOMMENDATIONS

1) Obtain scale samples from largemouth bass in 2003 survey to assess age distribution and growth of species.

2) Institute a 10-inch minimum length limit and daily bag limit of 15 fish on white and black crappie and evaluate reproduction, recruitment and harvest.

3) Continue supplemental stocking of channel catfish and walleye fingerlings.

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APPENDIX A

Fish Stocking Record

Iowa Army Ammunition Plant 1980-2001 Mathes Lake (#18)

Date	Number	Species	Size	Source
09/23/80	2,000	CCF	5-7" (263 lbs.)	ICC-Rathbun SFH
10/ /82	1,300	BLC/WHC	6-7"	IAAP Commercial
09/ /82	2,000	CCF	5-8" (270 lbs.)	ICC-Rathbun SFH
06/28/82	8,700	WAE	2" (870 lbs.)	Genoa NFH
05/07/84	20,000	WAE	Fry	Genoa NFH
06/21/84	18	SMB	7-9"	Water Supply Pond
07/12/84	4,150	SMB	2-3" (450 lbs.)	Genoa NFH
07/12/84	8,300	WAE	2" (10 lbs.)	Genoa NFH
04/13/87	260,000	WAE	Fry (2 lbs.)	Cordova IL/LaSalle SFH
04/15/88	250,000	WAE	Fry (2 lbs.)	Cordova IL/LaSalle SFH
04/20/89	250,000	WAE	Fry (2 lbs.)	Cordova IL/LaSalle SFH
09/15/89	2,000	CN/BLG	3-5"	Kloubec Fish Farms
04/18/90	250,000	WAE	Fry (2 lbs.)	Cordova IL/LaSalle SFH
04/17/91	250,000	WAE	Fry (2 lbs.)	Cordova IL/LaSalle SFH
04/15/92	250,000	WAE	Fry	Genoa NFH
08/11/92	500	STB	2.6" (4 lbs.)	Neosho NFH
04/07/93	330	WAE	8.75" (100 lbs.)	Cordova IL/LaSalle SFH
04/07/93	156	WAE	6" (62 lbs.)	Cordova IL/LaSalle SFH
08/19/93	915	SBH	4.9" (19 lbs.)	Neosho NFH
09/28/93	353	WAE	5-7"	Cordova IL/LaSalle SFH
09/28/93	80	WAE	8-10"	Cordova IL/LaSalle SFH
08/02/94	580	WAE	4.5" (70 lbs.)	Cordova IL/LaSalle SFH
08/10/95	1,122	WAE	4.5" (15.1 lbs.)	Cordova IL/LaSalle SFH
09/18/95	511	SBH	6.0" (10.6 lbs.)	Neosho NFH
07/30/96	450	WAE	5" (10 lbs.)	Cordova IL/LaSalle SFH
09/03/96	295	SBH-TEX	4.5" (12 lbs.)	Neosho NFH
07/25/97	1000	WAE	5.0" (25 lbs.)	Genoa NFH
10/15/97	430	SBH-TEX	6.0" (43 lbs.)	Neosho NFH
10/15/97	8850	RSF	1.25" (7.5 lbs.)	Neosho NFH
10/15/97	300	CCF	6.4" (23 lbs.)	Neosho NFH
07/29/98	800	WAE	5.0" (17 lbs.)	Cordova IL/LaSalle SFH
08/11/98	430	SBH	6.0"	Neosho NFH
1998	300	CCF	6.4"	Neosho NFH
1998	8,850	RDS	1 1/4"	Neosho NFH
07/20/99	500	WAE	5.0"	Cordova IL/LaSalle SFH
08/01/00	500	WAE	4.0"	Cordova IL/LaSalle SFH
07/25/01	400	WAE	4.5" (7 lbs.)	Cordova IL/LaSalle SFH
08/22/01	1000	CCF	8"	Neosho NFH

Stump Lake (#19)

Date	Number	Species	Size	Source
11/ /80	800	CCF	10-12"	IAAP Commercial
09/ /82	700	CCF	5-8"	ICC-Rathbun SFH
09/15/83	1,300	LMB	2-3"	Genoa NFH
09/15/83	6,000	BLG	1"	Genoa NFH
05/31/84	300	NOP	3"	Genoa NFH
07/12/84	1,000	LMB	2-3"	Genoa NFH
09/04/84	1,400	CCF	3-6"	Senecaville NFH
04/15/86	8,000	NOP	Fry	Genoa NFH
05/20/91	250	NOP	1-2"	Genoa NFH