Fall 2021

Crappie Edition

KDWP Fisheries Division Newsletter

Independence District Fisheries

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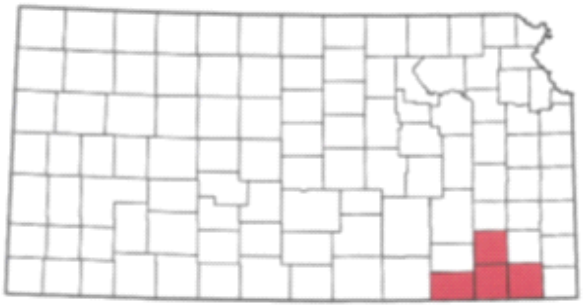
Area Happenings

This spring and summer were busy with our normal walleye and saugeye stockings, bass electrofishing, blue catfish electrofishing and hoop netting for channel catfish. In addition to our standard workload we have been busy continuing the crappie projects. There is also an in-depth look at flathead catfish in Montgomery State Fishing Lake and Wilson State Fishing Lake. The flathead catfish study is still pending results, so stay tuned to future newsletters to see those findings. However, we are getting a lot of incoming data on the crappie tagging project as well as many interested individuals, so this newsletter is all about crappie!



Kansas Department of Wildlife and Parks

Crappie Edition

This newsletter will be dedicated to all things crappie. In this edition I will try and give you the basis for crappie management and how fisheries biologists determine how a crappie population is functioning. I also will touch on crappie regulations. In this section I will touch on the basis on why we use different regulations and explain why a regulation may not work the way it is intended to.

I will give an update on the two crappie research projects that are being done in the area thru Emporia State University (ESU) and Missouri State University (MSU). The ESU project was focused on crappie growth rates around the state. While the MSU project was focused on crappie harvest rates in three lakes in Southeast Kansas.

Management

The first topic I want to cover in this special crappie issue of my newsletter is crappie management. When I hear people talk about crappie management I hear a lot of differing opinions and suggestions, ranging from reducing or increasing the number you can keep to a minimum size limit that should be imposed. While all regulations we use have a purpose, there is no blanket regulation that is good for every body of water or for every crappie population. For these reasons we have to evaluate each crappie population, which includes recruitment (how well and how often crappie reproduce), growth (how fast fish are growing) and mortality (how many fish are not making it to the next year). Mortality can have many natural causes (old age, exit the dam or spillway, spawning stress, winter/summer kills or predation by larger fish) as well as human causes (fishing harvest, hooking mortality).

While all of these can be evaluated, it often takes a lot of time and effort per water body during a specific time of the year, which we often don't have the luxury of having. As a fisheries biologist we can look at sampling trends, how many fish we catch, the size we are catching and the condition of fish to make many of the decisions about fish populations. However, thanks to some graduate students out of Emporia State University (ESU) and Missouri State University (MSU) we have been able to evaluate some of our crappie populations on a greater level and understand them in much greater detail. I will go into a little detail on what we look for in a quality crappie population, then I will go into detail and the findings so far from the projects and what lakes they include.

Above: Ryan with an Elk City Reservoir white crappie.

Above: My wife Dani and daughter Olivia with a private pond black crappie.

Above: The local legend Hudson Lies with an Elk City white crappie.

Management Cont…

The first aspect when assessing a crappie population is recruitment (how well and often they reproduce). Crappie populations in Kansas can exhibit wide a wide variety of spawning success from lake to lake and from year to year. Crappie need very specific water temperatures during the right time of year to successfully reproduce. These environmental conditions, that we have no control over, can include drastic cold fronts, rapidly increasing water temperatures, and flood events at the wrong time. If any of these events happen during the wrong time, crappie populations can have little to no reproduction that year. However, some crappie populations in certain lakes have the ability to reproduce effectively almost every year no matter the environmental conditions. This can be attributed to the differing outlet structures (which can affect the severity or duration of a flood) in a lake, more abundant spawning habitat, better nursery habitat for fry, the list could go on but I'm sure you get the idea.

We can effectively evaluate crappie reproduction during the fall, where we collect crappie in trap nets. By evaluating the crappie that were reproduced that year (usually a few inches in length) from trap net data we can see if the spawn was good, bad or average. This data can then be compared over the years to determine how frequently crappie have good reproduction in each lake.

One would think that having good reproduction every year would be great, however that is where the next part of crappie management comes in, growth. Some crappie populations do very well with consistent reproduction, however some lakes get overpopulated quickly and suffer

Below: Ryan and Danci with some white crappie from Elk City Reservoir.

slow growth rates. Having slow growth rates can lead to a number of problems, including having a lake full of 6-inch fish.

Many factors can influence growth rates, including the availability of forage, crappie density (fish/acre), and lake productivity (less productive lakes = slower growing fish). You may be thinking that there is always an abundance of gizzard shad in most reservoirs for them to feed on, however they are not always at the right size for crappie to feed on (too large or too small). Other studies have tried to increase bait fish populations to increase the growth rates of crappie but have been unsuccessful. Crappie density is often difficult for anglers to see as a bad thing (more fish = better fishing, right?), however sometimes crappie populations get overpopulated and there just isn't enough resources to support them. I like to use the analogy that you can only have so many cows in a pasture before there isn't enough resources or room for healthy weight gain.

Management Continued…

Growth rates can be assessed in a few different ways. Typically biologists look at the overall size structure of the fish that we sample each year. If there are small, medium and large crappie present in a lake, we can make the assumption that fish are growing well. However, if we see that there are no, or very few, large fish left in a lake we must determine if the problem is growth or mortality. This can be best determined by collecting fish of all sizes from a lake and removing the otoliths (a small bone that develops growth rings every winter like a tree trunk). By looking at these growth rings we can determine if fish are growing slow or dying before they get to a large size. After assessing growth rates we can determine if growth rates are an issue or if we need to look further into mortality.

Mortality can be the hardest to quantify of the three population dynamics. Since there are so many reasons in which fish mortality can occur, and most of them are unseen and unquantifiable, it is difficult to really determine what the cause of mortality is. As I mentioned earlier there are two types of mortality, natural and human induced. Natural mortality is almost impossible to change, while the human aspect can be more closely controlled via fish regulations, but first you must determine if it is human related or natural causes. Fish biologists usually assess mortality by looking at the decline of fish as they age, in other words if we saw good reproduction of fish in 2019 we would track the decline of that age class as they got older thru the following years. Once we assess our mortality rates, we try to tease out what is human related mortality by conducting creel surveys. Creel surveys are simply interviews conducted on anglers to determine what they caught, how many and how much time the anglers spent fishing. From these creel interviews we can get an idea of how many fish and of which species are harvested from a water body during a year. Once we have an idea of human related mortality we associate the rest of the mortality as natural causes. Now that I have explained what we look at while determining crappie population dynamics, I will discuss why we use regulations and an in depth look at crappie populations in the Independence Fisheries District that have been looked at by ESU and MSU.

Above: White crappie sampled from Sedan City Lake- North.

Crappie Regulations

Crappie regulations are something that many anglers have differing opinions on, and many times no one agrees on which regulation is best. The truth is that there is no blanket crappie regulation that is good for every lake, as each lake system has different population dynamics and differing amounts of fishing pressure. It has been looked at extensively, and it has been found that until anglers are harvesting 33% or more of a population during a year, no fishing regulation will change the crappie population or increase the size of crappie in the lake. How do you determine what 33% is? I will get to that more in depth with the research projects.

I have heard many anglers wonder why we allow such liberal crappie regulations, as many lakes have a 50 fish per day limit and no size restrictions. It may surprise many of you, but in some cases liberal harvest can actually help crappie populations (reduced density = faster growth). In other populations where crappie growth is good regulations may be warranted. However if angler harvest does not exceed 33% of the population, regulations will not improve crappie size.

Let me go into further detail on why liberal regulations are the norm. Crappie are a short-lived fish species (typically only living 5-7 years in this area) that have the capability of producing large number of young each spring. Crappie populations are very cyclic, they can exhibit very abundant populations at times and other times they can be very low density and hard to find. However, these boom-and-bust cycles are not an effect of overfishing, but rather environmental conditions during their spawn.

Below: Eldon Brozek holding a pair of Elk City white crappie.

Crappie are a fish species that, when conditions are right, have the capability to produce very large year classes even with a low-density population. This means that a very small percentage of crappie in a lake can produce enough crappie to completely repopulate the entire lake. If you couple this with the fact that many crappie reproduce at a size much smaller (~8 inches long) than most anglers harvest, it is much easier to see that environmental conditions can play a larger role in crappie populations than angler harvest.

One regulation that I hear from anglers is dropping the limit from 50 to 20 per day. This regulation could be put into place if angler harvest is 33% or greater of the population in a year, and you have a significant number of anglers harvesting over 20 per day. This, however, does not happen very often as annual creel surveys statewide show that only ~5% of anglers harvest more than 20 per person per day.

Regulations Cont…

Another regulation that I hear suggested is a 10-inch minimum length limit. This length limit can be used if two things are occurring; crappie growth rates are high, and anglers are harvesting more than 33% of crappie that are under 10 inches. One thing that we have seen in this part of the state, is many lakes where there is an abundance of small fish and not many large fish, is slow growth rates. These slow growth rates often inhibit the crappie from growing to 10 inches, and thus very few ever become harvestable for the anglers. This leads to many fish dying of other natural causes (including old age) before they are available for anglers. Another thing we see from our creel surveys is that very few anglers harvest many fish under 10 inches in length, as they are viewed too small to keep (self-imposed 10-inch minimum length limit).

So what all does this mean for crappie population is our part of the state? With the abundance of data we have received from ESU and MSU, we know more about some of our crappie populations than we ever have. In the following segments I will give an update on crappie growth rates, reproduction rates, and mortality rates (including angler harvest rates).

Above: Black crappie (left) and white Crappie (right).

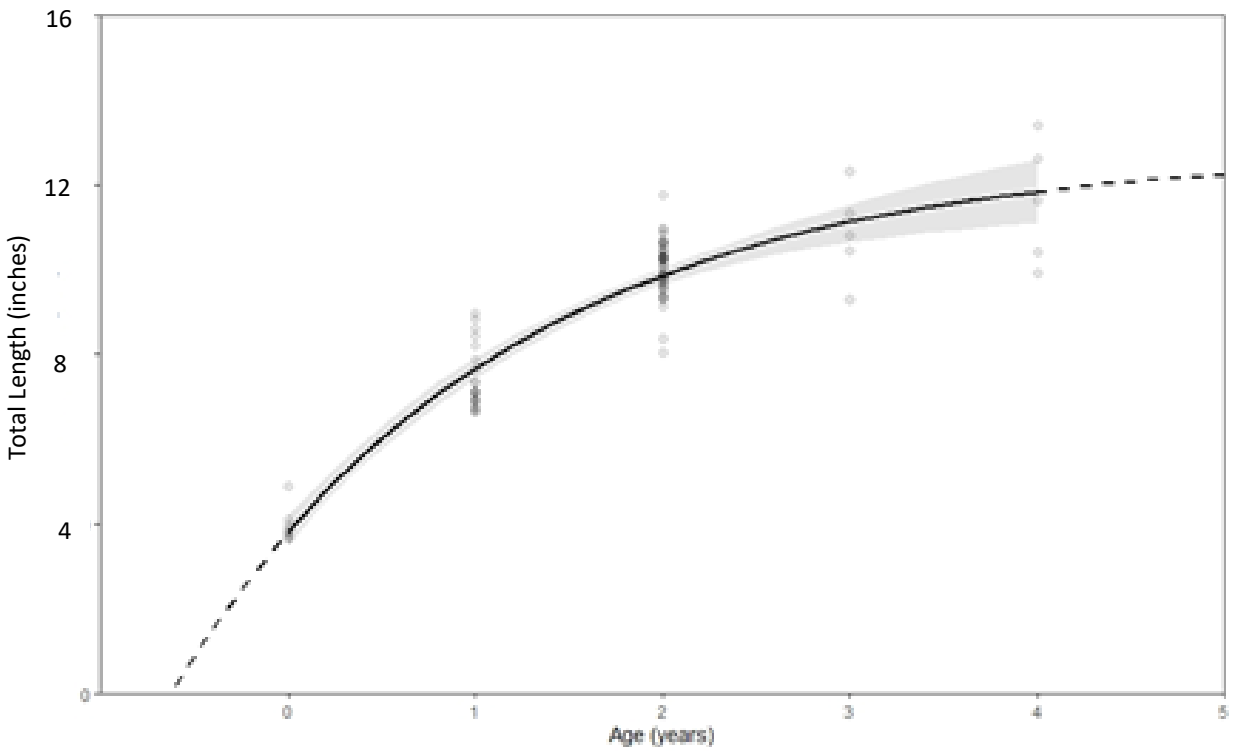
Below: Danci with some white crappie from Elk City.

Crappie Age-and-Growth ESU Study

Kansas Department of Wildlife and Parks partnered with Emporia State University (ESU) to do a comprehensive study looking at the growth rates of crappie in Kansas. Jim Miazga is the graduate student from ESU that took on the task of evaluating crappie populations from across the state. Jim took otoliths from crappie from federal reservoirs, state fishing lakes and CFAP lakes across the state. These otoliths were used to determine how fast crappie populations were growing in each body of water. Jim also analyzed these growth rates against many years of sampling data to get recruitment (reproduction) rates as well as mortality rates.

The lakes that we were able to collect enough fish from in the Independence District include Big Hill Reservoir, Elk City Reservoir, Parsons City Lake, Altamont City Lake – East and Sedan City Lake – North.

Big Hill Reservoir



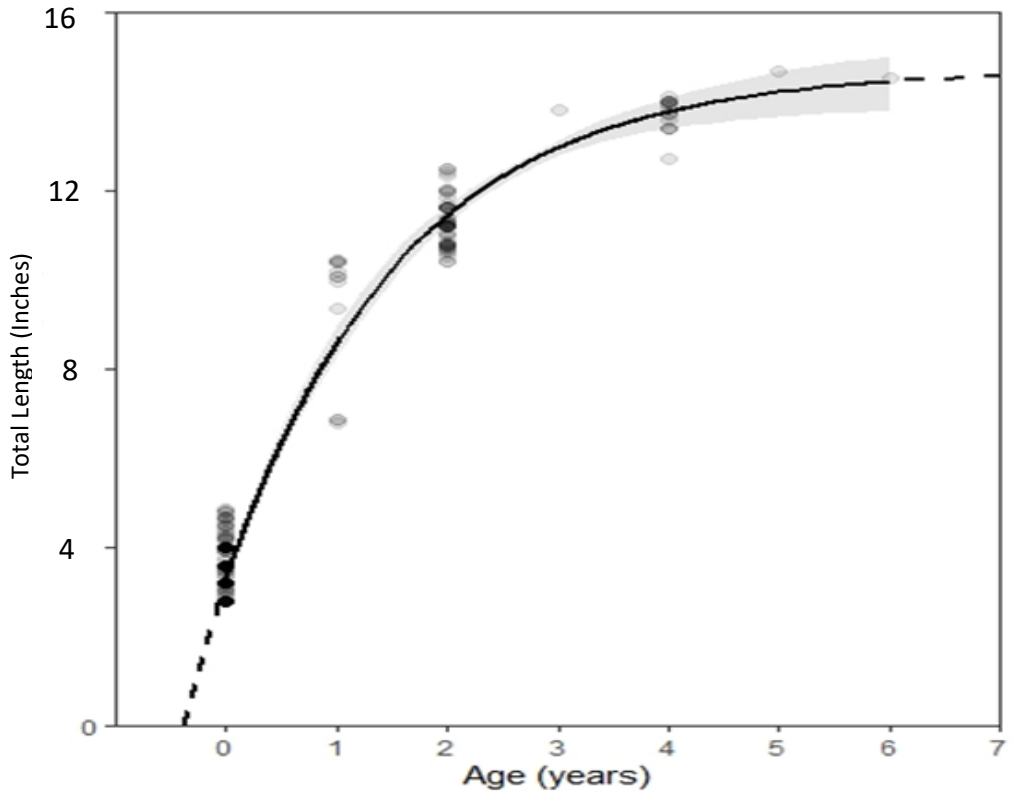
Above you can see the length-at-age graph for white crappie in Big Hill Reservoir. It is important to note that all fish growth slows as fish become mature and start to reproduce. If you notice on the graph crappie are reaching roughly 4 inches by the end of the year they were hatched, just shy of 8 inches the next year, and 9 ½ inches by the end of their third growing season. When compared to the statewide study Big Hill exhibits average growth rates for the state of Kansas.

When looking at the other population dynamics, Big Hill had steady recruitment. Data showed that white crappie had good recruitment 81% of the time, meaning that 81 out of 100 years they would reproduce well. Big Hill Reservoir also exhibited 76% mortality rates during the year, which was average for the statewide project. You may be shocked at a 76% mortality rate, and the fact that it is average, but keep in mind much of this mortality happens during the first year of growth (via predation, harsh weather, etc.…).

Overall, Big Hill Reservoir exhibits consistent recruitment, average growth rates and average mortality rates for lakes across Kansas.

Above: Olivia with a nice Black Crappie.

Elk City Reservoir



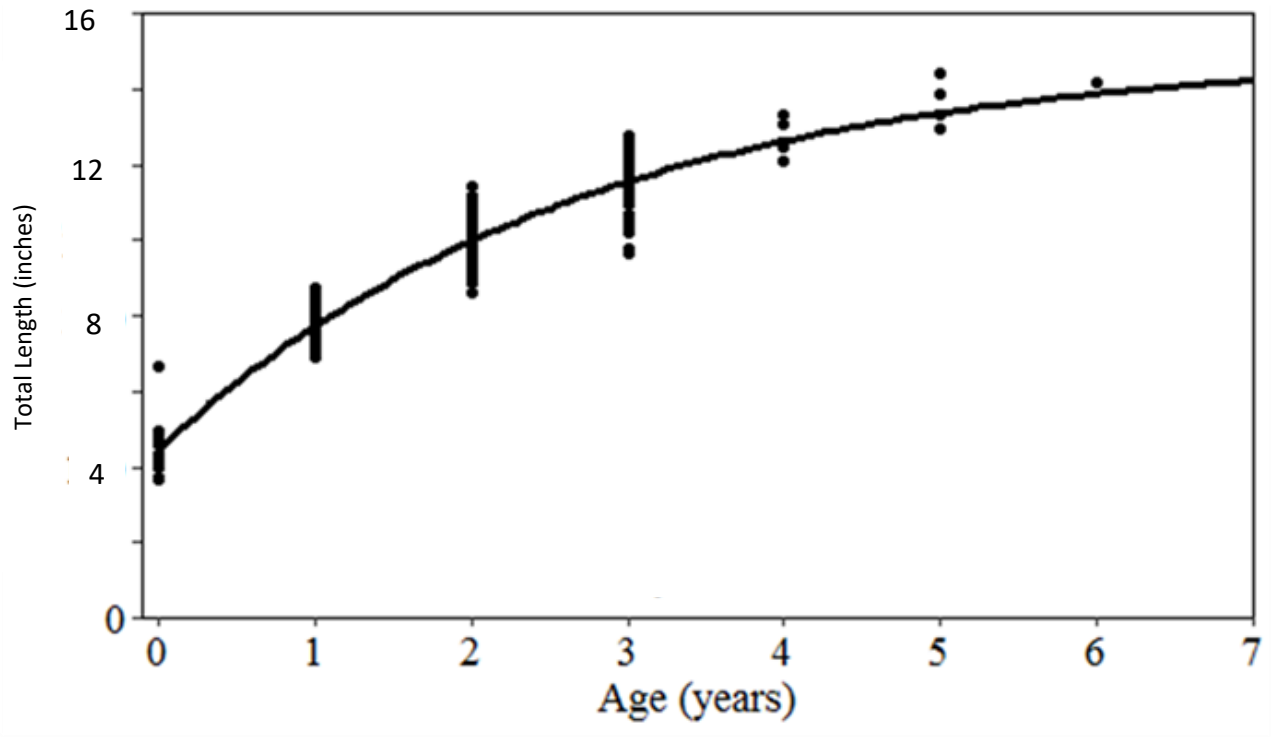
Above you can see the length-at-age for white crappie in Elk City Reservoir. Once again we notice that crappie are reaching about 4-inches in length by the end of their first year of growth. By the end of the second year of growth crappie are reaching just over 8-inches, and just shy of 12 inches by the end of their third growing season. When compared to other white crappie populations across the state, Elk City Reservoir has above average growth rates.

When looking at the other population dynamics of white crappie in Elk City Reservoir, we see that Elk City has below average recruitment when compared to other population in Kansas. Elk City has a recruitment rate of about 34%, or we see good reproduction about once every three years. We also found that Elk City had a mortality rate of almost 91% during the course of a year.

Overall the white crappie population in Elk City Reservoir has above average growth rates and mortality rates, while below average reproduction rates when comparted to the other Kansas lakes that were looked at.

Above: Hudson with a white crappie from Elk City.

Parsons City Lake



Above you can see the length-at-age graph for white crappie in Parsons City Lake. If you notice on the graph crappie are reaching roughly 4 inches by the end of the year they were hatched, just shy of 8 inches the next year, and just shy of 10 inches by the end of their third growing season. When compared to the statewide study Parsons City Lake exhibits average growth rates for the state of Kansas.

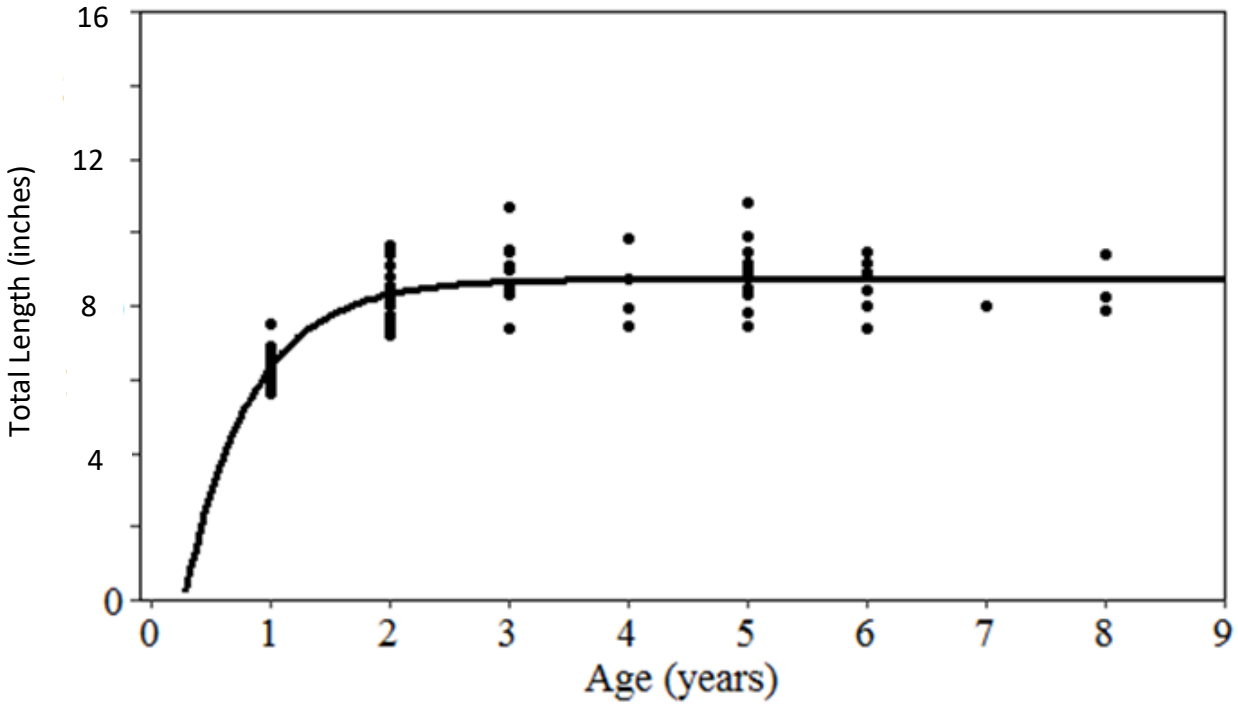
When looking at other population dynamics, Parsons City Lake had stable recruitment. White crappie recruitment occurs 90% of the time, or 9 out of 10 years there is good reproduction. Parsons City Lake exhibited 64% annual mortality, which was average with the statewide project.

Altamont City Lake – East

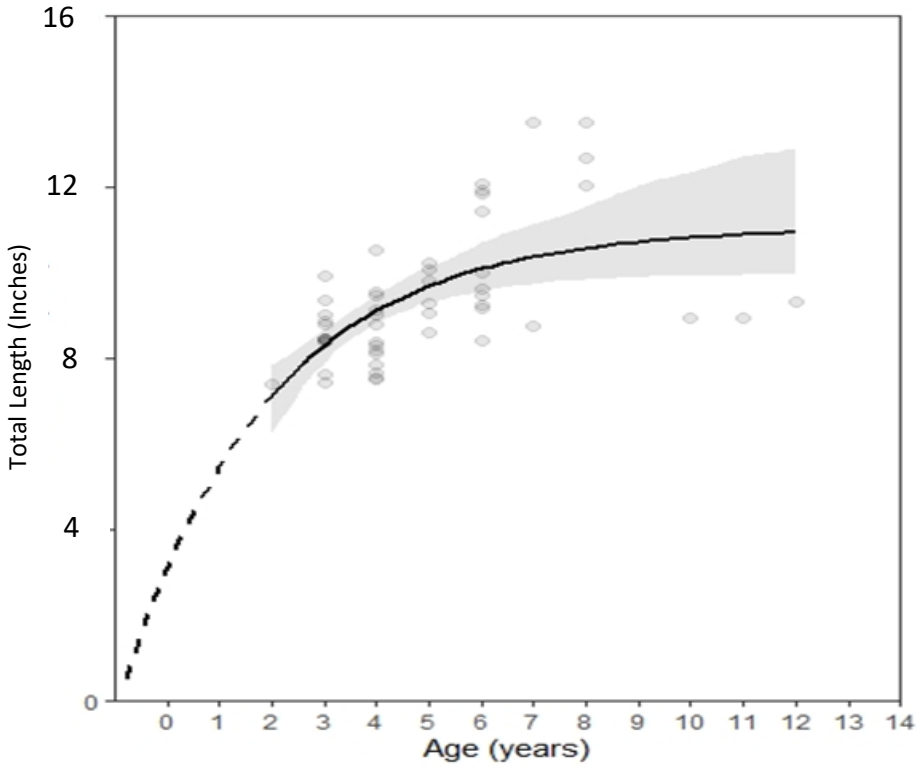
Below you can see the growth rates for white crappie in Altamont City Lake – East (Idle Hour East). During the first growing season white crappie reach roughly 6 inches in length, but slow drastically after. Many crappie in Idle Hour East reach 8 inches in length by the end of their second growing season and stall out there-after. As with any populations of fish, there are exceptions to this graph where there are certain individuals in Idle Hour East that will grow to a large size.

When looking at the other population dynamics of Idle Hour East, we see that there is fairly stable recruitment. In Idle Hour East white crappie have a recruitment rate of 59%, or roughly 6 years out of 10 there will be good reproduction. Idle Hour East exhibited 35% mortality throughout the year, which is below the statewide average.

Altamont City Lake – East Continued



Sedan City Lake – North



Sedan – North Cont…

Above you can see the growth rates of white crappie in Sedan City Lake – North. Growth rates were found to be slightly below average for the statewide project and exhibited quite a bit of variability among individual fish. On the graph above, each dot indicates an individual fish's length-at-age, suggesting that around age-3 some fish start slowing down in growth while others continue to grow quickly. On average white crappie are around 4-inches after their first year of growth, about 7-inches after the second year and just over 8-inches after the third year of growth.

The other population dynamics of Sedan City Lake – North showed below average recruitment. Sedan - North had a recruitment rate of 35%, or about once every three years. The mortality rates were also below the statewide average, with a mortality rate of 25% during the year. Overall, Sedan City Lake – North is a lake that has below average reproduction and mortality, with a variable growth rate among individuals.

Above: Some nice white crappie from Elk City Reservoir.

We would like to thank Jim Miazga for all his hard work around the state of Kansas and gathering us valuable age-and-growth information. We would also like to thank everyone else who helped from ESU, we know this wouldn't be possible without fellow students and staff. This project will be valuable in determining factors that are indicative to good crappie populations, as well as provide fisheries biologists the knowledge to provide good crappie fisheries across Kansas.

Above: Elaine from MSU with a white crappie from Parsons City Lake.

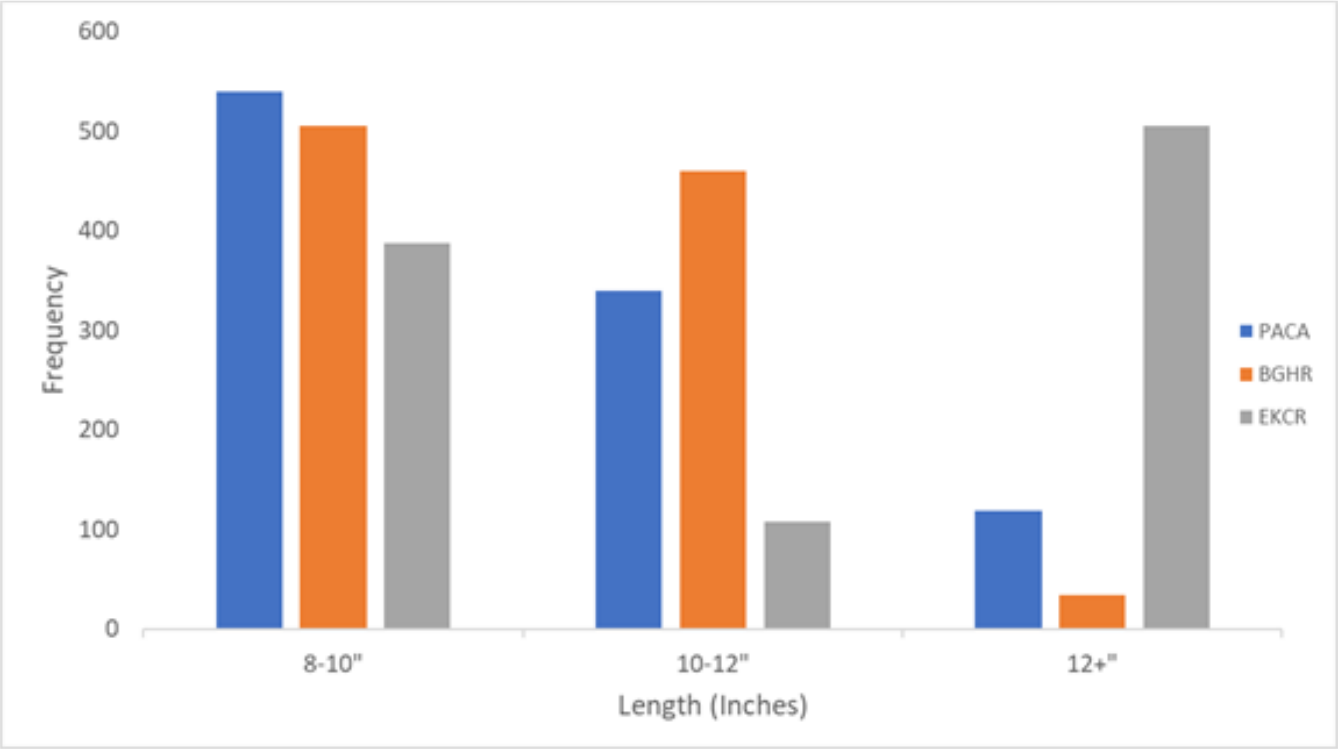
Crappie Tagging Project

MSU Study

Once we had all the information about our crappie populations, we wanted to evaluate where crappie mortality was occurring (naturally vs human harvest). We were able to partner with Missouri State University (MSU) to further evaluate angler harvest on Elk City Reservoir, Big Hill Reservoir and Parsons City Lake. Danci Johnston was the graduate student who undertook this project through MSU.

As I stated in the management and regulations sections of this newsletter it is important to evaluate where crappie mortality is occurring. For this project Danci was able to collect and put floy tags (2-inch-long tag protruding from the fish near the dorsal fin), in 1,000 crappie in each of the three reservoirs being evaluated. The fish that were tagged included any crappie captured over 8-inches in total length. This study will not only help evaluate the percentage of crappie harvested by anglers per year, but also help us evaluate what size anglers prefer to harvest.

However, this project is not only dependent on Danci, but also on the anglers themselves. Danci and KDWP **NEED** anglers to report these tags (via the phone number on the tags) to help us get data as accurate as we can. As an incentive for anglers to take the time to call in **ALL** tagged fish caught, Danci will be giving away a hard-sided cooler (estimated $300/cooler) for **EACH LAKE** in the study. This drawing will include everyone who has reported a tagged fish, with extra chances for each fish reported (example 4 tagged fish reported = 4 chances in the drawing). This study will continue through early spring 2022, with a period for anglers to turn in tags before the drawing occurs.

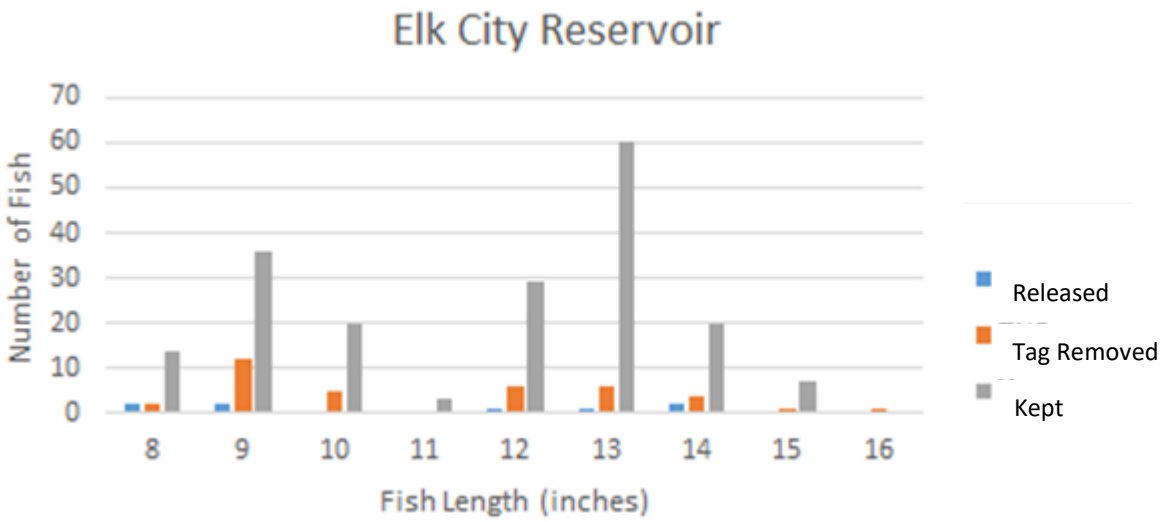


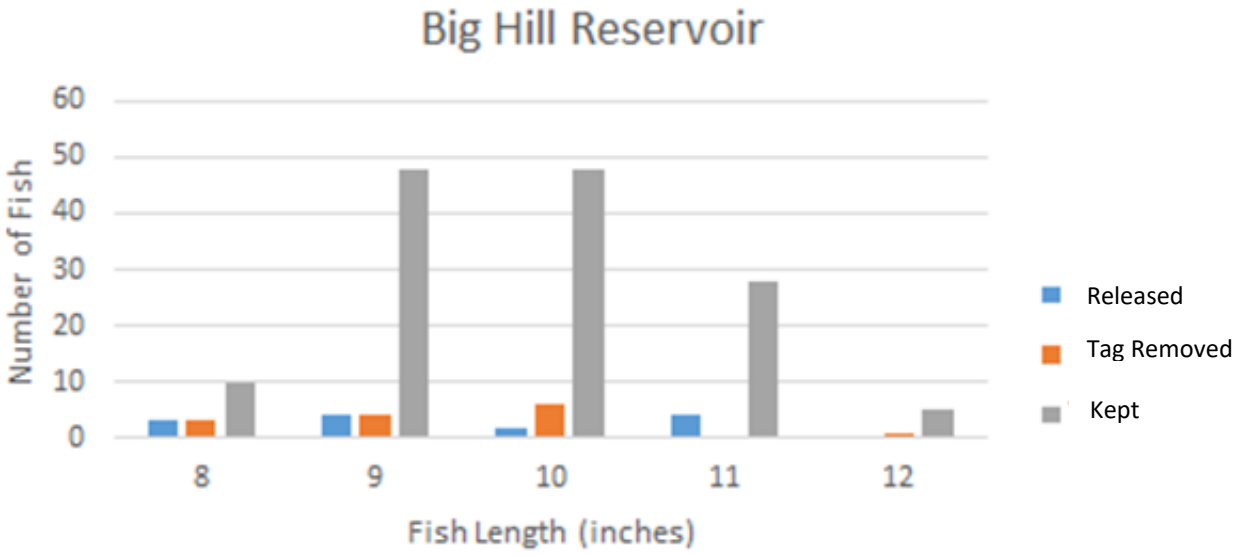
Above: Size and number of crappie tagged in Parsons City Lake (PACA), Big Hill (BGHR) and Elk City (EKCR).

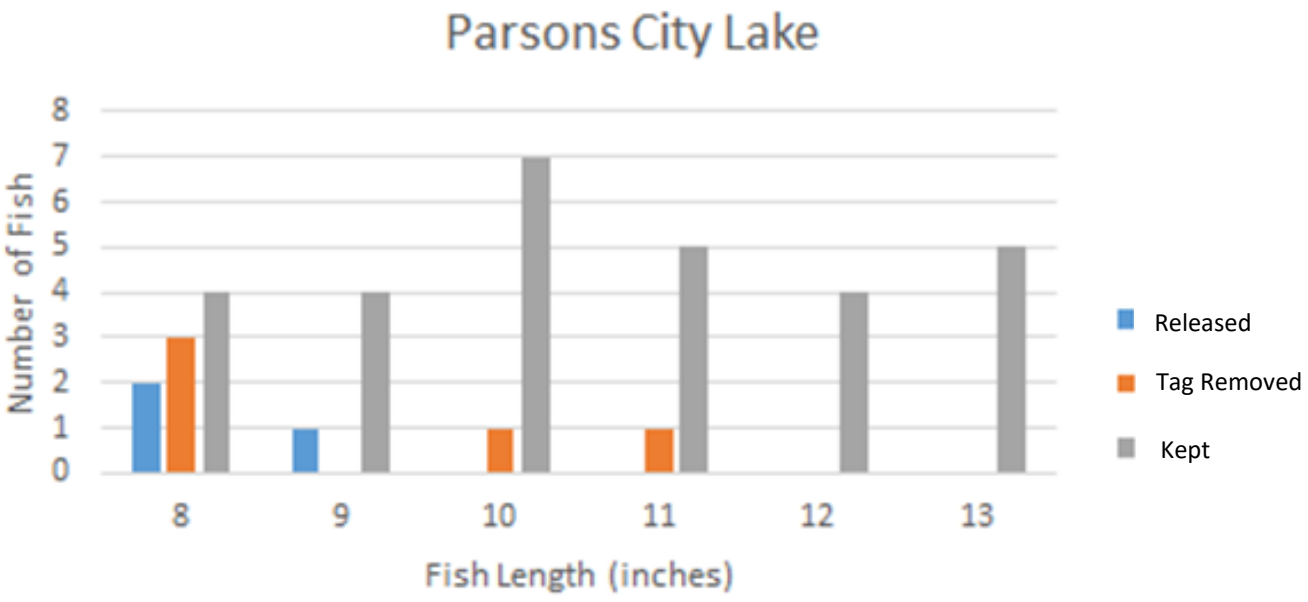
Tagging Project Continued

Since this project began, I have been getting questions on how many tags have been caught and from which lakes. Crappie were tagged from late October 2020 and finished in mid-April 2021, since then 437 of the 3,000 tags have been reported caught. Also a friendly reminder that if you catch a tagged fish and you don't intend to keep it, **please leave the tag in the fish when it is released**. Below is a breakdown of how many fish per lake were caught, harvested, released or tag removed from a fish, along with graphs to show the size of fish harvested and released in each lake.

		Elk City	**Big Hill**	**Parsons**
Tag Reported	Harvested	189	139	29
	Not Harvested	8	13	3
	Tag Removed	37	14	5
Total		234	166	37




Big Hill Reservoir
Number of Fish
60
50
40
30
20
10
0
8
9
10
11
12
Fish Length (inches)
Released
Tag Removed
Kept


Parsons City Lake
Number of Fish
8
7
6
5
4
3
2
1
0
8
9
10
11
12
13
Fish Length (inches)
Released
Tag Removed
Kept

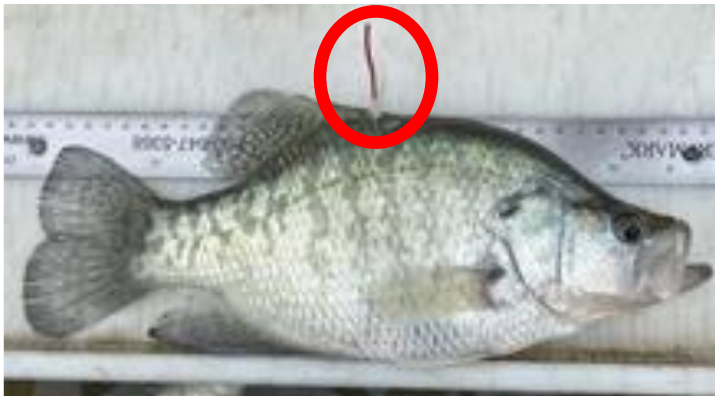
Tagging Project Continued

Looking at the data above from tag returns it's obvious that a larger percentage of tags are being turned in from Elk City and Big Hill reservoirs than from Parsons City Lake. There is still plenty of time for tags to be turned in and for this data to change. However, currently there have been 234 tagged fish reported from Elk City, of which 189 crappie were harvested (18.9% harvest mortality). Big Hill has had 166 tags reported caught, with 139 crappie harvested (13.9% harvest mortality). Parsons City Lake has had 37 tags reported caught, with 29 crappie harvested (2.9% harvest mortality).

Besides the obvious harvest mortality information, we have seen some interesting things on harvested and released crappie. In all three study lakes we saw anglers willing to keep 8-inch fish (some of these anglers have admitted it was simply because of the tag), but we have also seen anglers willing to release fish up to 11-inches in Parsons, 12-inches in Big Hill and16-inches in Elk City. We also have had an angler at Big Hill Reservoir turn in 26 tagged fish (the most of any angler so far), there is also an angler from Elk City Reservoir who has turned in 19 tags and in Parsons there are two anglers who have turned in 3 tags apiece. Remember that each one of these tags is an entry into the drawing for the coolers, and the number of entries is dependent on how many tags are turned in by the end of the study.

We would like to thank Danci for all her hard work on this project as well as the people at MSU who have assisted greatly in this project. From this project we will be able to more properly determine where our mortality is coming from on these three lakes.

Above: Connor Ossowski with two white crappie from Parsons City Lake.



Above: White crappie with floy tag highlighted.

Above: A 62-pound flathead catfish from Wilson State Fishing Lake.

Below: Some nice white crappie and channel catfish from Elk City Reservoir.

Above: Olivia with her first largemouth bass.

Final Thoughts

I hope this newsletter finds everyone healthy and ready for fall fishing. As the weather cools down and the fishing heats up, this newsletter should give you a great starting point for finding fish this fall. I also hope that I have answered all your questions on the crappie work that has been going on in the Independence District.

As always feel free to contact me with any further questions or comments you may have via the information above or check our website at: http://ksoutdoors.com/. Maybe I will even run into you while conducting my fall surveys in the coming months.

Happy Fishing!