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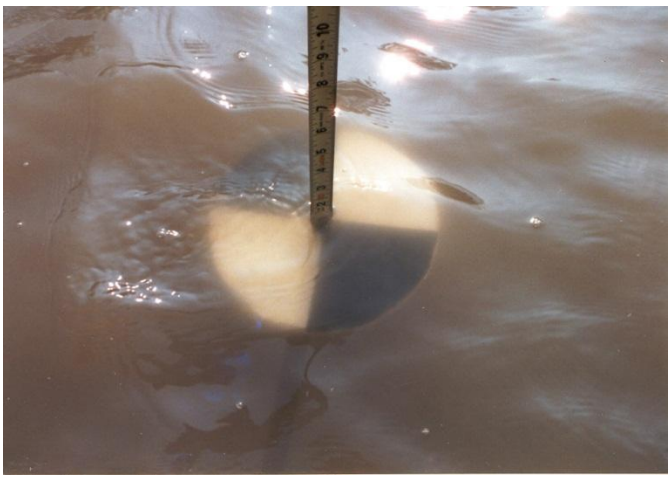
Robin Jennison, Secretary
Sam Brownback, Governor

Fall River/Toronto Fisheries District Newsletter

Lyon State Fishing Lake Largemouth Bass

In the March newsletter, you read that six of the lakes in the Fall River/Toronto Fisheries District ranked among the top in the state for bass fishing. Lyon State Fishing Lake was on that list, but only for bass under 15 inches. You may have also read the May 2011 newsletter article "Lyon State Fishing Lake: The Making of a Bass Factory" in which I wrote about my hopes for turning the newly renovated lake into a dedicated bass anglers paradise. Well, twelve years have passed since I started over at the lake, and I'm here to report what's being done to bring that dream to fruition.

First, I'd like describe my idea of an ideal largemouth bass fishery for this latitude in Kansas (from the viewpoint of a fisheries biologist). To start with, it's essential to have good water quality. Water transparency, as measured by a secchi disk, should exceed 18 inches. Bass are sight feeders, and although



Secchi disk in muddy water.

they can feed relying on their lateral line sense in turbid waters, really good populations prosper in clean, clear water. Lyon SFL had an average transparency of 6 feet throughout last year.

Excellent water quality at Lyon SFL is a result of many factors. First was its location within the drainage basin. It only has 1,400 acres of mostly grassland runoff to fill the 135 surface acres and a volume of 1,890 acre-feet of water. Of the 35 inches of average annual precipitation, only 7.5 inches runs off through native grass to fill the lake. The mean hydrologic residence time is 788 days. Another way of thinking about this is that on average, it takes two years and about two months for the entire volume water in the lake to pass over the spillway located on the corner of the dam. A low drainage index like that is good for maintaining stable water levels and not flushing fish out of the lake, but it's bad for bringing new nutrients into the lake. The lake's nutrient content is directly related to how fast the fish grow. By comparison, all the other nine small lakes within the district have a hydrologic residence time of one year.

LYSL water willow and American pond weed.

In addition to not much water running into the lake combined with grassland runoff, the lake has a dense stand of water willow along the shoreline. Water willow further filters any sediment that enters the lake and breaks up shoreline wave erosion. It also grows out to a depth of 3 feet and provides superb littoral spawning habitat and cover for not only bass but forage like bluegill and redear sunfish, crappie, crayfish, and aquatic insects. The lake also supports dense stands of sago and American pond weeds in deeper water.

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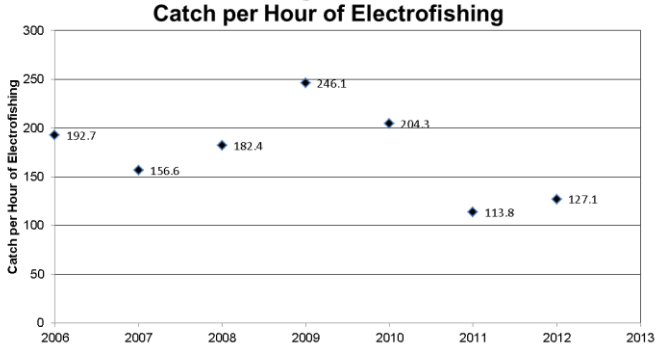
In addition to good water quality and aquatic littoral vegetation habitat, the ideal largemouth bass fishery has good recruitment. Recruitment is not the same as reproduction. Recruitment is the ability of a fish to reach "stock size." Stock size is 20 percent to 26 percent of the world record length for that species and is the minimum size that provides recreational value. Stock size is also when the fish becomes sexually mature, and is the size normally available to sampling gear traditionally used by biologists when monitoring lakes. Largemouth bass are recruited to the population at 8 inches. The half-log bass spawning structures described and pictured in the May 2011 newsletter enhanced reproduction in Lyon SFL, but not necessarily recruitment. Good water quality, abundant aquatic littoral vegetation habitat, food availability, and predation on young bass are all factors affecting recruitment.

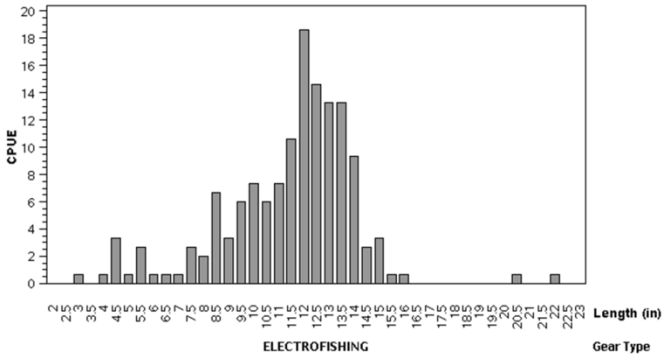
Once bass are recruited, the population density must be balanced. Biologists measure population balance by PSD (proportional stock density) indices. A balanced bass population should have a PSD of 40-60; in other words, 40 percent to 60 percent of stock size bass should be longer than 12 inches. This indicates that sufficient numbers of small bass are entering the population compared to larger brood stock. If the PSD is too low, it indicates that too many large brood stock are being taken out of the population. If PSD is too high, it can indicate reproduction and/or recruitment are too low or that large fish are being stock piled (usually due to a length limit).

LYSL Largemouth Bass Catch per Hour of Electrofishing



An ideal population is not only balanced, but it also has the right number of big bass. Biologists refer to that as RSD-P or the relative stock density of preferred-size bass. The management objective RSD-P range is 10-30. That translates to 10 percent to 30 percent of stock size bass should be longer than 15 inches. It's intuitive that when RSD-P is too low, the bass are stunted and growth is too slow. This can result from too many mouths to feed and/or combined with too little forage. When RSD-P is too high it indicates that forage is being wasted that could otherwise be consumed by more bass. In other words, bass density could be increased. When RSD-P is too high, it can indicate low reproduction or recruitment. When prey is plentiful, sometimes, bass can stock pile under an 18- or 21-inch length limit and would also be indicative of high RSD-P.

Length Frequency of Electrofished Largemouth Bass at Lyon SFL in May 2012



The number of bass a population can support depends on a lot of factors. Obviously, the amount of food available is paramount. The amount of food is dependent on how many bass and other predators there are in the lake. Lyon SFL has a simple predator/prey relationship. Largemouth bass is the primary predator. However, someone stocked saugeye in the lake in 2008, and they are developing a population, too, and are taking away from the bass population. Stock size bass feed on crappie, bluegill, redear sunfish, and crayfish. Any channel catfish that are reproduced in the lake are also gobbled right up, spines and all. For some reason, bass show a preference for feeding on small catfish.

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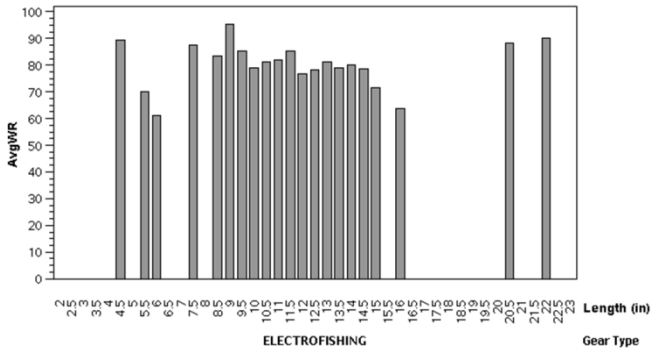
That's why we only stock channel catfish larger than 8 inches, so they won't be eaten by bass.

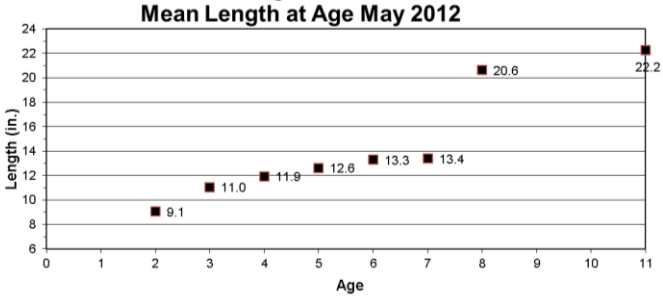
When bass get enough to eat, they not only grow to larger sizes, but they have good body condition. Biologists refer to fish condition as Wr, relative weight. Wr is defined as the ratio of the actual weight of a fish to the ideal standard weight. The management objective range for bass in Lyon SFL is 80-100. When Wrs exceed 100, it indicates too few fish in the population and forage fish are going to waste. When Wrs are high, bass grow rapidly, they exceed five pounds, and bass die of old age after reaching 18-20 inches long or more. Conversely, when Wrs are low, there isn't enough food. This is usually the case when the population density is too high. That is, there are too many mouths to feed. When Wrs are low, growth is slow, bass seldom exceed 2.5 pounds, and die of old age before reaching 18 inches long.

Average Relative Weight (Wr) of Electrofished Largemouth Bass at Lyon SFL in May 2012



So, now that you know the management objective set by fisheries biologists, how does the largemouth bass population at Lyon SFL measure up? Lyon SFL had a high-density bass population. On January 1, 2007 the 15-inch length limit was replaced by a 13- to 18-inch slot length limit. This was done to increase growth rate by decreasing small bass density, assuming that anglers are willing to harvest sufficient bass less than 13 inches. Five years after implementing the slot length limit, anglers have not been effective at reducing the population density. Stock size catch per hour of electrofishing was 127 which exceeded the objective density range of 80-100. Recruitment was too high. The bass population size structure was balanced. The PSD of 61 just exceeded the management objective range of 40 to 60. However, the RSD-P of three was below the management objective range 10 to 30. Too few bass grew to larger sizes.

LYSL Largemouth Bass Mean Length at Age May 2012



Largemouth Bass Stats	2009	2010	2011	2012
Total Catch	269.00	341.00	133.00	210.00
Stock Catch	251.00	307.00	114.00	191.00
Units of Effort	1.02	1.50	1.00	1.50
Stock CPUE	246.08	204.26	113.77	127.08
Quality CPUE (Density Rating)	141.18	124.42	65.87	77.84
Preferred CPUE (Preferred)	26.47	16.63	3.99	3.99
Memorable CPUE (Lunker Rating)	0.98	0.67	0.00	1.33
Sub-Stock CPUE	17.65	22.62	18.96	12.64
RSD S-Q (8-12”)	42.63	39.09	42.11	38.74
RSD Q-P (12-15”)	46.61	52.77	54.39	58.12
RSD P-M (15-20”)	10.36	7.82	3.51	2.09
RSD M-T (20-25”)	0.40	0.33	0.00	1.05
RSD T+ (≥25”)	0.00	0.00	0.00	0.00
PSD	57.37	60.91	57.89	61.26
Mean Wr S-Q (8-12”)	87.82	89.12	87.55	84.30
Mean Wr Q-P (12-15”)	80.83	83.63	80.63	78.29
Mean Wr P-M (15-20”)	79.04	83.75	69.62	63.88
Mean Wr M-T (20-25”)	106.27	105.00	0.00	89.17

Bass were in fair to good condition. Mean Wrs for all but quality-size fish were within the objective range of 80 to 100. In the past seven years, the catch rate exceeded the objective density, which limited growth. There were too many mouths to feed. Age analysis from scale samples showed that mean lengths at ages two through eight and 11 were 9.1, 11.0, 11.9, 12.6, 13.3, 13.4, 20.6, and 22.2 inches, respectively. Most bass died by age seven and reached a maximum length of 13.4 inches. Two fish, and eight- and an 11-year-old, grew faster and exceeded 20 inches.

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To increase bass growth, 30 pounds of bass less than 15 inches per habitat acre were targeted for removal from the population by electrofishing during spring sampling. Lyon SFL had 35 acres of shoreline less than 4.9 feet deep. Therefore, the goal was to remove 1,050 bass. However, after 2.5 hours of electrofishing, two laps around the lake in 2011 and 2012, only 447 bass were removed. Removed bass were stocked into Olpe Jones Park Pond, Emporia Peter Pan Park Pond, and Emporia Jones Park West Pond to establish new populations. Olpe and Peter Pan ponds had no bass due to summer fish kills, and Emporia Jones Park West Pond was recently renovated. The 2012 spring electrofishing sample indicated that the change in length limit and selective removal efforts were effective in reducing bass density. Therefore, to increase bass growth, it is recommended that gizzard shad be stocked as an additional forage base.

Managing Undesirables

There are new regulations for moving fish this year that if obeyed, could improve your fishing. Wild caught baitfish can only be used on the body of water where taken, except that bluegill and green sunfish may be taken from a non-ANS designated water and used for bait. If taken on a flowing stream or river, wild caught baitfish shall not be transported upstream across any dam or natural barrier. Anglers who purchase bait from a commercial dealer are required to carry the receipt for the live bait fish purchase while fishing. Aquatic nuisance species, ANS, waters are defined as waters containing prohibited species such as Asian carp, white perch, or zebra mussels. Fish may not be transported alive from ANS designated waters. Livewells and bilges must be drained and drain plugs removed from all vessels being removed from waters of the state before transport on a public highway. As always, it is illegal to release any fish into public waters unless caught from that water.

Here are three examples of what happens when these regulations were not followed, and it resulted in managing the undesirables.

17-inch white bass

White bass were discovered in Lyon SFL during fall test netting in 2012. They were not stocked by KDWPT. Therefore, they were likely illegally stocked by an unscrupulous angler. The nearest population of white bass was the Marais des Cygnes River above Melvern Reservoir, 5.5 miles away. This population is contaminated with zebra mussels as are the next three closest sources. Therefore, additional zebra mussel veliger plankton tows were taken in October, but none were detected. However, a zebra mussel population may not have reached sufficient density to detect, yet.

White Bass Stats	2012
Total Catch	74.00
Stock Catch	74.00
Units of Effort	52.00
Stock CPUE	1.42
Quality CPUE (Density Rating)	1.38
Preferred CPUE (Preferred)	1.31
Memorable CPUE (Lunker Rating)	0.10
Sub-Stock CPUE	0.00
RSD S-Q (6-9”)	2.70
RSD Q-P (9-12”)	5.41
RSD P-M (12-15”)	85.14
RSD M-T (15-18”)	6.76
RSD T+ (≥18”)	.
PSD	97.31
Mean Wr S-Q (6-9”)	121.27
Mean Wr Q-P (9-12”)	.
Mean Wr P-M (12-15”)	102.46

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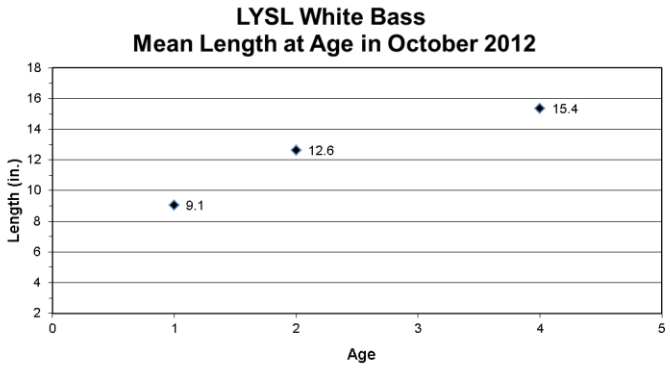
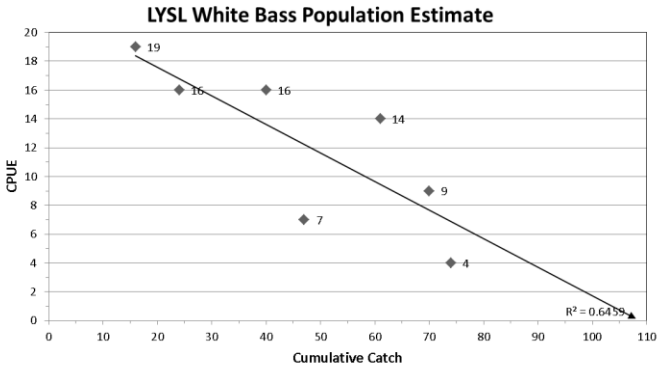
Mean Wr M-T (15-18")	97.21

Age analysis from scale samples revealed that there were three year classes present. Age one fish were 9.1 inches long (stock and quality size) and were likely reproduced in the lake. Age two fish were the dominant year class. They averaged 12.6 inches (preferred size) and were also likely reproduced in the lake due to the fact that there were 63 of them. It was unlikely that someone moved 63 adult white bass from another water body without a large hauling tank. There were no age three fish. There were five age four fish that averaged 15.4 inches (memorable size). It was likely that the four-year-old memorable size fish were the original brood stock introduced into the lake.



White bass were not selected to be stocked after renovation due to their competition with largemouth bass. Prior to renovation, the lake contained a naturally reproducing white bass population which was one of the justifications for lake renovation. Nevertheless, Lyon SFL now had a low density white bass population. Fifty-two gill nets were set over seven days to reduce the population density and to calculate a population estimate. All 74 white bass gill netted were killed. The estimated population size was 109 fish; 35 remained in the lake. However, r^2=0.65, so there was little confidence in this estimate.

White bass population eradication by gill netting was unsuccessful. The stock catch per gill net night was one fish. By comparison, good populations had five. The population size structure was not balanced. It was skewed toward larger fish. The PSD of 97 exceeded the objective range of 40 to 70. Recruitment was limited because of unfavorable spawning conditions and predation by the high density largemouth bass population. The RSD-P of 92 exceeded the management objective range of 10 to 40. The RSD-M of seven was within the management objective range of one to 10.



Fish were in excellent condition. Mean Wrs were high in or exceeded the objective range of 80 to 100. High white bass Wrs indicated that they were more successful at finding food than saugeye or largemouth bass, which had low Wrs. Saugeye and largemouth bass Wrs declined in 2012 indicating unsuccessful competition for food with white bass.

Saugeye were discovered in Lyon SFL in 2008. They were not stocked by KDWPT. Therefore, they were likely illegally stocked by an unscrupulous angler. The nearest population of saugeye was Council Grove Reservoir, 32 miles away. Age analysis from scale samples from all seven fish sampled in 2007 revealed that they were from the 2006 year class and 2½ years old. Neither saugeye nor walleye were selected to be stocked after renovation due to their competition with largemouth bass. Prior to renovation, the lake contained a naturally reproducing walleye population. Therefore, it is likely that saugeye will reproduce as well. In fact, due to their density and size, it was likely that the saugeye sampled were from reproduction and not the original stocked fish.

Mean catch per core-panel gill net night of saugeye was one fish. No management objective

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density was set for this species. However, in other lakes the objective density range was 2-4 fish. The size structure was not balanced. It was skewed toward larger fish indicating poor recruitment. The PSD was 100. In other lakes, the objective PSD range was 40 to 60. The RSD-P was 100 further indicating limited spawning and recruitment. In other lakes, the objective RSD-P range was 10 to 30. Saugeye were in poor condition. Mean Wrs for both size groups were below the objective range of 80 to 100.

Even though saugeye and white bass population densities were low, they negatively impacted largemouth bass. As these populations continue to increase in density, the largemouth bass population will suffer. Largemouth bass condition (Wr) declined as saugeye and white bass consumed bass forage. Mean Wrs for memorable size (20-25 inches), and preferred size (15-20 inches) largemouth bass declined 18 percent and 26 percent, respectively, after the introduction of the additional predators. Furthermore, the number of preferred size (15-20 inches) largemouth bass declined 81 percent! This showed that the decline in forage base caused by increased predation from saugeye and white bass resulted in largemouth bass stunted growth.

The final example of managing undesirables occurred at Howard City Lake. The lake contained a moderate density of large common carp. Carp were undesirable because they consume resources (food) that more desirable sport fish species could use. Their feeding activity also reduces water quality by stirring up bottom sediments. Furthermore, they eat fish food from the feeder meant for channel catfish and their large size and aggressive feeding behavior intimidates smaller channel catfish and discourages them from utilizing the feeder.

As a special experimental project, common carp were selectively electrofished in May 2012 after the largemouth bass were sampled. A special rubber dip net was used to capture carp to eliminate entanglement with their serrated anal spine. Carp were electrofished after the bass sample was taken to eliminate bias to the bass sample, because if the netter was dipping a large carp, he could potentially miss a bass. Also, the heavy rubber dip net was less effective at dipping bass than the normal fabric net one due to its increased weight and resistance when pulling it through the water.

Common Carp Stats	2012
Total Catch	47
Stock Catch	47
Units of Effort	1.17
Stock CPUE	40
SUB-STOCK CPUE	0
RSD S-Q (8-15”)	0
RSD Q-P (15-19”)	4
RSD P-M (19-25”)	87
RSD M-T (25-33”)	9
RSD T+ (≥31”)	0
PSD	100
Mean Wr S-Q (8-15”)	.
Mean Wr Q-P (15-19”)	.
Mean Wr P-M (19-25”)	78
Mean Wr M-T (25-33”)	82

A total of 47 common carp were captured. They averaged 7.49 pounds. All 352 pounds of carp were killed and removed from the lake. No small carp were sampled, indicating low recruitment. This was likely due to abundant bass predation and good water quality for the sight feeding bass. Carp were only in fair condition. Their mean Wrs were low in or below the objective range of 80-100.

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Common carp removed from Howard City Lake

It was the objective of this project that by making one lap of the entire lake shoreline and removing all spawning carp that it would enhance the sport fish populations. Bluegill and crappie fish condition (Wr) showed no improvement by fall test netting. However, channel catfish condition improved significantly (nine percent) by fall. Furthermore, stock and quality size largemouth bass condition improved five percent by fall test netting. Initially, it appeared that even the limited scope of this carp removal was beneficial to the sport fish population, and the project should be continued for further evaluation.

Now that you understand and can see the biological results and consequences of undesirable fish introductions, I hope you will share this information with your friends. After all, it is the goal of me and every fisheries biologist in Kansas to conserve sport, non-sport, threatened and endangered fishes, the water they rely on, and their habitat; to increase your fishing opportunity; and to increase your fishing success.

Nutty Observations

Something interesting is happening to elm trees around Emporia this winter. Now that's not something you'd expect to hear from a fisheries biologist. In early March, I was at Emporia Peter Pan Park Pond with the city park manager, trying to figure out where to get electricity for the purpose of installing aerators for the pond. The pond is becoming eutrophied, which is a fancy term used to describe the natural aging process whereby organic debris (in this case tree leaves) build up on the pond bottom. When they decompose during the hot days of summer, they cause oxygen depletion and kill the fish. A temporary solution to prevent this is to install two aeration fountains. This worked well at Wooster Lake on the Emporia State University campus. Ultimately, however, the pond will have to be drained and the bottom muck scooped out.

Well, while I was at the pond the park manager asked me what was eating the bark off the elm trees around the pond. Many of the elm trees in the park had the bark stripped from the tops of the outer most limbs. It looked like a porcupine had eaten the bark, but the limbs were too thin to support an adult porcupine, which can weigh between eight and 40 pounds but average 20. Plus, porcupines are rare in this part of Kansas. Nevertheless, my last encounter with a porcupine was last year below Toronto Reservoir dam. He had completely stripped the bark from the upper half of a domestic pine tree which likely killed the tree. This was definitely something different. Some other kind of critter was maiming these trees.

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Damaged elm tree in Emporia Peter Pan Park

The offending rodents causing property damage to the Elm trees in Peter Pan Park were fox squirrels. These are the common red squirrels frequently seen in the park and everywhere around here. I've seen fox squirrels eating elm buds in spring, but never tree bark. The normal diet of fox squirrels is tree buds, flowers, fruits, and seeds. They especially love oak tree acorns and cache them in the ground in fall. Later, they dig them up and eat them.

What's different this year in Emporia was 17 inches of snow covering the ground. The squirrels couldn't dig up their cached acorns or even forage on the ground for that matter. The deep snow confined them to the trees. With no other suitable food source,

Fox squirrel

they gnawed up the supple elm tree bark on the smaller limbs. Elm bark must taste good, because from what I observed, they selected it exclusively. Personally, I would choose a delicious maple tree. Maybe the silver and red maple tree sap around Emporia isn't as sweet as the sugar maple from which we derive our pancake syrup. A quick search on the internet confirmed this scenario. We usually have mild winters and abundant food, but the weather we had this winter stressed everyone and everything. I'll let you know if the fish experienced any ill effects from the winter weather.