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Notes from the Author

This issue is the first newsletter detailing angling related going's on in the Cedar Bluff District. The Cedar Bluff District essentially encompasses the majority of Northwest Kansas. See Figure 1 below.

Most people who call the Cedar Bluff District home know the important role that water plays in almost every aspect of our lives. For long-time residents of this district the importance of water is made apparent by the arid climate that typically characterizes our region. Obviously the availability of water plays the primary role in shaping our fisheries in this district.

Fortunately, going into the 2010 season, our weather pattern has been relatively wet, resulting in increased flow in our streams and increased water levels in our lakes. This wet weather pattern really started with the ice storms that occurred during the 2006/2007 winter. Increased stream flow allows fish and other aquatic organisms to recolonize many miles of streams that went dry during the past drought thus increasing the availability of stream fishing opportunities district-wide.

Similarly, district lakes have also benefited from the prevailing wet period. Many farm

ponds that went dry have refilled as have several public fishing lakes such as Atwood Township Lake and Ellis City Lake. Other district lakes such as Cedar Bluff Reservoir and Sheridan State Fishing Lake have realized increased water levels, and improvements in the fisheries have followed suite. Despite the wetter weather, some lakes like Smoky Gardens and Logan State Fishing Lake remain dry. The habitat is there just waiting for water and fish.

The current situation in the Cedar Bluff District looks promising, but we all know how quickly that can change with the onset of dry weather. So keep your fingers crossed, keep hoping for more rain, and good luck fishing this upcoming season as there are numerous excellent opportunities available this coming year.

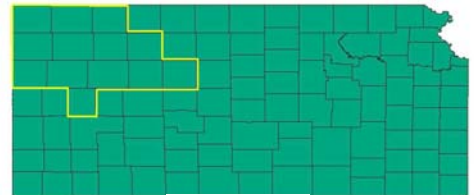


Figure 1

Who Pays for Fisheries Management Programs?

Sport fish stockings, boat ramp construction, habitat developments, fish hatcheries, purchase of fish feeders and feed, electro-fishing boats and sampling equipment, salaries for biologists, informational literature -- it takes a lot of money to survey, protect, and manage our aquatic resources. Where do we get the money to accomplish all these things?

Contrary to popular belief, it is **not** from the general taxes you were required to send to Topeka last April 15. KDWP's fisheries division relies on license

fees paid by anglers and boaters, and federal funds from the Sport Fish Restoration Act to fund our programs. The Sport Fish Restoration Act applies a 10 percent manufacturer's excise tax on fishing rods, reels, tackle boxes, lures, trolling motors, fish finders, and pleasure boats, with revenues distributed back to the states through a grant program. Approved sport fishing enhancement, boating, and aquatic education projects are reimbursed at 75 percent. KDWP uses fishing license dollars to pay the 25 percent match, and a lot gets accomplished. The Act has been America's

Who Pays, continued

most effective and successful user-pay/user-benefit success stories in resource conservation.

So you, the anglers and boaters, pay for aquatic conservation and sport fish management efforts in Kansas.

Give yourself a pat on the back. Recruit others to participate, so we can do even more to enhance sport fishing opportunities.

Reestablishment of Fisheries at Atwood Township Lake and Ellis City Lake Underway

As mentioned before, Atwood Township Lake and Ellis City Lake recently refilled and are currently in the reestablishment phase since the recent drought eliminated fish populations that previously inhabited both lakes. Both lakes could be considered mixed bags in that there are some positive trends occurring within the fisheries, but with the new inflow, immigration of undesirable species such as carp and bullheads has presented challenges to management at both lakes.

Progress at Ellis has been slowest. With the increased flow of water from Big Creek into Ellis City Lake, carp, bullheads, gizzard shad, and white crappie emigrated from perennial pools in the creek and all populations exploded to a degree that has negatively impacted the quality of the fishery. Over-abundant carp and bullheads limit the welfare of the channel catfish population by competing directly for food and space. Bottom rooting activity of carp and bullheads also decrease water clarity, resulting in reduced feeding efficiency for sight feeding predators like largemouth bass and bluegill. Carp are also formidable nest depredators, feeding on the eggs and ultimately reducing the reproductive output of desirable sport fish.

The gizzard shad population at Ellis has also expanded to nuisance proportions. Oftentimes, gizzard shad are a poor fit in small impoundments because they compete directly with young fish of all species for food. And in a productive lake like Ellis, gizzard shad grow quickly and out grow their usefulness as a prey source for desirable sport fish.



Common carp specimen from Ellis City Lake

Although white crappie are a popular sportfish and are highly sought after in many lakes, this species has become a problem at Ellis. Extremely high production of young crappie has overwhelmed the forage base resulting in poor crappie growth. The poor growth among Ellis white crappies has resulted in a situation where 6-inch crappie are stacked in the lake like cord-wood and few will be able to surpass this small size without a change.

The key to improving the situation at Ellis City Lake is to build the number of predator fish. Management activities to this end have already been undertaken with the stocking of adult flathead catfish, intermediate and fingerling largemouth bass, fingerling saugeye, and intermediate striped bass hybrids. Some promise has been noted as bullhead numbers appear to have decreased and fat and happy flatheads were sampled last fall. Progress for the largemouth and saugeye populations have not been as notable as catch rate of largemouth remains low and no saugeye have been sampled to date. Given the historic poor performance of largemouth at Ellis the outlook for this population is tenuous. However, despite the lack of saugeye in last fall's nets, I wouldn't count this population out yet. Saugeye have shown promise in many other small turbid waters around the state, so I would expect that this population will begin to establish itself given time and continued stocking.

Similar to Ellis, Atwood Township Lake has suffered an influx of undesirable fish species, but the prognosis at Atwood isn't nearly as daunting. As of last fall, only common carp and bullheads had immigrated into Atwood. Sampling results indicated that common carp numbers were high, but bullheads have yet to really increase to excessive numbers. On a positive note, no gizzard shad or crappie have been detected at Atwood, but it may only be a matter of time before one or both species turn up in the lake since both are present in the drainage.

The name of the game at Atwood is similar to that at Ellis, and it is to load the lake with predators to control the undesirable species. But the big difference so far has been that the slower refilling of Atwood has enabled a more proactive management approach, in that predatory sport fish populations could be established before existing carp and bullhead populations mushroom out of control or before species like shad and crappie even enter the system. Similar to Ellis, largemouth bass and flathead

Reestablishment of Fisheries, continued

catfish have been stocked. Intermediate- to adult-sized bass and flatheads capable of preying on the carp were stocked at Atwood. In addition to largemouth bass and flathead catfish, stockings of saugeye and striped bass hybrids have been requested and should be stocked during 2010, depending on availability from our hatchery system.



A couple of nice Atwood Township Lake largemouth bass

As eluded to above, the different rate of refilling has influenced progress of desirable sportfish populations. At Ellis, refilling was rapid, and this allowed for almost immediate establishment of roughfish populations, which complicated the establishment of desirable sport fish.

On the other hand, the slow refilling of Atwood has helped to minimize negative impacts of rough fish and promoted establishment of several sport fish species. Early in the refilling of Atwood, fathead minnows, adult channel

catfish, and adult hybrid sunfish were stocked. The minnows did their job and produced an abundant forage supply for predatory sportfish, resulting in good catfish and sunfish growth. As of last fall, fair numbers of catfish up to 3.5 pounds and hybrid sunfish in the 7- to 8-inch range were available. Furthermore, stocking of intermediate-sized channel catfish during the fall of 2009 improved the overall number of catfish. The adult largemouth bass stocked during the summer of 2009 also benefited from the abundant forage in Atwood such that bass body condition is excellent and quick growth has resulted in the availability of fish up to 3 pounds.



Quality hybrid bluegill from Atwood Township Lake

Management challenges for both lakes remain. But with more time, continued management activities, and hopefully continued rainfall, both lakes should offer up much needed angling opportunities.

2010 Walleye Egg Harvest at Cedar Bluff a Success

Every spring during late March and early April, walleye and sauger in Kansas lakes move into dams and other rocky areas to spawn. During this timeframe, KDWP fisheries staff collect and fertilize eggs from wild broodfish to provide the raw material needed for hatchery production of walleye, sauger and saugeye fry and fingerlings that are stocked at public fishing waters statewide. To maximize the efficiency of the egg-collection process, donor lakes are selected based upon walleye population dynamics. Lakes that harbor populations composed of high numbers of large females are preferred since the larger the female walleye the more eggs the fish will yield.



A female walleye caught in a gill net during walleye egg collection. Trap nets are also used to primarily capture male walleye during the spawn.

2010 Walleye Egg Harvest, continued

Cedar Bluff Reservoir, along with Hillsdale and Milford reservoirs, was a site where walleye eggs were collected during the spring of 2010. Walleye egg collection operations have been conducted annually at Cedar Bluff since 2006, yielding good results. The Cedar Bluff portion of the 2010 walleye egg collection operation ran from March 19 to March 30, and eggs were only actually collected on nine of the 12 days during this time period since adverse, windy conditions were deemed a safety threat on several days. During the egg collection operation at Cedar Bluff, daily water temperature ranged from 42 to 46 degrees with an average daily water temperature of 43.5 degrees.

At Cedar Bluff, 702 female walleye broodfish were captured. And out of this total, eggs were successfully collected from 419 of the females, 75 of the females captured had already spawned in the lake, and the remaining balance of 208 females were in prespawn condition at capture. Female walleye broodfish captured ranged from 17 to nearly 29 inches in length and the average length of females captured was 23 inches. For a complete length break down of female walleye caught at Cedar Bluff see Figure 2.

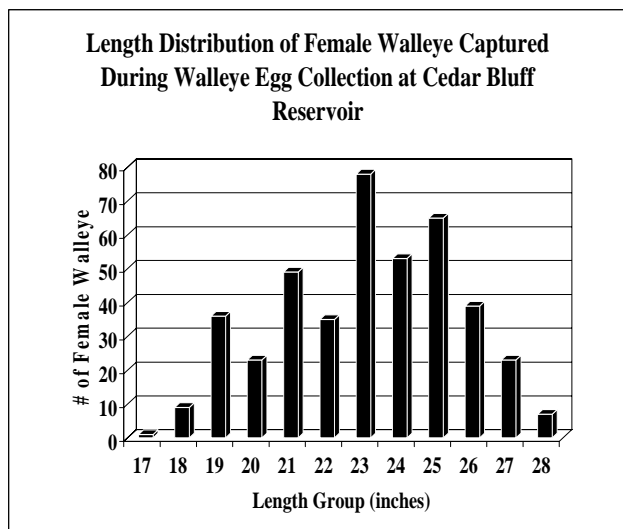


Figure 2

Walleye eggs collected at Cedar Bluff were fertilized by sperm from male walleyes captured during the egg collection process. The total number of male broodfish captured over the operation was 401 fish. All broodfish captured during the egg collection operation were returned to the lake except that nine fish succumbed to handling mortality resulting in a total handling mortality rate of 0.008 percent.

The annual statewide egg harvest quota that the collection operation must meet is ultimately set by the number of fry and fingerling walleye requested for stocking by district fisheries biologists. For 2010, 42 million fry and 920,000

fingerling walleye were requested statewide and the statewide walleye egg quota was set at 100 million, figuring an egg hatch rate of approximately 50 percent.



Pressure is applied to the ovaries of the broodfish to release the eggs.

The egg collection operation at Cedar Bluff yielded a total of 59.8 million eggs, accounting for 62 percent of the total statewide walleye egg harvest. To make it more tangible, that is approximately 120 gallons of walleye eggs. The hatch rate for eggs harvested at Cedar Bluff was approximately 58 percent, yielding 35 million fry and 653,000 fingerlings for stocking in Kansas waters.



Hatchery staff tending to walleye eggs in an incubation battery

Given the success of walleye egg collection at Cedar Bluff in 2010, it is likely that the reservoir will be one of the donor lakes for walleye egg collection during 2011. This ongoing, annual egg collection operation is essential to maintaining high-quality walleye angling opportunities in reservoirs and smaller waters throughout Kansas where natural production and recruitment of walleye is less than desired. Thus, for the entire Fisheries Section, the busy days of the walleye spawn is a rite of spring that heralds the beginning of the season.

Crappie 10-inch Minimum Length Limit Evaluation to Take Place at Cedar Bluff

Over the past 10 years, the Cedar Bluff crappie population, consisting of both black and white crappie species, has declined to levels well below what was realized during the late 1990's. Reduced crappie abundance has been due to factors associated with the effect of reservoir water level decline on crappie recruitment. However, from 2007 to the end of 2009 the reservoir water level has remained low but relatively stable. Fall 2009 standard sampling detected the formation of a relatively strong 2008 cohort of white and black crappies that recruited to age-1. Although the 2008 crappie cohort was strong compared to recent year classes, it is suspected that the 2008 year class was only abundant enough to moderately improve overall crappie abundance.



Crappies from the heyday in the late 1990's

Given 2009 crappie dynamics, characterized by an extremely low abundance of individuals larger than 10 inches and relatively abundant 2008 cohort that ranged from 5 to 7 inches, it is probable that anglers will harvest

crappies less selectively and begin imparting harvest mortality on the 2008 year class before many of the fish grow to larger size. With the prevailing water level and relatively low crappie recruitment, it may be prudent to restrict harvest of small individuals thus allowing them to grow to larger, more desired lengths.

During 2010 fall sampling, crappie population abundance, size structure, and age structure information will be collected. This information will be compared to the same data collected during the recent crappie heyday at Cedar Bluff that occurred during the late 1990's to allow a within basin evaluation of current growth and recruitment. Furthermore, Cedar Bluff crappie growth will be compared to the same data collected at other lakes. And based upon other Kansas crappie growth studies, it is fair to assume that if Cedar Bluff crappie can attain an average length of 10 inches or larger by age-3 or younger, then growth is rapid enough that fish will reach harvestable size in a reasonable amount of time. If recent growth is sufficient and recruitment continues to be lower than that observed in the late 1990's then recommendation to implement a 10-inch minimum length limit will be proposed.

Water level has a profound influence on the quality and quantity of crappie available at Cedar Bluff by determining the suitability of conditions for crappie recruitment and growth. During periods of declining water level, conditions for crappie recruitment are poor resulting in decreased numbers. Therefore, by protecting the crappies that successfully recruit to the fishery from angler harvest during periods of water level decline, we effectively conserve a limited resource in hopes that the crappie population quality will be optimized.

Farm Pond Restocking

During the first half of this past decade, prevailing drought conditions throughout the Cedar Bluff District caused many farm ponds to dry up or become critically low, eliminating existing fish populations. Now with the return to a wetter weather pattern, many farm ponds have refilled. If you happen to own such pond or know some one who does, you may be interested in reestablishing a fishery in a newly-filled pond. Following in this article are a few hints relative to pond restocking and management that will hopefully help you optimize the quality of the fishery in your pond.



Drought stricken farm pond subsequent to water level-related fish kill

Farm Pond Restocking, continued

Although it is disappointing when the water level in a pond gets low or the pond goes dry, the period of time while the pond basin is dewatered affords the opportunity to do some work in the basin that will improve fish habitat. In ponds with heavy silt deposition, drying of the basin allows for the most cost-effective opportunity for silt removal. Fish attracting structure can also be increased while doing earthwork in the pond basin. Fish prefer to orient around changes in bottom topography such as points and drop-offs versus occupying a flat, featureless bottom. During the silt removal process, topographical features within the basin can be accentuated or created to provide structure attractive to fish.

With any silt removal project, it is important to dispose of silt in a location that will not allow the silt to wash back into the pond. Usually somewhere on the downstream side of the dam is best. Other factors such as local geology can result in additional considerations relative to silt removal, so seeking technical advice from sources such as Natural Resources Conservation Service (NRCS) and KDWP prior to undertaking a silt removal project is recommended. Furthermore, there may be legal considerations relative to silt disposal, modifying a dam structure, and/or altering the volume of a pond that may result from a silt removal project. Therefore, it is best to consult the Kansas Department of Agriculture Division of Water Resources before endeavoring into any silt removal project.

A dry pond basin is the perfect setting for a wide variety of fish habitat improvements. One common form of fish habitat is the installation of brushpiles. Dragging whole trees into the pond bottom and weighting them with concrete or rock anchors is best. Be sure to use plenty of weight to ensure that the trees don't float when the pond refills. Another type of fish habitat to consider is a stake bed. Stake beds are essentially artificial stump beds built by digging a series of post holes in close proximity to each other and tamping in posts or logs into the post holes to create fish habitat. Hardwood trees, logs, and posts made of Eastern red cedar or hedge will last longer than soft woods. Using rock or broken concrete to create rock piles is also a good way to enhance fish habitat, as well. If you decide to go with concrete, make sure to use material without rebar.

With any fish habitat improvement project, placement of structures adjacent to changes in bottom topography enhances the effect of the structures. Placement of structures that involve penetration of the pond bottom should be avoided in pond basins that are sealed by liners or other basin sealants like bentonite. The bottom line relative to fish habitat construction is be creative and try to think like a fish.



Cedar tree fish attractor installed in a dewatered lake basin

When a pond refills it's time to reestablish fish populations, and the most common questions are when and what species to stock. It is generally best to stock fish during the spring and fall when water temperatures are cool. Transporting and stocking fish during the summer increases the risk of stress-induced fish mortality.

When and how rapidly a pond refills is a factor determining when to stock, as well. If the pond refills quickly and floods a great deal of terrestrial vegetation that had grown in the basin while the pond was dry, delaying stocking is important. Decay of flooded dead vegetation will consume oxygen dissolved in the water. Thus fish stocked into a rapidly refilled pond can suffocate. If you are unsure whether dissolved oxygen levels in your pond are sufficient to support fish life, contact a KDWP fisheries biologist for technical advice.

A pond that refills slowly shouldn't have this problem and should be ready to be stocked with a full complement of fish species as soon as it reaches at least 75 percent of full capacity. Waiting until the pond is nearly full ensures that most of the terrestrial vegetation is flooded and has a chance to go through the necessary decay process before fish are introduced.

However, if there is question as to whether the pond will completely refill or whether it will refill quickly, stocking is fine, but one must always keep in mind that there is risk of a fish kill if a large volume of the pond refills quickly and floods an abundance of terrestrial vegetation. With this in mind stocking a forage species like fathead minnows while the pond is in the initial filling stages is a good way to get a jump on the stocking process. This way if the pond continues to fill slowly then there will be an established forage base for later stocked sportfish, but if the pond fills rapidly and kills out the minnows then the financial loss will be minimized.

Selection of fish species for stocking is determined by habitat, water quality, and forage availability. Most Kansas sportfish species will survive in most bodies of

Farm Pond Restocking, continued

water regardless of water size and habitat availability, but variations in these factors primarily influence the size potential of a given species. In general, small ponds have limited habitat diversity and thus the species composition of the fishery should be fairly simple. But as pond size increases, so does habitat diversity and thus, a larger pond can adequately support a more diverse array of fish species.

In most ponds with water clarity* of at least 18 inches, stocking bluegill, channel catfish, and largemouth bass is usually a good mix of species to start with. Fish species diversity can be augmented by stocking hybrid bluegill, and in ponds possessing abundant aquatic vegetation, redear sunfish would likely be a good fit. However, in small ponds with limited water clarity, development of quality sunfish and largemouth bass populations can be difficult, thus focusing on catfish production may be the most feasible objective. In turbid ponds where catfish production is the primary objective, stocking a forage species like fathead minnows, golden shiners, and/or bluegill along with channel catfish only is recommended. Other common sportfish species such as crappie, walleye, and wipers are not recommended for stocking in small ponds even if the water clarity is good. In the case of crappie, over population and lack of a suitable forage base is usually the limiting factor. Relative to walleye and wiper, forage and habitat availability prove limiting.

In larger ponds, there is greater potential to establish a higher diversity of fish species, as well as achieving fish populations of desirable size quality. In addition to largemouth bass, channel catfish, and various sunfish, crappie can be stocked and managed such that reasonable crappie quality can be expected. If establishing crappie is desired, the pond must have clear water, stocking black crappie is recommended as they are less prone to overpopulation, and it is important to maintain good largemouth bass abundance to help keep crappie numbers in check.

In some cases, larger ponds can produce quality walleye and wiper populations, but typically the presence of gizzard shad as a forage species is necessary. Stocking gizzard shad in most pond situations is not recommended since annual shad production in ponds tends to be unpredictable, resulting in a boom in some years and a bust in others. Furthermore shad will compete with sunfish for food and may result in a poor-quality sunfish population. Stocking predators to control shad should really only be done if establishment of shad was inadvertent.

Regardless of what species are chosen for stocking, there is a recommended sequence. Initially largemouth bass, bluegill, channel catfish, and a short-term forage species like fathead minnow should be established prior to adding other species for diversity sake. The simplest stocking sequence is to stock all fingerling sized sport fish and adult minnows at once in the spring. Relative to cost, this is also

the cheapest regime. However, stocking small fish will require allowing a couple of years for fish to grow before any real fishing opportunities are realized. It is also important to stock the right number of fish to hedge against creating imbalances in the fishery. Stocking fingerling-sized fish at the following per-acre rates are recommended; 100 largemouth bass, 500 bluegill, 100 channel catfish, and 3 pounds of fathead minnows.



Dip net full of advance-sized bluegill just prior to stocking

Another option is to stock intermediate-sized fish, in other words 6- to10-inch largemouth bass, 4- to5-inch bluegill, and 6- to10-inch channel catfish. When stocking advance-sized fish, the sequence of stocking becomes more critical and the expense is greater, but the amount of time before the pond provides fishing opportunities is lessened. With this regime, it is important to establish your prey base first, so stocking adult fathead minnows at a rate of 3 pounds per acre, preferably in the spring a year prior to stocking the sportfish species is best. Then during the spring following minnow establishment, the remaining core sport fish species can be stocked at half the per-acre rate recommended for fingerling-sized fish. Once the largemouth bass establish themselves, they can be expected to eliminate the fathead minnow population. But this is not a problem and no further fathead stocking is warranted since bluegill will constitute the primary forage fish species once they spawn.

Once the respective species for stocking are chosen, consideration as to the source from which to obtain fish must be made. It is possible, but definitely not recommended, to obtain wild fish to stock a pond. Collecting enough wild-caught fish to approximate the above mentioned stocking rates is time consuming. Furthermore, collecting fish from wild populations can be illegal in the case of collecting from public waters. And in other cases, collecting fish for stocking from the wild also greatly increases the chance of an unintended introduction of an undesirable animal or plant species into your pond that may result in management challenges in the future.

Farm Pond Restocking, continued

The best source of fish for stocking is from a reputable commercial fish producer. A list of Kansas commercial fish producers can be found at www.kansasaquaculture.org or obtained from a local KDWP, County Extension, or NRCS office.



Some typical fish hauling equipment such as an insulated hauling box and compressed oxygen cylinder

The final and most obvious step to establishing a pond fishery is acquiring and stocking the fish. Best-case scenario is that the commercial fish producer will transport and stock the fish. But depending on distance and number of fish, the producer may not be willing to transport the fish without additional cost. If transport and stocking by the producer cannot be arranged, then the pond owner may have to undertake the task themselves. The best advice for those who plan to transport the fish themselves may be to arrange to borrow fish hauling equipment from the commercial fish producer or contact your local KDWP district fisheries biologist to see about borrowing hauling equipment.

When stocking fish of any size it is important to minimize stress imparted by the transport/stocking process. Minimizing handling of fish is one way to lessen stress. In other words, the fewer times the fish is netted or handled the better. Dissolving 0.5 percent sodium chloride (uniodized table salt) into the hauling water will help reduce stress further. The fish provider may be willing to help you determine the correct amount of salt for your hauling water when they load the fish.

Another way to reduce stocking-related stress is to acclimate the fish prior to stocking by slowly equalizing the temperature of the hauling water to that of the pond. In general, smaller fish are less tolerant to a change in temperature, so the hauling water should be within two degrees of the temperature of the pond before the fish are released. Larger fish tolerate a greater temperature differential, but it is still best to get the temperature of the hauling water and pond as close as possible.



A common management objective for establishing a pond fishery

There are quite a few things to consider when stocking a new pond or a pond that has refilled. What fish species, how many fish, where to get fish, how to transport the fish from the hatchery to the receiving pond, and how to ensure good stocking survival are all important issues. And having answers to all the above mentioned questions before proceeding with stocking a pond ensures the best result. The information provided above should help with the decision making process. I'm sure this article may not cover every situation and may have spurred more questions, but hopefully you will find this information useful if you are interested in pond stocking. As always, if any questions remain it is advisable to contact your local KDWP district fisheries biologist.

**Water clarity can be measured by submerging a white object into the water and measuring the depth at which the object is no longer visible from the surface.*