Main Stem Report for the Cumberland River Basin

Wolf Creek/Lake Cumberland

Lake Cumberland's temperature layers blended together by the end of October 2009, much earlier than the usual mid-December to mid-January timeframe for total mixing. As you may remember, the reason for the early mixing was the evacuation of cold water caused by a wetter than normal 2009 coupled with the ongoing lake level restrictions in force as repairs to the dam's structure continue. The mixing process also occurred just in time to prevent potentially very harmful conditions from occurring in the adjacent Wolf Creek National Fish Hatchery, which draws its water supply from Lake Cumberland. With the complete and rapid mixing of the water in the reservoir, Lake Cumberland has undergone expected winter time cooling reaching a cool 40^0 F. Dissolved oxygen conditions in the lake and tailwater were excellent at this time.

The other event that occurred this winter was a major rainfall event and generally wet weather particularly in late January 2010. These events pushed up the lake level which resulted in a need for evacuation of water back to the near 680.0 foot elevation lake level mandated for dam safety concerns. As a result, large amounts of materials were flushed into Lake Cumberland and water clarity suffered with water transparency at the dam reduced to just over one foot as measured with a Secchi disk. Weather conditions occurring during the spring months (March-May) will be critical to determining what kind of conditions develop in the reservoir during the critical warm season months. Hopefully, drier conditions will prevail in 2010 and water quality will remain suitable during summer and fall for the coolwater fisheries (striped bass, walleye, and smallmouth bass).

In the tailwater, water quality conditions for fish were marginal in 2009, mostly due to the abundant rainfall and high flow conditions experienced during the year. The abundant rainfall flushed most of the cold water from the lake early in the year and caused the tailwater to become much warmer than normal in late summer and fall. The abundant rainfall continued into early 2010 and tailwater flows remained elevated throughout most of the late winter which did improve dissolved oxygen levels and overall water quality.

The high flow and unusually warm water temperatures in 2009 affected the tailwater fisheries. Results from a creel survey conducted by the Kentucky Department of Fish and Wildlife Resources (KDFWR) during 2009 indicated the trout fishery declined since 2006 (the previous survey year). The average size of rainbow and brown trout caught by anglers decreased since 2006 and anglers made fewer fishing trips in 2009 (22% lower than 2006). Also, sampling by KDFWR personnel in 2009 revealed that growth of rainbow and brown trout slowed in the past few years and their body condition has worsened. These results are undoubtedly related to the poor conditions (warm water and lower oxygen levels) present in the tailwater during the last few years.

Due to the on-going issues with the dam, the emergency fishing regulation enacted last September in the tailwater will likely remain in effect for 2010. The emergency regulation increased the creel limit on rainbow trout from 5 to 10 fish. The 15-20-inch protective slot limit on rainbow trout stayed in effect. Therefore, only 1 of the 10 rainbow trout in the daily limit may be 20 inches or longer. The emergency regulation was designed to encourage anglers to harvest the abundant "stocker" trout, while still preserving the larger fish in the population. This regulation will likely remain in effect until dam repairs are completed and the tailwater returns to more normal conditions.

KDFWR will again work closely with the Corps of Engineers (Corps) through summer and fall 2010 to monitor water quality conditions in the Cumberland tailwater. KDFWR personnel plan to deploy temperature loggers at several locations in the tailwater during late spring to record hourly water temperatures. Hopefully, the rest of 2010 will be drier, allowing the lake to retain most of its cold, winter-stored water providing the tailwater with cold water during the critical late summer and fall period. Ideally, it will rain enough to keep flows adequate in the tailwater but not so much that the lake is flushed of all its cold water.

Dale Hollow

Dale Hollow followed a more typical mixing pattern as no sluice releases were required at the project. Mixing was gradual, occurring at the dam down to 80 feet by early December, 110 feet by mid-December, and completely mixed by mid-January 2010. As mixing progressed, tailwater dissolved oxygen conditions showed steady improvement. Again, the really dramatic difference between mixing patterns at Lake Cumberland and Dale Hollow were tied to the very heavy withdrawals, particularly sluices at Wolf Creek. Water transparency values were dramatically better than those seen at Lake Cumberland. On February 22, 2010 Secchi disk transparency at Dale Hollow was recorded as 20.7 feet. Remember Lake Cumberland came in with a transparency of only 1.3 feet!

Center Hill

At Center Hill Dam repairs continue to lessen seepage of water through the dam, surrounding landscape, and geological formations. Fairly restrictive pool level constraints also continue with the top of the power pool reduced to 630.0 feet above sea level.

Center Hill mixed more slowly than did Lake Cumberland, following a pattern more like Dale Hollow. By mid-December mixing to 80 feet behind the dam had occurred. This amount of mixing did result in dissolved oxygen improvements in the tailwater surpassing the critical 6.0 milligrams per liter level. Cold weather in December facilitated mixing so that by December 17, 2009 the project was considered completely blended. Center Hill cooled rapidly with the advent of an extreme cold period in early January 2010 reaching a temperature of 43^0 F.

Large inflows resulted in a rapid rise in lake levels during the latter half of January 2010. Lake managers responded by increasing flows out of the dam dramatically and for a sustained period of several weeks high flows were a regular occurrence. Finally by early March, some reduction of outflows was possible; and lake levels moved back to about elevation 625. Many fishermen have noted the dingy, colored appearance of the water in the tailwater and have attributed that at least in part to the ongoing construction activities at the dam. However, this dingy water is coming not from the construction area but is passing from the lake through the turbines and sluices. A possible explanation is that large inflows and the need to pass this water quickly for pool level control resulted in much reduced detention times with less time for the water to clarify. Such an operation reduces the efficiency of Center Hill Lake as a settling basin.

J. Percy Priest

J. Percy Priest mixed by early December 2009 and as the winter proceeded dissolved oxygen conditions improved steadily in the portions of the lake close to the dam that are routinely monitored. By the end of February 2010 water temperatures had reached approximately 40^0F.

Winter is the perfect time to undergo habitat and fish attractor projects due to the exposed reservoir banks. Because of this, 600 bald cypress trees were planted by the Tennessee Wildlife Resources Agency (TWRA) in Percy Priest to reduce erosion of banks and islands, provide spawning habitat for fish and benefits to other wildlife species. Survival rates of plantings in recent years have been 80 percent.

Fish attractors are built to provide marked structures for anglers to increase their fishing success. The goal is to bring the fish and fishermen together. TWRA maintains 21 fish attractor sites marked by buoys with fish insignias in J. Percy Priest Reservoir. All 21 sites were refurbished this winter and should yield excellent fishing spots. The sites were re-brushed by suspending donated Christmas trees with floats near the top and anchors at the trunk. Twelve trees were placed at each site. TWRA also maintain approximately 175 stake beds marked by a PVC pole with the TWRA logo in the lake. These were enhanced with additional stakes; and marker poles were reset this winter.

Main Stem Projects

The main stem projects of Cordell Hull, Old Hickory, Cheatham, and Barkley basically served as conveyances for releases from upstream tributary projects, particularly Wolf Creek and Center Hill. High flows were a dominant factor throughout most of the winter, only beginning to diminish by the beginning of March 2010. As the growing season advances, conditions may change dramatically in these lengthy, generally shallow reservoirs. Future weather conditions will drive water quality conditions for these projects. Stay tuned!

In Old Hickory Reservoir, fish attractors were placed around all bank fishing piers over the winter. These sites provide great fishing spots for anglers not wanting to fish from a boat and are accessible by wheelchair.

In Cheatham Reservoir, all fish attractor sites marked with buoys were refurbished with suspended Christmas trees. Ten new stake bed fish attractors were constructed in Johnson and Sycamore Creeks.

Sauger and walleye populations in Old Hickory and Cheatham Reservoirs are dependent on hatchery stockings to enhance both fisheries. Each occur naturally in big river systems such as the Cumberland, but the construction of dams has altered habitat and flow requirements essential to natural production. Mid-March is the start of the spawning season for walleye in Normandy and Springfield Fish Hatcheries. We collect walleye broodfish from the Rock Island area of Center Hill Reservoir where they concentrate to spawn. Approximately 20 pair of walleye were taken to Normandy Hatchery and 5 pair to Springfield Hatchery. As of March 22, most had spawned and eggs were present. After eggs hatch, the fry live in 4 foot diameter round tanks for about 4 days while their mouth parts and digestive systems develop. Once developed, the fry are ready to feed on zooplankton (tiny microscopic animals) and are stocked in prepared production ponds. They live in the hatchery ponds for 30 – 45 days at which time they become piscivorous (feed on fish). They are harvested and stocked in the reservoirs at this early age to avoid losses to cannibalism in the hatchery ponds. The stocked walleye fingerlings average 2 inches.

Other Projects

Generally wet weather facilitated considerable power production at the Laurel Project, which features one 61 megawatt unit. The project produces power for the Eastern Kentucky Power

Cooperative. Some of the nicest natural scenery in the Nashville District is found around Laurel River Lake which lies within the Daniel Boone National Forest.

Martins Fork is the smallest, by far, of Nashville District's lake projects at 578 acres. It is nestled in the rugged mountains of eastern Kentucky and provides an important recreational resource with fairly good water quality. Principal influences upon water quality are occasional sediment concerns from logging or other land disturbances and small quantities of acid mine drainage. Outflow water quality is regulated through a multiple level release structure built within the dam that is used to meet temperature goals in the downstream channel. This is the only multiple release project operated by Nashville District.