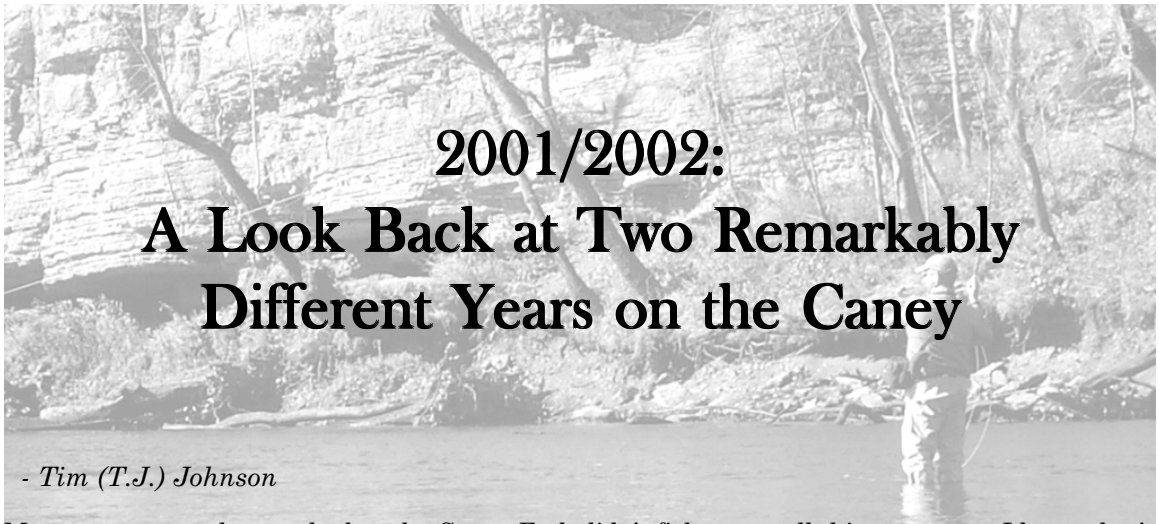


2001/2002: A Look Back at Two Remarkably Different Years on the Caney

- Tim (T.J.) Johnson

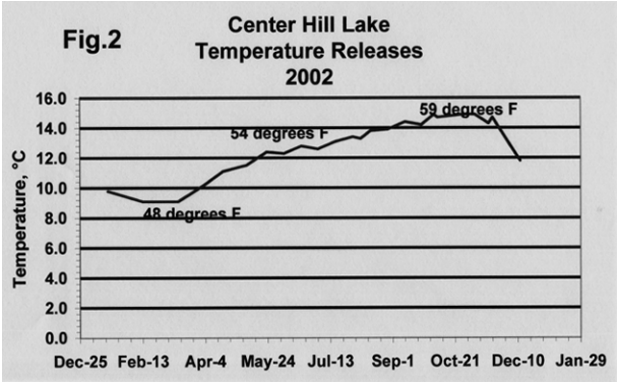
Most everyone understands that the Caney Fork didn't fish very well this past year. I know that's a pretty subjective observation, but if you compare this past year to the banner year we had in 2001, or even the two years before that, '02 was somewhat forgettable. I have no electro-shock or creel survey info, but in general, most fishermen I talked to didn't experience the quality fishing of the previous three years. There were some nice fish caught, but the numbers of big fish were down. And what happened to the hatches? The spring caddis never showed like in '01 and they barely made an appearance in the fall.

The Water Management division of the Corps has provided some data that may shed some light on the differences. By the way, thanks to the Corps for the info and let's hope that these studies will help us in mitigating some of our trout habitat problems when possible. While there is no data that will show the precise culprit, frankly because it's probably a combination factors, we have been provided with evidence that runs along familiar lines. Obviously, trout need cold water, food, and oxygen. It's here that we can start to formulate what went wrong. I'll try to refrain from speculation, but if I am presumptive in some areas, I'll be using words like "probably" and "maybe". Hey, this is not a scientific journal piece. This is to educate you to the major factors effecting our closest trout water.

Fig. 1 Spring Rainfall totals in Center Hill Basin (in.)

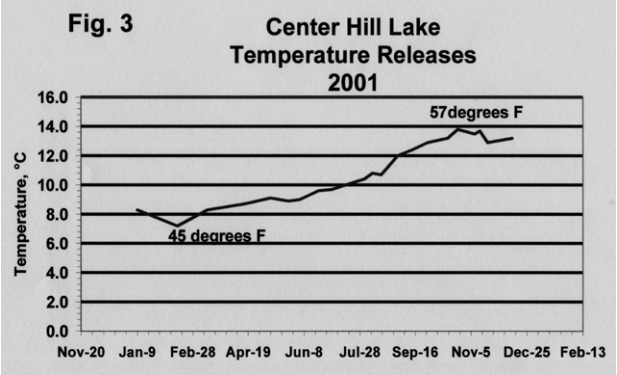
	1997	1998	1999	2000	2001	2002
January	4.68	4.81	7.98	3.04	3.47	5.7
February	3.11	3.85	3.07	3.3	3.43	2.18
March	8.89	4.01	4.75	3.75	4.07	**7.28**
April	2.93	7.28	3.06	5.34	2.84	3.48
May	4.11	5.02	3.43	4.54	1.87	**5.36**
June	**7.3**	**8.45**	5.39	2.88	0.93	2.46
March to June totals	23.2	24.8	16.6	16.5	9.7	18.6

According to the Corps, the thread that ties all the habitat issues together is rain, particularly late spring rains. I suppose it's not suprising that warm water is an influence, but it's not just about temperature; it's also timing. The Corps keeps the lake low through the winter to manage big winter rains. In '02 there were two periods of 20,000 cfs discharges, in Jan. and Mar. (10,500 cfs is the typical amount for three units on the Caney). By May, in anticipation of less rainfall through the summer, they bring the lake up to summer pool so they'll have an adequate supply. If we get big rain events after this point, the Corps has to release the good, cold water winter supply from the bottom to make room for the warmer water. Starting May 3, Center Hill ran 6 days of 2 units around the clock, and on the 9th started 3 units around the clock for 9 more days to answer for a big May '02 rain event (Fig.1). The temperature of discharged water was remarkably higher compared to the previous year (Fig.2 and 3). On Memorial Day weekend Center Hill stopped generating completely, maybe for holiday fishing,

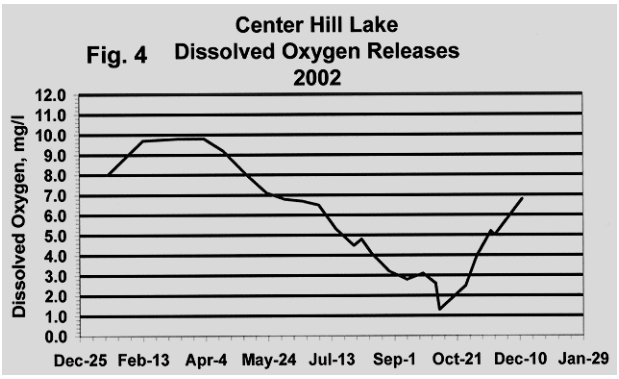


except for 1 unit for an hour at 4pm. This continued for a week. During that week, water temps in the 70's were reported around Stonewall. After these reports, Center Hill began an early morning, 1 hour pulse to supply the lower river with a shot of cold water during the heat of the day...and it worked. TWRA set out temp monitors which showed that the water stayed within range far down river.

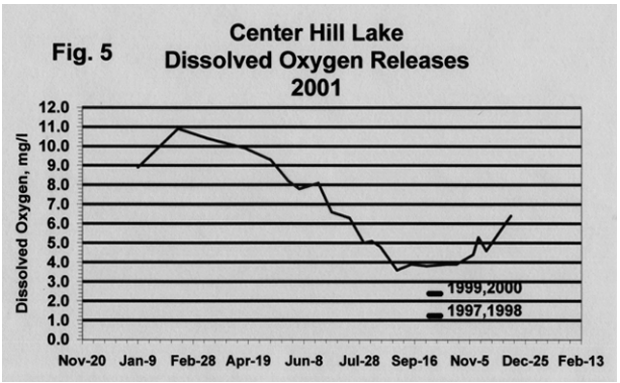
It has been theorized that the Smith Fork may have been contributing largly to the temp problem during that last week in May, and that through the summer as the Smith Fork receded, the morning pulse may have lost some of its value in controlling temperature. Water discharge temps continued to rise all summer and fall, however (Fig.2). We don't know, but at that point, the pulse became a rough manager of minimum flow. There may be a more appropriate time to pulse to manage minumum flow, and the Corps and other volunteers set about trying to better understand river flows with studies performed this past Nov. My understanding is that the Corps just can't turn on the water any time it likes. They answer to the Southeast Power Administation (SEPA). They had to ask for the pulse and once Water Management got it they probably didn't want to lose it. I'm just thankful that the Corps was reponsive to the temperature issue.



So what happened to the spring caddis? Is its departure an indication of a lack of quality trout food in '02? Was it the week of high temps? Caddis and mayflies are generally more prevalent below Smith Fork and that's where it was hot. Or was it scouring? The river was full of caddis in early Jan. Remember the hatches of the previous fall? They went strong into Dec. Maybe two shots of 20,000 cfs flows through the winter washed them out. Does anyone know if they were still there at the end of March? It could be the 9 continuous days of 3 unit generation in May right in the middle of when they came off in '01. Or was it a combination of high discharges in May and then suddenly shutting everything off? During that week in May, I saw tons of cased caddis baking in the sun up on the shoals. Maybe they skipped a hatch -- still alive and just waiting for fall since spring conditions weren't favorable. Is that possible? I believe it's the same species that comes off at both times. Of course, if they were waiting for fall, there were other things to hamper their survival. Low D.O.

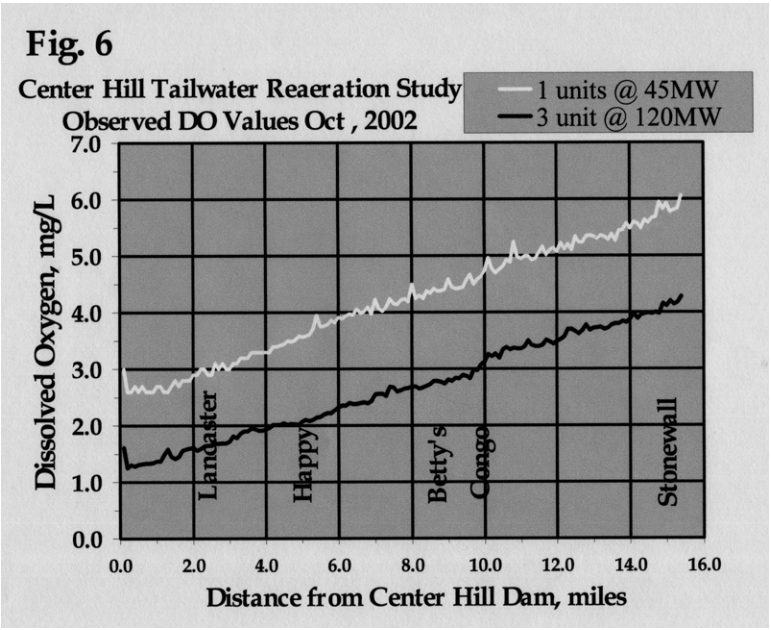


The lowest dissolved oxygen levels occur in the fall (Fig.4) and, wouldn't you know it, are associated with big, late spring rains. In '97 and '98 there were very low DO discharges (marked on Fig. 5). Check out the rainfall (Fig. 1)-- lots of rain in June for both years. You'll remember that '97 is the year of the fish kill. 1999 had 5.5 in. in June but only 6 in. for the previous two months which limits the amount of runoff (less into the lake) associated with that rain. Also, big winter rains don't affect it as much. What's at play later in the spring is more non-point source polution (fertilizers possibly) that wash into the lake, grow algae



which dies to be comsumed by bacteria. Bacteria consume oxygen as part of their metabolism. Of course, higher lake temperatures mean more bacterial activity. So our May rain event in '02 helped give us low DO's in the fall (Fig. 4).

But what about the hub baffles and turbine venting? Hub baffles are very limited and are dam and turbine specific. Studies by the Corps and TVA on Center Hill's baffles done in the fall of 2001 estimate that they can add about 2.5 mg/l with 1 unit on and about 0.5 mg/l with 2 or 3 units in operation. Figure 6 illustrates DO measurements on two days in Oct. of '02. Remember, 2.5 mg/l can be lethal to trout for an extended period of time. Below 4.5 mg/l, trout incur an oxygen debt and 6 mg/l is the state standard for coldwater fisheries. With 1 unit on during this last Oct. the DO didn't reach 6mg/l until it reached Stonewall -- mixing with atmospheric oxygen as it rolled downstream. In the fall, the axis of higher water temps and and low dissolved oxygen intersect at the "crossroads of stress" -- not an easy local for trout or trout food. Higher DO's in the fall help maintain quality food sources, something a trout will need if he is to survive the winter. And isn't that what we want -- quality, holdover trout?



So why bother with stream conservation or trying to mitigate any of these issues if they are controlled by the rain -- which, of course, we have no control of? Because some of it *can* be changed. 20,000 cfs during the winter can't be avoided, but these insects and fish species have survived eons of flood conditions. The Corps gave us a pulse which aleviated temp problems and the dissolved oxygen can be brought up with new turbines. Work in the watershed could reduce non-point source polution. (Where are you TDEC?) Hub baffles and 1 hour pulses are interum measures to changes that need to happen -- changes that would make a difference. We have seen what the Caney is capable of back in 2001, and I don't think we have to pray for a drought for that to happen.

**All graphs and data courtesy of Water Management USACE Nashville District*

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