

# Management Plan for the Obey River Trout Fishery

2008-2014



By:

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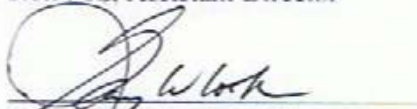
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## Goal

To maintain a quality, year-round fishery for rainbow and brown trout within the Dale Hollow Tailwater.

## Objectives

- Provide fishing opportunity for 20,000 anglers per year with an average angler catch rate of 1.0 rainbow trout per hour.
- Maintain an electrofishing catch rate of one per hour for brown trout greater than 14 inches.

## The Obey River

The Dale Hollow Tailwater or Obey River is located in Clay County near Celina, Tennessee. Dale Hollow Dam was constructed in 1945 for flood control and power generation. Dale Hollow drains an area of 935 sq. miles and encompasses 27,700 surface acres at normal, summer pool. Dale Hollow Dam is presently operated by the U.S. Army Corps of Engineers (USACE). The dam contains three turbines and each turbine operation usually provides 1,800 cubic feet per second (cfs) with a maximum of 2,000 cfs each. At times of no generation, a continuous, minimum flow of 25 cfs is provided.

Coldwater releases from this hydropower dam have eliminated the native fish populations. In order to mitigate for the loss of this resource, the Tennessee Wildlife Resources Agency (TWRA) and U.S. Fish and Wildlife Service (USFWS) cooperate to stock trout in the Dale Hollow Tailwater.

The tailwater is relatively narrow and well confined within wooded bottoms and steep, wooded banks, with little or no shoal/riffle areas. During hydropower generation, it is not easily fished by wading. Ninety percent of the fishing is done from the bank, 8% wade, and 1% float (Williams and Bettoli 2003). Most of the fishing pressure on the Obey River is concentrated in the upper 3 km of the tailwater (Bettoli 1996).

The trout section of the Obey River runs from the Dale Hollow Dam, about 12km (7.5 river miles), to its confluence with the Cumberland River. Boat ramps, public restrooms, and extensive picnicking facilities provide ample attraction to this tailwater. Several fishing piers provide convenient access

for all anglers, especially senior citizens, anglers with children, and those with physical limitations.

This tailwater offers other activities than fishing. A USACE campground is situated on the banks of the river, immediately downstream of the dam. Campers have easy access to the river provided by several fishing piers and walkways. The Dale Hollow National Fish Hatchery is adjacent to the river and it also attracts tourist to the tailwater, providing daily tours of the facility. There is also a private campground located on the lower reaches of the tailwater, just upstream of Highway 53.

Below the hatchery there is a small creek (Hatchery Creek) that is also stocked with trout. A paved walking path along the creek provides easy access. Water levels usually rise in this creek during generation periods. During weekends, 28% of the Obey River anglers used Hatchery Creek and 54% anglers utilized this creek during the week when dam discharges were typically higher (Bettoli 2002).

### Water Quality

Dissolved oxygen concentrations (DO) in the Dale Hollow tailwater can drop to critical levels in the fall. DO levels below 2 mg/l have been documented by the TWRA (Young 1998). In 1999, the USACE performed modifications on unit one which included a turbine venting system. On September of that year, the Tennessee Valley Authority, Norris Laboratory, conducted aeration performance tests to determine the success of the venting system. These tests were conducted with inlet DO concentrations in the forebay ranging from 2.26 to 3.15 mg/l. It was concluded that, depending on the amount of turbine loading, from a minimum of 20% to a maximum of 100%, the increase in tailwater DO ranged from 4 mg/l to 1.5 mg/l respectively (Carter 2000).

To this date, no modifications have been made to the remaining units. Thus, at times of three-unit operation, the DO enhancements provided by turbine one are minimized. However, the installation of this turbine venting system on the one turbine, allows the Corps some ability to manipulate DO concentrations in the Dale Hollow tailwater during critical months.

Warm water temperatures have never been a problem in the Obey River. Water temperatures yearly range from 42 F (5.5 C) in the winter months to 56 F (13.2 C) in the summer (Young 1996).

## The Obey River Angler

A study by Hutt and Bettoli (2003) assessed the motivations and attitudes of anglers at Tennessee tailwaters. Hutt and Bettoli (2003) reported that the Obey angler is the least specialized of all tailwater anglers, with respect to fishing gear. Compared to other Tennessee tailwaters, Obey anglers are the most likely to harvest a trout. Sixty-seven percent of the anglers harvested trout. Harvesting trout for food was a strong motivation among anglers. The study indicated that Obey anglers were significantly more likely to oppose regulations that prohibit the use of bait than other tailwater anglers.

Williams and Bettoli (2003) found that Obey anglers were three times more likely to be multipurpose oriented compared to other trout tailwaters. Fishing trips were usually associated with camping and reservoir activities. Walkways, ramps, and fishing piers are located along the uppermost part of this tailwater and they tend to concentrate anglers. Anglers are most likely to be using bait (73% of the anglers surveyed) and still fishing with bait is the most common technique used by Obey anglers (Bettoli 1996). Only 7% are fly fishermen and 10% are using artificial lures. The Obey angler will likely be from surrounding counties, from 60 miles or less distance. The Obey River is among the most economically important trout tailwater in this state, valued at \$1.7 million (Williams and Bettoli 2003).

Creel surveys conducted in 1995 and 2001 provide information on angler use and success (Bettoli 1996, 2002).

Year	Catch (trout/hr.)	Trip Length (hours)	No. trout caught per trip	Number harvested per trip	Percent rainbows released	Percent browns released	Number that used bait
1995	1.03	2.9	4.41	2.84	26.2%	54.9%	86%
2001	1.19	2.6	3.90	3.00	24.2%	52.0	67%

## Discussion

The Dale Hollow Tailwater is the result of a man-made structure with limitations inherent to water sources from such impoundments. Deep reservoirs like Dale Hollow typically stratify in the summer and produce tailwaters, cold enough to support trout. However for the long-term growth and survival of trout, other components of their habitat must be present.

Nutrients are necessary for the production of food sources for fish, within any body of water. The oligotrophic limnology of Dale Hollow Reservoir (Gordon 1976) does not yield significant nutrients to the Obey River (Goldman 1983). Also, daily fluctuations in water levels during hydropower discharge, negatively affect riverbank habitats as well as benthic communities, eliminating cover and food sources for trout.

Each late summer and fall the DO dips well below the Tennessee Department of Environment and Conservation (TDEC) recommended criteria of 6.0 mg/l for tailwaters. Declines in the growth rates of trout have been associated with declining DO concentrations below 4.0 mg/l (Devlin 1999). Low DO concentrations in tailwater releases can affect the overall health of trout (Grizzle 1991). As aforementioned, the DO concentration can reach critical levels in the Dale Hollow Tailwater.

Electrofishing catch rates for rainbow trout, greater than 10 and 14 inches, are shown in Figure 1. Since rainbow trout are stocked at 9 to 10 inches in length, these data would indicate that few rainbow trout survive to grow to 14 inches. The inconsistent electrofishing catch rates of rainbows greater than 10 inches are not the result of stocking rates, as Figure 2 shows relatively consistent stocking rates during corresponding years of sampling.

Electrofishing catch rates for brown trout, greater than 10 and 14 inches, are shown in Figure 3. Brown trout are stocked from 6 to 8 inches in length. These data indicate that brown trout have greater potential to grow and survive than rainbows and the electrofishing catch rates of brown trout do not appear to be related to stocking rates, as illustrated in Figure 4.

Figure 1. Dale Hollow Tailwater Rainbow Trout Catch Rates 99-06

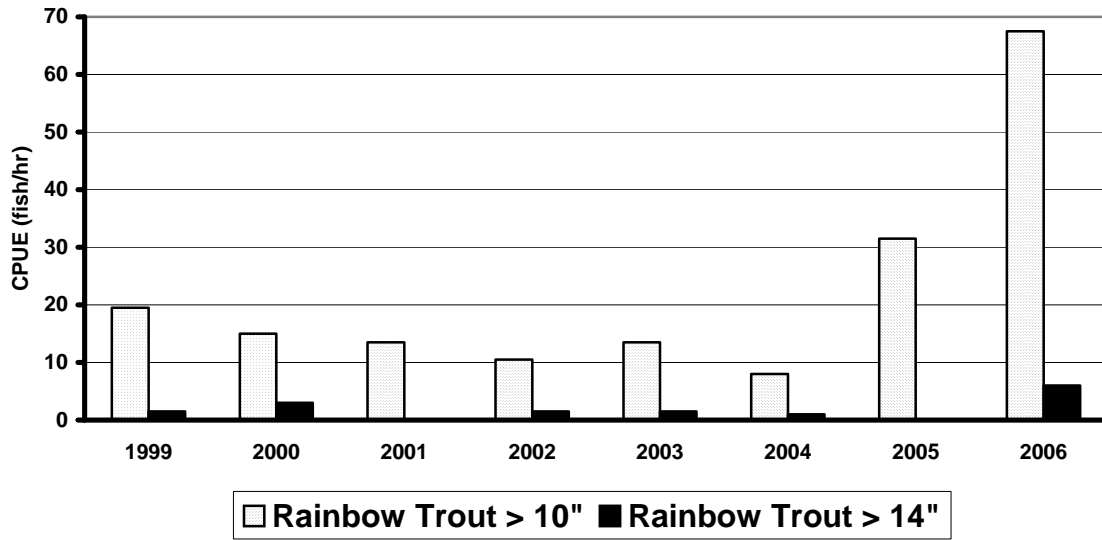


Figure 2. Rainbow Trout Stocking Rates Dale Hollow Tailwater

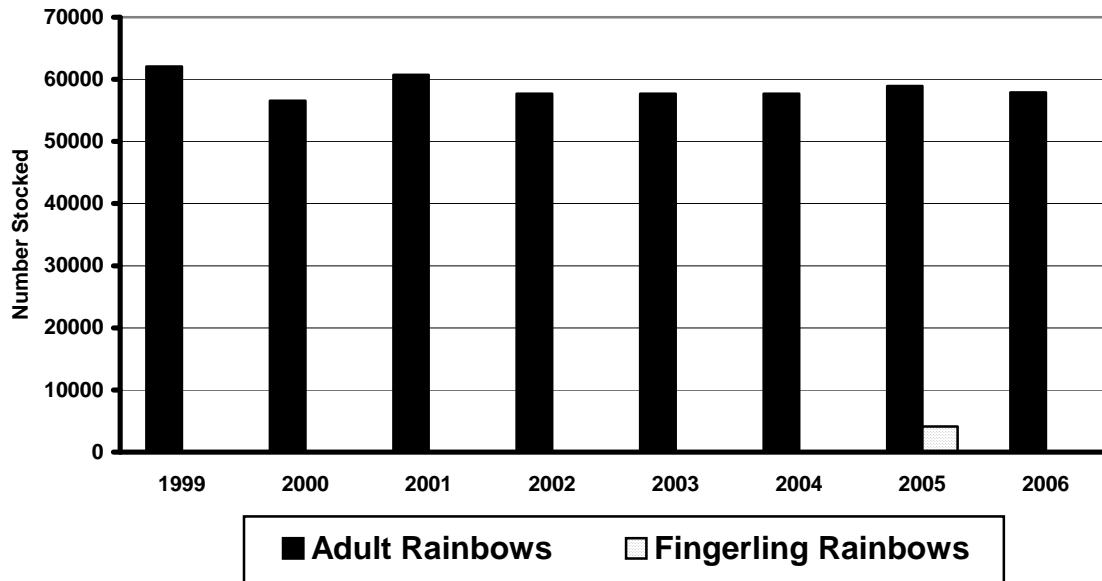


Figure 3. Dale Hollow Tailwater Brown Trout Catch Rates 1999 to 2006

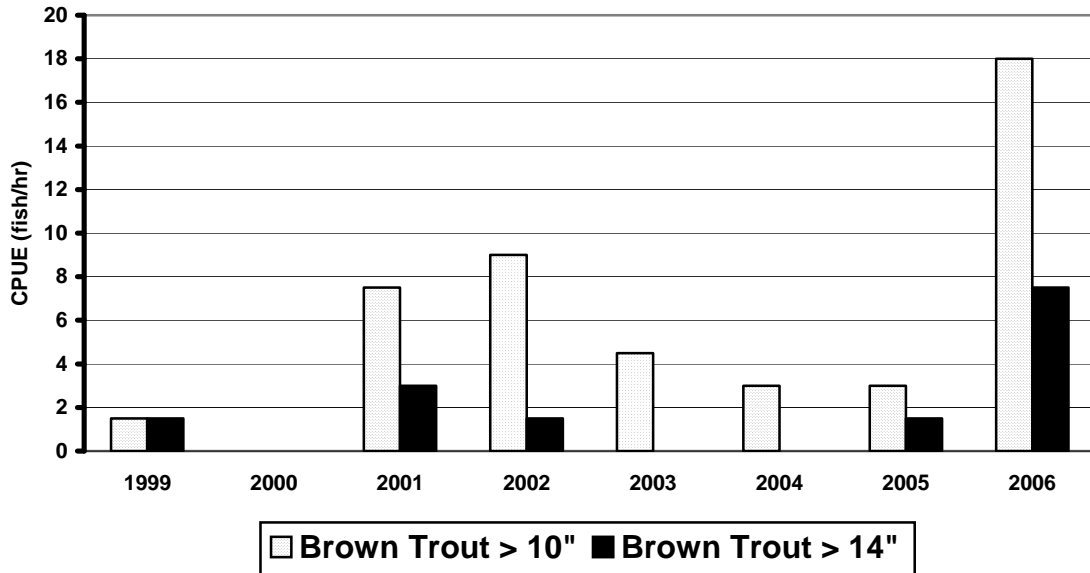


Figure 4. Brown Trout Stocking Rates Dale Hollow Tailwater

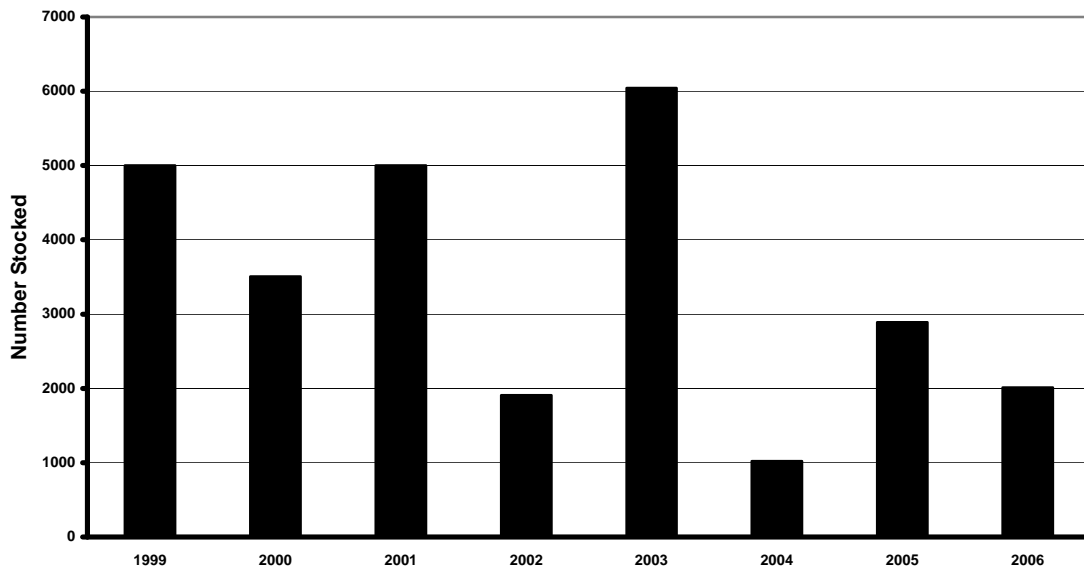




Figure 5 shows the average, relative weights of rainbow and brown trout from Dale Hollow tailwater. The relative weights indices are a length/weight relationship that shows the general, overall health and condition of a fish, compared to a 100% norm. Again, brown trout exhibited greater potential for growth, sometimes greater than 100%. It appears that the browns are surviving long enough to convert to natural food sources and grow to a good condition while the rainbows surveyed essentially represent fish from relatively recent hatchery stockings, as shown in Figure 6. Again, in Figure 7, brown trout showed greater potential to grow to 12 inches and greater in length.

Based on the numerous angler studies and the fish data collected, the management alternatives appear to be few for the rainbow trout fishery in the Obey River. Growth rates and survival of rainbows indicate that this trout fishery is essentially limited to put-and-take management. Rainbow trout should be stocked as 9-10 inch fish, and size restrictions are not biologically warranted.

Further, studies clearly defined the "Obey River Angler" as being one that would be opposed to typical trout management tools (Hutt and Bettoli 2003; Williams and Bettoli 2003). There was a prevailing attitude of strong opposition to bait restrictions and the highest tendencies to harvest rainbow trout, of any tailwater angler in Tennessee. In general, anglers were satisfied with the Obey River fishery. Catch rates of 1.19 trout per hour (Bettoli 2002) are considered to be a good angler catch rate (Fiss 2006). It is believed that the angler catch rate in the Obey may be a function of stocking (Bettoli 1996). We feel that the current stocking rate of 57,000 9-inch rainbow trout is sufficient to maintain the existing fishery at average catch rates of one trout per hour.

Brown trout do not play an important part in the Obey River fishery. As far as angler success, the brown trout stockings produce extremely low return rates (Bettoli 2002) but the few that do survive multiple years provide anglers an opportunity to catch large (greater than 12 inches) trout. Since 1999, 58% of brown trout collected were over twelve inches compared to rainbows with only 31% over twelve inches (Figures 6 and 7). These numbers are more impressive considering most rainbows stocked are 9-10 inches and brown trout are stocked at 6-8 inches in length. Creel surveys have shown a low harvest rate and high release rate for small brown trout (Bettoli 1996 & 2002). This would suggest that small brown trout are not being exploited at an excessive rate and a size regulation on brown trout in this tailwater would produce little benefit to this fishery.

Figure 5. Average Relative Weights ( $W_r$ ) Trout Dale Hollow Tailwater

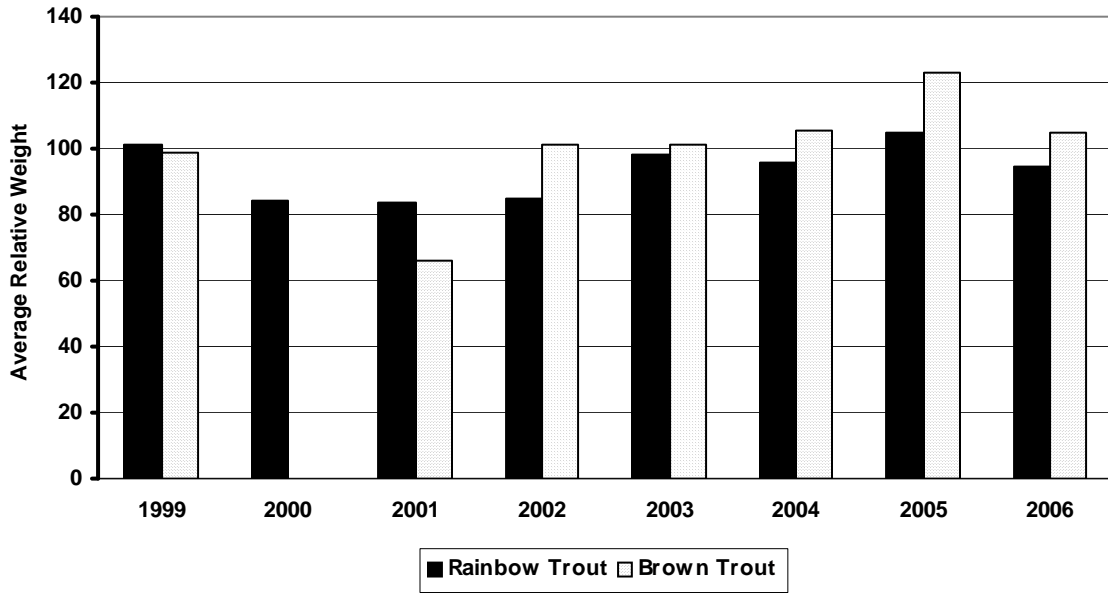


Figure 6. Dale Hollow Tailwater Length Frequency Distribution Rainbow Trout 1999-2006 N=165

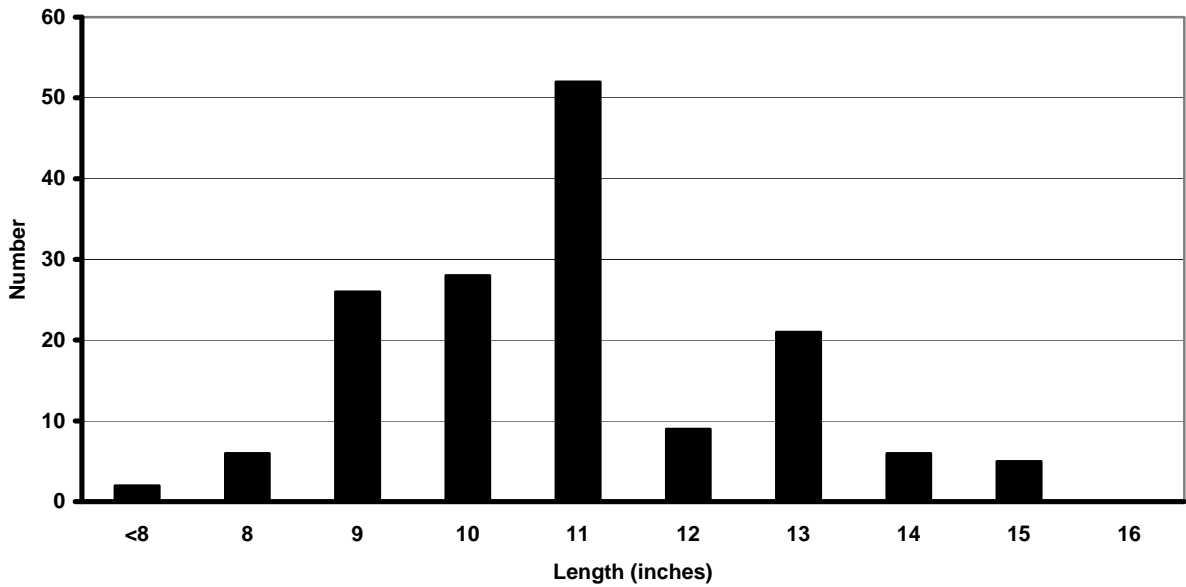
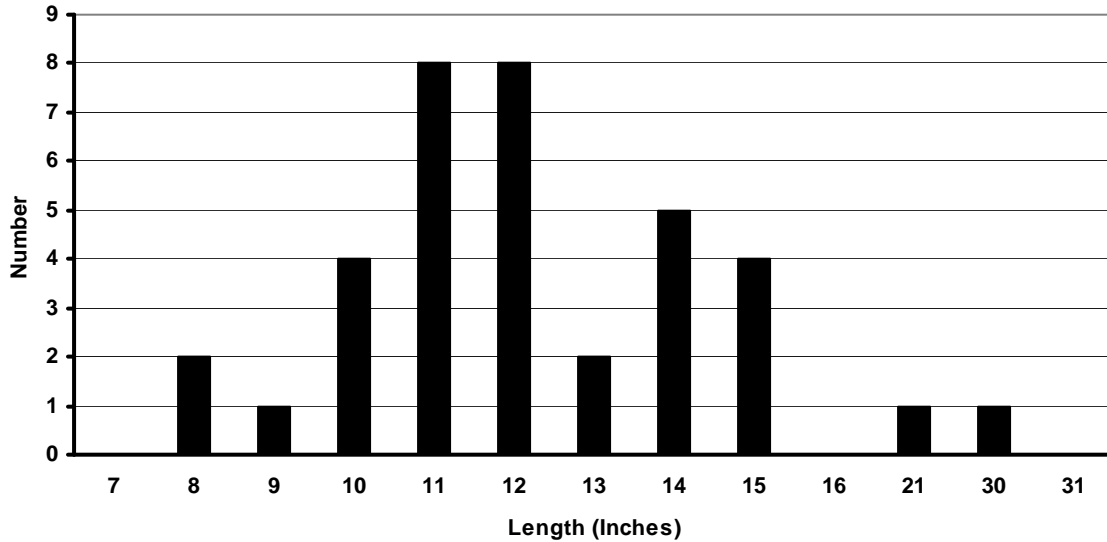


Figure 7. Dale Hollow Tailwater Brown Trout Length Frequency Distribution 1999-2006 N=36



### Management Recommendations

- Maintain statewide fishing limits for trout: a daily creel of 7 trout, with no bait or size restrictions.
- Continue to stock 57,000, 9 to 10 inch rainbow trout throughout the year.
- Managers will seek the possibility of stocking larger rainbow trout (10-12 inches), should that option become feasible.
- Continue to stock 1,000 8-inch brown trout each spring.
- Maintain an average angler catch rate of one trout per hour. If catch rates drop significantly below this target rate, managers will review and seek an adjustment of stocking rates in order to compensate.
- In 2008, start stocking brook trout (northern hatchery strains) to give anglers the opportunity to catch an additional species. As available, stock 500 to 1,000 annually.

## Literature Cited

- Bettoli, P. W. 1996. Survey of the trout fishery in the Obey River below Dale Hollow Dam. Fisheries Report No. 96-16. Tennessee Wildlife Resources Agency, Nashville, Tennessee.
- Bettoli, P. W. 2002. Survey of the trout fishery in the Obey River below Dale Hollow Dam. Fisheries Report No. 02-06. Tennessee Wildlife Resources Agency, Nashville, Tennessee.
- Carter, J. C. Jr. 2000. Turbine venting aeration performance tests Dale Hollow units 1,2, & 3 - September 1999. TVA Report # WR2000-2-600-134. Tennessee Valley Authority, Knoxville, Tennessee.
- Devlin, III, G. J., and P.W. Bettoli. 1999. Creel survey and population dynamics of salmonids stocked into the Caney Fork River below Center Hill Dam. Fisheries Report No. 99-8. Tennessee Wildlife Resources Agency, Nashville, Tennessee.
- Fiss, F. C., and J. W. Habera. 2006. Trout management plan for Tennessee 2006-2016. Tennessee Wildlife Resources Agency, Nashville, Tennessee.
- Goldman, C. R., and A. J. Horne. 1983. Limnology. McGraw-Hill Inc.
- Gordon, J.A. 1976. Water quality conditions in Dale Hollow Lake. Nashville District of USACE Report, Nashville, TN.
- Grizzle, J.M. 1981. Effects of hypolimnetic discharge on fish health below a reservoir. Transactions of the American Fisheries Society 110:29-43.
- Hutt, C. P., and P.W. Bettoli. 2003. Recreational specialization, preferences, and management attitudes of trout anglers utilizing Tennessee Tailwaters. Fisheries Report No. 03-01. Tennessee Wildlife Resources Agency, Nashville, Tennessee.
- Williams, J. S., M.S. and P.W. Bettoli, Ph.D. 2003. Net value of trout

fishing opportunities in Tennessee Tailwaters. Fisheries Report No. 03-21. Tennessee Wildlife Resources Agency, Nashville, Tennessee.

Young, D. W. 1996. Fisheries Aquatic Habitat Protection Program, Region III. Annual Report: 1995-96. Tennessee Wildlife Resources Agency, Nashville, Tennessee.

Young, D. W. 1998. Fisheries Aquatic Habitat Protection Program, Region III, Annual Report: 1997-98. Tennessee Wildlife Resources Agency, Nashville, Tennessee.