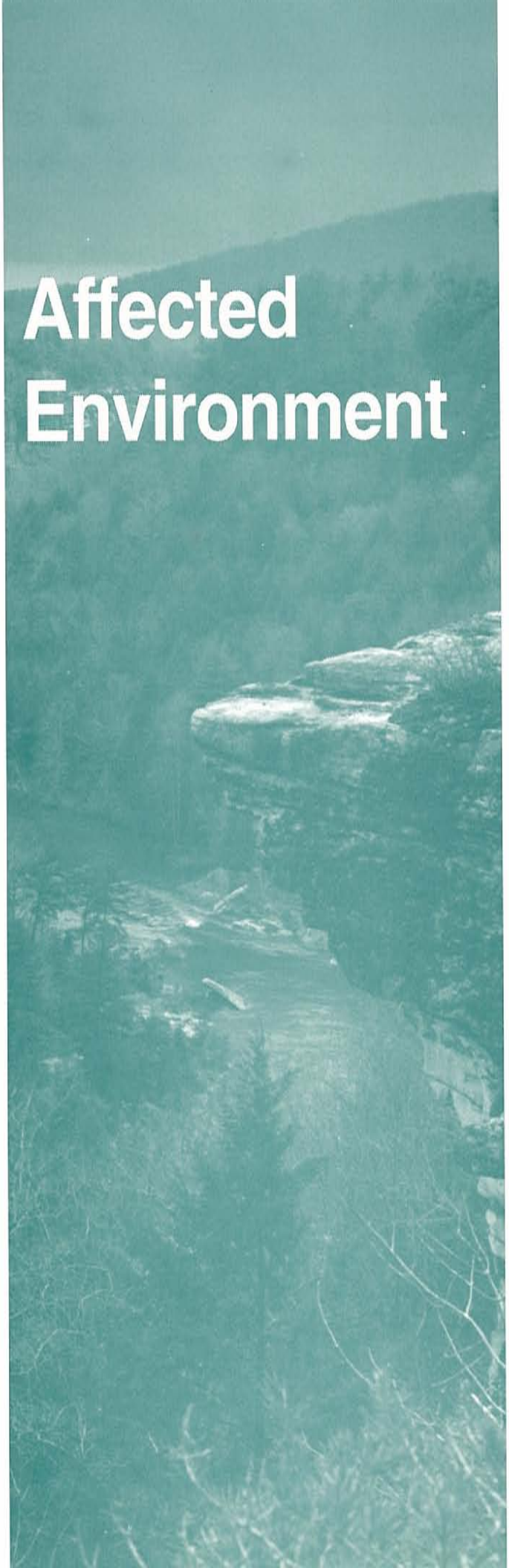
Affected Environment



NATURAL ENVIRONMENT

Water is the principal resource of the Obed Wild and Scenic River (Obed WSR). Without it and ensuing processes, the resources for which the park is valued would not exist. Lands drained by the Obed River, Daddys Creek, Clear Creek, and the upper Emory River form the watershed for the Obed WSR. It is important to examine the entire watershed since most factors affecting the Obed WSR's water resources occur outside of Obed WSR's boundaries. Physiography, soil and bedrock geology, climate, and other factors affecting water flows and water quality are described.

PHYSIOGRAPHY

CUMBERLAND PLATEAU

The watershed of Obed WSR is located on part of Tennessee's Cumberland Plateau. The Plateau is distinguished by its flat to rolling upland areas (less than 10 percent slope), deeply incised river gorges, and a long line of cliffs that separate it from the lower elevations of the Ridge and Valley Province.

WATERSHED

The four principal streams of the watershed, the Obed River, Clear Creek, Daddys Creek, and the upper Emory River drain approximately 615 square miles (1,593 square kilometers) in Cumberland, Morgan, and Fentress Counties.

Elevations in the watershed range from about 1,600 feet (485 meters) in headwater uplands to approximately 860 feet (261 meters) at the downstream end. Some gorge sections are quite narrow, only 800 feet (242 meters) across, and have near vertical sides, up to 400 feet (121 meters) high.

These high gradient streams are similar to most other streams on the Cumberland Plateau and are considered geologically to be quite young. Stream gradients, with drops averaging 19 feet (5.7 meters) to 21 feet (6.4 meters) per mile, are steepest in downstream sections.

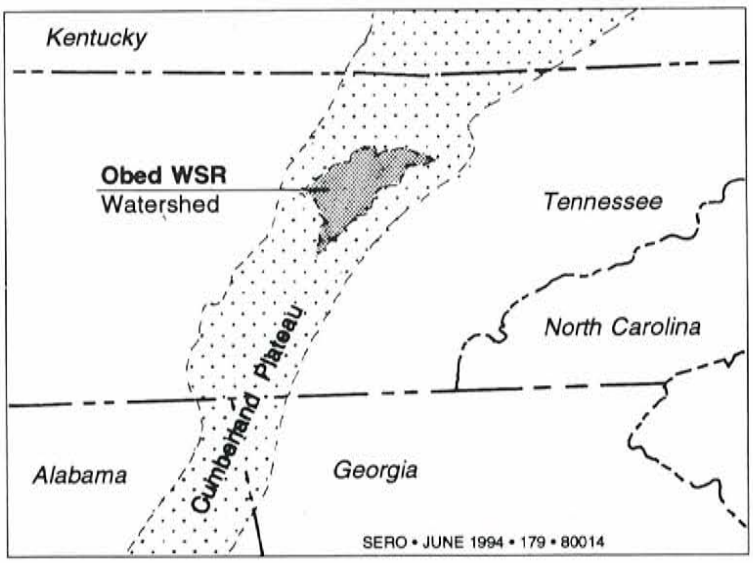
SOIL and BEDROCK GEOLOGY

BEDROCK

Exposed bedrock in the watershed is of the underlying Pennsylvanian (280 to 320 million years old) and Mississippian (320 to 345 million years old) formations. The Pennsylvanian sandstone, shale, coal, and conglomerates form the broad, flat to rolling areas of the northwest Cumberland Plateau. Boulders deposited in the stream corridors were once part of the sandstone rimrock which break away from the bluff by effects of erosion from wind, water, and temperature. Mississippian calcareous shale and siltstones are exposed along the upper reaches of Daddys Creek.

SOILS

Soils are derived from the sandstone, shale, and siltstone bedrock and are typically



Cumberland Plateau and the Obed WSR Watershed.

shallow, loamy, and generally low in fertility. Upland soils, found on varying slopes (from 5 to 50 percent), tend to be highly permeable and well drained, are shallow to bedrock (0.6 to 1.2 meters), acidic (pH of 3.6 to 6.0), and low in fertility.

Erosion potential is high for the steep slopes of the escarpments and river gorges if vegetation is removed. The soils on the rest of the plateau have slight to moderate erosion potential.

A soil survey was completed for Cumberland County in 1938. No completed soil survey exists for Morgan or Fentress Counties; however, the same soil types and their locations as in Cumberland County are thought to occur along streams in Fentress and Morgan Counties.

There are no known prime or unique farmlands in the Obed WSR boundaries.

CLIMATE

The climate in the region is humid with moderate temperatures. A frost-free season from late April to late October lasts about 180 days. Temperatures reach or exceed 90° F (32° C) about 75 days per year and winter temperatures seldom drop below -5° F (-21° C). Yearly, the Cumberland Plateau receives about 52 inches (132 centimeters) of precipitation (Gaydos et al. 1982).

Most of the precipitation occurs in the winter and early spring. Rainfall associated with severe summer thunderstorms can be heavy and tornadoes occasionally occur on the plateau (Dickson 1960).

Evaporation and water loss from biological activities and processes on the plateau is less than in adjacent areas (Sifley and Parks 1974). Short summer droughts occur but severe droughts are rare (Vaiksnoras and Palmer 1973). The driest periods occur in the autumn from September through November (U.S. Dept. of Commerce 1942, 1965).

WATER RESOURCES

WATER QUANTITY

The Obed River originates in Cumberland County, southwest of the city of Crossville (Sulkin 1988). The Obed River and Daddys Creek generally flow north and east from Cumberland County into Morgan County. Clear Creek originates in Cumberland County, flows north into Fentress County and then east and south into Morgan County before joining the Obed River. The Obed River then flows into the Emory which joins the Clinch River at Watts Bar Lake near Harriman, and thus is part of the Tennessee River drainage which flows into the Ohio River and on into the Gulf of Mexico.

Wetlands within the watershed were inventoried and mapped by the Fish and Wildlife Service in 1987. The majority of wetlands in the Obed WSR are located in the river channel and along the stream banks. These wetlands are maintained by seasonal flooding. The most common wetlands outside the river gorge are farm ponds and other impoundments on small streams.

The quantity of water flows within the streams are determined by rainfall and runoff patterns, groundwater recharge, and flow alterations occurring in the watershed. Like other streams on the plateau, the Obed River and its tributaries have their highest flows during the winter and spring of the year. However, during low flow periods in summer and early autumn, upper reaches of the river system resemble intermittent streams in which pools form with little or no flow between them.

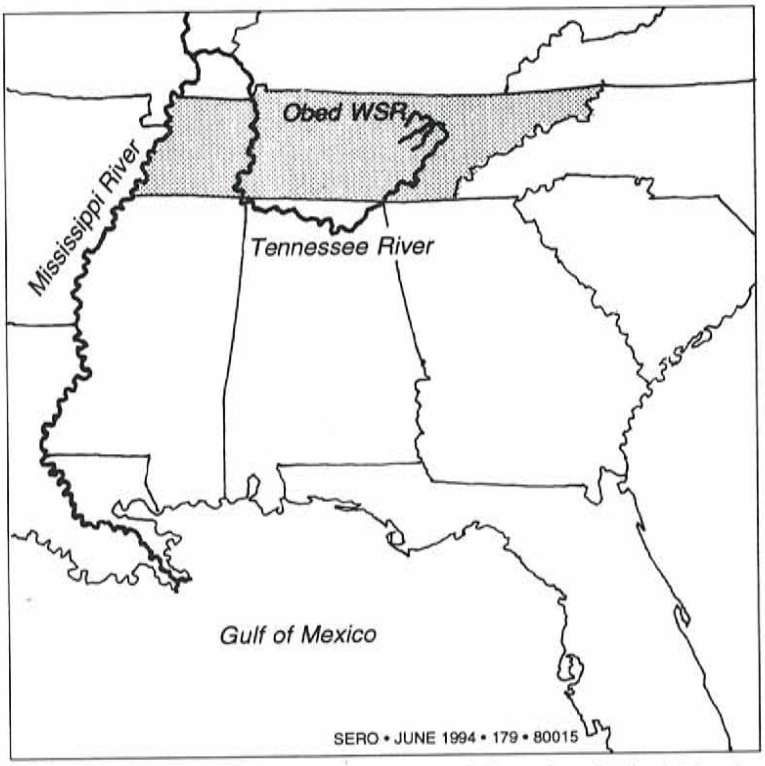
Rapid surface runoff and little groundwater storage create a wide range of water flows in watershed streams. Stream flows of the Emory River at Oakdale, Tennessee, have been measured from 10 cubic feet/second (cfs) to more than 189,000 cfs, recorded in December of 1991. Flows of 45,900 cfs

can be expected to occur every 2 years. Ten floods with peak flows over 70,000 cfs were recorded at the Oakdale gauging station between 1929 and 1977.

Flooding is frequent because:
--long, wet periods in the winter and spring create high water levels in the rivers; 79 percent of floods have occurred between December and April; and
--summer downpours result in flash floods during this low flow period.

It is a generally accepted fact that stream regulation reduces natural physical and biological variability and promotes conditions of constancy within a stream system. Regulation of flow may create discontinuities in the natural physical and biological conditions of a stream system. Within the Obed River watershed, there exist numerous ponds and water supply impoundments on several tributaries upstream of the Obed WSR. It is possible that natural streamflows within the Obed WSR have been altered due to the individual and/or cumulative effects of streamflow impoundment in the watershed. Impoundments on smaller stream tributaries provide for recreational use and agricultural water supplies however, they intercept and retain runoff and thus alter flow regimes. Since the designation of the Obed WSR, there has been concern that the construction of water supply and recreational use reservoirs on the Obed River and its principal tributaries may significantly reduce the natural variability of streamflows in the Obed WSR and impair water-related resource attributes. Although a systematic survey of the Obed WSR has not been completed, 42 reservoirs larger than 2 acres (0.8 hectares) in surface area have been identified. According to the NPS's 1993 Dams Inventory Report, 14 of these impoundments are more than 50 acre feet in size (Appendix I).

The issue of proliferating impoundments in the Obed River watershed is made more complex by the lack of basinwide/regional



Water Flow: from the Obed WSR to the Gulf of Mexico.

comprehensive water resource planning and the NPS's mandate to preserve the free-flowing condition and outstandingly remarkable values of the Obed WSR as provided in the Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) (WSRA). The NPS also has a responsibility to take action against unreasonable injury to it's rights as a riparian landowner. Water rights for Obed WSR have not been determined. Information is needed to determine water rights for the Obed WSR and the potential for injury to these rights from water development.

Water Quantity Impacts

Water impoundments constructed to meet growing municipal and industrial demands alter water quantity of the Obed WSR. Although minimum flow releases are required from some reservoirs, the practice of seasonal storage and consumptive withdrawals impact the stream flows. There is concern that these impoundments are having significant negative impacts on the outstandingly remarkable values for which the Obed WSR was designated. The

effects on natural and recreational resources has not been fully evaluated or even determined at this time.

Since 1932, six studies examining the possibility of damming streams in the watershed have been prepared by the Corps of Engineers or TVA. None were constructed because they were cost prohibitive, offered poor recreational opportunities, provided only minimal flood storage, or would destroy aesthetic resources. At this time, there are no known plans to proceed with any of these projects.

However, a 100 acre (40.4 hectare) lake and 1.5 MGD water treatment plant have been proposed for construction on Clear Creek by the Catoosa Utility District and Farmers Home Administration. The site is at RM 44, approximately 26 miles (41.8 kilometers) upstream of the Obed WSR, and will have a 5.89 square mile (1,525.5 hectares) watershed. Other similar projects may be proposed as development pressures around the Crossville area increase posing a serious threat to the water quality and quantity in the Obed WSR. Currently, four impoundments over 100 acres (40.4 hectares) have been constructed by others than the Corps of Engineers and TVA: Lake Tansi and Brown Creek Lake on tributaries of Daddys Creek; and Fox Creek Lake and Lake Holiday on the Obed River and its tributaries.

Dams and water withdrawal activities of this type slow and reduce flows in the upper reaches of the Obed River and therefore reduce the quantity, frequency, and duration of water flows in downstream sections of the Obed River. For example, the headwaters of the Obed River are dammed at river mile (RM) 40.2 to impound Lake Holiday. The river then flows without restriction and merges with the Emory River at Emory River, RM 28.5. The impounding of Lake Holiday has altered flow rates, water temperature, and other stream conditions (Sulkin 1988, Wojtowicz and Clark 1989).

From Lake Holiday, the city of Crossville operates a 3 million gallon per day (3 MGD) intake for its water treatment plant (Sulkin 1988). This water source currently meets the city's domestic needs. However, a 1973 engineering report indicated that at then current growth levels, the withdrawals would drain the city's water supplies by 2020 (Wayne L. Smith and Associates, Inc. 1973).

When water is withdrawn from Lake Holiday the amount of water flowing out of the reservoir during late spring, summer, and early fall greatly decreases. During these periods, the only flows into the Obed River come from the water plant filter's backwash, meager groundwater supplies, limited flows from small tributary streams, and sewage treatment plant discharges (Wojtowicz and Clark 1989, TN Dept. of Health and Environment 1990).

During these low flow periods, groundwater, which has higher concentrations of total dissolved solids than surface runoff, makes up a greater percentage of the stream flow. Thus, water quality parameters based on levels of total dissolved solids, such as conductivity, hardness and alkalinity, are higher than those taken during wetter periods. Of these factors, alkalinity directly affects aquatic systems.

Impounded flows on the Cumberland Plateau generally suffer from minimal aeration and exhibit temperature elevation and stratification. Impoundments located in areas with high human and livestock populations possess greater biological activity due to nutrient overloading. Thus, impoundments not only restrict stream flows, but also can be expected to alter water quality in those flows.

WATER QUALITY

Water quality in the streams that make up the Obed WSR is generally better than in other areas of the State although the most recent data suggest water quality is not as high as previously believed (Tennessee

Department of Health and Environment 1990).

The Tennessee Water Quality Control Board designates water uses for major stream stretches, lakes, and groundwater resources in the State. The Board sets Water Quality Index Standards that are used to maintain the designated uses.

Water uses for all of Daddys Creek, Clear Creek, and sections of the Obed River within the Obed WSR are designated for:

--recreation uses;
--fish and aquatic life;
--livestock and wildlife watering; and
--irrigation.

Water in the Obed River from RM 40.1, located in Crossville, to its origin are also designated for:

--domestic water supplies; and
--industrial water supplies.

The two uses with the most stringent water quality requirements are recreation and to support fish and aquatic life.

The Emory River partially supports the uses for which it was designated but is impacted by pollution from agricultural activities, surface mining, and urban/storm water runoff. Although water quality in Daddys Creek is listed as fully supporting recreational activities and aquatic life, it is threatened by agricultural pollution. The Obed River is listed as only partially supporting uses because of impacts from municipal discharges, construction activities, and urban runoff (TN Dept. of Health and Environment 1990). Waters in Clear Creek currently support all designated uses.

Water Quality Monitoring

Water quality surveys of the upper Emory and Obed River watershed were initiated by the NPS in cooperation with Tennessee Technological University in 1979 and 1980. The NPS implemented a water quality monitoring program in November 1982. This program begins to document existing water conditions in Obed WSR (Rikard 1985). Water samples are collected and analyzed once every month. Data are collected to monitor pollution from development, agricultural, and coal mining activities. In addition, tests for bacteria (*Fecal coliform* and *Fecal streptococcus*) are done to document the fluctuations in sewage levels of both humans and livestock, respectively.

Water Quality Impacts From Activities Outside Obed WSR

The Obed WSR's land base is relatively small considering the size of its watershed. Therefore, water quality of each stream is greatly affected by activities occurring outside of the Obed WSR's boundaries.

The principal impacts on the water quality of the Obed WSR are:

--high levels of siltation and suspended solids;
--fecal bacteria contamination;
--low dissolved oxygen content;
--high nutrient levels;
--oil and gas spills; and
--disturbance of acidic strata.

The major contributors of these impacts are municipal discharges, surface drainage from mineral extracting operations, and runoff from silviculture, agriculture, and construction activities. Each of these impacts is discussed below and depicted on the Water Quality Impacts Map.

Downstream of Lake Holiday is the Crossville Sewage Treatment Plant . This is a 2.4 MGD activated sludge treatment plant that utilizes an aerated nitrification tank, sand filters, and a cascade aeration process before discharging into the Obed River at RM 38.6 (Sulkin 1988, Wojtowicz and Clark 1989). Since the Obed River flows are lowest during summer and early autumn, upper reaches of the river are primarily fed by flows from the water plant filter's backwash, meager groundwater supplies, limited flows from small tributary streams, and sewage treatment plant discharges

(Wojtowicz and Clark 1989, Tennessee Department of Health and Environment 1990).

Impacts from sewage have been documented on Clear Creek, White Creek, and Obed River (Rikard 1985). NPS tests indicate that *F. coliform* levels are increasing in Daddys Creek and Clear Creek. High bacterial levels appear to be related to rainfall amounts and the possible illegal dumping of septic tank pumpers, or honey wagons

Coal Mining. Although there are no permitted coal mines now operating in the Obed River watershed, runoff from old coal mining sites and its associated activities, have reduced water quality in the Obed WSR. The areas with concentrations of coal mines are shown on the Water Quality Impacts map.

Coal was commonly mined by stripping earth away along the contours of a hill. Sometimes, more coal was extracted by augering as far back into the hill as economically possible (Gaydos *et al.* 1982). Erosion from mine spoils, bare earth areas, and unimproved roads increase sediment loads entering the river system. Stream beds can fill with sediment which alter the aquatic ecosystem and reduce aesthetic and recreational values. Mining activities unearthed several chemicals which react with air and water to form solutions known as acid mine drainage (Rikard 1985). Rainwater runoff and small streams carry these solutions from abandoned mines to the rivers. Acid mine drainage raises sulfate, iron, manganese and aluminum levels and destroys stream ecosystems.

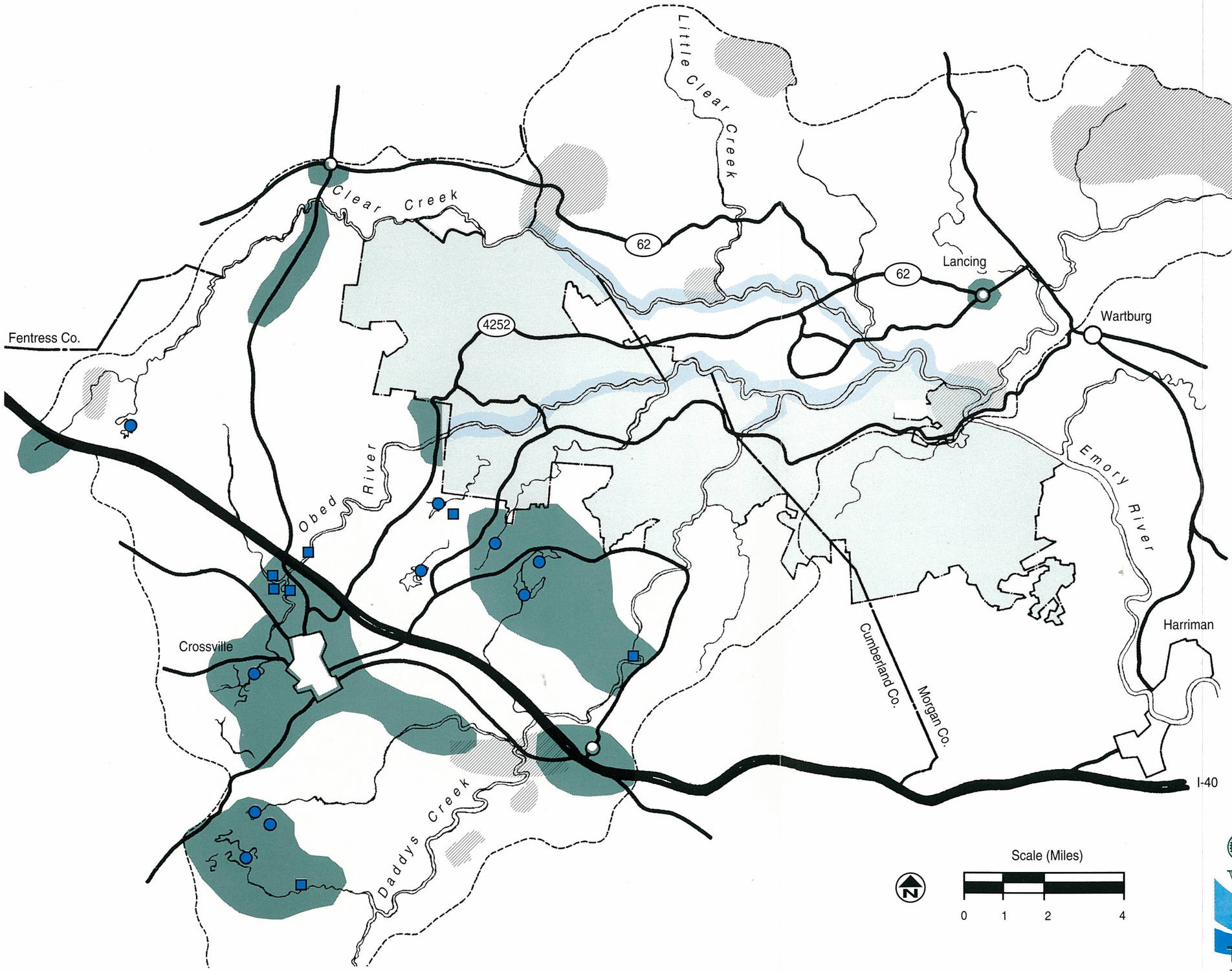
Raised sulfate levels indicate acid runoff from mines are entering Clear Creek, Emory River, and the Obed River. Daddys Creek and White Creek appear to have no mining impacts (Rikard 1985). However, the 1990 305(b) Report: The Status of Water Quality in Tennessee, lists Daddys Creek water quality as being threatened by mining sources.

To reduce the erosion and acid mine runoff, the Surface Mining Control and Reclamation Act of 1977 (SMCRA) requires that abandoned mines on both private and public lands be reclaimed. Any future coal mining in and adjacent to Obed WSR would be subject to the permitting, operating, and reclamation requirements of SMCRA.

Within the Obed WSR there is one deep mine and portions of two strip mines. The deep mine is located on the eastern side of the Emory River about 0.5 mile (0.9 kilometer) upstream of Nemo Bridge and less than1000 feet (305 meters) upslope from the river. The mine shaft has filled with 12 to 18 inches (0.3 to 0.46 meters) water and its two openings are gated. The Office of Surface MInes (OSM) has suggested that the entrances be blasted to close the shafts. No other mitigation measures have been proposed. There is a strip mine on the south side of the Obed River near Obed River RM1. The area has revegetated itself with scrub vegetation and efforts have been made to establish cattails in the ponds on site The strip mine was never reclaimed topographically and OSM has stated to do so now may do more harm than good. The other strio mine is located across the river on property in the Obed WSR's proposed boundary area. This site has also revegetated itself naturally but has never been reclaimed.

Rock Creek, a tributary to the Emory River and upstream of Nemo Bridge, has severely degraded water quality. The stream's mouth is within Obed WSR boundaries and the creek is the dividing line between Catoosa WMA and Obed WSR. The stream drains some reclaimed deep mines and a strip mine and

Water Quality Impacts



LEGEND

- WATERSHED BOUNDARY
- OBED WSR
- MAJOR CONSTRUCTION & DEVELOPMENT AREAS
- MAJOR OIL/ GAS DRILLING AREAS
- MAJOR COAL MINING AREAS
- MAJOR IMPOUNDMENTS
- MAJOR DISCHARGES
- CATOOSA WILDLIFE MANAGEMENT AREA

Scale (Miles)

0 1 2 4

OBED
WILD & SCENIC RIVER
TENNESSEE

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probably supports no aquatic life (Rikard 1985). OSM plans to reclaim this area and NPS will seek money for reclamation through funds set up under SMCRA for sites abandoned prior to 1977.

Oil and Gas Operations. Oil and gas operations use brine solutions, oil, acids, sudsing agents, and other chemicals during the drilling and production processes. These chemicals often enter tributaries of the WSR through spills, releases, and overflows. Such pollution events are difficult to locate and document as they are sporadic and isolated incidents. The erosion and subsequent sedimentation from the land clearing and road construction associated with mining activities also reduce water quality (Rikard 1985).

There is a need to test for other operation by-products in the water due to active oil and gas sites within and adjacent to the Obed WSR. There are two operations within the Obed WSR; a site near Lilly Bluff and a site 1 mile downstream of Barnett Bridge. Three other operations are located on lands not yet acquired but within the current boundary. The State is responsible for testing water but does not have a program in place in the Obed WSR and it has no monitoring program for gas and oil operations after the initial installation inspection. Within the Obed WSR, NPS staff routinely monitor oil and gas production sites and transport lines for leaks that could cause resource damage.

Most accidents involving oil spills are associated with transportation activities and, if small, are cleaned up relatively fast. When a spill occurs, the Tennessee Emergency Management Agency (TEMA) is notified by the county sheriff. EPA may also be called in to assist in the cleanup. In responding to a spill, a TEMA representative oversees emergency management, implements cleanup, assesses impacts, and handles enforcement. Since there are no cleanup crews near Obed WSR (the closest are in Nashville and Johnson City), the response time to the accident scene and subsequent cleanup initiation is substantial.

Silviculture and Agriculture. Forestry and farming operations occur on most of the land in the watershed. Over 90 percent of the watershed is forested and many of these acres are managed for wood production. Approximately 5 percent of the area is in agricultural production.

Elevated conductivity and *F. streptococcus* levels obtained from Clear, White, and Daddys Creeks indicate possible runoff impacts from agriculture and forestry operations (Rikard 1985). The 1990 305(b) Report found Daddys Creek to be threatened by runoff from livestock operations.

The NPS monitoring program has found all streams, except Rock Creek, to have elevated levels of *F. streptococcus* during warmer months. Most likely, this comes from runoff from farm and pasture land adjacent to these waters.

Construction. Increased sediment in water samples from streams in the Obed WSR indicate construction and earth moving activities are taking place in the watershed. Otter Creek, a tributary of the Obed River, has suffered severe siltation from construction activities in the Fairfield Glades development. The Obed River contains silt from development in the Crossville area (305(b) Report 1990).

BIOLOGICAL RESOURCES

The Cumberland Plateau possesses a variety of environmental conditions and the Obed WSR exhibits this diversity.

VEGETATION

A variety of plant communities occurs in the Obed WSR. Depending on specific natural conditions, they have evolved over the centuries and vary from those dependent on frequent flooding along river gravel bars to those tolerant of the driest conditions on exposed rock outcrops.

Human activities on the plateau have also altered the composition of many plant communities. Prehistoric Americans once frequently burned upland areas to attract grazing wildlife species. Later, logging activities and range burning altered the vegetation over large areas. Presently, mid-to-late successional plant regrowth comprises most of the vegetation. Mature, old growth forest remain in only the most inaccessible gorges.

Based on plant surveys by the Tennessee Department of Conservation and University of Tennessee, at least 734 taxa have been identified. Plant surveys of the Cumberland Plateau have also been published and provide additional information on species, growth habits, and locations.

Various plant communities have been identified and are described below.

Aquatic. Submerged and emergent aquatic vegetation can be found in pools and riffle areas although few plants can be found in the main stream channel where flows are stronger.

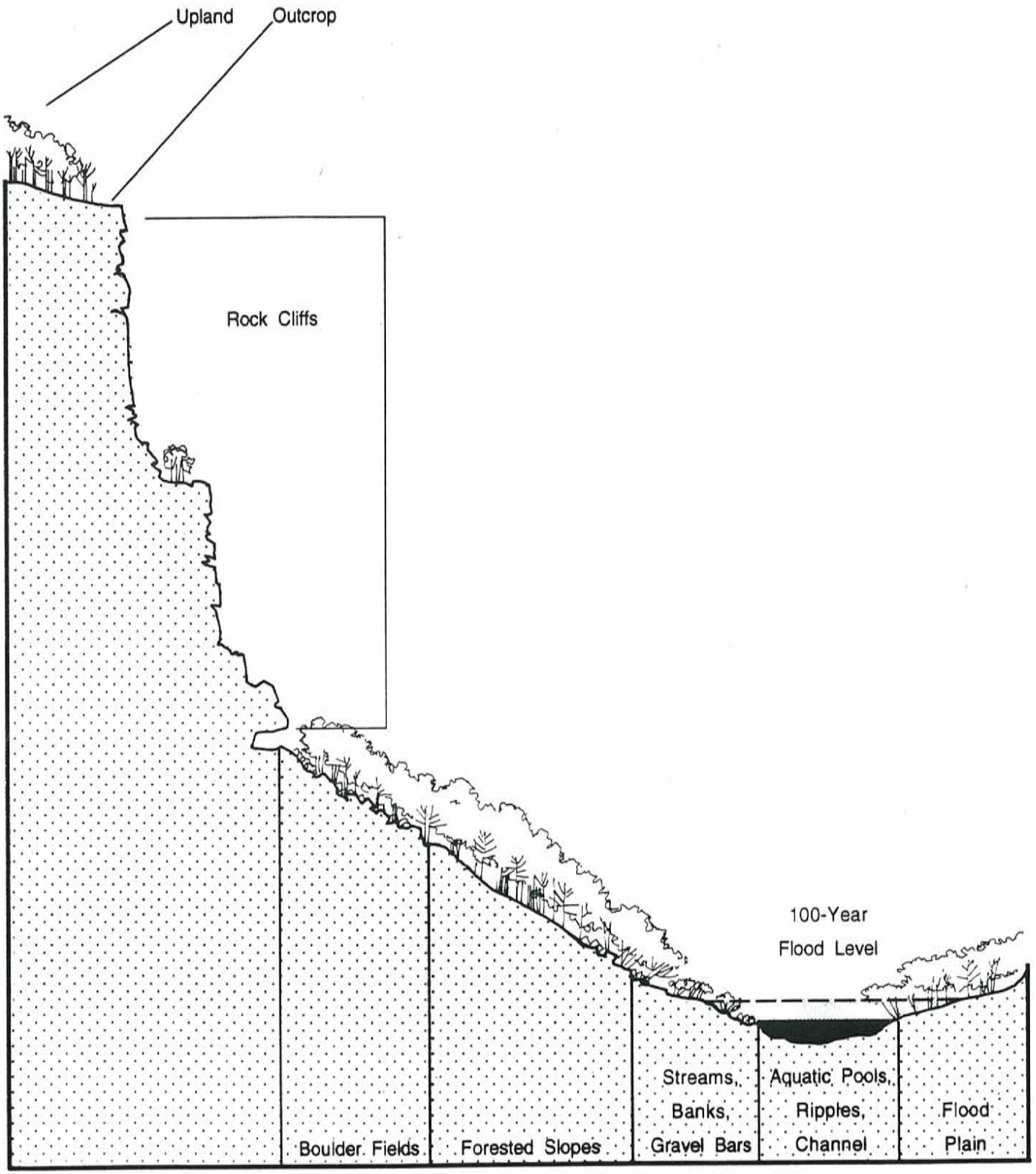
Riparian. Riparian shrub/herb communities inhabit gravel and sand bars adjacent to the streams. These shrub-thickets and perennial grasses depend upon periodic flooding. Seasonal flooding creates conditions necessary for these species to grow and prevents the establishment of flood-intolerant species.

The most continuous, best developed and most extensive area of riparian shrub-herb communities in the Obed WSR occur on gravel and sand bars on the Obed River from below the confluence of Daddys Creek to the Emory River. Other gravel bars that support good examples of the riparian shrub-herb community are found in the Lilly Bridge area and downstream to the junction of Clear Creek and the Obed River.

Other less-developed and smaller riparian shrub-herb communities occur along the Obed WSR: on Daddys Creek from the bridge at the Morgan/Cumberland County line downstream to the Obed River junction; on the Obed River from Huse Potter Ford downstream to Obed River Junction; and on Clear Creek from RM 7 downstream to Lilly Bridge.

Most gravel bar habitats are in good condition as human impacts have been minimal. However, gravel bar habitats around Obed Junction and other local access points are frequently used to fish from. The gravel bars around Lilly Bridge and downstream on the northeast side of Clear Creek have received some impact from road construction and recreational use. Gravel bars farther away from the bridge have been impacted the least.

Floodplain Forests. Riverine associations of floodplain forests include sycamore, birch, elm, and ash associations. A solid stand of river birch is located in the floodplain at the junction of Fox Creek and the Obed River. This prime example of a river birch forest appears to be an early successional community that originated from human or natural disturbances.



Representational cross-section of the Obed WSR depicting the typical location of major plant communities.

Other Forests. Hardwood and mixed forest dominate upland areas. Primary species include oaks, hickories, pines, and common understory species include rhododendrons, azaleas, mountain laurel, and numerous forbs, grasses, ferns, and mosses.

Typical forest communities of the Cumberland Plateau and Obed WSR include:

--oak and oak-pine forest associations near the gorges that occupy the uplands of the plateau;

--oak forests with poplar, beech, and hemlock communities that occupy middle and upper slopes of coves, gorges, and slopes; and

--mesophytic forests which are restricted to lower slopes, north-facing slopes, and draws or other protected sites (Hinkle 1978).

A particularly good example of mesic deciduous forest occurs on the fairly remote, north-facing slope of Clear Creek about 0.5 miles (0.8 kilometers) downstream from old Hall Ford. Although once logged, a rich herbaceous layer can be found beneath the sugar maple, basswood, tulip poplar, and beech canopy.

Another mesic deciduous forest of beech, sugar maple, and tulip poplar occurs in the draw and on the slopes along Sugarcamp Branch. This site is downstream Adams Bridge on the Obed River and extends down the north-facing slope about 0.25 miles (0.4 kilometers).

Boulder Fields. Massive sandstone boulder fields occur intermittently along the slopes on the north side of the Obed River between RM 8 and the junction of Clear Creek and Obed River. These slopes, logged in the past, are now forested with chestnut oak, white oak, and white pine.

Outcroppings. Plant communities have adapted to shallow soils covering the bedrock and in scattered depressions on sandstone outcroppings. Such areas support fragile plant communities adapted to the intense light levels and soils that drain rapidly.

The largest sandstone outcropping within Obed WSR, is located along the edge of the cliffs on the southwest side of Clear Creek above Lilly Bridge at Lilly Bluff. The sandstone feature consists of two exposed outcroppings separated by a narrow fissure. Patches of mosses and lichens cover the sandstone. Depressions in the stone collect soil and support drought tolerant herb and shrub species and dwarf Virginia pine. Farther back from the cliff, the outcrop grades into Virginia pine and mixed oak-pine forest. A vegetation survey of Lilly Bluff was conducted in May 1993 and is included in Appendix G (Risk 1993).

Trampling, vehicle use, litter, vandalism, and camp fires on the northern outcropping have destroyed much of the vegetation on this portion of the site. The southern portion still exists as a relatively undisturbed "plateau bluffline" community. Other outcrops of this community occur along Clear Creek at about RM 7, which is known to be relatively undisturbed, and other places within the Obed WSR.

Rock Cliffs. Sandstone cliffs rim the river gorges for much of their length and contain plant communities that have generally not been disturbed. Besides supporting moss and lichens, shrubs, grasses, and ferns root in cracks on the vertical cliffs.

Wet shale cliffs, associated with two small waterfalls, occur along Melton Mill Branch near its junction with Clear Creek. The cliffs support mosses and liverworts restricted to this type of habitat.

WILDLIFE

Numerous wildlife species native to eastern North America occur in the Obed WSR. The streams contain smallmouth, rock, and largemouth bass, longear sunfish, flathead catfish, and carp. The Obed River and Daddys Creek are habitat for the southern-most population of native muskellunge in the United States.

Forty-one mammal and 138 bird species have been observed in the Obed WSR. Common game species include white-tailed deer, both gray and red fox, gray squirrel, raccoon, cottontail rabbit, wood duck, mallard, and turkey. Nongame species frequently seen are skunks, numerous songbirds, and raptors.

Endangered and Threatened Species

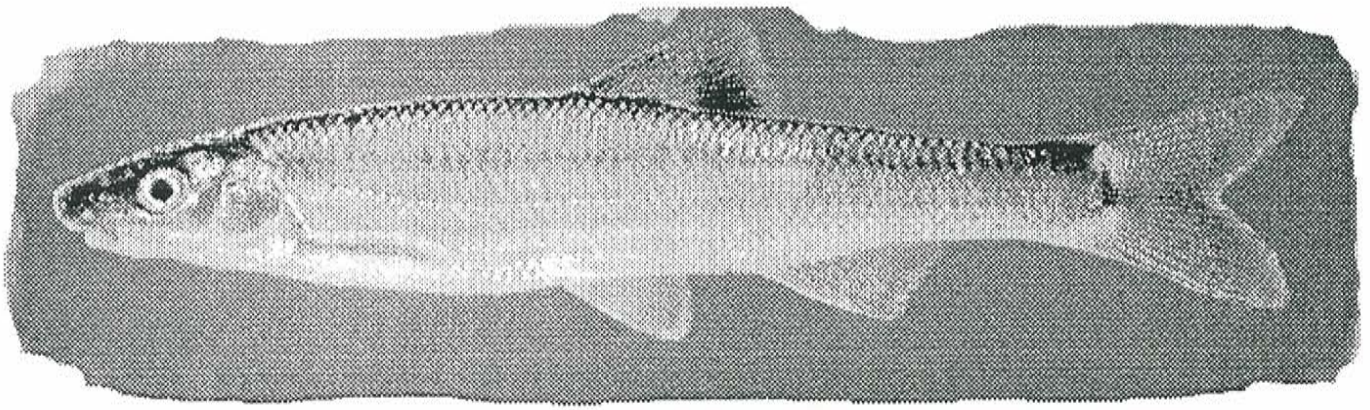
Federal and State endangered and threatened plant and animal species are generally described below. A full listing can be found in Appendix F.

Plants. There are four federally-listed Endangered or Threatened Plant species that may be found in the Obed WSR: Cumberland rosemary; Cumberland sandwort; American chaffseed; and Virginia spiraea. Although listed, no populations of the Cumberland sandwort have been identified as occurring in the Obed WSR. Seven plant species that may occur in the Obed WSR are being considered for listing. However, these species are not legally protected by the Endangered Species Act and the Fish and Wildlife Service is mandated to monitor populations of these species so that steps can be taken to prevent their formal listing.

Sixteen plant species found within the Obed WSR are listed by the State of Tennessee as endangered, threatened, or of special concern. Nine of these species are found on gravel and sand bars along the streams.

No areas in Tennessee have been federally listed as "Critical Habitat" for a plant species.

Wildlife. The red-cockaded woodpecker, spotfin chub, and Alabama lamp pearly mussel are on the Federal list of Endangered or Threatened Wildlife Species of species known to inhabit the Obed WSR. The Obed WSR has no known nesting colonies of the red-cockaded woodpecker and the Alabama lamp pearly mussel has not been found in the streams for over 20 years. In addition, there are six candidate species for listing that may occur in the Obed WSR. The State of Tennessee lists one other animal found in the Obed WSR, the tangerine darter, as being threatened.



The spotfin chub (Cyprinella monacha) is a federally-listed Endangered species found in the Obed WSR. The typical size of a mature adult is 8.5 cm / 3.3 inches in length, about half the size shown above.

All portions of the Emory and Obed Rivers and Clear and Daddys Creeks within the Obed WSR are designated by the US Fish and Wildlife Service as "Critical Habitat" for the spotfin chub. The Federal government considers that sections of these streams contain significant populations of the species or provide habitat critical for their survival.

Exotic Species

Plant surveys indicate there are 59 nonnative plant species in the Obed WSR. These represent 8 percent of the 734 plant species in the Obed WSR. Most exotic species tend to be species associated with early successional stages and primarily occur on disturbed sites. At present, none of the species is known to pose a long-term threat to native plant communities.

The primary exotic animal is the European wild boar (feral hog). Small populations of wild boar are found in the Obed WSR and boar hunting is allowed during designated seasons.

Zebra mussels do not exist within the watershed but represent a potential threat to the Obed WSR.

CULTURAL ENVIRONMENT

HISTORIC BACKGROUND

Prehistoric Native American cultures may have inhabited the gorges and bluffs along the Obed WSR as early as 12,000 B.C. (Lewis and Kneberg 1958, Chapman and Shea 1981). The gorges appear to have been used as a hunting ground and not a permanent dwelling place throughout this period. Native American influences on the vegetation do not appear to have been great, although they may have set ground fires for hunting.

Seasonal occupation of lands now in Obed WSR began approximately 9,000 years ago during the Early Archaic Period. Hunting and gathering groups lived in this area and existed on the abundant flora and fauna. This type of subsistence continued even into the primarily agricultural Mississippian Period of 1,000 to 400 years ago. After the Mississippian period, Native American groups of the Historic Period claimed the Upper Cumberland Plateau as tribal territory. However, historic accounts state that only infrequent hunting parties were encountered in this area and no full-time occupation site of any group has been identified.

European settlement on the Cumberland Plateau began around 1800 (Raulston and Livingood 1974, Bullard and Kreshniak 1956). The remoteness of the Obed region from major settlements and railroad lines, coupled with its wilderness environment, caused the area to be bypassed and of little significance during the Civil War.

Early settlers cleared land for subsistence agriculture and set fires to improve grazing for cattle (Hacker 1849 in O'Connell 1970). Land clearing for agriculture increased from the 1880s until the end of World War II. Range fires were set frequently and burned over much of the land (Jones 1940, Bullard and Kreshniak 1956). In 1952, woods arson fires consumed 17 percent of the forested lands in Cumberland County (Bullard and Kreshniak 1956).

County agents and agricultural experiment station workers worked actively in the early 1900s to improve agricultural practices and to make the Plateau soils productive. The Cumberland Plateau gradually evolved a marginal agrarian economy that has largely remained to date.

Major logging of this area began in 1879 after construction of railroads (Bullard and Kreshnizk 1956). The Tennessee Mineral and Lumber Company acquired the Obed River area, along with other large tracts of land, and began large scale logging around 1910. Its main operation was at Catoosa which, at its height, was a settlement with 330 buildings. The company also mined coal and shipped both lumber and coal by a branch railroad to Nemo. The 1929 flood destroyed the branch railroad and operations were not resumed on a large scale.

By the end of World War II, all of the old-growth forests were cut or burned (TVA 1934, 1935; Jones 1940, Bullard and Kreshniak 1956). The State of Tennessee began acquiring lands from the Tennessee Mineral and Lumber Company, along with abandoned farms and burned over range, in 1942 for incorporation in the Catoosa WMA (Bullard and Kreshniak 1956, TVA 1968). The forests have generally been in a period of regrowth since then.

Coal mining increased with the coming of the railroads, although small mines had been in local use since 1847. Iron furnaces around Rockwood created a need for coal since 1868. Many small and some larger mines were developed after the 1880s. Coal was mined at Nemo and Catoosa within the Obed area (Jones 1940). Strip mining did not become important until after World War II (Bullard and Kreshnizk 1956).

Structures associated with coal mining include: extraction sites and an 1880s railroad tunnel within Obed WSR and mining camp ruins.

Other developments in this period include oil and gas development and sandstone quarrying for building stone. Although there are numerous oil and gas wells within the Obed WSR's watershed, little historical information is available on the extent or locations of abandoned operations within the Obed WSR's boundaries.

CULTURAL RESOURCES

Partially because of its remoteness and rugged landscape, there have been few archeological investigations in the Obed WSR. One archeological and two cultural resource surveys have been done but they were of limited scope and only examined a few sites (Thomas 1979, Des Jean 1991). The Archeological Appraisal Section of the NPS has described most of the Obed WSR area as "unknown country".

Thirteen culturally significant sites were identified in the surveys: ten prehistoric rock shelter sites and three sites associated with 19th and 20th Century farmsteads and industries including one site that shows evidence of multiple periods of human occupation in both historic and prehistoric times. None of these sites have been evaluated to determine if they are eligible for listing on the National Register of Historic Places.

Based on similar physiographical features and archeological investigations at nearby Big South Fork National River and Recreation Area, there may be as many as 340 rock shelters within Obed WSR. Unconfirmed accounts of other historic sites within Obed WSR include subsistence farms, liquor still sites, timbering sites, coal strip and deep mine coal sites, and oil and gas exploration sites. However, no historic structures have been identified with any of these sites. The Nemo bridge and abandoned railroad tunnel are over 50 years old and may have historical significance.

Human activities threaten the cultural resources within the Obed WSR's boundaries. Vandalism of archeological sites has occurred throughout the region. Less than ten percent of the prehistorically occupied rock shelters remain intact anywhere on the Upper Cumberland Plateau. Cultural resources within the Obed WSR are also threatened by unauthorized off-road vehicle use. Minimal onsite monitoring occurs due to limited staff.

THE SOCIOECONOMIC ENVIRONMENT

REGIONAL LAND USE

Historically, agriculture, timbering, and mining activities have supported the economy in Morgan, Cumberland, and Fentress Counties. Outside of the rugged stream corridors, level lands are suitable for growing corn and soybeans and raising livestock. Soils are generally poor so most commercial agriculture is limited to the western portions of the watershed area. Coal mining, once a viable business, has ceased and there are now no permitted operations within the watershed.

Forestry and farming operations occur on most of the land in the watershed. Over 90 percent of the watershed is forested and large land tracts are managed for wood production. Approximately 5 percent of the area is in agricultural production.

Oil and natural gas extraction still occur in the watershed. Both active and abandoned wells are located in the Obed WSR boundaries and the watershed.

Economic growth in the region has generally lagged behind other areas of the State. However, the growth of tourism and the influx of retirees into retirement communities is becoming an important factor in the growth of the local and regional economy.

The major road through Wartburg is US 27 which runs from Chattanooga north to the Tennessee/Kentucky border. Interstate 40 intersects US 27 in Harriman, about 20 miles (32.2 kilometers) south of Wartburg. The interstate runs east/west connecting Memphis, Nashville, Crossville, and Knoxville.

POPULATION

Morgan, Cumberland, and Fentress Counties cover approximately 1,702 square miles (4408.2 square kilometers) and have a population of 222,405. Populations are most dense in Cumberland County. There are 51 persons per square mile in Cumberland County as compared to 29 persons per square mile in Morgan and Fentress Counties (US Dept. of Commerce 1991).

Wartburg has a population of 3,976. Crossville contains the largest population in the watershed with 14,926 inhabitants. Regionally, the largest commercial and population centers are in Oak Ridge and Knoxville, about 20 miles (32.2 kilometers) and 42 miles (67.5 kilometers) east of Wartburg, respectively.

VISITOR USE

VISITOR PROFILE

Generally, there are three major types of visitors to the Obed WSR. The groupings are based on similar patterns of use.

Area Resident Visitors. Area Resident Visitors live in Morgan and surrounding counties. They primarily come to fish, swim, picnic, hunt, and camp during the warmer months. Some also come to party and drive all-terrain-vehicles (ATVs).

These visitors have used the area for years. They know the area well and go directly to desired locations. The Nemo Bridge area is heavily used by this visitor group. Areas adjacent to existing bridge crossings and fishing and swimming holes are also popular.

Some areas, such as Canoe Hole and Turn Hole, are difficult to get to and almost exclusively used by area residents. These areas are not designated on maps and can be reached only by travelling undeveloped and unmaintained roads.

The number of visitors to the Obed WSR from this group remains the most constant

Specific-Use Visitors. These visitors come to the Obed WSR to participate in a specific activity; such as white water boating, rock climbing, and hiking. Other specific activities that occur in the Obed WSR and areas outside the boundaries include horseback riding, mountain bicycling, hunting, and fishing. Like the Area Resident Visitor, these visitors generally know the area and stop at the visitor contact station in Wartburg to obtain specific information such as water levels. While some visitors from this group reside in the local community, many come from great distances. Grouped together, they represent a significant and steadily increasing type of visitor.

National Park Visitors. The third visitor type includes those who visit the Obed WSR because it is a unit of the National Park System. Typically, the Obed WSR is not a final destination for this visitor. They tend to have limited time and typically come first to the Visitor Contact Station in Wartburg to obtain information. Depending on available time and interests, these people are generally directed to the Lilly Bridge area. Presently, few facilities accommodate these visitors. At this time, this group comprises the smallest number of visitors to Obed WSR.

VISITOR ACTIVITIES

Stream flows, water and air temperatures, and site conditions are largely responsible for determining how and when visitors use the streams and land within Obed WSR. Average stream flow and monthly visitation are shown on page 83.

While the water and air temperatures can be quite low, high stream flows in the winter and spring facilitate white water boating.

Warm air and water temperatures and low stream flows, typical of summer months (June through September), are preferred for water based activities, other than boating, and shoreline use. Many people flock to the waters edge to swim, fish, camp, picnic, sunbathe, and generally enjoy the area's natural beauty. Over time, summer use of the Nemo Bridge area has increased dramatically. Between 300 to 500 people occasionally congregate in the area on weekends.

Other activities occurring in the Obed WSR include: hunting, hiking, rock climbing, sight-seeing, horseback riding, and mountain bicycling. Inappropriate and illegal activities such as off-road vehicle use and marijuana cultivation also occur within the boundaries. The Obed WSR staff also offers various interpretive services at several locations in the Obed WSR and the local area. The activities and associated facilities are discussed and have been grouped into water based activities, land based activities and interpretive services.

Water Based Activities

There are a limited number of places where the river can easily be reached. These areas are depicted on the River Access Sites map. State and county maintained roads lead to river access sites at Nemo Bridge, Potters Ford, Devils Breakfast Table, Barnett Bridge, Jett Bridge, and Lilly Bridge. Several undesignated and unimproved roads lead to other fishing, camping and swimming areas at Alley Ford, Fox Creek, Norris Ford, Huse Potter Ford, Turn Hole, Canoe Hole, and Obed Junction.

The primary water based activities are swimming, white water boating and fishing. The participation in these activities is affected by water quality, flow, and temperatures. During peak eriods, such as summer holidays and under ideal white water boating conditions, river use reaches high levels and the park's facilities are inadequated to meet visitor demands.

Swimming. Swimming holes are very popular and are primarily used by area residents. The favorite holes are at Nemo Bridge, Lilly Bridge, Devils Breakfast Table and Slant Rock near Jett Bridge. Low flows in the summer expose sandy beaches in these areas. Other swimming holes occur throughout the Obed WSR but are difficult to get to and, therefore, receive minimal use.

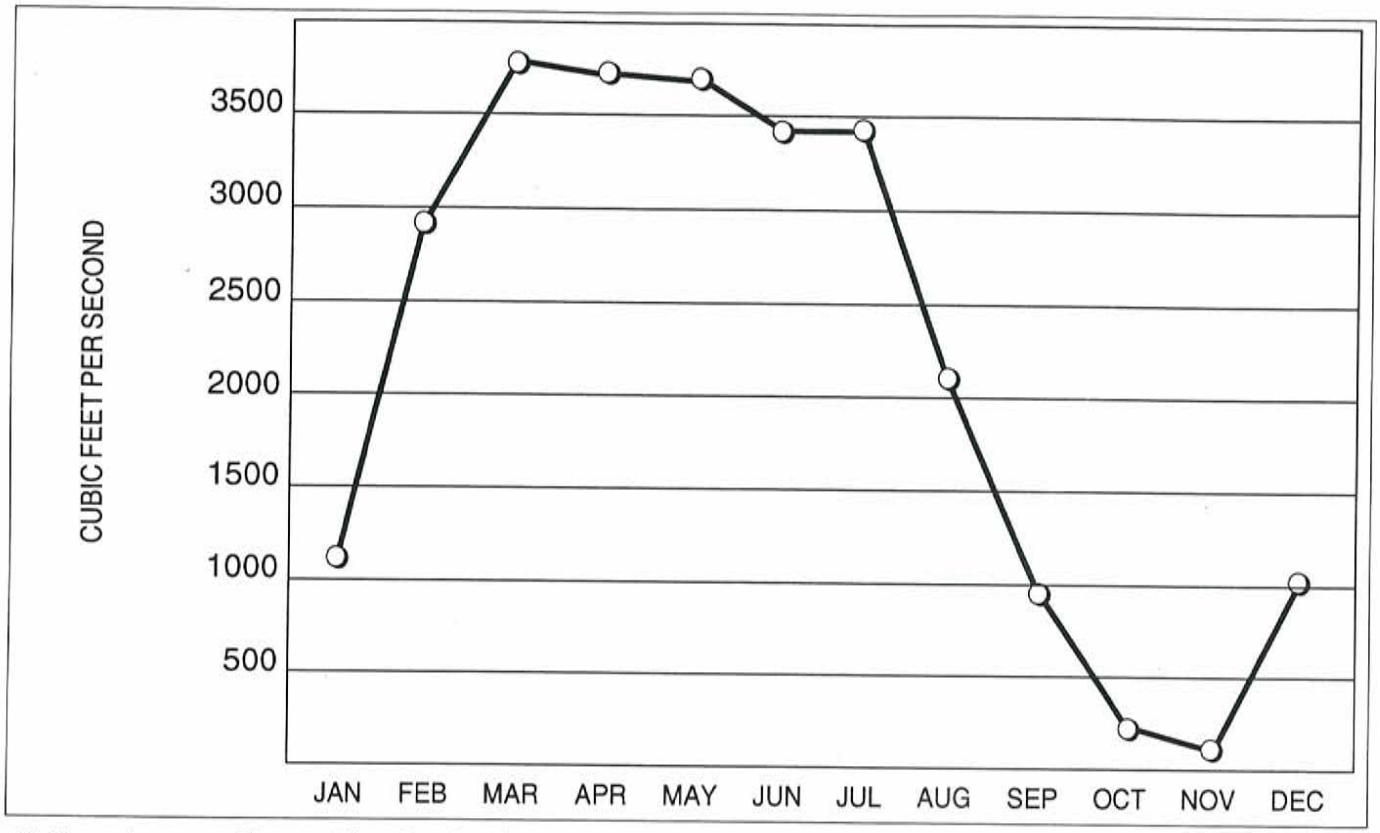
The only facilities to accommodate swimming are at Nemo which has a beach area, parking, picnic tables, grills, trash receptacles, and sanitary facilities.

White Water Boating. The Obed WSR has numerous Class II, III, and IV rapids and is one of the finest pool and drop white water rivers in the eastern United States. Although a good rain will bring boaters out any time of year, most boaters come to the park during the winter and early spring when water flows are the highest. Generally, white water conditions are best from February until mid or late May.

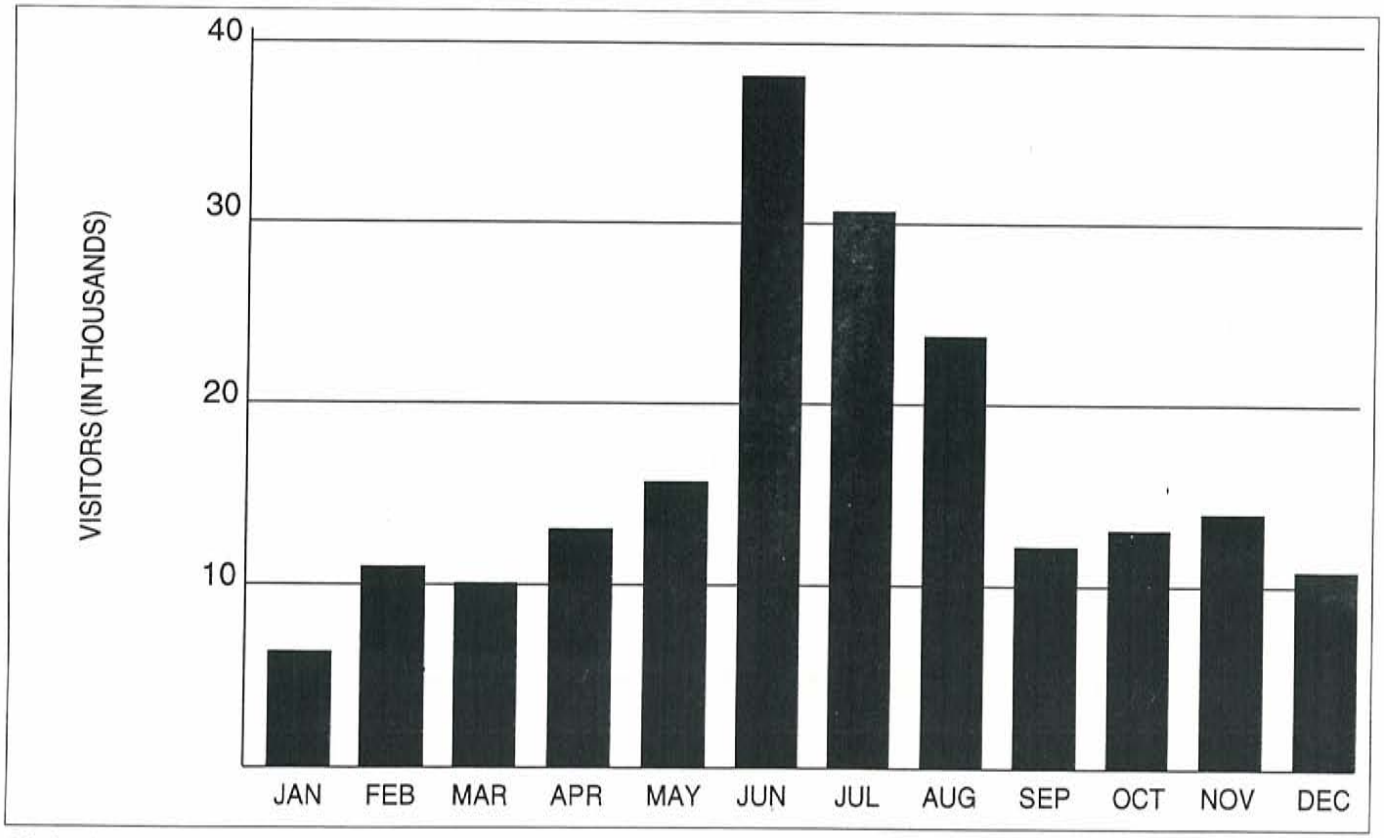
Retail sales indicate white water boating is one of the fastest growing outdoor activities in the United States. During boat season, over 100 boaters visit Obed WSR on the average weekend and more than 400 boaters on the busiest weekends. Park staff predict over 200 boaters will use the river on the average weekend during the 1993/94 boating season.

Boaters often travel considerable distance to get to Obed WSR. Most come from nearby Nashville, Chattanooga, Knoxville, Oak Ridge, and Lexington (Kentucky), but some also come from other states including Georgia, North Carolina, Missouri, Ohio, and Michigan. Boaters typically spend 6 to 8 hours per day at the Obed WSR and often return for additional boating trips.

Minimal facilities exist at Obed WSR to accommodate boaters. The heaviest used river access sites include Obed Junction, Jett Bridge, Barnett Bridge, Lilly Bridge, the 127 Bridge, and Nemo Bridge. Nemo and Jett Bridge have small parking areas and on busy weekends the areas overflow and vehicles are parked along the roads. No parking areas exist at the other sites so vehicles are parked along the road or where they can find room.



10-Year Average Stream Flow for the Emory River.



Visitation levels for the 1992 Calendar Year.

Several sites outside Obed WSR boundaries are used by boaters to reach river sections in the Obed WSR. These include Lavender Bridge, Antioch Bridge, Montgomery Bridge, and Adams Bridge and are depicted on the River Access Sites map. Boaters who put-in their boats within the Obed WSR at Nemo takeout downstream at Camp Austin Bridge.

Big South Fork National River and Recreation Area handles commercial use licensing for the Obed WSR. Three river outfitters have a commercial use license to operate in the Obed WSR but only one is actively providing these services. Services offered include equipment rentals, guided trips and shuttles.

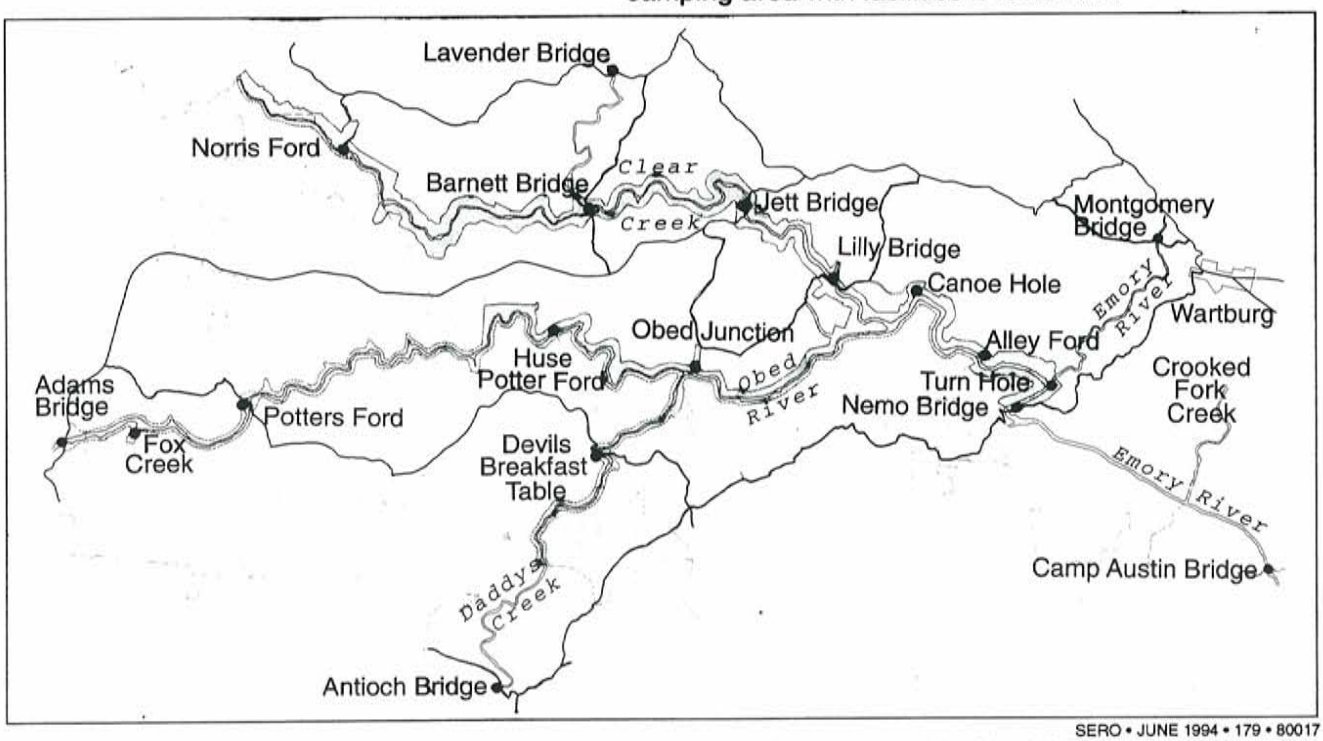
Fishing. Fishing is a popular sport near all river access sites. Most fishing occurs by "area resident visitors" who tend to have a favorite fishing hole and use the same area year after year. This activity has caused the formation of many undesignated trails that lead to the fishing holes. The Obed WSR is in the process of becoming more known for its river-type sport fishing and is beginning to attract more specific-use visitors from outside the surrounding communities.

A Tennessee fishing license is required to fish in the Obed WSR.

Land Based Activities

Land based activities include camping, picnicking, hiking, sight-seeing, hunting, rock climbing, horseback riding, mountain bicycling, ATV use, and drug cultivation and consumption. Most of these activities occur at or in conjunction with the river access sites as described under Water Based Activities.

Camping. Since camping typically occurs in association with other activities such as swimming, fishing, hunting, and boating, it is a year round activity. Camping takes place at river access points and in isolated clearings along the rivers and creeks. The only designated camping area with facilities is located at



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River Access Sites both inside and outside Obed Wild and Scenic River.

Norris Bottoms which contains six campsites, parking, and sanitary facilities. Potters Ford, Huse Potter Ford, Barnett Bridge, and Fox Creek are also popular camping areas but have no facilities.

Picnicking. Visitors picnic throughout the Obed WSR but use is concentrated at river access sites and near popular swimming holes. Picnic tables and trash receptacles are located at Nemo Bridge and Jett Bridge.

Hiking. The most popular hiking routes follow fishing trails, old road beds, and old fire lines and include Lilly Bridge to Canoe Hole, Lilly Bridge to Lilly Bluff, the Obed River/Clear Creek Junction area, and Obed River/Clear Creek Junction to Obed Junction. Many of these routes contain spectacular views of the Obed WSR or lead to interesting geologic formations. Some hiking also occurs around the Nemo Bridge area, from the bridge to Turn Hole. The only designated trail within Obed WSR is a portion of the Cumberland Trail. This trail is not a popular route as it does not overlook the Obed WSR or lead to a specific destination.

Sight-Seeing. A variety of sight-seeing opportunities exists in and near the Obed WSR. Visitors come to the Obed WSR and Catoosa WMA to see the streams, gorges, and other geological features, wildlife, white water boating, and the fall vegetation colors. No specific facilities currently exist to provide visitors views of the Obed WSR. As discussed under hiking, the most popular trails tend to lead to areas where spectacular views are available. Two of the most popular areas are around Lilly Bluff and Obed River/Clear Creek Junction.

Hunting. The relatively small land base and narrow corridor limit the amount of hunting that actually occurs within Obed WSR. Most hunting occurs on the adjoining Catoosa WMA and private lands.

Deer, boar, turkey and small game may be hunted in season with a permit from TWRA. Wild boar and deer hunting seasons coincide during scheduled periods from September through December.

Catoosa WMA and roads through it are closed from February 1 to March 28. This area is also closed to nonhunters during deer season in the fall and turkey season in the spring.

Rock Climbing. Climbing and rappelling are year-round activities and participation is increasing at Obed WSR. Two years ago, rock climbers only visited Obed WSR about once every 3 or 4 months. Presently, 10 to 15 climbers are expected on a weekend day.

Climbers use old road beds, old fire lines, and fishing trails to access climbing areas. The most popular rock faces to climb are located on:

--the north side of Clear Creek between Lilly Bridge and Canoe Hole;

--the north side of the Obed River just upstream from Obed River/Clear Creek Junction; and

--the south side of Clear Creek between Lilly Bridge and Obed River/Clear Creek Junction.

Climbers construct trails and clear vegetation along the bluff where climbing is taking place. Ladders and fixed routes are periodically installed by climbers as are holes in the bluff for permanent anchor points. It is not known if any significant resource damage is occurring from present use.

Horseback Riding. Horseback riding is occurring in a few areas of the Obed WSR but there are no trails designated for this purpose. Several trails exist in the Obed River/Clear Creek area and a previous landowner has constructed a trail out along the narrow ridge to the streams' confluence. Another popular riding area begins near Norris Bottoms Campground and goes over Catoosa WMA lands to Alley Ford. The rugged terrain, limited land base, and lack of trails, provide few horseback riding opportunities within the Obed WSR.

Mountain Bicycling. For the same reasons as stated for horseback riding, mountain bicycling is minimal in the WSR. Some use occurs on the trails and old road beds used by hikers and horseback riders. Use is increasing on old logging roads in Catoosa WMA and other adjacent lands.

All-Terrain-Vehicles. There are many heavily used, undesignated four-wheel-drive roads in the Obed WSR. Continuous use, especially by 4x4s has created and maintained most of these routes and has caused heavy resource damage. These routes usually begin on private land and cross into the Obed WSR's boundaries. They are primarily used by area resident visitors and boaters to access the river at: Fox Creek; Huse Potter Ford; Norris Ford; Obed Junction; Canoe Hole; and Turn Hole. A new route has been created this year just upstream of Huse Potter Ford. The NPS is in the process of purchasing land rights along the routes leading to Norris Ford and Obed Junction.

Four-wheelers and dirt bikes are smaller ATVs, accommodating one or two persons, and are illegal within the Obed WSR boundaries. Attempts by Park Service staff to restrict their use have been unsuccessful and resources are being damaged at Lilly Bluff and many other sites.

Drug Cultivation and Consumption. Rangers have discovered several crops of marijuana cultivated within Obed WSR boundaries. Crops range from a few to several hundred plants. Cultivation methods can be quite intensive and involve clearing land of native vegetation, planting, weeding, protecting young plants from animals, and supplemental watering. Along with natural resource impacts, this activity also poses threats to visitors. Growers have been known to carry firearms and knives when cultivating areas and sometimes, traps are set to keep people away from crops.

Heavy consumption of alcohol and drugs by visitors is frequent at areas like Nemo, Lilly, and Barnett Bridges. Vandalism, offensive behavior, and damage to park property and resources are often associated with this activity. These activities have historically been a problem at Obed WSR. Facility development and patrolling, as time and staff permit, have had little impact on curtailing these activities.

Interpretive Services

A visitor contact station is operated in Wartburg. Open daily, it offers information and orientation to NPS visitors and serves as a contact point for specific-use visitors such as boaters. There are a few exhibits and an automated slide program will soon be in operation.

Interpretative services offered in the Obed WSR's boundaries are limited. Rangers on patrol and the maintenance staff working in the field, are the primary providers of information and assistance to area resident and specific-use visitors. Additional information regarding boundaries, area closures, and other pertinent topics are posted on an information board at Nemo Bridge. Park ranger led programs are sometimes offered

at river access sites to organized groups including Scout programs, canoe clubs, and school classes.

Outreach interpretive programs are popular and are presented at area schools, parks, and community meeting places. In the last 5 years, programs have been presented in all schools in Morgan County with the majority presented at Wartburg Central Elementary School. All first through sixth grade classes in Morgan County received programs as part of the Take Pride in America initiative during the 1990 and 1991 school years. Limited staff and expanding duties have prevented this type of outreach for the past 2 years.

Interpretive programs cover a wide range of topics. Those requested regularly include: Biodiversity, DARE (Drug Abuse Resistance Education), Orientation to the Obed WSR, Pioneer/Longhunter (living history demonstration), Web of Life (the ecosystem and how things fit together), and White Water Canoe Instruction.

REGIONAL RECREATIONAL OPPORTUNITIES

Other major recreational, educational, and visitor-use areas in proximity to Obed WSR are shown on the Regional Recreational Opportunities map and discussed below. The variety of recreation opportunities available in the region continue to have a bearing on those available at the Obed WSR.

Catoosa Wildlife Management Area. Managed by Tennessee Wildlife Resources Agency, Catoosa WMA contains more than 90,000 acres (36,422 hectares) of which more than 98 percent are forested. The lands are primarily managed for wildlife and timber production. Lands currently within the Obed WSR that are part of Catoosa WMA will continue to be owned and managed by the TWRA in accordance with Public Law 94-486, the Wild and Scenic Rivers Act.

Catoosa WMA contains few improved facilities except for roads. Besides hunting, there are opportunities for primitive camping, sight-seeing, hiking, boating, horseback riding, and mountain bicycling when the area is not closed. Catoosa WMA and roads through it are closed from February 1 to March 28. This area is also closed to nonhunters during deer season in the fall and turkey season in the spring.

Royal Blue Wildlife Management Area. Also managed by TWRA, this relatively new area comprises more than 43,000 acres (17,401 hectares) and is located along I-75 near La Follette, Tennessee. The area will be managed and offer opportunities similar to Catoosa WMA.

Frozen Head State Natural Area. Located 7 miles (11.3 kilometers) from Wartburg, this State park contains facilities for a wide range of activities including: camping (with rest rooms and showers), playgrounds, picnicking (with some shelters), volleyball, horseshoe, trout fishing. A visitor center provides information and audio visual programs and an amphitheater is used for interpretive programs. NPS and State park staff frequently conduct outreach programs together and often recommend each other to conduct programs.

Lone Mountain State Forest. This State forest is managed for wildlife and forest production and is located in Morgan County, 2 miles (3.22 kilometers) south of Wartburg. Recreational opportunities include: hunting; 12 miles (19.3 kilometers) of hiking and horseback riding trails (a horse camp and corral are available); backcountry camping; picnicking; and mountain bicycling. Currently, no interpretive programs are provided.

Cumberland Trail. The route of the Cumberland Trail starts at Highway 27, approximately 7 miles (11.27 kilometers) south of Wartburg, and goes through Morgan, Campbell, and Anderson Counties and on north to Cumberland Gap National Historical Park. Only portions of the trail for hiking and backpacking have been developed, mostly on private property. Originally, the trail was organized and maintained by the Department of Conservation, Division of Parks and Recreation, however, the project had been abandoned. More recently, the Tennessee Trails Association has adopted this trail and is actively seeking an extension of the trail. Hiking, backpacking, and camping opportunities exist along portions of the trail route.

Big South Fork National River and Recreational Area. The southern entrance to Big South Fork National River and Recreation Area (NRRA) lies about 45 miles (72.4 kilometers) north of Wartburg. Recreational opportunities are similar to those in the Obed WSR although Big South Fork NRRA has a much larger land base. Opportunities and facilities are available for backcountry and primitive camping, hiking, swimming (a pool is located in the campground), white water boating, horseback riding, and mountain bicycling. Hunting is allowed in season.

Cumberland Mountain State Park. Located in Cumberland County, 5 miles (8 kilometers) from Crossville, Cumberland Mountain State Park contains camping (with rest rooms and showers), lodging, hiking trails, playgrounds, picnicking, and a lake for swimming and boating.

Tennessee Valley Authority (TVA). The TVA manages numerous water projects in central and eastern Tennessee. The closest TVA reservoir is Watts Bar Lake on the Tennessee River which is located about 20 miles (32.2 kilometers) south of Wartburg. Also within the 50-mile radius (80 kilometer) are Melton Hill, Norris, Fort Loudoun, and Tellico Reservoirs offering a variety of recreation opportunities. Opportunities available include motorized boating, swimming, fishing, and picnicking.

The TVA also operates a program to provide for public access to navigable rivers. Through this program, The TVA designed and paid for construction of the facilities at Jett Bridge. TVA owns properties at the following sites that provide access to river sections inside the Obed WSR: Adams Bridge on the Obed River; Center and Meridian Bridges on Daddys Creek; and Twin and Lavender Bridges on White Creek (a tributary of Clear Creek).

Pickett State Park. This State park is located in Fentress County, about 60 miles (96.5 kilometer) north of Wartburg. There are opportunities for camping and picnicking.

Great Smoky Mountains National Park. This popular national park is about a 2-hour drive and about 90 miles (145 kilometer) southeast of Wartburg. The park provides opportunities for many outdoor recreational activities including camping and hiking.

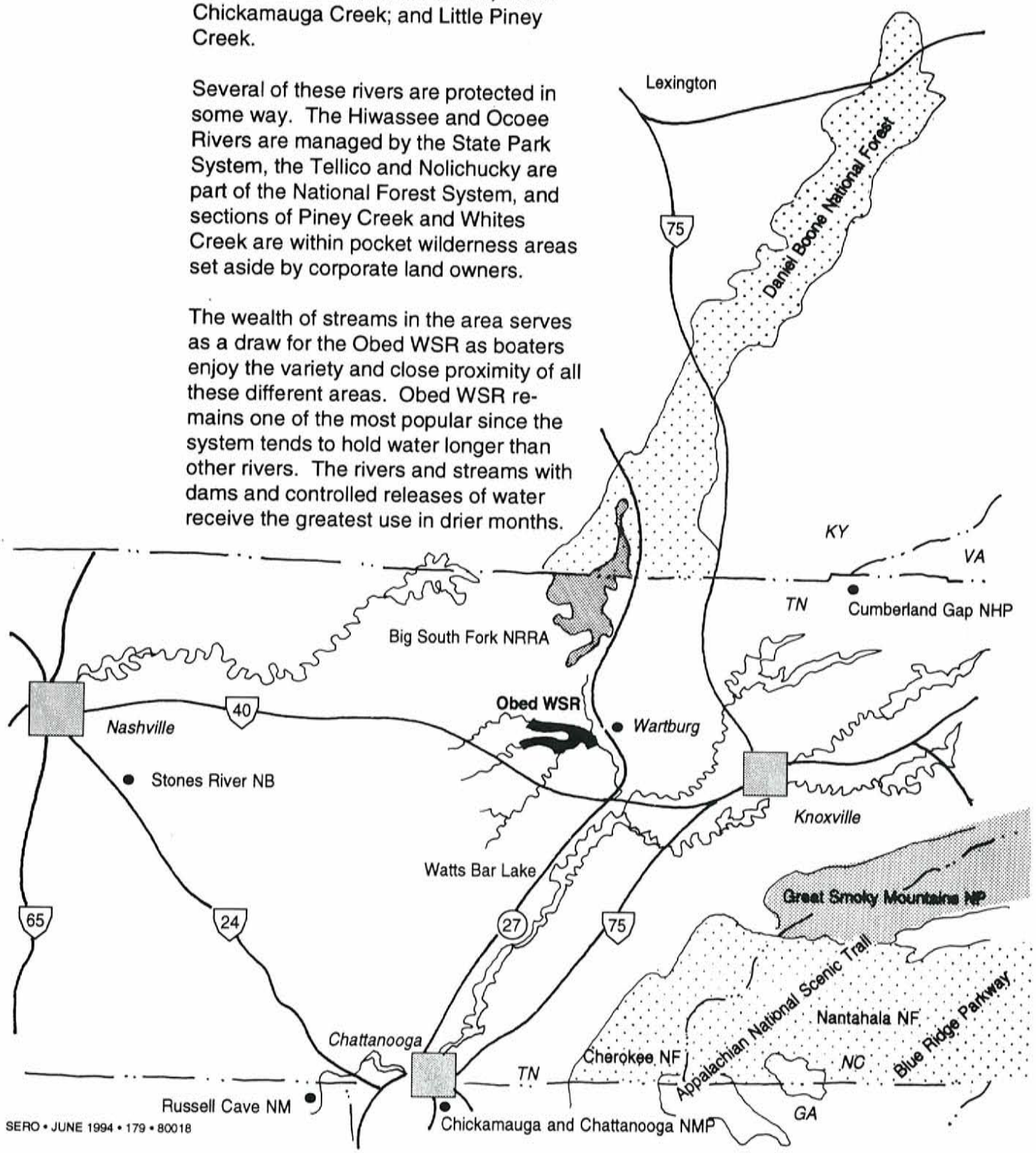
Cherokee National Forest. Adjacent to the Great Smoky Mountains NP, Cherokee National Forest contains hiking trails and campgrounds.

White Water Rivers. Many rivers in East Tennessee offer a wide variety of white water boating experiences. Some of the most heavily used rivers include: Tellico River; Little River; Little Pigeon River; Doe River; Watauga River; French Broad River; Big South Fork; Nolichucky River; Ocoee River; and Hiwassee River. Other streams, known to boaters as "steep creeks", can only be run after a good rain as their water levels drop quickly and are usually run by intermedi-

ate to advanced boaters. Steep creeks in the area include: Yellow Creek; Piney Creek; Whites Creek; Crab Orchard Creek; Fall Creek; Island Creek; North Chickamauga Creek; and Little Piney Creek.

Several of these rivers are protected in some way. The Hiwassee and Ocoee Rivers are managed by the State Park System, the Tellico and Nolichucky are part of the National Forest System, and sections of Piney Creek and Whites Creek are within pocket wilderness areas set aside by corporate land owners.

The wealth of streams in the area serves as a draw for the Obed WSR as boaters enjoy the variety and close proximity of all these different areas. Obed WSR remains one of the most popular since the system tends to hold water longer than other rivers. The rivers and streams with dams and controlled releases of water receive the greatest use in drier months.



Regional recreational opportunities.

PARK OPERATIONS

STAFFING and FACILITIES

The Superintendent for Big South Fork National River and Recreation Area (NRRA) is also responsible for managing the Obed WSR. Resource management functions at Obed WSR are the responsibility of the Resource Management staff at Big South Fork NRRA, and to a lesser degree, other Big South Fork NRRA divisions also support the Obed WSR.

At present, five full-time employees comprise the staff stationed at Obed WSR which is considered to be insufficient to effectively administer the area. Staff functions include Unit Management, Administrative Assistant, Interpretation, Law Enforcement, and Maintenance. Park Ranger duties are geared primarily toward visitor and resource protection, and visitor service.

Administrative offices are combined with the visitor contact station in Wartburg. The building was previously a bank. The City of Wartburg purchased the building and currently leases the building to the NPS.

A maintenance facility containing office space, equipment storage, and work areas, is located about 2 blocks from the administrative offices. Some Park Ranger equipment is also stored in this facility including boats and search and rescue gear. At this time, the maintenance staff is adequately equipped to do minor road work within the park and to do general maintenance of the rest of the Obed WSR, including the river access sites. Periodically, Big South Fork National River and Recreation Area lends assistance and equipment for large scale projects.

Major equipment at the Obed WSR includes:

--3 motorized vehicles (2 patrol and 1 maintenance);

--13 boats (2 rafts, 1 inflatable kayak, 5 kayaks, 5 canoes); and

--1 tractor.

LAND OWNERSHIP AND MANAGEMENT

OWNERSHIP

The Wild and Scenic Rivers Act of October 1968 authorized 320 acres (129.5 hectares) of adjacent lands per river mile to be included within the boundaries of units of the National Wild and Scenic Rivers system. The total authorized acreage for the 45.2 mile Obed WSR is 14,464 acres (5853.5 hectares).

The Act limits public ownership in fee to 100 acres (40.4 hectares) per river mile which equates to 4,520 acres (1829.2 hectares) for the Obed WSR. Once 50 percent or more of a wild and scenic river is publicly owned in fee, the use of condemnation to acquire fee title is prohibited. There are no restrictions regarding acquisition of easements.

Based on the boundaries depicted in the LPP (1992), the current total acreage within the Obed WSR boundary is approximately 5,057 acres (2046.5 hectares). The Park Service presently owns approximately 2,085 acres (843.7 hectares) in fee and 1,066 acres (431.4 hectares) in easements and the State of Tennessee owns 57.5 acres (23.2 hectares) in fee. The remaining acreage is still under private ownership.

The State of Tennessee owns 3 tracts totally 57.5 acres (23.3 hectares) in fee. These lands are managed by TWRA and the Department of Transportation and are being managed in a manner compatible with the puposes outlined in the Wild and Scenic Rivers Act, as amended.

The remaining 1,621.57 acres (656.2 hectares) are in 48 tracts under private ownership. Twenty-nine tracts have river frontage and 30 tracts have either trail or vehicular access on or across the property. These lands are frequently used for recreational activities such as hiking, camping, off-road vehicle driving, swimming, fishing, and hunting (approximately 24 tracts are used only for hunting).

Almost all of the tracts were logged at some time in the past and most have since revegetated naturally. However, some areas back from the rim of the gorge are being converted from mixed hardwood-pine forests to pine monoculture or are being cleared for pasture and cropland. Other uses and activities occuring on privately owned lands, include: the cutting of firewood; the dumping of untreated sewage or wastes, and trash; the construction of second homes or livestock facilities and other structures; and mineral extraction.

Easements allow for continued private ownership and use subject to specific restrictions and are tailored to a specific property. Generally, the existing easements in the Obed WSR:

--provide protection for the existing landscape character;

--restrict advertising, dumping trash, and developing lands and new structures;

--provide for public use along the river and floodplain;

--prohibit road construction;

--permit limited agriculture and timber practices on the rim while prohibiting these activities in the gorge; and

--prohibit animal operations with large populations.

MANAGEMENT

At this time, the waters of the Obed WSR are considered to be navigable under the Rivers and Harbors Act of 1899. Section 10 of the Rivers and Harbors Act prohibits the alteration or obstruction of any navigable waters of the United States unless authorized by the Secretary of the Army acting through the Chief of Engineers. The State of Tennessee exercises regulatory jurisdiction over navigable waters in the State. Under the authority of Section 404 of the Clean Water Act of 1977, the U.S. Army Corps of Engineers controls the discharge of dredge or fill material to restore and maintain the chemical, physical, and biological integrity of waters of the United States. Section 26a of the TVA Act requires that no dam, appurtenant work, or other obstruction affecting navigation, flood control, or public lands or reservations be constructed and thereafter operated or maintained across, along, or in the Tennessee River or any of its tributaries until plans for such construction, operation, and maintenance have been submitted to and approved by TVA.

Part of the Obed WSR flows through Catoosa WMA. The Wild and Scenic Rivers Act states that lands within the Obed WSR boundary that are currently part of the Catoosa WMA shall continue to be owned and managed by the TWRA in such a way as:

> "to protect the wildlife resources and the primitive character of the area and without further development of roads, campsites, or associated recreational facilities unless deemed necessary by that agency for wildlife management purposes".

In accordance with the Act, a MOU has been established in which the TWRA agrees to:

--manage and administer Obed WSR lands, from the thread of the river to 100 feet back (30.46 meters) from the bluff, in accordance with the Wild and Scenic Rivers Act;

--keep the NPS informed of planning, development and administrative policies and needs, and to consult with the NPS before implementation;

--provide professional advice and assistance;

--improve river access points;

--not cut timber within the gorge except when necessary and after prior consultation with the NPS; and

--allow access to the river over existing roads except when Catoosa WMA is closed.

The current MOU also permits the NPS to construct and maintain a hiking trail on Catoosa WMA lands with the TWRA approval and consistent with their mandate related to wildlife management. The current MOU was signed in 1992 and is updated every 5 years.

MANAGEMENT ZONES

The NPS has a management zone system for managing the lands in the Obed WSR. The existing management zone system is described in the 1992 LPP and is based on ownership status, suitability of the land for proposed uses, and the nature of the resources. The zones are listed and described below.

Natural Zone
Land outside Catoosa WMA that is managed with an emphasis on protecting natural and cultural resources while permitting compatible recreational activities.

Historic Zone
Lands which have historic or archeological significance will receive historical zone classification and be managed to preserve, protect and interpret their associated values.

Park Development Zone
Lands intensively developed and used to meet needs of management and visitors.

Administrative Development-Visitor Services Subzone. Applied to a parcel of land outside the existing boundaries for the construction of a visitor contact station, administrative offices and a maintenance facility.

Special Use Zones
Lands within exterior boundaries that are managed by others.

Transportation Subzone. Lands used for State and local roads and railroads that are managed primarily or exclusively for nonpark purposes.

Scenic Easement Subzone. Lands where certain rights are purchased to restrict certain uses and includes areas in which present use is compatible with river values, but uncontrolled use could be detrimental to those values.

State-Owned Subzone. Lands owned and managed by the TWRA and covered under a MOU with the NPS.

Unmanaged Non-Federal and Non-State Owned Lands Subzone. Private lands that are not currently associated with an identifiable land use and might be used for incompatible purposes.