TVA Reservoir Operations Study Wetland Monitoring Summary Report

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Introduction

On May 19, 2004, the TVA Board of Directors approved a new policy for operating the Tennessee River and reservoir system. This policy took effect on June 1, 2004, and is the result of TVA's Reservoir Operations Study (ROS), a comprehensive review of how TVA operates 35 of the 49 dams and reservoirs in the river system. The TVA Board approved the policy alternative that reduces environmental impacts and best matches the objectives identified by the public at the outset of the study. In general the new operations policy shifted the focus from reaching specific summer reservoir elevations to a flow-based approach of efficiently moving water through the river system. The new policy was shaped with extensive public input from citizens all across the Valley, as well as representatives from state and federal agencies. The overall goal of the change was to improve recreation opportunities and extend higher lake levels beyond the August/September timeframe in which drawdown typically began.

Main-stem reservoir operation changes

To reduce flood risk along the Tennessee River, the spring fill on Fort Loudoun/Tellico, Watts Bar, and Chickamauga reservoirs will occur more gradually, assuming normal rainfall and runoff. As in the past, half the normal spring fill will occur in the first week of April to ensure that fish spawning areas are covered. The second half of the fill will continue more slowly and be completed by mid-May. The summer operating zone will be maintained through November 1 on Watts Bar and through Labor Day on Chickamauga, Guntersville, Wheeler, and Pickwick. The minimum winter pool level at Wheeler will be raised six inches, and minimum flows of up to 25,000 cubic feet per second will be provided from Kentucky Dam. Water levels on Kentucky and Barkley reservoirs will remain the same. Changes were considered as part of the ROS, but they were not adopted because of concerns expressed by some members of the public and by other agencies regarding potential resource and flood-risk impacts.

Tributary reservoir operation changes

The new operating policy will improve recreation on tributary reservoirs by:

- Limiting the drawdown of 10 tributary reservoirs (Blue Ridge, Chatuge, Cherokee, Douglas, Fontana, Hiwassee, Norris, Nottely, South Holston, and Watauga) from June 1 through Labor Day.
- Allowing higher winter water levels on the same 10 reservoirs, as well as on Boone Reservoir.
- Attempting to fill Great Falls Reservoir to its summer operating level by Memorial Day.
- Providing expanded releases for tailwater recreation at five additional tributary projects (Apalachia, Ocoee No. 1, Norris, Watauga/Wilbur, and South Holston), including advance notice of water release schedules.
- Providing continuous minimum flows between Apalachia Dam and Powerhouse from June 1 through November 1.

Potential Effects on Wetlands

Over the years, several types of wetland habitats have developed in shallow-water and seasonally-wet areas around TVA reservoirs. Some of these wetlands are dominated by larger trees (forested wetlands), some are dominated by bushes (scrub-shrub wetlands), and others are occasionally covered by grasses and other annual plants (flats habitats). The ecological importance of wetlands, coupled with the continued incremental loss of wetland habitats across the Tennessee River Valley and around the Nation, has led to a greater recognition of the need to protect these resources wherever they occur.

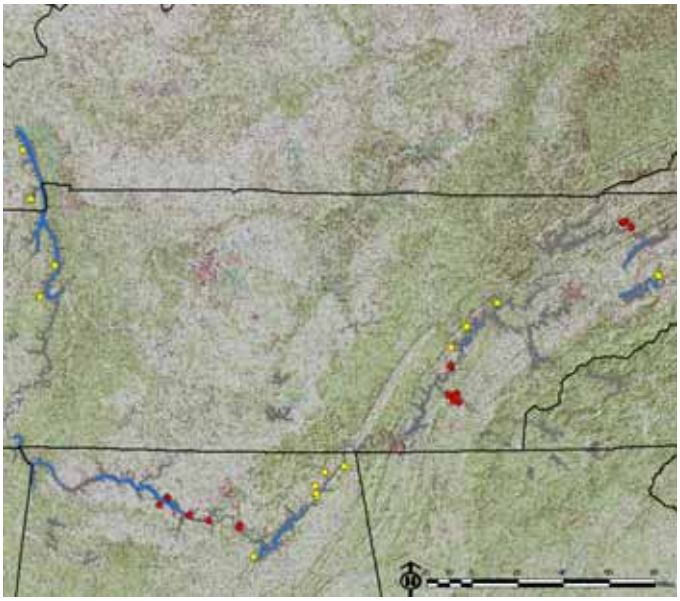
The ROS Preferred Alternative includes changes in the operations policy that will hold high water levels in most reservoirs for longer during the growing season. This could cause changes in the extent of wetlands around the reservoirs and in the distribution of different types of wetlands communities. During the review of the ROS draft EIS, members of the public, as well as state and federal agencies, expressed concern that changes in the reservoir operating regime could adversely affect forested, scrub-shrub, and flats habitats and the wetland functions they provide. In response to these concerns, TVA included a commitment in the ROS final EIS and Record of Decision to monitor wetland habitats (in particular forested and scrub-shrub wetlands) and to determine whether shifts of wetland plant communities occur as a result of the extended high water levels. This monitoring effort will continue for a period of at least 15 years because changes in some wetland habitats could occur slowly over long periods of time.

Beginning in FY 2005, TVA staff selected the forested and scrub-shrub wetland sites to be included in this monitoring effort and conducted a baseline survey for this work. This summary document presents the results of this initial baseline study for each reservoir.

Methods

For this survey, wetland study areas were established on representative reservoirs that could be affected by the longer duration of high pool levels (Norris, Douglas, Watts Bar, Wheeler, Guntersville, Chickamauga) and on Kentucky Reservoir where no ROS-related pool level changes will occur. On each reservoir, a maximum of four long-term study plots were established in forested and scrub-shrub wetlands. Selection of the reservoirs, survey transects, and study plots included input from staff focused on shorebirds and sports fish ROS monitoring, as well as TVA regional biologists.

Due to the long-term time frame of this study, one of the criteria for the selection of monitoring sites was that sites be located on land that is managed for long-term protection. All of the sites are located either on TVA land or land owned/managed by state natural resource management agencies (e.g. wildlife habitat, resource conservation, habitat protection). All of the sites were also chosen because of their representativeness as high quality wetlands present on that particular reservoir.



On each of the 7 reservoirs a maximum of eight separate wetland sites (four forested, four scrub-shrub) were selected to be used for long-term monitoring of vegetation and general wetland characteristics (hydrology, soil). On several reservoirs it was difficult to find four sites that exhibited the wetland characteristics needed; on several reservoirs it was especially difficult to find eight sites that were located on public land. This was especially true on Douglas, where the monitoring sites were confined to the Rankin Bottoms area, and also on Chickamauga and Watts Bar reservoirs, where high quality forested and scrub-shrub wetlands are relatively uncommon.

Initial site reconnaissance was conducted in spring and early summer 2005, and baseline monitoring was conducted June – August, 2005. Monitoring will be conducted as near to the same date as possible in all subsequent years. The date will not vary by more than two weeks on either side of the original sampling date. All monitoring efforts will take place during the growing season. After the initial baseline sampling, each monitoring plot will be remeasured on three year intervals for a period of 15 years. A final monitoring report will be issue in 2020.

Vegetation

Sample plots included three nested plots regardless of the wetland community type. One plot was used to characterize the canopy, a second plot to characterize the sapling/shrub/woody vine layer, and a third plot to characterize the herbaceous layer.

Trees: One fixed-area, circular, 0.1-acre (4,356-ft^2) sample plot (37.2-ft radius) was established in each of the forested wetlands selected for monitoring regardless of whether trees are present or not. The species and total number of each tree species rooted in the sample plot was recorded, providing a measure of stem density by species. Trees are defined as being over 20 feet tall and 5 Inches or more in DBH. Other measurements include percent cover, basal area, and crown condition.

The percent cover of trees over the sampling plot was estimated using a spherical densitometer. Each measurement was taken from the exact center point of the plot, and an ocular estimate in each of four quadrants (defined by cardinal direction) was recorded. The measurements were averaged to arrive at the estimate of crown density. The percent cover included any cover provided by individual trees that were not rooted in the plot, but which provided cover over the plot area.

Basal area is another measure of the degree to which trees occupy an area. Basal area is the cross-sectional area of a tree stem 4.5 feet above ground. Basal area was

recorded in each tree plot using a prism with a basal area factor (BAF) of 10. Basal area was estimated by turning a circle from the plot center and using the prism to determine which trees are counted. The total number of trees counted multiplied by 10 (with a BAF of 10) gives an estimate of the BA expressed on a per acre basis (e.g., 10 count trees X BAF 10 = 100 ft^2 per acre).

Crown condition has been used as an indicator of stress in trees. Under healthy conditions (low environmental stress) the crown should consist of live, healthy leaves and branches with little evidence of mortality or chlorosis (discoloration of leaves). As environmental stress increases, there may be evidence of increasing amounts of leaf and branch mortality and chlorosis. Evaluation of crown condition consists of a visual estimate of the condition of the crown in terms of leaf and branch mortality and overall color. Crown condition was evaluated on four trees in the plot that represent dominant, subdominant, and/or intermediate trees in the canopy. Trees in the super-dominant and suppressed areas of the canopy were avoided as they are not representative of canopy conditions.

Crown condition was evaluated through a visual estimate of the amount of crown that was occupied by healthy foliage and branches relative to the total area of the crown. The crown condition classes included: 1) 100% intact (i.e., little or no evidence of leaf and branch mortality and/or chlorosis); 2) 50-90% intact, 3.) 1-49% intact, 4) recently dead (a dead tree with leaves and/or small twigs present evidencing death within last few years) and 5) old dead (a dead tree with only coarse limbs remaining and/or obvious decay, that has obviously been dead for several years). The same trees will be evaluated during the life of the study. The total height and diameter at breast height (4.5 feet) of each tree evaluated for crown condition was recorded during each sampling event. The distance and bearing to each tree was recorded from the plot center and study trees were marked with ID tags.

Shrubs: The shrub layer was monitored using one fixed-area, circular, 0.01-acre (435.6-ft^2) monitoring plot (11.8-ft radius) that was established in the center of each of the 0.1-acre tree sample plots. The species and total number of each shrub and actively climbing woody vine species that are rooted in the sample plot were recorded. Shrubs include woody plants >3 feet tall and<5.0 inches DBH.

The percent cover over the plot of each shrub species was estimated using a modification of the line-intercept method. Sampling occurred on four radii oriented to the cardinal directions. Percent cover was sampled by recording the length of intercept for each shrub species measured along the radius where the plant canopy or basal portion began and the plant canopy or basal portion ended. When these intercept lengths are summed and divided by the total length of the four radii (47.2 feet), the result is an estimate of percent cover for the shrub species along the four radii. This includes any cover provided by individual shrubs that are not rooted in the plot, but which provide cover over the plot area. A change in the plot location to another part of the plot was permitted if the center plot was not representative of the scrub-shrub community.

Ground Cover: Two fixed-area, circular, 0. 0002-acre (9-ft^2) monitoring plots (1.7-ft radius) were established inside the 0.1-acre tree sample plot to characterize the ground cover (forbs and woody plant seedlings and vines) community in each sample macro plot. To avoid trampling, the ground cover plots were located away from the center of the macro plot. Each groundcover plot was located on a randomly selected line segment

oriented to the cardinal directions between the outer edge of the shrub plot and the outer edge of the tree plot. In areas with low species diversity, one plot was used to provide an adequate sample of groundcover diversity.

The presence and percent cover of each forb species, woody plants < 3-feet, and trailing vines that are rooted in the sample plot were recorded. Species that could not be identified in the field were collected and brought back to the office for accurate identification. To prevent the cover estimate from exceeding 100%, three-dimensional tallies were avoided. Only that portion of the vegetation or substrate clearly visible from a vantage point 3 feet above the plot, looking directly down, was considered. Underlying portions occluded from view were not included in the estimate. A change in the plot location to another part of the plot was permitted if the center plot was not representative of the forb community.

Plot Location

To facilitate relocation of the plots, the centers of each of the plots were marked with 1-ft long, ½" diameter, steel rebar to which aluminum ID tags were affixed. The tags contain reservoir ID, transect number, and the plot ID. The tops of the rebar were driven into the ground with approximately 1-2 inches protruding above ground surface. Rebar was capped and/or flagged with surveyors ribbon and were located using a GPS unit capable of achieving sub meter accuracy to facilitate finding them in the field in future years.

Soils

In order to track any potential changes in soils under the influence of changing hydrological inputs, soil pits were excavated to a depth of at least 12 inches in each of the tree/shrub plots using a "sharp-shooter" shovel. The distance and bearing of each soil pit were recorded from the plot center to aid in later relocation. A GPS point was also recorded at the soil sampling pit. In subsequent monitoring years, soil samples will be taken in other areas of the plot and marked accordingly to avoid the possibility of errors resulting from past sampling disturbance. For each soil pit, the Munsell color (Macbeth 2000), redoximorphic features, and texture (Environmental Laboratory 1987) were described. Ground disturbance was kept to a minimum and the excavated soil was replaced in the soil pit after data collection. The soil description includes redoximorphic features, texture, and parent material. Soil descriptions also include observations regarding subtle features of the soil that may be attributable to changes in local hydrology resulting from changes made under ROS (for instance, the difference between recent concretions and relict concretions or the signs that indicate altered hydrology in recent years).

Hydrology

Primary and secondary field indicators of wetland hydrology (Environmental Laboratory 1987) were recorded in each of the tree/sapling plots. Primary field indicators include depth of surface water, depth to saturated soil, depth to free water in the soil pit, drift lines, water marks, and drainage patterns. Secondary indicators include oxidized root channels and water-stained leaves. Average precipitation data and reservoir level data for the preceding year may be obtained from local meteorological stations and/or TVA Reservoir Operations.

Photo Points

Primary photo-documentation points were established at the center of each of the tree/sapling plots (P1). Four photos were taken in the cardinal directions (North, South, East, and West) from photo-point P1. Any change will be documented and mapped in the final monitoring report. Aerial photos, where available, may also be used over time to get an aerial view of changes over time.

Exotic Species and Wildlife Observations

The presence and percent cover of invasive, exotic plant species in the vegetation sampling plots was noted on the monitoring data sheets. A list of invasive, exotic plant species is maintained by the Tennessee Exotic Plant Pest Council (refer to the exotic, invasive plant species lists made by EPPC, TN-EPPC (http://tneppc.org); these are the lists that will be used in determining whether a plant is invasive, exotic, and the level of threat.

The use of wetlands by wildlife is an indicator of the functional characteristics of any particular wetland. Any observations of wildlife use of the wetland, through direct sightings or other signs (tracks, scat, sounds, etc.), were also documented.

TVA Rapid Assessment Method

TVA has developed a version (TVARAM) of the *Ohio Rapid Assessment Method* (ORAM v.5.0) specific to the TVA region for use in assessing wetland ecological condition. This method was chosen by EPA out of 40 rapid assessment methods as the most effective measure of wetland condition and quality; TVARAM has been used by TVA to more effectively assess the impacts of TVA actions on wetlands. For this project, TVARAM data was collected for each wetland, and each wetland was assigned a TVARAM category. The TVARAM is designed to distinguish between three categories of wetlands:

Category 1 wetlands are described as “limited quality waters”. They are considered to be a resource that has been degraded, has limited potential for restoration, or is of such low functionality that lower standards for avoidance, minimization, and mitigation can be applied. Category 2 includes wetlands of moderate quality and also wetlands that are degraded but could be restored. Category 3 generally includes wetlands of very high quality and wetlands which are of concern regionally and/or statewide, such as wetlands which provide habitat for threatened or endangered species.

Results and Discussion

Norris Reservoir

Norris Reservoir is the largest reservoir on a tributary of the Tennessee River. The reservoir is result of the Norris Dam impoundment on the Clinch River, creating a 34,200 acre lake. The lake spans a 73 mile slack water channel on the Clinch River and a 56 mile channel on the Powell, with a total of 809 miles of shoreline. This reservoir is located north of Knoxville, Tennessee, in the Appalachian Ridge and Valley physiographic province of east Tennessee (Bailey 1995). Wetland area within the Ridge and Valley province represents a small percentage of the landscape due to the geology of the region (Hefner et al. 1994). Wetlands areas along Norris are typically associated with the reservoir's floodplain.

Along reservoir shorelines, wetlands and riparian areas are transitional ecosystems between terrestrial and aquatic communities. Historically, there were no lakes in the upper Tennessee River basin. TVA's impoundments inundated the previous riverine and upslope habitats creating new wetland areas and many miles of terrestrial shoreline riparian habitat, which consist of summer shoreline riparian zones and winter drawdown mud flats (Amundsen, 1994). The wetlands of Norris Reservoir primarily lie along approximately 135.6 miles of shoreline. These fringe and reservoir wetlands influence 16.7 percent of Norris Reservoir's 809.2 miles of shoreline and embody a variety of wetland habitat types, including aquatic beds, emergent, scrub-shrub, and forested wetlands, all of which can be found as isolated or mixed units. The small percentage of wetland acreage, when compared to all TVA public land on Norris Reservoir, does not diminish overall importance of the wetlands. In fact, it serves to increase and focus their importance within the system, as it tends to concentrate the wildlife species utilizing these habitat types.

Three of the most significant reservoir-influenced wetland areas on Norris Reservoir are found in the Big Sycamore Creek, Indian Creek, and Lost Creek areas. These wetland areas range in size from approximately 20 to 60 acres. These wetland areas are the largest on Norris Reservoir and provide valuable brood-rearing areas for wood ducks in the spring and feeding areas for migrating water birds in the fall.

Currently, the normal summer water pool is maintained at 1020- foot contour elevation from Mid April through the first of September. The pool level begins dropping after the first of September and reaches the winter pool and is maintained at approximately 995-foot contour elevation between mid-November through mid-March. Water levels begin

rising in mid-March and reach full summer pool in mid-April. The proposed change in operations for this reservoir will result in a summer high water pool maintained at the same elevation but for a longer time period (April – September). Likewise, the winter low water pool will be maintained at a higher elevation that previously maintained for a shorter time period, from November to April.

Four forested wetland plots and four scrub-shrub plots were sampled for baseline data at two sites along Norris Reservoir: Big Sycamore Creek, Wolf and Indian Creek. Big Sycamore Creek and Indian Creek are tributaries of Norris Reservoir and contain extensive wetland areas at the mouth of each creek. The Big Sycamore Creek sites are located at the mouth, near the intersection of Big Sycamore Creek Road and Highway 25E, Claiborne County, TN. The Indian Creek sites are located at the mouth of the creek, near the intersection of Highway 25E and Indian Creek Road in Grainger County, TN.

Forested Wetland Sites: All sampled forested wetland sites contained sparse invasive species cover (0-25%); the Indian Creek sites scored as Category 3 (high quality wetlands) and the Big Sycamore Creek sites scored as Category 2 (moderate quality) wetlands. Three of the four sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. Likewise, all sites exhibited wetland hydrology, with indicators that included inundation and/or saturated soils in the upper 12".

- Sycamore Creek – Two forested wetland sites were sampled: NRF1, NRF2

  NRF1- Dominant tree species included sycamore (*Platanus occidentalis*) and box elder (*Acer negundo)* with cover measured at 89% crown closure and a basal area of 100ft^2/acre. Dominant shrub species included green ash (*Fraxinus pennsylvanica*) and box elder, with cover calculated at 45%. Groundcover was dominated by false nettle (*Boehmeria cylindrica*), tickseed (*Bidens spp*.), and smartweed (*Polygonum spp.),* with a 100% total ocular cover estimate.

  NRF2 – The sole dominant tree species for this plot was sandbar willow (*Salix exigua*), with cover measured at 75% crown closure and a basal area of 130ft^2/acre. Dominant shrub species included sandbar willow and buttonbush (*Cephalanthus occidentalis*), with cover calculated at 36%. Groundcover was dominated by duckweed (*Lemna spp*.), Moneywort (*Lysimachia nummularia*), and *Aster spp*., with a total ocular cover estimate of 60%.

- Indian Creek – Two forested wetland sites were sampled: NRF3, NRF4.

  NRF3 - This site was dominated by sycamore, green ash, and American elm (*Ulmus americana*) in the canopy layer with cover measured at 88% crown closure and a basal area of 80ft^2/acre. Dominant shrub species were green ash and American elm, with cover estimates calculated at 88%. Groundcover was dominated by unidentifiable seedlings, with a total ocular cover estimate of 3%.

  NRF4 - This site was dominated by green ash, with cover measured at 62% crown closure and a basal area of 160ft^2/acre. Dominant shrub species included green ash and American elm, with cover calculated at 29%. As with site NRF3,

groundcover was dominated by unidentified seedlings, with a total ocular cover estimate of 5%.

Scrub-Shrub Sites: All sampled scrub-shrub wetland sites contained nearly absent (<5%) to sparse (5-25%) invasive species cover, and all scored as TVARAM Category 3 wetlands, indicating high quality/ecological condition. All sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. Likewise, all sites exhibited wetland hydrology, with indicators that included inundation and/or saturated soils in the upper 12".

- Big Sycamore Creek – Two scrub-shrub wetland sites were sampled: NRS1, NRS2

  NRS1 - Dominant shrub species included sandbar willow and buttonbush, with cover calculated at 84 %. Groundcover was dominated by *Xanthium spp.* and an unidentified grass, with a 70% total ocular cover estimate.

  NRS2 – The dominant shrub species in this plot was buttonbush, with cover calculated at 83 %. Groundcover was dominated by *Aster spp*., with a 15% total ocular cover estimate.

- Indian Creek – Two scrub-shrub wetland sites were sampled: NRS3, NRS4.

  NRS3 - The shrub layer was dominated by buttonbush, with total cover calculated at 95 %. This site had no groundcover, thus the total ocular cover estimate was 0%.

  NRS4 - The shrub layer was dominated by buttonbush, with minor components of green ash, sandbar willow, sycamore, and green ash. The total cover calculated was 76 %. There was no groundcover, this site was entirely covered by shallow water, thus the total ocular cover estimate was 0%.

Douglas Reservoir

Douglas Reservoir is the result of the Douglas Dam impoundment on the French Broad River, creating a 28,420 acre lake with a total of 513 miles of shoreline. This reservoir is located northeast of Knoxville, Tennessee, in the Appalachian Ridge and Valley physiographic province of east Tennessee (Bailey 1995). As with Norris reservoir, wetland areas within the Ridge and Valley province represent a small percentage of the landscape due to the geology of the region (Hefner et al. 1994). Wetlands areas along Douglas are typically associated with the reservoir's floodplain.

Currently, the summer high water pool is maintained at 992' from late April through late August. The pool level drops and is maintained at approximately 955' between September and March. The proposed change in operations for this reservoir will result in a summer high water pool maintained at the same elevation but for a longer period of time. Likewise, the winter low water pool will be maintained at the same elevation for an extended period of time, from late September to late March.

Four forested wetland plots and three scrub-shrub plots were sampled for baseline data. All the sites are located in the Rankin Bottoms Wildlife Management Area in Cocke County, Tennessee. Rankin Bottoms is managed by the Tennessee Wildlife Resources Agency (TWRA), and is one of the most important wetland complexes in east Tennessee. The site is well known by birders and conservationists as a premier birding site, primarily due to the large exposed mudflat areas that are exposed during the winter drawdown of the water level.

Forested Wetland Sites: Three of the four sampled forested wetland sites contained moderate invasive species cover (25-75%); one had sparse coverage of invasive species. One of the sites scored as a TVARAM Category 3 wetland, the remainder scored as Category 2 wetlands, indicating moderate to high quality functions. Three of the four sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. All sites exhibited wetland hydrology, with indicators that included inundation and/or saturated soils in the upper 12".

- DGF1 – Dominant tree species included silver maple (*Acer saccharinum*) and black willow (*Salix nigra*), with cover measured at 80% crown closure and a basal area of 130ft^2/acre. Dominant shrub species included buttonbush and silver maple, with cover calculated at 100%. Groundcover was dominated by reed canary grass (*Phalaris arundinacea*). The total ocular cover estimate was 77%.

- DGF2 was dominated by silver maple and black willow, with cover measured at 74% crown closure and a basal area of 50ft^2/acre. Dominant shrub species included black willow and buttonbush, with cover estimates calculated at 83%. Groundcover was dominated by duckweed (*Lemna spp*.) and reed canary grass, with a total ocular cover estimate of 100%.

- DGF3 was dominated by sycamore and black willow with cover measured at 86% crown closure and a basal area of 160ft^2/acre. Dominant shrub species included silver maple, sycamore, and cottonwood (*Populus deltoides*), with cover calculated at 33%. Groundcover was dominated by reed canary grass and duckweed, with a total ocular cover estimate of 85%.

- DGF4 – The dominant tree species for this site, as with the other forested sites, was silver maple. Cover measured at 95% crown closure and a basal area of 250ft^2/acre, one of the highest basal area measurements recorded in this baseline sampling regime. Dominant shrub species included silver maple and American elm with cover calculated at 85%. As with the other sites, groundcover was dominated by reed canary grass, with a total ocular cover estimate of 35%.

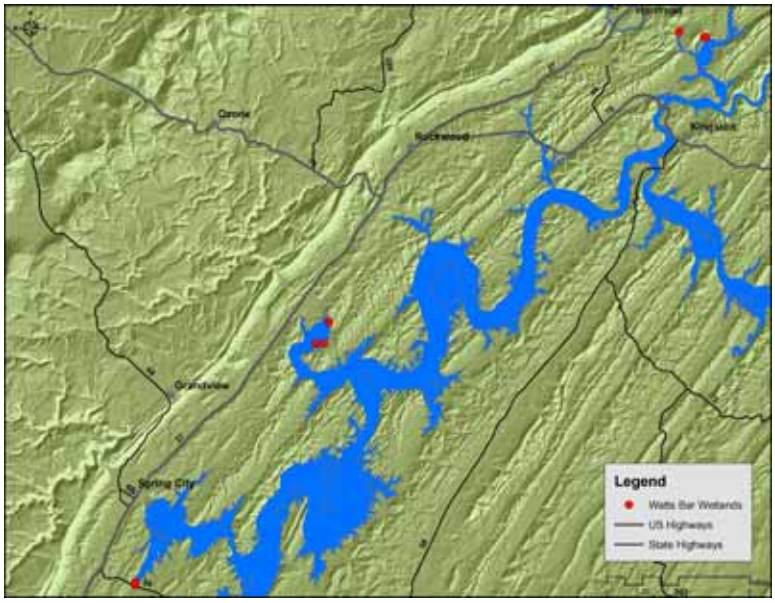
Scrub-Shrub Sites: All sampled scrub-shrub wetland sites contained nearly absent (<5%) to sparse (5-25%) invasive species cover, and all scored as TVARAM Category 2 or 3 wetlands, indicating moderate to high quality functions. All sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. Likewise, all sites exhibited wetland hydrology, with indicators that included inundation and/or saturated soils in the upper 12".

- DGS1 – Dominant shrub species included silver maple and buttonbush, with cover calculated at 68%. Groundcover was dominated by reed canary grass with an 85% total ocular cover estimate.

- DGS2 – As with DGS1, the shrub layer was dominated by silver maple and buttonbush, with total cover calculated at 84%. Groundcover was dominated by reed canary grass. The percent total ocular cover estimate was not collected for this site.

- DGS3 – The shrub layer was dominated by black willow/sandbar willow, with total cover calculated at 93%. Groundcover was dominated by duckweed and *Aster spp*., with an 80% total ocular cover estimate.

Watts Bar Reservoir



Watts Bar Reservoir is the result of the Watts Bar Dam impoundment on the Tennessee River, creating a 39,090 acre lake spanning 72.4 miles of blueway on the Tennessee River, a 20 mile slack water channel on the Clinch River and a 12 mile channel on the Emory, with a total of 722 miles of shoreline. This reservoir is located midway between Knoxville and Chattanooga, Tennessee, in the Appalachian Ridge and Valley physiographic province of east Tennessee (Bailey 1995). Wetland area within the Ridge and Valley province represents a small percentage of the landscape due to the geology of the region (Hefner et al. 1994). Wetlands areas along Watts Bar are typically associated with the reservoir's floodplain.

Currently, the summer high water pool is maintained at 740' from April through October. The pool level drops and is maintained at approximately 736' between November and March. The proposed change in operations for this reservoir will result in a summer high water pool maintained at the same elevation but only between May and October, a shorter period of time. Likewise, the winter low water pool will be maintained at the same elevation except for an extended period of time, from November to April.

Four forested wetland plots and three scrub-shrub plots were sampled for baseline data at three sites along Watts Bar Reservoir: Whites Creek, Wolf Creek, and Swan Pond. Whites Creek and Wolf Creek are tributaries of Watts Bar Reservoir and contain extensive wetland areas at the mouth of each creek. The Wolf Creek sites are located at the mouth, near the intersection of Wolf Creek and Hwy 68, Rhea County, TN. The White Creek sites are located at the mouth along the north shoreline, Roane County, TN. The Swan Pond sites are located along unnamed tributaries of Swan Pond Creek, due north of Kingston Fossil Plant.

Forested Wetland Sites:
All sampled forested wetland sites contained moderate invasive species cover (25-75%); however, all scored as TVARAM Category 2 or 3 wetlands, indicating moderate to high quality functions. All sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. Likewise, all sites exhibited wetland hydrology, with indicators that included inundation and/or saturated soils in the upper 12".

- Whites Creek (WBF1) – Dominant tree species included river birch (*Betula nigra*) and black willow, with cover measured at 79% crown closure and a basal area of

50ft^2/acre. Dominant shrub species included smooth alder (*Alnus serrulata*), grey dogwood (*Cornus ammomum*), red maple (*Acer rubrum*) and river birch, with cover calculated at 89%. Groundcover was dominated by fringed sedge (*Carex crinita*), tearthumb (*Polygonum sagittatum*), and *Aster* sp., with a 43% total ocular cover estimate.

- Wolf Creek – Two forested wetland sites were sampled: WBF2, WBF4.

  WBF2 was dominated by red maple, sweetgum (*Liquidambar styraciflua*), and sycamore in the canopy layer with cover measured at 73% crown closure and a basal area of 110ft^2/acre. Dominant shrub species included smooth alder, Chinese privet (*Ligustrum sinense*), and dogwood, with cover estimates calculated at 83%. Groundcover was dominated by Chinese privet and dogwood seedlings, and Japanese honeysuckle (*Lonicera japonica*), with a total ocular cover estimate of 43%.

  WBF4 was dominated by green ash and sycamore, with cover measured at 92% crown closure and a basal area of 50ft^2/acre. Dominant shrub species included smooth alder, Chinese privet, and dogwood, with cover calculated at 100%. Groundcover was dominated by *Aster* sp., jewelweed (*Impatiens capensis*), and moneywort, with a total ocular cover estimate of 99%.

- Swan Pond (WBF3) – Dominant tree species included river birch, red maple, sweetgum, and black willow, with cover measured at 77% crown closure and a basal area of 160ft^2/acre. Dominant shrub species included river birch and red maple, with cover calculated at 62%. Groundcover was dominated by blunt broom sedge (*Carex tribuloides*), with a total ocular cover estimate of 99%.

Scrub-Shrub Sites: All sampled scrub-shrub wetland sites contained nearly absent (<5%) to sparse (5-25%) invasive species cover, and all scored as TVARAM Category 2 or 3 wetlands, indicating moderate to high quality functions. All sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. Likewise, all sites exhibited wetland hydrology, with indicators that included inundation and/or saturated soils in the upper 12".

- Whites Creek (WBS1) – Dominant shrub species included red maple and steeple bush (*Spiraea tomentosa*), with cover calculated at 63%. Groundcover was dominated by *Rhyncospora* and *Juncus* spp., with a 100% total ocular cover estimate.

- Wolf Creek (WBS2) – The shrub layer was dominated by green ash, dogwood, and *Hypericum* sp., with total cover calculated at 100%. Groundcover was dominated by grasses and sedges, with a 100% total ocular cover estimate.

Swan Pond (WBS3) – The shrub layer was dominated by buttonbush, with total cover calculated at 81%. Groundcover was dominated by tearthumb and rice cut grass (*Leersia oryzoides*), with a 100% total ocular cover estimate.

Chickamauga Reservoir

Chickamauga Reservoir is the result of the Chickamauga Dam impoundment on the Tennessee River, just north of Chattanooga, Tennessee. The Chickamauga Reservoir is a 36,240 acre lake spanning 59 miles of blueway on the Tennessee River, with a total of 784 miles of shoreline. This reservoir is located within the Appalachian Ridge and Valley physiographic province of east Tennessee (Bailey 1995). Wetland area within the Ridge and Valley province represents a small percentage of the landscape due to the geology of the region (Hefner et al. 1994). Wetland areas along Chickamauga are typically associated with the reservoir's floodplain.

Currently, the summer high water pool is maintained at 682' from April to June. In July, the water level is dropped to 680' until September. Between October and December, the water level drops to 676', the target winter pool elevation, where it is maintained through March. The proposed change in operations for this reservoir will result in a summer pool maintained at 682' from May to September, and lowered to a winter pool maintained at 676' from December to April.

Three forested wetland plots and four scrub-shrub plots were sampled for baseline data at five sites along Chickamauga Reservoir: McKinley Branch, Candies Creek, Sugar Creek, Mouse Creek, and Rogers Creek. The McKinley Creek site is located at the creek's mouth, where it empties into Chickamauga Reservoir. Candies Creek, Sugar Creek, Mouse Creek, and Rogers Creek are tributaries of the Hiawasee River. All sample locations on these creeks are located at the mouth of the creek, where it intersects the Hiawasee River. The Hiawasee River flows into the Chickamauga, and the sample sites are located on the portion of the Hiawsee that is part of the Chickamauga Reservoir system and influenced by TVA's river operations.

Forested Wetland Sites: All sampled forested wetland sites contained sparse (5-25%) to moderate (25-75%) invasive species cover, and all scored as TVARAM Category 3 wetlands, indicating high quality. All sites, with the exception of McKinley Branch, exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. McKinley Branch soils contained concretions and exhibited reducing conditions but did not have gleyed/low chroma colors. All sites exhibited wetland hydrology, with indicators that included inundation and/or saturated soils in the upper 12".

- McKinley Branch (CHF1) – Dominant tree species included silver maple, American elm and red maple, with cover measured at 89% crown closure and a

basal area of 80ft^2/acre. Dominant shrub species included grey dogwood, buttonbush, and hackberry (*Celtis occidentalis*), with cover calculated at 100%. Groundcover was dominated by moneywort, with a 100% total ocular cover estimate.

- Candies Creek (CHF2) – Tree canopy was dominated by silver maple and green ash, with cover measured at 70% crown closure and a basal area of 80ft^2/acre. Dominant shrub species included silver maple and green ash, with cover calculated at 90%. Groundcover was dominated by blunt broom sedge, with a total ocular cover estimate of 95%.

- Sugar Creek (CHF3) – Dominant tree species included red maple and green ash, with cover measured at 86% crown closure and a basal area of 150ft^2/acre. Dominant shrub species included red maple and box elder, with cover calculated at 70%. Groundcover was dominated by sedge species (*Carex* ssp.), with a total ocular cover estimate of 63%.

Scrub-Shrub Sites: All sampled scrub-shrub wetland sites contained sparse (5-25%) to moderate (25-75%) invasive species cover; however, all scored as TVARAM Category 2 or 3 wetlands, indicating moderate to high quality functions. All sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. Likewise, all sites exhibited wetland hydrology, with indicators that included inundation and/or saturated soils in the upper 12".

- McKinley Branch (CHS1) – Dominant shrub species included buttonbush, American elm, green ash, and black willow, with cover calculated at 60%. Groundcover was dominated by marsh dewflower (*Murdannia keisak*) and rice cut grass, with a 100% total ocular cover estimate.

- Candies Creek (CHS2) – The shrub layer was dominated by buttonbush, with total cover calculated at 64%. Groundcover was dominated by lizard's tail (*Saururus cernuus*) and woolgrass (*Scirpus cyperinus*), with a 100% total ocular cover estimate.

- Mouse Creek (CHS3) – The shrub layer was dominated by buttonbush, with total cover calculated at 54%. Groundcover was dominated by tearthumb, rice cut grass, and woolgrass, with a 98% total ocular cover estimate.

- Rogers Creek (CHS4) – The shrub layer was dominated by buttonbush and black willow, with total cover calculated at 67%. Groundcover was dominated by woolgrass and *Polygonum* spp., with a 100% total ocular cover estimate.

Guntersville Reservoir

Guntersville Reservoir is the result of the Guntersville Dam impoundment on the Tennessee River, near Guntersville, Alabama. The reservoir is a 67,900 acre lake spanning 76 miles of blueway on the Tennessee River, with a total of 890 miles of shoreline. This reservoir is located within the Appalachian Ridge and Valley physiographic province of east Tennessee (Bailey 1995). Wetland area within the Ridge and Valley province represents a relatively small percentage of the landscape due to the geology of the region (Hefner et al. 1994). Wetlands areas along Guntersville Reservoir are typically associated with the floodplain.

Currently, the summer high water pool is maintained at 595' from April to October. Between October and December, the water level drops to 593', the target winter pool elevation, where it is maintained through March. The proposed change in operations for this reservoir will result in a summer pool maintained at 595' from April to September, and lowered a month early to 593', the targeted winter pool, which would be maintained through March.

Four forested wetland plots and four scrub-shrub plots were sampled for baseline data at five sites along Guntersville Reservoir: Beech Creek, Town Creek, Crow Creek, Cove Creek, and Mud Creek. The Beech Creek site is located at the creek's mouth, where it empties into Browns Creek, a tributary of the Tennessee River and a slack water channel of Guntersville Reservoir. Two Town Creek sites were sampled: one on Bellefonte Island Small Wild Area in the main reservoir channel at the mouth of Town Creek and the second at the head of a small cove off Town Creek on the south side of the embayment area. The Crow Creek sites are found within the boundaries of Crow Creek Wildlife Management Area, on the north side of Crow Creek. The Long Island Cove Creek sites can be found along the Long Island Cove Creek embayment. The Mud Creek site is located at the mouth of Blue Spring Creek, where it empties into the slack water channel of Mud Creek.

Forested Wetland Sites: All sampled forested wetland sites contained sparse (5-25%) invasive species cover, and all scored as TVARAM Category 2 or 3 wetlands, indicating moderate to high quality. All sites, with the exception of Beech Creek, exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. All sites exhibited wetland hydrology, with indicators that included inundation, saturated soils in the upper 12", drainage patterns, and/or oxidized root channels.

- Beech Creek (GUF1) – Dominant tree species included green ash and box elder, with cover measured at 78% crown closure and a basal area of 80ft^2/acre. Dominant shrub species included Chinese privet and box elder, with cover calculated at 92%. Groundcover was dominated by lizard's tail, with a total ocular cover estimate of 45%.

- Town Creek (GUF2) – Tree canopy was dominated by swamp tupelo (*Nyssa aquatica*), with cover measured at 79% crown closure and a basal area of 150ft^2/acre. Dominant shrub species included buttonbush and willow, with cover calculated at 55%. Groundcover was dominated by swamp smartweed (*Polygonum hydropiperoides*), with a total ocular cover estimate of 25%.

- Crow Creek – Two forested wetland sites were sampled: GUF3, GUF4.

  GUF3 was dominated by red maple and silver maple in the canopy layer with cover measured at 87% crown closure and a basal area of 120ft^2/acre. The shrub layer was dominated by red maple, and total cover was calculated at 39%. Groundcover was dominated by Canadian clearweed (*Pilea pumila*), with a total ocular cover estimate of 20%.

  GUF4 was dominated by willow oak (*Quercus phellos*), cherrybark oak (*Quercus pagoda*), and green ash, with cover measured at 89% crown closure and a basal area of 110ft^2/acre. Slippery elm (*Ulmus rubra*) dominated the shrub layer, which exhibited 100% cover. Groundcover was dominated by poison ivy (*Toxicodendron radicans*) and sedge species (*Carex* spp.), with a total ocular cover estimate of 30%.

Scrub-Shrub Sites: All sampled scrub-shrub wetland sites contained moderate (25-75%) invasive species cover; however, all scored as TVARAM Category 3 wetlands, indicating high quality functions. All sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. Likewise, all sites exhibited wetland hydrology, with indicators that included inundation and saturated soils.

- Town Creek (GUS1) – Dominant shrub species included buttonbush, grey dogwood, and black willow, with cover calculated at 71%. Groundcover was dominated by marsh dewflower and woolgrass, with a 100% total ocular cover estimate.

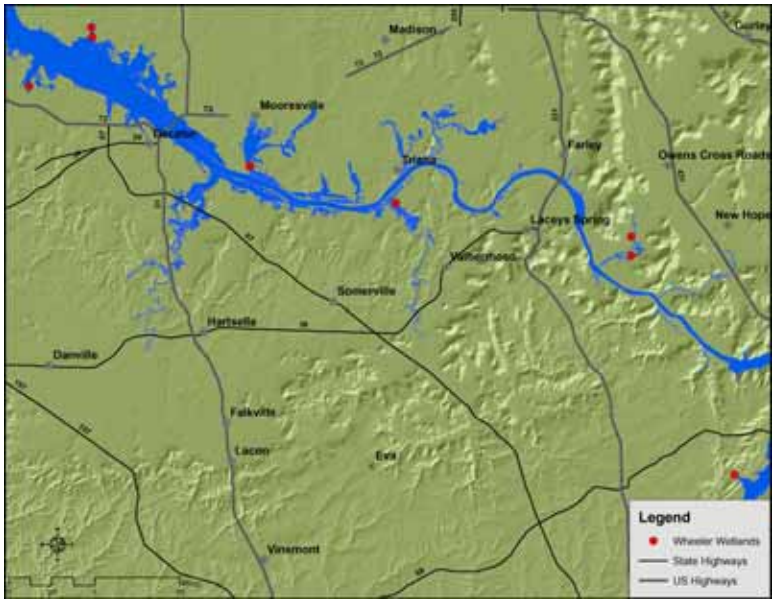
- Long Island Cove Creek – Two scrub-shrub wetland sites were sampled: GUS2 and GUS3.

  GUS2 was a buttonbush swamp, with total cover calculated at 90%. Groundcover was dominated by rice cut grass and marsh dewflower, with a 90% total ocular cover estimate.

  GUS3 was dominated by buttonbush and Virginia sweetspire (*Itea virginica*), with total cover calculated at 100%. Groundcover was dominated by marsh dewflower, with a 100% total ocular cover estimate.

- Mud Creek (GUS4) – The shrub layer was dominated by buttonbush, with total cover calculated at 72%. Groundcover was dominated by marsh dewflower, rice cut grass, and swamp smartweed, with a 100% total ocular cover estimate.

Wheeler Reservoir



Wheeler Reservoir is the result of the Wheeler Dam impoundment on the Tennessee River, between Muscle Shoals and Athens, Alabama. Wheeler Reservoir is a 67,070 acre lake with a total of 1027 miles of shoreline. This reservoir is located within the Interior Plateau physiographic province of northern Alabama (Bailey 1995). Wetland areas within the Interior Plateau province may be associated with a floodplain/riverine system or depressional systems with permanently or seasonally inundated and saturated soils.

Currently, the summer high water pool is maintained at 555' from April through July. Between August and November, the water level is lowered to 551', the targeted winter pool, where it maintained until March. The proposed change in operations for this reservoir will result in a summer pool maintained at 555' from April to September, and lowering the level quicker, such that the targeted winter pool is achieved and maintained at 551' from December to March.

Four forested wetland plots and four scrub-shrub plots were sampled for baseline data at five sites along Wheeler Reservoir: Limestone Creek, Cotaco Creek, Flint River, Fox Creek, and Round Island Creek. The Limestone Creek and Cotaco Creek sites are located along the embayments inside the Wheeler National Wildlife Refuge. One of the Flint River sites is located in a slough and the other is located along the river shoreline. The Fox Creek site is a fringe wetland, and the Round Island Creek sites are located on two islands in the embayment.

Forested Wetland Sites: All forested wetland sites scored as TVARAM Category 3 wetlands, indicating high quality. All sites showed evidence of wetland hydrology, including saturated soils and drainage patterns. However, only two sites exhibited hydric soils. One Flint River site and the Cotaco Creek site had saturated soils with mineral concretions, but chroma values were too high for a hydric soil determination.

- Limestone Creek (WHF1) – Dominant tree species included cherrybark oak, green ash, and American hornbeam (*Carpinus caroliniana*), with cover measured at 89% crown closure and a basal area of 150ft^2/acre. The shrub layer was dominated by holly (*Ilex* sp.), with cover calculated at 88%. Groundcover was dominated by *Aster* sp., with a total ocular cover estimate of 60%. This site exhibited moderate (25-75%) invasive species cover.

- Flint River – Two forested wetland sites were sampled: WHF2, WHF3.

WHF2 was located in a slough, where the tree canopy was dominated by water hickory (*Carya aquatica*) and green ash. Canopy cover measured at 92% crown closure and basal area was 290ft^2/acre. Dominant shrub species included water hickory and swamp privet (*Forestiera ligustrina*), with cover calculated at 56%. Groundcover was dominated by grass species, with a total ocular cover estimate of 31%. Invasive species were nearly absent (<5% cover) from the site.

WHF3 was dominated by bald cypress (*Taxodium distichum*) and red maple, with cover measured at 91% crown closure and a basal area of 220ft^2/acre. The shrub layer was dominated by bald cypress, with cover calculated at 67%. Groundcover was dominated by *Aster* sp., with a total ocular cover estimate of 15%. Invasive species were absent from the site.

- Cataco Creek (WHF4) – Dominate tree species included willow oak, sweetgum, and American elm, with cover measured at 92.25% crown closure and a basal area of 120ft^2/acre. The shrub layer included only two individuals, one red maple and one American elm. Cover was calculated at 35%. Groundcover was dominated by giant cane (*Arundinaria gigantea*), with a total ocular cover estimate of 55%. Invasive species were nearly absent (<5% cover) from the site.

Scrub-Shrub Sites: Three of the four sampled scrub-shrub wetland sites contained absent to nearly absent (<5%) invasive species cover, and all scored as TVARAM Category 3 wetlands, indicating high quality. One of the sites showed extensive coverage (< 75%) of alligator weed (*Alternanthera philoxeroides*), classified as an invasive aquatic plant in Alabama by the USDA/NRCS (http://plants.usda.gov:8080/plants//profile?symbol=ALPH). All sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. Likewise, all sites exhibited wetland hydrology, with indicators that included inundation and/or saturated soils in the upper 12".

- Limestone Creek (WHS1) – The shrub layer was dominated by buttonbush, with cover calculated at 91%. Groundcover was dominated by smartweed and *Aster* sp., with a 95% total ocular cover estimate.

- Fox Creek (WHS2) – The shrub layer was dominated by buttonbush and sandbar willow, with total cover calculated at 100%. Groundcover was dominated soft rush (*Juncus effusus*) and lizard's tail, with a 100% total ocular cover estimate.

- Round Island Creek – Two sites were sampled: WHS3, WHS4.

  WHS3 was dominated by buttonbush, sandbar willow, and trumpet creeper vine (*Campsis radicans*), with total cover calculated at 66%. Groundcover was dominated by alligator weed (*Alternanthera philoxeroides*), with a 100% total ocular cover estimate.

  WHS4 was dominated by buttonbush, with total cover calculated at 66%. Groundcover was dominated by penny-wort (*Hydrocotyle* sp.) and alligator weed, with a 100% total ocular cover estimate.

Kentucky Reservoir

Kentucky Reservoir is the result of the Kentucky Dam impoundment on the Tennessee River, near Calvert City, Kentucky. At full pool, the reservoir is a 160,300 acre lake spanning 184 miles of blueway on the Tennessee River, with a total of 2,064 miles of shoreline. It is the largest reservoir in the eastern United States. This reservoir is located within two ecoregions: the Interior Plateau and Southeastern Plains of western Tennessee and western Kentucky (Bailey 1995). Wetlands within these ecoregions are more widespread than in the eastern portion of the TVA region, and are typically associated with the floodplain. Kentucky Reservoir is unique among other reservoirs in the TVA system in that large areas of mudflats are exposed during the fall and winter. In some cases these mudflats are colonized by annual vegetation that is important for shorebirds and other types of waterfowl. Kentucky reservoir is also unique due to large stands of buttonbush that occur across the reservoir. These stands are particularly important as breeding and nursery areas for sportfish. Anecdotal evidence suggests these buttonbush stands have declined in extent over time due to shifts in water level and impacts associated with an insect that affects the reproductive success of the shrubs. Over time clonal reproduction appears to be the main mechanism for buttonbush reproduction and spread, as opposed to seed dispersal. This unstudied phenomenon may have a profound affect long-term on the type and extent of scrub-shrub wetlands on Kentucky reservoir.

The Reservoir Operations Study proposed no change in operation for Kentucky reservoir. Many comments from resource management agencies identified concerns with changing Kentucky's operating regime, and the effect the change would have on sport fish habitat and shorebird habitat. Currently, the summer high water pool is maintained at 359' from April to July. Between July and October, the water level drops to 354', the target winter pool elevation, where it is maintained through March.

Four forested wetland plots and four scrub-shrub plots were sampled for baseline data at four sites along Kentucky Reservoir: Birdsong Creek, Harmon Creek, Blood River, and Bear Creek. The Birdsong Creek sites are located near the creek's mouth, where it empties into the larger Birdsong Creek embayment. Two Harmon Creek sites were sampled: one on an island in the main reservoir channel at the mouth of Harmon Creek and the second on the western side of the creek just south of the Harmon Creek embayment. The Blood River sites are located on the northwestern side of the Blood River embayment, below the mouth of the Blood River. The Bear Creek sites can be found near where Bear Creek proper enters the Bear Creek embayment of Kentucky Reservoir.

Forested Wetland Sites: All sampled forested wetland sites contained sparse (5-25%) invasive species cover; three of the four sites scored as TVARAM Category 3 wetlands, and one scored at a Category 2, indicating moderate to high quality. All sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. All sites exhibited wetland hydrology, with indicators that included inundation, saturated soils in the upper 12", drainage patterns, and/or oxidized root channels.

- Bear Creek (KYF1) – Dominant tree species included red maple and scarlet oak (*Quercus coccinea*), with cover measured at 96% crown closure and a basal area of 210ft^2/acre. Dominant shrub species included American elm with cover calculated at 75%. Groundcover was dominated by aster, with a total ocular cover estimate of 65%.

- Blood River (KYF2) – Tree canopy was dominated by red maple, with cover measured at 93% crown closure and a basal area of 140ft^2/acre. Dominant shrub and vine species included cat briar (*Smilax spp.*) and river birch with cover calculated at 39%. Groundcover was dominated by Frank's sedge (*Carex frankii*), with a total ocular cover estimate of 45%.

- Harmon Creek (KYF3) – KYF3 was dominated by cherrybark oak and red maple in the canopy layer with total cover measured at 93% crown closure and a basal area of 130ft^2/acre. The shrub layer was dominated by sweet gum, and total cover was calculated at 29%. Groundcover was dominated by river oats (*Chasmanthium latifolium*), with a total ocular cover estimate of 67%.

- Birdsong Creek (KYF4) - KYF4 was dominated by black willow, with total overall cover measured at 84% crown closure and a basal area of 140ft^2/acre. Buttonbush dominated the shrub layer, which exhibited 40% cover. Groundcover was dominated by beggerticks (*Bidens spp.*) and aster species with a total ocular cover estimate of 82%.

Scrub-Shrub Sites: Two of the sampled scrub-shrub wetland sites contained moderate (25-75%) invasive species cover; however, all scored as TVARAM Category 3 wetlands, indicating high quality functions. Two of the sites had extensive coverage (< 75%) of alligator weed, classified as an invasive aquatic plant in Kentucky by the USDA/NRCS (http://plants.usda.gov:8080/plants//profile?symbol=ALPH). All sites exhibited hydric soil with indicators that included gleyed/low chroma colors, concretions, and reducing conditions. Likewise, all sites exhibited wetland hydrology, with indicators that included inundation and saturated soils.

- Bear Creek (KYS1) – The dominant shrub species in this plot was buttonbush, with cover calculated at 49%. Groundcover was dominated by alligator weed, with a 90% total ocular cover estimate.

- Blood River (KYS2) - As with the Bear Creek site, this site was totally dominated by buttonbush, with total cover calculated at 40%. Groundcover was dominated by *Eleocharis spp.* with a 100% total ocular cover estimate.

- Harmon Creek (KYS3) -This site was dominated by buttonbush, with Halberd-leaf Rosemallow (*Hibiscus militaris*) also a significant component of the community. Total cover was calculated at 64%. Groundcover was dominated by alligator weed, with a 100% total ocular cover estimate.

- Birdsong Creek (KYS4) – The shrub layer was composed of exclusively buttonbush, with total cover calculated at 73%. Groundcover was primarily alligator weed, with a 100% total ocular cover estimate.

Discussion

Baseline data summarized above will provide a benchmark for assessing changes in wetland plant communities that may occur in association with changes in the operating regime of the TVA reservoir system. As data is collected in subsequent years, changes in species composition, the vegetative health of the plots, hydrology, and soils will be assessed and compared, both at the individual reservoir level and across the seven reservoirs. Regional variations in species composition may not be evident within the 15-year time frame of the monitoring study, but stress and changes in the wetlands due to the extension of summer pools may appear as changes in crown condition, percent cover, and basal area.

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