DRAFT MASTER PLAN

Hartwell Dam and Lake Project

Savannah River, Georgia and South Carolina

(Hart, Franklin, and Stephens Counties in Georgia and
Anderson, Oconee, and Pickens Counties in South Carolina)

US Army Corps
of Engineers®
Savannah District

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INTRODUCTION

The Master Plan (MP) provides a programmatic approach to the management of all the lands included within the Hartwell Project boundary (Hartwell Project). The MP is the basic document guiding the United States Army Corps of Engineers (USACE) responsibilities pursuant to Federal laws to preserve, conserve, restore, maintain, manage, and develop the project's lands, waters, and associated resources. The MP is a planning document anticipating what could and should happen and is flexible based upon changing conditions. MPs are required for civil works projects and other fee-owned lands for which USACE has administrative responsibility for management of natural and manmade resources.

The primary goals of the MP are to prescribe an overall land and water management plan, resource objectives, and associated design and management concepts, which: (1) Provide the best possible combination of responses to regional needs, resource capabilities and suitability, and expressed public interests and desires consistent with authorized project purposes; (2) Contribute towards providing a high degree of recreation diversity within the region; (3) Emphasize the particular qualities, characteristics, and potentials of the project; and (4) Exhibit consistency and compatibility with national objectives and other state and regional goals and programs.

Current guidance includes revised categories of Land Classifications used to define project lands. All lands are acquired for authorized project purposes and allocated for these uses. The classification process is a further distribution of project lands by management categories which, based upon resources available and public needs, will provide for full utilization while protecting project resources. The current guidance also includes requirements for an interdisciplinary team approach for MP supplements or revisions. Coordination with other agencies and the public is an integral part of the master planning process.

The MP includes a Geographic Information Systems (GIS) database. Management can continually update the database throughout the life of the plan to allow USACE to take proactive management actions and adapt existing strategies. Acreages were calculated using best available GIS technology and may vary from acreages in prior MP or official land acquisition records.

The MP serves three primary purposes that are equal in importance. First, it is the primary management document for the project and provides direction for many of the other plans that guide the management of the Hartwell Project. Second, it is a land use management tool. This MP sets the stage for the update of many of the project's resource management plans, such as the Operational Management Plan (OMP). Third, the MP provides for the environmental assessment and public review necessary for facilities and activities proposed in the MP.

As a land use tool, this MP provides USACE and the public with the current classification and preferred future uses of project lands. The current land classification

of project lands allows USACE and the public to visually evaluate the distribution of uses of project lands. For example, the identification of project lands that are suitable for the development of a new recreation facility by USACE, a current lease holder, or a future development is beneficial. Maintaining an up-to-date MP allows USACE to respond effectively to development plans made internally or by outside parties as well as identify laws and policies that govern management of the Hartwell Project.

This policy-based MP, along with the accompanying environmental assessment (EA), and maps provide USACE with a document that sets goals and objectives but does not establish concrete development plans. This allows USACE flexibility in the management and development of the Hartwell Project, within a clear policy framework. A separate EA will not be required for proposed activities or facilities approved or included in this MP. This MP does not address the specifics of regional water quality, shoreline management, or water level management.

HARTWELL DAM AND LAKE PROJECT MASTER PLAN

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1.0 INTRODUCTION

Management of lands and waters at the Hartwell Dam and Lake (also referred to as the Hartwell Project) are guided by the Master Plan (MP), the 2013 Historic Properties Management Plan (HPMP) and the 2020 Shoreline Management Plan (SMP). As stated in Engineer Regulation (ER) 1130-2-550, Chapter 2, Paragraph 2-2.a (1), dated 15 November 1996, the Natural Resource Management Mission of the U.S. Army Corps of Engineers (USACE) is as follows:

Mission Statement

The Army Corps of Engineers is the steward of the lands and waters at Corps water resources projects. Its Natural Resource Management Mission is to manage and conserve those natural resources, consistent with ecosystem management principles, while providing quality public outdoor recreation experiences to serve the needs of present and future generations.

In all aspects of natural and cultural resources management, the Corps promotes awareness of environmental values and adheres to sound environmental stewardship, protection, compliance, and restoration practices.

The Corps manages for long-term public access to, and use of, the natural resources in cooperation with other Federal, State, and local agencies as well as the private sector.

The Corps integrates the management of diverse natural resource components such as fish, wildlife, forests, wetlands, grasslands, soil, air, and water with the provision of public recreation opportunities. The Corps conserves natural resources and provides public recreation opportunities that contribute to the quality of American life.

1.1 PROJECT AUTHORIZATION

A general plan on the comprehensive development of the Savannah River Basin for flood control and other purposes was approved by the Flood Control Act of 1944, P.L. 78-534. Development and utilization of reservoir lands for public access and recreational use was authorized by Section 4 of the Flood Control Act of 1944, and as amended in 1946, 1954, and 1962. The Hartwell Project was authorized by the Flood Control Act of May 17, 1950 (P.L. 81-516) as the second unit in the comprehensive development of the Savannah River Basin. Hartwell Dam was completed in 1959 and the power plant became operational in 1962. Guidance for specific land use planning is given in Public Law 85-624, (Fish and Wildlife Coordination Act of 1959) and Public Law 86-717, signed into law in September 1960, which specifies protection and development of land resources.

These laws apply only to development of new facilities and not to modifications made in existing USACE areas, erosion control work, or to the construction of sanitary facilities necessary to meet State health code standards.

1.2 PROJECT PURPOSE

As authorized, the Hartwell Project's primary project purposes are the generation of hydroelectric power, operations for flood control as required, and increased minimum regulated flows for navigation of the Savannah River below Augusta, GA. Additional purposes authorized are recreation (P.L. 78-534 and PL 89-72), fish & wildlife management (PL 85-624), water quality (PL 92-500), and water supply (PL 85-500).

The Federal Water Pollution Control Act of 1972 (PL 92-500) established a national goal of eliminating all pollutant discharges into the waters of the U.S. and added water quality as a consideration in general terms.

The Water Supply Act of 1958, as amended (PL 85-500) allows the USACE to reallocate water storage from hydropower to water supply if there is no significant impact on authorized project purposes. At Hartwell Project, up to 50,000-acre feet may be reallocated without additional legislation.

1.3 PURPOSE AND SCOPE OF MASTER PLAN

The last Hartwell Project MP Update was finalized in 1981 and over the past 39 years changes have occurred that warrant an update. The Hartwell Project MP is the strategic land use management document that guides the comprehensive management and development for recreation, natural resources, and cultural resources that is efficient and cost-effective throughout the life of the Hartwell Project. The MP is a vital tool for responsible stewardship and sustainability of the facilities and resources for the benefit of present and future generations.

Engineer Pamphlet (EP) 1130-2-550, dated 30 January 2013, states that one of the requirements of a MP is to evaluate specific land classification categories. One of the categories, Multiple Resource Management Lands, was not considered under the 1981 MP. This updated MP will prescribe an overall land and water management plan, resource objectives, and associated design and management concepts compliant with EP 1130-2-550, which:

- Provide the best possible combination of responses to regional needs, resource capabilities and suitability, and expressed public interests and desires consistent with authorized project purposes;

- Contribute towards providing a high degree of recreation diversity within the region;

- Exhibit consistency and compatibility with national objectives and other state and regional goals and programs; and

- Ensure that program management actions are based on current information and regulations through collaboration with the public, stakeholders, and subject matter experts.

The MP guidance includes revised categories of Land Classifications used to define project lands (Appendix A). All lands were acquired for authorized project purposes and allocated for these uses. The classification process is a further distribution of project lands by management categories which, based upon resources available and public needs, will provide for utilization while protecting project resources. The guidance also includes requirements for an interdisciplinary team approach for the development, re-evaluation, supplementation, and updating of the MP. Coordination with other agencies and the public is an integral part of the MP process.

The MP serves three primary purposes that are equal in importance. First, it is the primary management document for the project and provides direction for many of the other plans that also guide the management of the Hartwell Project. Second, it is a land use management tool. This MP will be utilized to update many of the resource management plans as needed such as the Operational Management Plan (OMP). Third, the MP provides for the environmental assessment and public review necessary for facilities and activities proposed in the MP.

As a land use tool, this MP provides the USACE and the public with the current classification and preferred future uses of project lands. The land classification of project lands allows USACE and the public to visually evaluate the distribution of uses of project lands. For example, the identification of project lands that are suitable for the development of a new recreation facility by USACE, a lease holder, or a future development is beneficial. Maintaining an up-to-date MP allows USACE to respond effectively to development plans made internally or by outside parties.

The MP includes a Geographic Information Systems (GIS) database. Management can continually update the database throughout the life of the plan to allow USACE to take proactive management actions and adapt existing strategies.

The policy-based MP, along with the associated Environmental Assessment (EA), provides the USACE with a document that sets goals and objectives but does not establish concrete development plans. This allows the USACE flexibility in the management and development of Hartwell Project, within a clear policy framework. A separate EA will not be required for proposed activities or facilities approved in this MP.

1.4 DESCRIPTION OF PROJECT AND WATERSHED

Hartwell Lake is impounded by Hartwell Dam and covers 55,950 acres; extends 49 miles up the Tugaloo and 45 miles up the Seneca at full pool elevation 660' above mean sea level (amsl) for a total shoreline of 962 miles. Dam construction began in 1955; filling the lake began in 1961 and reached full pool on March 12, 1962. The dam consists of a 204-foot high and 1,900-foot-long concrete gravity structure, flanked by two earth embankments and a saddle dike totaling 17,852 ft. in length. Hartwell Project also maintains two diversion dams on the South Carolina side of the reservoir adjacent to Clemson University totaling 4,710 ft. in length.

There are 76,450 acres of land and water in the entire project. Interstate 85 bisects Hartwell Lake and makes the area easily accessible to visitors. It covers parts of Hart, Franklin, and Stephens Counties in Georgia, and Anderson, Oconee, and Pickens Counties in South Carolina.

Hartwell Lake borders Georgia and South Carolina on the Savannah and Tugaloo Rivers. Hartwell Dam is located 7.1 miles below the point at which the Tugaloo and Seneca Rivers join to form the Savannah River. The lake extends 49 miles up the Tugaloo River to Yonah Dam, operated by Georgia Power, and 45 miles up the Seneca River to Keowee Dam, operated by Duke Energy. The Hartwell dam is 305 river miles above the Savannah River's mouth.

The Savannah River Basin consists of 34 watersheds. Hartwell Project is in three hydrologic units (HUC): HUC 03060101 (Tugaloo), HUC 03060102 (Seneca), and 03060103 (Upper Savannah). More information is available from the United States Geological Survey - https://water.usgs.gov/wsc/acc/030601.html.

The Savannah River forms part of the boundary line between Georgia and South Carolina and divides the total lake acreage of 19,582.5 acres in Georgia and 36,367.5 acres in South Carolina. The project includes an area of 79,516 acres acquired in fee; 55,950 acres of water at full pool (660' amsl) and a usable land area of 23,566 acres when the lake is at normal pool elevation. Under current management proposals, all project land is considered necessary for project purposes. Pool fluctuation was considered in the planning and construction of the public-use facilities which have been developed in accordance with the existing MP for the project. The facilities are designed primarily to serve the visitation demands of the population within a 100-mile radius. Emphasis has been directed toward day-use facilities to obtain maximum benefits for the public.

Maintenance of the project buildings and grounds, overlook structures, earthen embankment portion of the dam, spillway, and channel is performed by USACE project personnel and/or service contracts. Other activities include maintenance of project-owned equipment, replacement of riprap on the embankment and outlet channel, and construction of erosion control structures and public-use facilities. Periodic inspections

are made of all public-use areas (inspections of state lease areas are completed every three years) and major repairs are scheduled for off-season recreation periods.

As of the date of this report, Hartwell Project operates and manages a visitor center, eight campgrounds, 13 day use recreation areas, and 24 access areas all served by an extensive network of state and county roads. Access roads to all major recreation areas are paved and well maintained. Hartwell Project maintains all or portions of paved roads (Choestoea and Utz Roads) on retained road easements leading into Choestoea and SC River Recreation Areas.

Access to wildlife management areas may be either by paved or gravel roads. In several instances, access is at the discretion of the adjoining property owner. Efforts are underway to obtain permanent access or reclaim abandoned easements to larger management areas.

Management of other recreational areas and facilities is accomplished by Georgia Department of Natural Resources (GADNR) and South Carolina Department of Parks, Recreation and Tourism (SCPRT), and surrounding city and county agencies, and various quasi groups.

The public-use facilities are planned to provide a complete, safe, and healthful recreation experience in a manner that will minimize impacts to the natural assets of the area.

1.5 PRIOR DOCUMENTATION

Table 1: Design Memoranda

Design Memo	Title
22B(C-5)	Hartwell Reservoir, 1970
	1981 Master Plan Update

1.6 PERTINENT PROJECT INFORMATION

The following table provides pertinent information regarding existing reservoir storage capacity at the Hartwell Project.

Table 2: Water Storage Capacities

Feature	Elevation amsl (feet)	Area (acres)	Capacity (acre-feet)
Top of Dam	679	N/A	N/A
Spillway Crest	630	N/A	1,2800,000
Top of Flood Control Pool	665	N/A	2,842,700
Top of Conservation Pool	660	55,950	2,549,600
Bottom of Conservation Pool	625	27,650	1,134,100
Conservation Storage, usable	625-660	N/A	1,416,000
Flood Storage	660-665	N/A	293,000
Surcharge Storage	665-674	71,300	596,000

2.0 PROJECT SETTING AND FACTORS INFLUENCING MANAGEMENT AND DEVELOPMENT

2.1 DESCRIPTION OF RESERVOIR

The Hartwell Project is located on the Savannah River 29.9 miles above the Richard B. Russell Dam (RBR) and 67.3 miles above the J. Strom Thurmond Dam. The authorized purposes are flood control, fish and wildlife, water quality, water supply, hydroelectric power, and recreation. The reservoir contains 55,950 acres of water at full pool. Rainfall and tributaries provide some contribution to inflows. However, inflows are affected by two major tributaries. These major tributaries are the Tugaloo and Seneca Rivers which converge to form the Savannah River. Inflow from the Tugaloo River is largely regulated by Yonah Dam. Lake Keowee dam regulates flows on the Seneca River.

2.2 HYDROLOGY AND GROUNDWATER

The sub-basin drainage area for Hartwell Lake totals 2,088 square miles which represents 20 percent of the 10,579 square miles of the Savannah River Basin. Reservoir pool elevations fluctuate considerably and are influenced to a great degree by stream flow, power production demand, and regulated releases into RBR. In most years, Hartwell releases contribute over 80 percent of the total inflow to RBR. Normally, the reservoir reaches a summer pool elevation of 660’ amsl in April and remains within a few feet of this height until September. From September to mid-December, the pool is gradually lowered to 656’ amsl in preparation for winter and spring rains. A rising pool elevation occurs from January through April.

Hartwell has a 35-foot conservation storage pool that creates 1,416,000 acre-feet of usable storage for hydropower generation, flood storage, and water supply uses. In addition, the 5-foot flood pool provides an additional 293,000 acre-feet of flood storage.

Greater detail can be found in the Savannah District Water Control Manual: http://155.82.195.51/manual/index.cfm.

2.3 SEDIMENTATION AND SHORELINE EROSION

Hartwell Lake is typical of a majority of reservoirs where throughout the lifespan, siltation accumulates from upstream activities uncontrolled by USACE. Limited bathymetric surveys of areas adjacent to water supply intakes and the immediate dam forebay area revealed very limited siltation. Localized sedimentation has occurred in the "delta" areas of tributaries where the flowing water is slowed as it meets the reservoir. This sedimentation has resulted in minor boating access issues during drought periods, but no significant loss of reservoir storage.

Riprap and bio-engineering erosion control may be authorized for adjacent property owners to prevent erosion of the shoreline and loss of public land. USACE is responsible for placement of riprap for erosion control along the shoreline in USACE managed recreation areas. Shoreline erosion is a major problem for many areas especially on the South Carolina side of the lake due to prevailing westerly winds. In several instances, private property has been eroded. Many adjoining property owners have undertaken considerable erosion control efforts to protect facilities and property. Adjoining property owners must obtain the necessary permits prior to implementing erosion control measures.

2.4 WATER QUALITY

Water quality in Hartwell Lake is measured by Georgia and South Carolina natural resource state agencies. There are seven South Carolina Department of Health and Environmental Control (SC DHEC) monitoring stations (Figure 1) in Hartwell Lake. Currently, both states have identified fish consumption advisories for all species in the Seneca River and 12-Mile Creek arms for polychlorinated biphenyls (PCBs), and for Hybrid/Striped bass, Largemouth bass, Spotted bass, and Channel catfish throughout the lake due to potential mercury levels.

Hartwell Project conducts monthly sampling of dissolved oxygen and temperature at established locations in the reservoir. The routine monthly sampling is conducted only at the forebay station from December through March when reservoir conditions are isothermal and oxygen concentrations are near saturation. From April through November, stratification drives reservoir processes that lead to reduced oxygen conditions, and the reservoir is sampled at 11 established locations throughout the mainstream and major tributaries. Sampling locations are shown in Figure 1. Additional sampling may occasionally be required for special studies (i.e. Blueback herring entrainment, etc.).

Hartwell Lake experiences thermal stratification from April through September. Thermal stratification in the downstream region of the reservoir usually begins in late-April with the establishment of a thermocline (20-25 feet) in mid-May. Temperatures range from

55° to 85°F and the thermocline remains near an average depth of 30 to 40 feet throughout the stratification period. The thermocline begins to weaken in late-September when seasonal cooling begins, until the reservoir conditions are almost completely isothermal by late-December.

Reduced Dissolved Oxygen (D.O.) levels resulting from reservoir stratification are monitored both upstream and downstream of the Hartwell Dam. Temperature, D.O., and specific conductance are monitored continuously. In general, D.O. concentrations downstream of the dam are approximately 1 to 2 milligrams per liter (mg/L) higher than the upstream D.O. concentrations. The increase in D.O is the result of turbine venting and other re-aeration effects in the tailrace area.

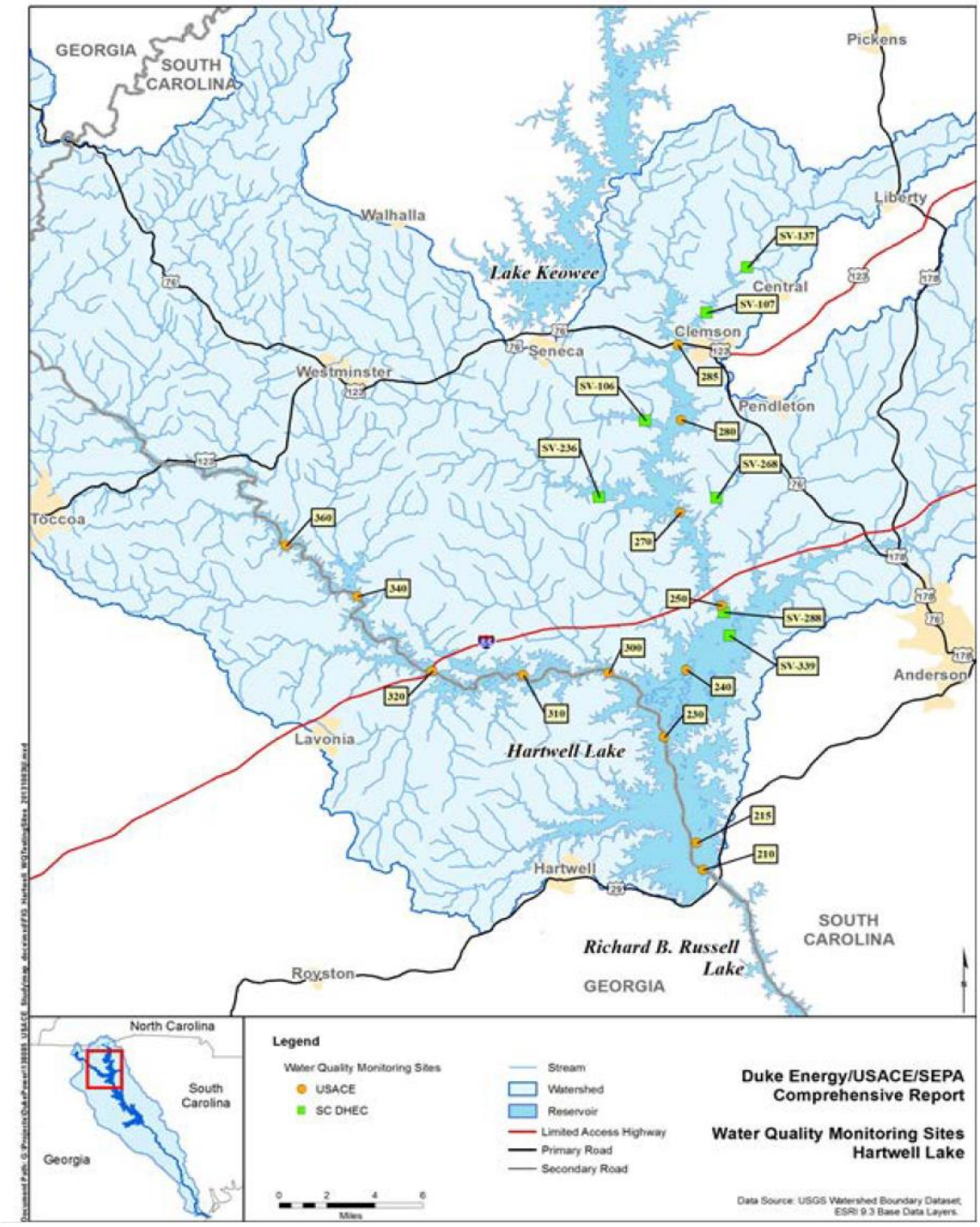

Figure 1: Water Quality Monitoring Sites

2.5 CLIMATE

The climate of the Hartwell Project has relatively short, mild winters and long, hot summers, thus creating a favorable environment for year-round outdoor recreation. The mean annual temperature is 61 degrees. The mean annual rainfall for the Hartwell area is approximately 62 inches. There are two general periods of heavy precipitation, one in February through March, and the other in July through August. Over the entire year, the most common forms of precipitation are thunderstorms, light rain, and moderate rain. Snowfall is rare in the region.

Severe thunderstorms with damaging winds and ice storms occur periodically causing moderate damage to timber stands and facilities. Tornadoes occur infrequently in the region; however, microbursts are more common. Remnants from hurricanes and tropical storms periodically impact the region.

2.6 TOPOGRAPHY, GEOLOGY AND SOILS

The Hartwell Project region has been dominated by agricultural and forest related land uses. In recent years, growth of urban areas throughout the region has brought about an increase in the manufacturing and service-related industries. This urban sprawl has changed the makeup of land use patterns in many areas of the region and has been a contributing factor to the changes in land uses seen in the areas adjacent to it. This data was presented in the 1981 MP.

The Hartwell Project area lies in the Piedmont geologic province, which is a dissected peneplain sloping from the Blue Ridge Mountain province on the north to the Coastal Plain on the south and southeast. Five rock types lie within the lake area: the Carolina gneiss series, Roan gneiss, Brevard schist and Lithonia - type granite gneiss, all of pre-Cambrian age, and the Palmetto type porphyritic granite of Carboniferous age.

The geologic structure of the region trends N 30° E. Secondary folding appears to have taken place at right angles to this trend. Stream patterns have been determined by the geologic structure in many areas, although the Savannah River is thought to be superimposed.

Small amounts of gold, lead, and magnetite were recovered in the area many years ago. However, Georgia and South Carolina report that no mineral deposits are now being worked in the lake area.

The principal rock type in the dam site is moderately hard, medium to coarsely grained, gray biotite granite gneiss. Other rock types at or near the dam site are the Lithonia type granite gneiss, pegmatite, garnetiferous amphibolite, sillimanite garnet schist, and basalt.

The Hartwell Project is in seismic risk zone 2 according to the Algermissen "Seismic Risk Map of the United States." The strongest local event recorded occurred on 2

October 1958, near Anderson, South Carolina, approximately 11 miles from the dam site. No faults of consequence are known except for the Brevard thrust fault in the extreme northwest corner of the lake area.

The predominate soil associations within the project are Cecil, Madison, and Lloyd. Cecil soil associations generally consist of deep, well- drained soils that developed in material weathered from granite, gneiss, and schist. These soils are found in the uplands on the tops of broad plateaus, ridge tops and hillsides. Slopes range from 2 to 15 percent. Cecil soils are low in natural fertility, contain little organic matter, and are strongly acid throughout the profile.

The Madison series consists of moderately deep to deep well-drained soils that are generally high micaceous throughout the profile. These soils formed on uplands in material weathered from quartz and mica schist. Most of the acreage is on broad stream divides and on smooth side slopes ranging from 2 to 15 percent.

Soils in the Lloyd association are situated on the Piedmont uplands with slopes ranging from 2 to 10 percent except for some steep slopes adjacent to drainage ways. They have a service layer of friable, sandy loam and a moderately permeable, dark red, clayey subsoil, relatively high in moisture-holding capacity. The smoothest ridge tops, which make up a large part of this association, are usually well managed and agriculturally productive.

The soils analysis classification 1 through 8, depict general recreation capabilities and limitations. Given the size of this project, development of a soil potential map was imperative. The Lake Scale Soil Analysis was developed through a deductive rating system which ranked soil types according to the following characteristics: permeability, depth of water table, flooding, slope, depth to bedrock, reaction rate, erosion potential, runoff rate, trafficability, corrosivity, and shrink/swell potential.

Every soil type existing on project lands was placed into recreation capability categories, depending upon computed potential. For graphic conveyance of general soil potentials around the lake, recreation capability categories were divided into the best recreation potential, restricted recreation potential, and least recreation potential, as defined as follows:

The "best recreation potential" soils category is generally composed of soils which have characteristics suitable to development. These soils are best suited for high density recreational activities requiring the least amount of rotational use for area recovery.

"Restricted recreation potential" soils are those where a potential for recreation exists, but guarded development is required due primarily to slope and erodibility. These soils will support high density recreational use but will require substantial maintenance and more frequent rotational use to protect the natural resources. The soils are better suited for low density recreational use.

Intrinsic characteristics of soils judged to have the "least recreation potential" generally include high water tables, susceptibility to frequent flooding, and excessive slopes with rapid runoff. These soils will support limited low-density recreational use but are best suited for natural areas with minimal disturbance.

2.7 RESOURCE ANALYSIS

2.7.1 Fish and Wildlife Resources

Prior to impoundment, the Hartwell Project area and the river portion below the existing Hartwell Dam had a limited fishery resource (U.S. Fish and Wildlife Service, 1960). The fishery potential of this area was impaired by the poor habitat conditions created by the unstable shifting river bottom and turbid sediment laden flows.

Under these conditions, the fishery resources were dominated by carp, gar, suckers, and other rough fish. Sport fisheries were primarily limited to sunfish, crappie and bullhead catfish. Due to the poor sport fisheries resources and the proximity of better area within moderate driving distance, fishermen tended to go elsewhere.

Since the construction of the Hartwell Project, recreational sport fishing has substantially increased both in terms of fishing pressure and harvest above and below the dam. The major reason for the increased fishery resources is the fishery management program with the cooperation of Georgia and South Carolina fishery departments. Game fish species found in Hartwell Lake include largemouth bass, spotted bass, catfish, crappie, and striped bass.

Hardwood and mixed pine-hardwood sites within the Hartwell Project are presently supporting deer and turkey populations. Other species of small game and fur-bearing animals found throughout the project include coyote, feral hog, muskrat, opossum, raccoon, beaver, and skunk. Extensive trapping of fur bearing animals has not occurred within the project area. Waterfowl observed in the project area include mallard, pintail, green-winged and blue-winged teal, gadwall, wood duck, ringneck duck, ruddy duck, and Canada goose. There are also many non-game animals found in the project area including indigenous species of songbirds, and several species of raptors, reptiles, and amphibians (Appendix B).

A one-mile stretch of the Savannah River below Hartwell Dam serves as a put-and-take trout fishery. The feasibility of this fishery is due to the cold-water discharges from Hartwell Dam supplemented by routine stocking of trout by Georgia and South Carolina Department of Natural Resources (DNR).

2.7.2 Vegetative Resources

The Hartwell Project is in the oak-pine forest region of the United States. Prior to inundation, 64 percent of Hartwell land was timberland. The remaining area was mostly open farm and pastureland on the gently to moderately rolling upland slopes. The

major forest types present are pine, pine--hardwood, and oak-hickory. These types are listed in the order of evolution to the climax forest.

Presently, pine forest occurs on approximately 50 percent of the project lands and consists of the native pines-shortleaf pine, loblolly pine, and Virginia pine. Slash and loblolly pine have been planted on abandoned cropland over the past 25 years. The pine-hardwood forest occupies approximately 25 percent of the project lands' upper slopes and ridges and is comprised of the native pines - shortleaf pine, loblolly pine and in limited areas, Virginia pine in combination with hardwood species, such as sweet gum, yellow poplar, black gum, white oaks, post oak, and willow oak.

The oak-hickory forest is the climax forest covering approximately 20 percent of the project area. Species such as white oak, northern red oak, southern red oak, chestnut oak, water oak, willow oak, post oak, black oak, shagbark hickory, pignut hickory, mockernut hickory, river birch, hackberry, American elm, American beech, and sycamore are strong dominant trees of this hardwood forest type.

The old abandoned home sites in the area are often identified with introduced and exotic species such as northern catalpa, tree of heaven, mimosa, empress tree, and privet which have escaped and become acclimated. These areas generally have a weed/grass cover and occur on about 5 percent of the project lands.

The Hartwell Project, due to its geographic location, provides a large variety of natural plant species. Eastern white pine, eastern hemlock, cucumber-tree, sweet shrub, and mountain laurel are uncommon because they are at the extremes of their natural ranges. The American chestnut is extremely rare due to its destruction in past years by the chestnut blight disease. Some of these plants represent flora generally found in the Appalachian Mountains. The faded trillium (Trillium discolor) is known to occur in the Walker Creek ramp area. In addition, the state-listed Goldenseal (Hydrastis canadensis) and Ozark Bunchflower (Veratrum woodii) are known to occur on the project near the Stephens County Park.

Other trees and shrubs – fringe tree, strawberry bush, silverberry, sweetshrub pawpaw, flame azalea, and fragrant azalea are uncommon because they naturally occur infrequently. Oconee bells (Shortia galacifolia) is in a class by itself. These plants are found in the Keowee River portion of the lake in the northern parts of Oconee County and western edge of Pickens County. This area is one of the very few places in North America where this beautiful flowering plant is found. When encountered, these plants will be favored and preserved for their scenic and aesthetic value.

The vegetative resources of the Hartwell Project were classified using information derived from FY2019 Project Site Vegetative Resource Records reported in Operations and Maintenance Business Information Link (OMBIL). These data are displayed in Table 3 and list acreages classified by vegetation type.

Table 3: Vegetative Resources

Division	Order	Class	Sub-Class	Acreage
Vegetated	Herb Dominated	Herbaceous Vegetation	Annual Graminoid or forb vegetation	712
Vegetated	Tree Dominated	Closed Canopy	Deciduous Closed Tree Canopy	3,140
Vegetated	Tree Dominated	Closed Canopy	Evergreen Forest	7,325
Vegetated	Tree Dominated	Closed Canopy	Mixed Evergreen-Deciduous Closed Tree Canopy	9,631
Vegetated	Shrub Dominated	Shrub	Deciduous	125
Total Vegetated				**20,933**

2.7.3 Protected Species

Based upon the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC), there are no identified endangered species within the project area. However, those federally-protected by other laws include bald eagle, golden eagle, osprey, and peregrine falcon which may be transient visitors during migration. Habitat may exist for the federally-listed Northern long-eared bat, smooth purple coneflower, and the recently listed Eastern Black Rail, however, there are no known occurrences on Hartwell Project.

Section 7(a)(2) of the Endangered Species Act (P.L. 93-205) requires federal agencies ensure that any action authorized, funded, or carried out by such agency is not likely to:
1) Jeopardize the continued existence of any endangered or threatened species, or
2) Result in the destruction or adverse modification of critical habitat.

According to 50 CFR Section 402.02, the term, "jeopardize the continued existence of" means to reduce appreciably the likelihood of both the survival and recovery of listed species in the wild by reducing the species' reproduction, numbers, or distribution. Jeopardy opinions must present reasonable evidence that the project will jeopardize the continued existence of the listed species or result in destruction or adverse modification of critical habitat.

If a survey for a project site is positive for any Threatened or Endangered species, USACE would consult with the USFWS in accordance with Section 7 of the ESA. Federally-listed threatened and endangered species having potential habitat at Hartwell Project fee lands, as identified by the USFWS, can be found in Table 4.

Table 4: Protected Species

	Status	Has Critical Habitat
Flowering Plants		
Dwarf-flowered Heartleaf	T	No
Mountain sweet pitcherplant	E	No
White fringeless orchid	T	No
Small-whorled Pogonia	T	No
Persistent Trillium	E	No
Smooth Coneflower	E	No
Mammals		
Northern Long-eared Bat	T	No
Reptiles		
Southern Bog Turtle	T(SA)*	No
Birds		
Eastern Black Rail	T	No

* Threatened due to similarity of appearance, not subject to Section 7 consultation

2.7.4 Invasive Species

Georgia and South Carolina have 207 state-listed invasive species. Invasive terrestrial animals known to occur at the Hartwell Project are the red imported fire ant (*Solenopsis invicta*) and the wild boar (*Sus scrofa*). Invasive terrestrial plants known to occur on Hartwell Project lands include Japanese honeysuckle (*Lonicera japonica*), Johnson grass (*Sorghum halepense*), and Kudzu (*Pueraria lobata*). Kudzu has significantly impacted some of the recreation areas and natural areas around the lake. Table 5 lists invasive species that occur on Hartwell fee lands. Data was retrieved from the FY19 Project Site Invasive Species Records reported in OMBIL.

Table 5: Invasive Species

Species Group	Species Common Name	Type of Occurrence	Acreage Impacted	Percent Acreage Impacted
Terrestrial Animals	Red imported fire ant	Minor	58	0.25
Terrestrial Animals	Wild Boar	Moderate	1000	4.2
Terrestrial Plants	Japanese Honeysuckle	Minor	300	1.3
Terrestrial Plants	Wisteria	Minor	2	0.01
Terrestrial Plants	Privet	Minor	15	0.01
Terrestrial Plants	Johnson Grass	Minor	12	0.01
Terrestrial Plants	Autumn Olive	Minor	5	0.01
Terrestrial Plants	Kudzu	Minor	75	0.3
Total Impacted Acres			1467	6.2

2.7.5 Ecological Setting

Hartwell Lake extends 49 miles up the Tugaloo River and 45 miles up the Seneca River. The Hartwell Dam is located 7 miles below the confluence of the Tugaloo and Seneca rivers where the Savannah River originates. Hartwell Dam is located 29.9 miles above Russell Lake and 67.3 miles above the Thurmond Dam.

Public lands surrounding Hartwell Lake are typical of the rolling hills found throughout the upper Piedmont. This region encompasses a wide variety of natural vegetation that includes oak/hickory, hickory/shortleaf pine forest, bottomland hardwood forest, Virginia pine, and loblolly pine forest. The dry forest areas are dominated by blackjack oaks, post oak, scattered hickory species, and sweetgum.

The mixed forests are dominated by species such as oak, maple, elms, sweetgum, Virginia pine, and loblolly pine. Vines such as muscadine, poison ivy, and greenbriar are mixed with a variety of grasses and other herbaceous species in the understory.

2.7.6 Wetlands

Table 6 lists the acreages of various types of wetlands present in and around Hartwell Lake. Data was derived from the Hartwell Project Geographic Information System (GIS) database with data populated from the National Wetlands Inventory provided by the USFWS at the following website: https://www.fws.gov/wetlands/data/Mapper.html.

Table 6: Wetland Summary

Wetland Class	Subtotals	Total Acres
Palustrine		
Aquatic Bed	3.98	
Emergent Wetland	850.17	
Forested Wetland	597.12	
Scrub-Shrub Wetland	338.94	
Unconsolidated Bottom	69.56	
Unconsolidated Shore	25.67	
Total Palustrine		1,885.44
Riverine		
Streambed	117.81	
Unconsolidated Bottom	99.83	
Unconsolidated Shore	24.28	
Total Riverine		241.92
Lacustrine		54,518.20
		Total 56,645.56

2.8 CULTURAL RESOURCES

Cultural resources are defined under the National Historic Preservation Act (NHPA), P.L. 89-665, as properties listed or eligible for listing in the National Register of Historic Places (NRHP) and are referred to as historic properties. Historic properties include buildings, structures, sites, districts, and objects, cultural items, Indian sacred sites, archaeological artifact collections, and archaeological resources. Eligibility for listing in the NRHP is based on one or more of four criteria: a) association with important historic events or patterns of history, b) association with persons important in history, c) representative of the work of a master or exemplary as a type, or d) have yielded or may yield information important to history or prehistory. 36 C.F.R. § 60.

The archaeological record details a long and continuous occupation of the Savannah River Valley extending from the Paleoindian period (ca 14,000 to 8,000 BC) through the Historic period (post-1930 AD). Ethnohistorical research indicates that many of the archaeological sites at Hartwell Project are affiliated with the Muskogean-speaking Creek and Cherokee tribes (Adams 2009). A generalized cultural overview for the Savannah River Valley, and in particular, the Upper Savannah River Valley, presented below, provides an understanding of the various prehistoric and historic time frames documented in the region.

Cultural Chronology

Prehistoric Periods

Paleoindian Period (ca 14,000 – 8000 BC)
The earliest evidence of human settlement in North America dates to the Paleoindian period. This cultural period corresponds with the terminal Pleistocene when the climate was generally much colder and sea levels were lower than today. Archaeological evidence suggests that sparse human populations followed the migratory cycles of the mega-fauna such as mammoth, and mastodons over wide-ranging physiographic environments. In the Savannah River Valley, the majority of Paleolithic sites are surface finds consisting of well-made fluted projectile points, or semi-fluted lanceolate points. Anderson et al. (1990) divide the Paloeindian period in the Southeast into three sub-periods, each defined by differing projectile point types: Early (Clovis); Middle (Cumberland, Suwannee, Simpson); and Late (Dalton).

Archaic Period (8000 – 1000 BC)
During the Archaic period population density increased as did technology. During this period the large lanceolate points of the Paleoindian period were replaced with smaller corner- or side-notched points. During the latter part of the Archaic period (3500 – 1000 BC), steatite and ceramic vessels appear in the archaeological record, indicative of increased sedentism. Sites that contain low frequencies of ceramics are interpreted as short term seasonal camps. Approximately 16 percent of sites recorded in the Savannah River Valley date to the Archaic Period.

Woodland Period (1000 BC – 900 AD)
Increased sedentism and larger populations are the hallmarks of the Woodland period. Subsistence during this period began to focus on maize, beans, and squash, and the necessity for planting and maintaining the crops helped establish more stable and settled societies. Woodland period sites, represented by diagnostic materials such as small, square-based contracting stemmed projectile points, triangular points, copper or polished slate spearheads, tubular stone pipes and trade goods, account for nearly 15 percent of the recorded sites in the Savannah River Valley. Sites dating to the Early (1000 – 100 BC) and Middle (100 BC – 500 AD) occur more frequently in the Upper Savannah River Valley than do Late Woodland (500 – 900 AD) sites. Evidence of access to exotic trade goods and craft specialization are much more common during the latter part of the period.

Mississippian Period (900 – 1600 AD)
It was during this period that regional chiefdoms and trade networks fully evolved throughout the Southeast. Based on ceramic sequences, Anderson (1994) divides the period into Early (900–1250 AD), Middle (1250 - 1450 AD) and Late (1450 – 1600 AD). During the Early Mississippian period, Savannah River people constructed small hamlets, medium-sized unfortified communities and large palisaded villages. Large earthen mounds appear around 1100 AD. Settlements were located along major rivers on wide, alluvial floodplains. During the Middle Mississippian mound-building intensifies. The Late Mississippian period includes large villages located on major river floodplains with platform mounds, plazas, and fortifications. The archaeological record suggests a decline in occupation of the Savannah River Valley during the Late Mississippian period.

Historic Periods

Contact Period (1540 – 1717 AD)
The Contact period in the Southeast is a time in which native communities were transformed by a series of European-influenced factors or encounters. The abandonment of the Middle and Upper Savannah River Valley was historically documented in four different narratives of the Hernando de Soto expedition, which passed through the area in April 1540. The interior of South Carolina and Georgia remained largely unexplored by Europeans until the settling of Charles Towne in 1670.

Colonial (1700 – 1781 AD)
By the mid-eighteenth-century Europeans from the low country and the Carolina Piedmont began encroaching on Cherokee Territory in the northwest portion of South Carolina. Ties between the colonists and the Cherokees slowly disintegrated resulting in the Cherokee War of 1759 - 1761. In an effort to keep peace between Euro-Americans and the Cherokee, a boundary line was drawn between the Savannah River and the Reedy River (present day South Carolina Counties Anderson and Abbeville) in 1766 that officially prohibited white settlement in Cherokee territory. Prior to and during the Revolutionary War the area was inhabited by Euro-American squatters who had settled the area to escape colonial authorities. Relations between settlers and the

Cherokee again disintegrated during the 1770s when the Cherokee were brought into the War, siding with the British and often attacking frontier settlements.

Antebellum (1782 – 1865 AD)
Settlement of the Upper Savannah River region increased after the Revolutionary War and the subsequent fall of the Cherokee towns. Following the war, the area's population continued to grow as a result of relocation of the native population who had inhabited the region. Franklin County, Georgia, established in 1784 out of the 1783 Treaty of Augusta, was the first county in the state created after the American Revolution. Hart and Stephens counties were created in 1853 and 1905, respectively.

In South Carolina, lands of the Cherokee were granted to settlers in 1784, and in 1785, South Carolina was divided into six districts, each consisting of multiple counties. In 1791, the state formed Washington District, from which the counties of Pickens (1826), Oconee (1868), and Anderson (1826) evolved. Anderson County established the town of Anderson as the county seat in 1828. As there was no railroad that directly linked Anderson with the outside world, most freight traffic occurred on the Savannah River.

The area developed a subsistence agrarian economy. Early crops such as corn, oats, wheat, rye, barley, cotton, and tobacco became staples. The introduction of the cotton gin and increases in cotton prices following the War of 1812, solidified cotton's position as the dominant cash crop of the region's economy. The natural transportation networks established by the Savannah and Broad Rivers propelled the success of cotton for nearby Elbert County, and by 1849, the county yielded 500 pounds of cotton to the acre. As cotton grew in popularity in the region, so too did slave holdings. Hart and Franklin Counties, being on the northern fringe of the cotton region, were not as reliant on slave labor as counties to the south. By 1860, slaves accounted for about 25 percent of the population in Hart County and 17 percent in Franklin County. In comparison Elbert County's slave population accounted for over 50 percent of county's population.

Postbellum Period (1865 – 1930 AD)
Although the Upper Savannah River was not directly affected by Civil War military action, the war caused a major disruption in lifeways in the region. Emancipation allowed some former slaves to migrate, causing a shortage of labor for former slave owners who had managed to retain some of their pre-War lands. The migration coupled with the labor shortage encouraged the development of the tenancy system. The increasing number of railroads in the region spurred settlement and economic activity. Water power and industrialization became emphasized as the number of textile mills increased in the region.

Modern Period (post - 1930 AD)
During the Great Depression, the region continued to shift away from cotton production. Federal New Deal programs (1933 - 1938) encouraged farmers to take their cotton fields out of production and plant trees. As a result, many farm workers moved from rural areas to cities and towns to work at textile or lumber mills. Beginning in the 1940s,

agriculture in Elbert and Hart Counties began to decline noticeably as the number of farms lessened and continued to decline over a span of 40 years.

Previous Investigations
Prior to impoundment of Hartwell Lake, Joseph Caldwell conducted a reconnaissance level survey of the uppermost parts of the Savannah River and parts of the Tugaloo and Seneca-Keowee Rivers. Caldwell identified 54 sites during the survey; six recommended for additional excavations, and one for additional testing. Subsequent follow-on investigations and excavations of several of Caldwell's recorded sites were conducted in the early 1950s - late 1970s. Small scale Section 106 compliance archaeological surveys have been conducted for various types of development and lease actions since the late 1970s. As a result of these investigations Hartwell Project manages six archaeological sites listed or eligible for listing on the NRHP. Five sites date to the prehistoric period; one site is a historic farmstead. All six sites are located in South Carolina.

Long-Term Cultural Resources Objectives
A Hartwell Project HPMP was developed in 1997 and updated in 2013 for the Project, but the update was not coordinated with the SHPOs and not finalized. In general, Hartwell Project protects its cultural resources by avoidance when location is known or discovered when considering development of activities on public land. As funding allows, a Cultural Resources Management Plan (CRMP) will be developed and incorporated into the OMP in accordance with EP 1130-2-540.

The purpose of the CRMP is to provide a comprehensive program to direct the historic preservation activities and objectives at the Hartwell Project. In consultation with the Georgia and South Carolina State Historic Preservation Officers (SHPO), all currently known sites with unevaluated NRHP status must be evaluated to determine their eligibility. In accordance with Section 106 of the NHPA, any proposed ground-disturbing activities or projects, such as those described in this MP or as may be proposed in the future by others will require coordination with the respective SHPO to locate and evaluate potential impacts to historic and prehistoric resources. Resources determined eligible for the NRHP must be protected from proposed project impacts, or the impacts must be mitigated. All future cultural resource investigations at Hartwell Project must be coordinated with the respective SHPO and federally recognized Tribes to ensure compliance with the NHPA, the Archaeological Resources Protection Act (P.L. 96-95), and the Native American Graves Protection and Repatriation Act (P.L. 101-601).

2.9 SOCIOECONOMIC RESOURCES

Socioeconomic resources describe the existing setting related to population, employment, income, and ethnicity.

2.9.1 Affected Environment

The affected environment includes regional and local demographic and economic information as it relates to the Hartwell Project and the surrounding area. For the purposes of this section, the socioeconomic study area Anderson, Oconee and Pickens Counties in South Carolina, and Hart, Franklin, and Stephens Counties in Georgia.

2.9.2 Population Demographics

The total population for the zone of interest is 474,012 as shown in Table 7. Of that population, 42 percent is in Anderson County, 16 percent is in Oconee County, and 26 percent is in Pickens County. Each of the remaining counties makes up less than 6 percent of the zone of interest total population.

From 2017 to 2060, the population in the zone of interest is expected to increase to 589,766, an increase of 24 percent. By comparison, the population of Georgia is projected to increase by 35 percent and South Carolina by 34 percent during the same period. The distribution of the population by gender is approximately 48.7 percent male and 51.3 percent female in the zone of interest (Table 8).

Table 7: 2017 Population Estimates and 2060 Projections

	2017 Population	2060 Projection	2017 Percent of Zone of Interest	Annual Growth Rate
States:				
Georgia	10,439,379	14,085,359		0.81%
South Carolina	5,024,369	6,714,826		0.78%
Counties:				
Franklin, GA	22,820	24,665	4.81%	0.19%
Hart, GA	25,794	24,122	5.44%	-0.15%
Stephens, GA	25,890	27,360	5.46%	0.13%
Anderson, SC	198,759	259,605	41.93%	0.71%
Oconee, SC	77,270	88,976	16.30%	0.35%
Pickens, SC	123,479	165,038	26.05%	0.78%
Zone of Interest Total	474,012	589,766		0.57%

Source: U.S. Bureau of the Census, 2017 Estimate; Georgia Governor's Office of Planning and Budget

Table 8: Percent of Population Estimate by Gender

	Male	Percent Male	Female	Percent Female
States:				
Georgia	4,968,887	48.7%	5,232,748	51.3%
South Carolina	2,376,759	48.6%	2,516,685	51.4%
Counties:				
Franklin County, GA	10,852	48.6%	11,476	51.40%
Hart County, GA	12,502	49.0%	13,033	51.04%
Stephens County, GA	11,930	46.6%	13,695	53.44%
Anderson County, SC	93,474	48.1%	100,700	51.86%
Oconee County, SC	37,417	49.3%	38,509	50.72%
Pickens County, SC	60,358	49.7%	61,091	50.30%
Zone of Interest	226,533	48.7%	238,504	51.3%

Source: U.S. Bureau of the Census, 2017 Estimate

Tables 9 shows the population composition by age group. The distribution by age group is similar among the counties, zone of interest, and the state overall. The largest age group is the 18 to 64, with 53.9 percent of the total population in the zone of interest.

Table 9: Age Distribution

	Under 18	18 to 64	65 and Over
States:			
Georgia	22.6%	61.8%	15.6%
South Carolina	22.0%	60.8%	17.2%
Counties:			
Franklin County, GA	22.9%	22.9%	18.0%
Hart County, GA	22.0%	59.1%	18.9%
Stephens County, GA	19.0%	64.5%	16.5%
Anderson County, SC	25.6%	61.4%	13.0%
Oconee County, SC	21.8%	57.8%	20.4%
Pickens County, SC	19.3%	57.5%	23.2%
Zone of Interest	21.8%	53.9%	18.3%

Source: U.S. Bureau of the Census, 2017 Estimate

Population by Race Alone or in Combination with Other Races is displayed in Table 10. For the zone of interest, 84.7 percent of the population is White, 11.8 percent is Black, 4.3 percent are Hispanic or Latino, 1.9 percent are two or more races, and 1.2 percent

are Asian. The remainder of the races make up less than 1 percent of the zone of interest population each.

By comparison, for the state of South Carolina, 68.5 percent of the population is White, 27.3 percent is Black or African American, and the remaining races constitute a slightly greater percentage of the total population than in the zone of interest. For Georgia, 60.8 percent of the population is White, 32.2 percent is Black or African American and the remaining races constitute a slightly greater percentage of the total population than in the zone of interest.

Table 10: 2017 Population Estimate by Race/Hispanic Origin

	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian or Other Pacific Islander Alone	Two or more races	Hispanic or Latino
States:							
Georgia	60.8%	32.2%	0.5%	4.2%	0.1%	2.1%	9.6%
South Carolina	68.5%	27.3%	0.5%	1.7%	0.1%	1.9%	5.7%
Counties:							
Franklin, GA	86.8%	9.7%	0.4%	1.2%	0.1%	1.8%	4.6%
Hart, GA	77.9%	19.1%	0.2%	1.1%	0.0%	1.7%	3.9%
Stephens, GA	85.0%	11.0%	0.5%	0.9%	0.1%	2.4%	3.6%
Anderson, SC	80.6%	16.3%	0.3%	1.0%	0.0%	1.7%	3.9%
Oconee, SC	89.2%	7.6%	0.4%	0.9%	0.0%	1.8%	5.7%
Pickens, SC	88.9%	7.0%	0.3%	2.1%	0.0%	1.8%	3.8%
Zone of Interest Total	84.7%	11.8%	0.4%	1.2%	0.0%	1.9%	4.3%

Source: U.S. Bureau of the Census, 2017 Estimate

2.9.3 Education and Employment

Table 11 shows the population over 25 years of age by highest level of educational attainment for each of the geographical areas. In the zone of interest, for 5.4 percent of the population 25 years old and older, the highest level of education attained is below the ninth-grade level. Another 10.9 percent attended high school but did not graduate. For 32.2 percent of the population, the largest in the zone of interest, a high school degree is the highest level of educational attainment. Another 20.5 percent attended some college but did not graduate. Bachelor's degrees were the highest educational

attainment of 12.9 percent, while associate degrees were such for 9.9 percent. The smallest group is those that have graduate or professional degrees, at 8.2 percent.

By comparison, in Georgia 5.0 percent have less than ninth grade education, 8.7 percent attended some high school, 28.0 percent graduated high school, 20.8 percent attended some college but did not graduate, 7.5 percent obtained an associate's degree, 18.6 percent obtained a bachelor's degree, and 11.4 percent have a graduate or professional degree. For South Carolina, 4.5 percent have less than ninth grade education, 9.0 percent attended some high school, 29.4 percent graduated high school, 20.8 percent attended some college, 9.3 percent obtained an associate degree, 17.2 percent obtained a bachelor's degree, and 9.8 percent have a graduate or professional degree.

Table 11: Population Over 25 Highest Level of Education Attainment

	Less than 9th grade	9th to 12th grade, no diploma	High school graduate (includes equivalency)	Some college	Associate's degree	Bachelor's degree	Graduate or professional degree
South Carolina	4.5%	9.0%	29.4%	20.8%	9.3%	17.2%	9.8%
Georgia	5.0%	8.7%	28.0%	20.8%	7.5%	18.6%	11.4%
Anderson County, SC	5.1%	10.5%	31.5%	21.5%	10.6%	13.2%	7.5%
Oconee County, SC	6.2%	9.8%	30.8%	19.5%	9.6%	14.2%	10.0%
Pickens County, SC	4.9%	10.5%	30.3%	20.4%	10.4%	14.1%	9.5%
Hart County, GA	4.8%	14.1%	39.2%	20.4%	7.8%	8.3%	5.4%
Franklin County, GA	8.3%	14.4%	39.1%	17.6%	7.7%	8.1%	4.6%
Stephens County, GA	5.4%	12.9%	36.1%	18.9%	7.0%	10.6%	9.0%
Zone of Interest	5.4%	10.9%	32.2%	20.5%	9.9%	12.9%	8.2%

Source: U.S. Bureau of the Census, 2017 Estimate

Employment by sector is presented in Table 12. Each figure represents the percentage of the employed civilian population in each area. In the zone of interest, the largest sectors are educational services, health care, and social assistance, with 24.1 percent of the civilian employed population. The second largest sector is manufacturing, which employs 19.7 percent. This is followed by retail trade with 11.5 percent. The remaining sectors each fall under 7 percent.

Similarly, the largest employment sectors for Georgia and South Carolina are also educational services, health care and social assistance, with 20.8 percent and 21.7 percent, respectively, of the total employment. While manufacturing has importance in both the zone of interest and state, employment is driven by service sector employment.

Table 12: Employment by Sector (Percentage of Employed Civilian Population)

	Agriculture, forestry, fishing and hunting, and mining	Construction	Manufacturing	Wholesale trade	Retail trade	Transportation and warehousing, and utilities	Information	Finance and insurance, and real estate and rental	Professional, scientific, and management, and administrative and waste	Educational services, and health care and social assistance	Arts, entertainment, and recreation, and accommodation and food services	Other services, except public administration	Public administration
South Carolina	1.0	6.5	13.8	2.6	12.2	4.8	1.8	5.7	9.9	21.7	10.4	5.1	4.6
Georgia	1.1	6.5	10.6	2.9	11.8	6.2	2.5	6.3	11.8	20.8	9.4	4.9	5.1
Anderson County, SC	0.7	5.7	21.3	3.3	12.5	3.7	1.3	3.9	7.9	24.0	8.0	4.9	3.0
Oconee County, SC	1.2	7.9	20.0	1.3	9.2	5.3	1.0	4.1	8.2	22.5	11.2	5.7	2.4
Pickens County, SC	0.9	7.2	16.0	2.5	11.0	5.5	1.1	4.5	7.8	25.6	9.9	4.9	3.1
Hart County, GA	5.2	6.9	24.2	1.9	14.0	4.8	1.1	3.5	5.7	16.4	7.4	3.6	5.3
Franklin County, GA	4.2	8.2	18.6	2.0	11.0	5.2	1.1	4.0	5.3	24.9	6.3	5.3	3.7
Stephens County, GA	1.5	6.6	21.2	3.0	10.8	2.8	1.8	3.3	4.5	28.5	5.3	5.7	5.0
Zone of Interest	1.2%	6.7 %	19.7 %	2.6 %	11.5 %	4.5 %	1.2 %	4.0 %	7.5%	24.1%	8.8%	5.0 %	3.2 %

Source: U.S. Bureau of the Census, 2017 Estimate

2.9.4 Households and Income

There are approximately 181,613 households in the zone of interest with an average household size of 2.6 persons. For Georgia, there are 3.7 million households and in South Carolina, 1.9 million, with an average size of households at 2.8 for Georgia and 2.6 for South Carolina, as shown in Table 13.

Table 13: 2017 Households and Household Size

	Households	# per Household
South Carolina	1,871,307	2.6
Georgia	3,663,104	2.8
Anderson County, SC	76,234	2.5
Oconee County, SC	31,354	2.4
Pickens County, SC	46,428	2.6
Hart County, GA	9,848	2.6
Franklin County, GA	8,322	2.7
Stephens County, GA	9,427	2.7
Zone of Interest	181,613	2.6

Source: U.S. Bureau of the Census, 2017 Estimate

As shown in Table 14, households in the zone of interest had generally lower median income than the Georgia and South Carolina state averages in 2017. In the counties in zone of interest, the median household income ranges from $39,246 in Franklin County to $45,551 in Anderson County. These all fall below the Georgia median household income of $52,977 and the South Carolina median household income and $48,781.

Similarly, counties in the zone of interest had a lower 2017 per capita income. In the counties in the zone of interest, per capita incomes ranged from as high as $21,668 in Hart County, Georgia to as high as $26,798 in Pickens County, South Carolina. These are below the average Georgia per capita income of $28,015 and the average South Carolina per capita income of $28,015.

Table 14: Median Household and Per Capita Income, 2017

	Median Household Income (2017 Dollars)	Per Capita Income (2017 Dollars)
South Carolina	$ 48,781	$ 26,645
Georgia	$ 52,977	$ 28,015
Anderson County, SC	$ 45,551	$ 24,485
Oconee County, SC	$ 43,978	$ 26,798
Pickens County, SC	$ 45,332	$ 23,501
Hart County, GA	$ 41,216	$ 21,668
Franklin County, GA	$ 39,246	$ 19,663
Stephens County, GA	$ 39,756	$ 21,657

Source: U.S. Bureau of the Census, 2017 Estimate

The percentage of persons whose income was below the poverty level in the zone of interest was above that of Georgia and South Carolina. A “low-income person” is defined as a person whose household income is at or below the income level stated in the U.S. Department of Health and Human Services’ poverty guidelines, which in the 2017 guidelines was $20,420 for a family of three.

Most of the counties in the zone of interest showed between 18 and 19 percent of all persons having incomes below the poverty level (Table 15). Anderson County had the lowest percentage below the poverty threshold at 15.6 percent. Franklin County had the highest percentage below the poverty threshold at 25.4 percent.

Table 15: Population below Poverty Threshold, 2017

	Population for whom Poverty Status is Determined	Below Poverty Level	Percent Below Poverty Level
South Carolina	4,751,345	790,657	16.6%
Georgia	9,931,935	1,679,030	16.9%
Anderson County, SC	191,170	29,776	15.6%
Oconee County, SC	75,156	13,993	18.6%
Pickens County, SC	114,654	20,987	18.3%
Hart County, GA	24,642	4,642	18.8%
Franklin County, GA	21,680	5,503	25.4%
Stephens County, GA	24,898	4,504	18.1%
Zone of Interest	452,200	79,405	17.6%

Source: U.S. Bureau of the Census, 2017 Estimate

2.10 RECREATION FACILITIES, ACTIVITIES, AND NEEDS

2.10.1 Zones of Influence

The primary area of economic influence encompasses portions of Anderson, Oconee, and Pickens in SC, and Hart, Franklin and Stephens Counties in GA with additional economic influence from within a 100-mile radius of the lake. This six-county region has been utilized as the basis in summarizing the population characteristics of the Hartwell Project.

2.10.2 Visitation Profile

Most visitors to the Hartwell Project come from within a 100-mile radius of the lake area. The majority of visitors' primary activities involve water-based recreation such as swimming, fishing, boating, water skiing (including wakeboarding), kayaking, and sailing. Picnicking and camping are often an important part of their visit. Another large segment of visitors relies on the Hartwell Project's land base for activities such as hunting, hiking, bird watching, and mountain biking. Many visitors are repeat customers who have been "going to the lake" for years. Visitors are a diverse group ranging from campers who utilize the campgrounds around the lake; full time and part time residents of private housing developments that border the lake; hunters who utilize the Wildlife Management Areas and collar lands around the lake; day users who picnic in the city, state, and USACE operated parks; marina customers, fishermen, and many other user groups.

2.10.3 Recreation Analysis

Recreational use at the Hartwell Project continues to evolve with approximately 9.2 million visitors in FY2020. While visitation in recreational areas remains strong, facilities (e.g., marina and cabins) in outgranted areas indicate that there is a demand for recreational opportunities not offered in traditional USACE parks.

2.10.4 Recreation Carrying Capacity

The recreation carrying capacity of the project is the amount of development, use, and activity any lake and associated recreational lands can sustain without being permanently adversely impacted. USACE staff will identify overcrowding and overuse and apply appropriate management practices to maintain a quality recreational experience.

2.11 REAL ESTATE

Hartwell Project was authorized by the Flood Control Act of 1950 and the land was acquired under the 1953 - 1962 acquisition policy known as the Eisenhower Policy. This policy limited land acquisition to what was required for operational purposes, as a cost saving measure. Land acquisition involved the purchasing of fee titles to all land acquired for the dam site, construction area, permanent structure area, reservoir, and lands for the safe and efficient operation of the project. This included all lands encompassing the acquisition guideline at or below an elevation of 674.0' amsl (maximum surcharge elevation). Distance from the boundary line to full pool typically ranges from 100 to 200 feet.

The project includes an area of 23,566 acres of land acquired in fee above the full conservation pool of 660' amsl with an additional 676 acres of flowage easement. Total project lands and water equal 79,516 acres. Neither surface nor subsurface minerals were acquired below the normal high-water line of the natural river channel. This was generally defined on the ground at the vegetative line on the riverbank. Permanent inundation precludes use by the surface owner; however, adjacent property owners may apply for a dredging permit (in the dry) of silt during periods of low water. Dredging (in the dry) requires an additional permit from the USACE Regulatory Division. Applications for dredging should be submitted to the local Hartwell Project office.

Government property is monitored by USACE personnel to identify and correct instances of unauthorized use. When encroachments are discovered, Savannah District - Real Estate Division will be notified after the project exhausts all efforts to resolve it in the field.

Forest products generated through clearing, flood damage and salvage operations, or incidental to implementation of the approved Forest Management Plan, and not required for USACE use, will be sold. Disposal procedure for standing timber is a Real Estate Division function and all proposed sales will incorporate a disposal plan. Generally, the plan will indicate extent, volume, and justification for such sales. Funds derived from the sale of forest products are returned to the project and utilized for the implementation of natural resource management programs in accordance with the Collection of Civil Works Appropriation Refunds USACE Policy (2016-05).

Currently, at Hartwell Lake, project staff and the Savannah District Real Estate Division oversee and manage over 303 real estate easements, 57 leases, 14 consents, 10,277

shoreline licenses, and 10 miscellaneous licenses. They provide oversight for leases for five marinas, four state parks, fourteen city/county parks, nine quasi-public sites, and seven private clubs. Additionally, there are 2,450 acres of public land under license to the states of GA and SC for wildlife management.

2.12 APPLICABLE PUBLIC LAWS

There are many public laws that are applicable to the Hartwell Project. The USACE complies with all public laws and uses public laws to guide the development of policies and plans. A complete listing of applicable public laws can be found in Appendix C.

3.0 RESOURCE OBJECTIVES

3.1 PROJECT-WIDE RESOURCE OBJECTIVES

Resource considerations at the Hartwell Project exist primarily due to user demands. Multiple user types have interests in the recreation facilities, project lands and waters, and such demands regularly create conflicts. USACE is also obligated to manage these resources for the overall interest of the public and not just for a select group of individuals. It is the responsibility of the project and USACE to attempt to provide an environmentally-sound balance of these demands.

The project-wide resource management objectives involve the long-term development and management goals of project resources to guide proposed future actions for the public benefit, consistent with resource capabilities within the framework of USACE Environmental Operating Principles. Resource objectives are attainable goals for development, conservation, and management of natural, cultural, and manmade resources at the project. They are guidelines for obtaining maximum public benefits while minimizing adverse impacts to the environment and are developed in accordance with: 1) authorized project purposes; 2) applicable laws and regulations; 3) resource capabilities and suitability; 4) regional needs; 5) other governmental plans and programs; and 6) expressed public desires.

The project-wide resource objectives for the Hartwell Project, not in priority order, are listed below:

- Increase the benefit of all project lands and waters for recreation, fisheries, and wildlife.
- Manage the existing natural resources and recreation facilities in compliance with all pertinent laws, regulations, and policies.
- Develop and manage the area for maximum enjoyment of the recreating public to the extent compatible with other authorized purposes.
- Protect and conserve the existing native wildlife species and improve habitat now and in the future.
- Manage habitat for fish, game, and non-game species, thereby providing a quality hunting, fishing, and wildlife viewing experience.

- Protect and conserve Government property from erosion through natural resource management and fostering good stewardship by minimizing encroachments and other unauthorized uses.
- Inform the public, through programs, public outreach, education, and personal contacts, about the project and resource management purposes and objectives.
- Integrate fish and wildlife management practices with other natural resource management practices while working closely with state and local natural resource agencies. Forest management techniques (i.e., timber thinning and prescribed burning) will be utilized to improve wildlife habitat and as a forest management tool to improve insect and disease resistance in forest stands.
- Identify safety hazards or unsafe conditions, correct infractions, and implement safety standards in accordance with EM 385-1-1.
- Encourage hunting and fishing participation through special events, habitat management, programs, and other outdoor recreation pursuits compatible with project purposes.
- Preserve and protect important cultural, ecological, and aesthetic resources in compliance with existing federal statutes and regulations.
- Detect invasive species and minimize impacts to authorized project purposes in a cost-effective and environmentally sound manner. Monitor invasive species populations accurately and reliably, and if feasible, provide for restoration of native species and habitat.

Implementation of these objectives is based upon time, manpower, and budget. The objectives provided in this chapter are established to provide high levels of stewardship to USACE managed lands and resources while still providing a high level of public service. These objectives will be pursued using a variety of mechanisms such as assistance from volunteers, partnerships, hired labor, contract labor, remediation, and special lease conditions. It is the intention of the Hartwell Project staff to provide a realistic approach to the management of all resources.

The natural resource elements within the identified objectives come in several different categories of work. They can be broken into recreation, fisheries, game, and non-game. Management objectives for these categories are dependent on the individual resource, location, and lead agency (i.e., GADNR and SCDNR).

3.1.1 Aids to Navigation Management

The Hartwell Lake Aids to Navigation (ATON) management program provides for the maintenance of approximately 1,196 navigation markers with a focus on providing safe recreational opportunities. ATONs are maintained by USACE staff, through contracts and volunteers.

3.1.2 Wildlife and Fisheries Management

Wildlife and fisheries are managed cooperatively between the GADNR, SCDNR, and USACE.

Objectives for fisheries are to continue to monitor current populations, ensure the populations are healthy and stable, and provide a quality fishery for recreation. Agencies conduct annual sampling and data analysis to assess fisheries populations. They also make adjustments in creel and size limits as necessary to keep existing populations healthy. Striped bass, hybrid bass, and trout are routinely stocked in Hartwell Lake.

The Fish and Wildlife Management Plan for Hartwell Project integrates management practices that are compatible with the multiuse purposes of the project for the long-range optimization and sustained use of a diverse yet balanced wildlife population. The management plan and associated activities are coordinated with appropriate Federal, State, and USACE personnel to ensure compatibility and continued success of the programs.

Wildlife management efforts are directed principally to habitat conservation, with food, cover, and nesting areas being the critical areas of concern. Principal management tools used to accomplish habitat management include silvicultural practices to ensure diverse vegetative cover, establishment of food plots and strips; placement of nesting aids to supplement natural tree cavities; and, beaver pond manipulation.

The fish management plan is designed to provide a successful and sustained harvest to ensure maximum recreational enjoyment by present and future users at Hartwell Lake. Fisheries management includes habitat manipulation, population monitoring, and distribution of population and habitat information to the local news media.

Habitat management includes controlling water levels to enhance spawning conditions for game fish, constructing artificial reefs and fish shelters, and controlling water discharges to ensure a cold-water fishery below the Hartwell Dam. In 1998, the Hartwell Dam generating units 1 - 4 were retrofitted with vent pipes to induce air into the hydro turbines during power generation. This venting system increases the dissolved oxygen in the Hartwell tail water during periods when ambient conditions are less than optimal for fisheries.

Creel census, fishing club tournament surveys, electro-shocking, rotenone sampling, and vertical gill are the tools used for fish population monitoring. From data received during monitoring procedures, estimations are made as to the general health, numbers and potential problems of the overall population. Certain information received from these studies, such as average depth of the game fish and general locations, are combined with current catch and success information.

3.1.3 Recreation

Recreation falls within two categories that can be identified as either land or water-based recreation. Management objectives for each type vary depending on the location and the intensity of use. General objectives are provided in this MP as to the work necessary to meet the public's needs for land and/or water-based recreation.

Land-based recreation includes activities that typically occur on, or adjacent to USACE lands and waters, such as camping, hiking, hunting, picnicking, wildlife/bird viewing, sightseeing, etc. Land-based recreation areas include campgrounds, day-use areas, overlooks, roads, bike trails, and wildlife management areas. Facility types typically found within these recreation areas include campsites, picnic sites, shelters, hunting areas, trails, restrooms, boat ramps, and courtesy docks. These recreation areas are managed by several entities: USACE, state and local governments, and private organizations.

Water-based outdoor recreation includes opportunities, activities, areas, and facilities that occur on water managed by USACE. These activities include fishing, boating, swimming, scuba diving, kayaking, etc. Water-based recreation is managed by USACE and state and local agencies.

A primary mission of USACE is to provide safe, recreational opportunities. This involves looking at recreation carrying capacity versus current use patterns, zoning requirements for no-wake or restricted areas, and areas to remain open for public recreation. USACE will keep in close coordination with the state and local agencies in determining use patterns within the water portions of the project and promote water safety.

3.1.4 State Comprehensive Outdoor Recreation Plan (SCORP)

Both GA and SC have State Comprehensive Outdoor Recreation Plans (SCORP), which make the states eligible to receive federal grant dollars through the Land and Water Conservation Fund. These plans are typically updated every five years.

The GA 2017-2021 SCORP stresses the positive impacts provided by outdoor recreation by highlighting the value that parks and recreation bring to protecting natural resources, maintaining healthy populations, and adding to local economic vitality. Their priority is to attend to the urgent needs of current outdoor recreation facilities.

The SC 2014 SCORP face the same issues as GA with regards to funding, maintaining recreational and natural resources, providing recreational opportunities to all populations, and create economic benefits for the surrounding communities.

One of the unique challenges identified in the SCORP is the increase in resource user groups that have historically represented ethnic and racial minorities. The SCORP demonstrated that low-income and rural constituents often face unique challenges in

accessing outdoor recreation resources. Any reduction in the availability of outdoor recreation would increase the negative impacts on these population groups. USACE will continue to maintain public access to these areas to facilitate outdoor recreation use and help address these needs.

4.0 LAND ALLOCATION, LAND CLASSIFICATION, WATER SURFACE, AND PROJECT EASEMENT LANDS

Land allocation categories identify the congressionally authorized purpose for which project lands were acquired, whether by fee simple purchase or through other means as described below. All 23,566 acres of project lands acquired at Hartwell were for the purpose of Operations.

4.1 LAND CLASSIFICATION

Land Classifications are determined based on characteristics that make an area suitable for a particular land use and is largely dictated by resource capability (i.e., soils, topography, and vegetation) and location. There are six categories of classification for the MP identified as: Project Operations, High Density Recreation, Mitigation, Environmentally Sensitive Areas, Multiple Resource Management Lands, and Surface Water. Each classification may have sub classifications. For example, recreation areas are classified based on two designations: 1) High Density for intensive use with sub-classifications of public recreation, quasi-public development, and private club sites, and 2) Low Density recreation sites which are identified under the Multiple Resource Management category. Maps showing the various land classifications can be found in Appendix A.

4.1.1 Project Operations

Project Operations includes the lands categorized as restricted use that are managed for the dam, spillway, hydropower plant, and project office. These lands were acquired to provide for the safe and efficient operation of Hartwell Project. This includes the land on which project operational structures are located and all lands below the 674-foot contour, the maximum design surcharge elevation. These lands, totaling 68 acres, were acquired specifically to meet the requirements of the congressionally authorized purpose of constructing and operating the project for flood control, and hydroelectric power generation and are comprised of two categories: administrative and dual use.

Administrative lands are classified for the safe and efficient operation of the dam and powerhouse, radio tower locations, the resource manager’s marine base, the resource manager’s office and maintenance areas, and the pumping station at the Clemson diversion dams. Dual Use lands are located between elevation 660’ AMSL (top of conservation pool) and 674’ amsl (maximum design surcharge elevation). These lands were also classified for project operations but allow public use for recreation and fish and wildlife. Dual Use lands are not depicted on the Land Use Plates due to scale limitations and for clarity.

4.1.2 High Density Recreation

These are lands that typically occur near the shoreline and are developed for intensive recreational activities for the visiting public including day use areas, campgrounds, concession areas, cabins, lodges, docks, fishing piers, hiking trails, education centers, interpretive displays, restaurant, boat launching ramps and supporting facilities, shelters, and pavilions. This category includes lands acquired for project operations and allocated for use as developed public use areas for intensive recreational activities by the visiting public, including areas for concession and group use development. In order to recognize and honor past commitments, this classification is further subdivided:

- Public Recreation Areas are defined as lands identified and managed for the benefit of the public in general, including concessions.
- Quasi-Public Development. This category includes lands leased to church groups, Girl Scouts, Clemson University and other similar groups.
- Private Club Leases. This designation will allow the District to honor past lease commitments in accordance with existing USACE policy on private exclusive use. There are no additional lands for lease to private clubs.

A total of approximately 5,875.5 acres were acquired specifically for the congressionally authorized purpose of recreation development (Table 18).

4.1.3 Environmentally Sensitive Areas

These are areas where scientific, ecological, cultural, and aesthetic features have been identified. This designation limits and can prohibit any further development within the area. There are 7,626.7 acres classified for environmentally sensitive areas.

4.1.4 Multiple Resource Management Lands

This classification is divided into four subcategories identified as: Low Density Recreation, Wildlife Management, Vegetative Management, and Future/Inactive Recreation Areas. A given tract of land may be classified using one or more of these subcategories. The following identifies the amount contained in each subcategory of this classification.

Low Density Recreation. These are lands with minimal development or infrastructure that support passive public recreational use (e.g., fishing, hunting, wildlife viewing, shoreline use, hiking, etc.). They were lands purchased for recreation and classified for low density recreation. The intention of these classified lands is to ensure available lands for low density recreation serving as a buffer between areas classified as recreation intensive use and wildlife management. There are 8,345.8 acres under this classification at Hartwell Project.

Wildlife Management. These are lands designated for the stewardship of wildlife resources. There are 1,650 acres of land under this classification. The focus of these

areas is providing public access and habitat management through maintained wildlife openings and prescribed burning.

Vegetative Management. These are lands designated for stewardship of forest, prairie, and other native vegetative cover. There is no acreage under this classification at the Hartwell Project.

Future or Inactive Recreation. These are lands designated for recreation with site characteristics compatible with potential future recreation development. These areas will be managed as low-density recreation lands which will still provide for recreational benefits until there is an identifiable need and opportunity to develop these areas. Currently, Hartwell Project does not have any lands that fit this designation.

4.1.5 Surface Water

The project does have a surface water management program for project operations and public safety. The navigation channel and hazard buoys are managed by USACE.

Restricted. These are water areas restricted for project operations, safety, and security purposes. The area around the dam and hydropower intakes in the forebay has been identified for no boat entry which covers an area of approximately 23 acres. The area restricted in the tailwater encompasses 14.6 acres for a total of 37.6 acres of restricted surface water.

Designated No-Wake. Hartwell Lake has approximately 37 no-wake areas surrounding the bridges and railroad crossings, five marinas, 92 boat ramps, and four state parks. Total surface water designated as no-wake is 360.5 acres.

Fish and Wildlife Sanctuary. These areas are managed with annual or seasonal restrictions to protect fish and wildlife species during periods of migration, resting, feeding, nesting, and/or spawning. Hartwell Lake does not have surface water designated for this purpose. However, there are spring water level restrictions for the purpose of maintaining largemouth bass spawning habitat (Division Regulation (DR) 1130-2-16). The spawning period is defined as beginning when water temperatures reach 65 degrees Fahrenheit and lasting until three weeks after water temperatures reach 70 degrees. The spawning period usually starts around the first of April and lasts 4 to 6 weeks. Past studies indicate that the 4-week period of April 1 - 28 is the peak spawning period. Stable lake levels should be provided during this peak spawning period to prevent the stranding of eggs and abandonment of nests.

Throughout the spawning season, water levels should not be lowered more than six inches below the highest lake elevation recorded during the operational spawning window. If inflows during the spawning season cause lake levels to rise to flood levels, managers have the authority to lower lake levels more than 6 inches, since flood control takes precedence over fish spawn. Additionally, maintaining these stable lake levels may not always be possible during drought.

Open Recreation. Other than the restricted areas near the dam, the remainder of the lake is open to recreational use. There is no specific zoning for these areas, but there is a buoy system in place to help aid in public safety. These buoys mark hazards in the navigation channel, no wake areas, boat restriction, and navigational channel and direction.

Table 16 provides a summary of land classifications at Hartwell Reservoir. A map representing these areas can be found in Appendix A.

Table 16: Land and Water Classifications

Land Classification	***Acres***
Project Operations	68.0
High Density Recreation (includes Future/Inactive)	5,875.5
Environmental Sensitive and Natural Areas	7,626.7
MULTIPLE RESOURCE MANAGED LANDS	
Low Density Recreation	8,345.8
Wildlife Management	1,650.0
Vegetative Management	0
TOTAL LANDS	23,566.0
Future/Inactive Recreation (included under Recreation above)	0
Water Classification	
Surface Water: Restricted	37.6
Surface Water: Designated No-Wake	360.5
Surface Water: Fish and Wildlife Sanctuary	0
Surface Water: Open Recreation	55,562.5
TOTAL WATER	55,960.6

4.2 PROJECT EASEMENT LANDS

These are lands on which easement interests were acquired. Fee title was not acquired on these lands, but the easement interests convey to the Federal government certain rights to use and or restrict the use of the land for specific purposes. Easement lands are typically classified as Operations Easement, Flowage Easement, and/or Conservation Easement. There are 750.6 acres of easement lands at the Hartwell Project.

4.2.1 Operations Easement

These are easements USACE purchased for the purpose of project operations. There are no acres of operations easements at the Hartwell Project.

4.2.2 Flowage Easement

These are easements purchased by USACE giving the right to temporarily flood private land during flood risk management operations. There are 750.6 acres of flowage easement lands located at the Hartwell Project. These lands occur along tributaries outside the project boundaries and are not included as part of the resource plan.

4.2.3 Conservation Easement

These are easements purchased by USACE for the purpose of protecting wildlife, fisheries, recreation, vegetation, archeological, threatened, and endangered species, or other environmental benefits. There are no conservation easements at the Hartwell Project.

4.3 LAND CLASSIFICATION OBJECTIVES

4.3.1 Operations

USACE will operate and maintain the Hartwell Project based on authorized project purposes with a priority on security and safety. For lands designated for operations, USACE will conserve and improve natural resources through management activities and restrict access as needed for security and safety purposes. In addition, these lands will be used to promote hunting and fishing through special events.

4.3.2 High Density Recreation

Because high density recreation can include concessions, camping, boat ramps, and day use areas, often near each other, the Hartwell Project will coordinate planning with state partners while ensuring that use of project lands is compatible with sound stewardship of the natural resource. In cooperation with our state partners, USACE will develop and manage project resources to support types and levels of recreation activities indicated by visitor demand and consistent with carrying capacities, mitigation requirements, and natural resources capabilities.

4.3.3 Multiple Resource Management

Low Density Recreation

USACE will manage areas designated for low density recreation to accommodate and support a variety of uses such as hiking, wildlife observation, hunting, and fishing. Forest and wildlife management techniques such as thinning, prescribed burns, and planting wildlife openings may be used. However, the low-density designated areas occupy small acreages making some management techniques impractical.

Wildlife Management

USACE will utilize both forest management and agricultural techniques to maintain or improve wildlife populations with consideration of land capabilities as well as to promote hunting opportunities and improve public access.

4.3.4 Surface Water

Restricted
USACE maintains restricted areas (defined by buoy lines) in the forebay and tailrace areas of the dam for public safety purposes.

No Wake
USACE designates no wake areas (designated by no wake buoys) near boat ramps and bridges for public safety purposes.

Open Recreation
USACE provides and maintains approximately 1,196 ATONs which include both channel and hazard markers. Both types of markers improve safety for boaters and fishermen.

4.3.5 Easement

Flowage easements are inspected periodically and evaluated for encroachments. In addition to easements the USACE has acquired, the USACE also issues easements for crossings on public land. Please see Section 6.5 NON-RECREATIONAL OUTGRANTS.

5.0 RESOURCE PLAN

5.1 Purpose: The overall objective of the resource plan is to maximize recreational benefits while maintaining the projects unique natural resources and scenic qualities. The resource plan recognizes that budgets are variable from year to year and visitor use patterns and preferences change over time.

5.2 Common Recreation Facilities: In general, the following types of common recreational facilities listed in Table 18 may be considered for development within existing high-density recreation areas without an additional formal Environmental Assessment (EA) or modification to the MP. Each development or expansion along with utilities and rights-of-way will be evaluated for cultural resources, wetlands, and protected species in accordance with our standard NEPA evaluation as well as all current guidance for recreational development.

Table 17: Potential Recreational Facilities Development

Public Parks:

Facilities approved on the lease development plan	Replacement, relocation, and/or modernization of existing facilities not to exceed 10% of the original facility's footprint
Campsites not to exceed 25% of the existing number of campsites	Picnic Sites not to exceed 50% of the existing number of picnic sites
Yurts not to exceed 25% of the existing number of campsites/yurts sites combined	Portable or fixed mini cabins not to exceed 25% of the existing number of campsites/yurts sites combined
Sanitary facilities necessary to meet existing or expected demand including restrooms, shower houses, septic systems, or RV dump station	Conversion of picnic areas to campgrounds or campgrounds to picnic areas
Picnic shelter not to exceed 200-person capacity	Amphitheater not to exceed 250-person capacity
Designated parking lot(s) not to exceed 100 spaces	Disc golf course not to exceed 25 acres in size
Archery or skeet range not to exceed 25 acres in size	Additional lanes to existing boat ramps. Realignment of roads to improve safety and traffic flow at boat ramps
Playground(s)	Park office or gate house
Restaurant	Hiking, biking, interpretive, fitness, endurance, or equestrian trails or zip lines/high ropes courses
Courtesy dock, fishing pier	Park attendant/camp host sites
Fish cleaning station	Swim beach(s)
Shoreline erosion control	Game court, ball field
Camp store not to exceed 1,000 sq. ft.	Designated pet friendly areas
Interpretive Center	Splash pad/mini floating water park not to exceed one acre

Public Marinas:

Facilities approved on the lease development plan	Replacement, relocation, and/or modernization of existing facilities not to exceed 10% of the original facility's footprint
Additional wet slip, dry stack, or open boat storage not to exceed 25% of the approved total of boat storage opportunities	Marina office, ships store or gate house
Sanitary facilities necessary to meet existing or expected demand including restrooms, shower houses, septic systems, or marine pump out station	Picnic shelters not to exceed 200-person capacity
Amphitheater not to exceed 250-person capacity	Marine service and sales facility not to exceed 1 acre.
Playground(s)	Fish cleaning station
Courtesy dock, fishing pier	Restaurant

Lessee must submit detailed plans prior to approval of such facilities, infrastructure, or rights-of-way. Engineer approved plans may be required. A feasibility and market analysis may be required for larger, revenue producing facilities. All state and local ordinances and laws apply. A public comment period may be required. Prior to construction, an endangered species survey will be conducted in accordance with the Memorandum of Agreement between the USACE, Savannah District, and the USFWS, dated July 2010. Cultural resources information will be reviewed to ensure these resources are protected. Clean Water Act and Rivers and Harbors Act permits may be required from USACE Regulatory Division for potential impacts to wetland or waters of the U.S. if the activities cannot be approved via Hartwell's delegated Regional or Programmatic General Permits. Generally, habitable structures will not be authorized below 674' AMSL elevation, the maximum flood surcharge.

5.3 Area Resource Plans: Appendix D provides resource plans for individual recreation areas (including lease areas) and wildlife management areas. Maps of these areas are available on ArcGIS Online at (web address link). These descriptions provide the following information:

Management Agency – The agency responsible for the day-to-day operations and maintenance of an area

Land Classification – The designated land use as defined in Section 4.2

Location – A brief description of the area's location including the plate number

Description – A brief description of the area, focusing on recreation features currently on site

Future Development – Lists the potential for future development based on the features originally in the design, but due to various constraints were not constructed. Also, includes those features being proposed for development, but not in the original design.

Table 18: Recreation Area Managing Agency

PARK	Map #	TOTAL ACRES	AGENCY
Andersonville Island	1	455.0	USACE
Apple Island Recreation Area	2	107.0	USACE
Asbury Recreation Area	3	27.0	Anderson County, SC
Barton's Mill Access Area	4	0.17	Oconee County, SC
Big Oaks Recreation Area	5	12.0	USACE
Bradbury Access	6	2.42	Hart County, GA
Brown Road Access	7	2.18	Anderson County, SC
Broyles Recreation Area	8	24.0	USACE
Bruce Creek Recreation Area	9	41.0	Stephens County, GA
Camp Creek Access	10	47.0	USACE
Carter's Ferry Access	11	20.0	USACE
Chandlers Ferry Recreation Area	12	48.0	USACE
Choestoea Recreation Area	13	369.0	Oconee County, SC
Clemson City Park	14	35.0	City of Clemson, SC
Cleveland Access	15	2.0	USACE
Crawford's Ferry Access	16	36.0	USACE
Darwin H. Wright Park	17	28.0	City of Anderson, SC
Denver Access	18	19.0	USACE
Double Springs Access	19	18.0	USACE
Duncan Branch Access	20	11.0	USACE
Durham Access	21	4.0	USACE
Eighteen Mile Creek Access	22	6.73	USACE
Elrod Ferry Recreation Area	23	39.0	USACE
Fair Play Recreation Area	24	16.0	Oconee County, SC
Franklin County Access	25	2.10	Franklin County, GA
Friendship Recreation Area	26	27.0	Oconee County, SC
Georgia Dam Viewing Area	27	10.0	USACE
Glenn Ferry Recreation Area	28	211.0	USACE
Green Pond Landing	29	35.0	Anderson County, SC
Gum Branch Recreation Area	30	35.0	Hart County, GA
Hartwell Volunteer Village	31	22.0	USACE

PARK	Map #	TOTAL ACRES	AGENCY
Holcomb Access	32	6.6	Stephens County, Ga
Honea Path Access	33	21.0	USACE
Hoyt Tilley Access	34	0.93	Anderson County, SC
Hurricane Creek Access	35	5.27	Anderson County, SC
Island Point Recreation Area	36	32.0	USACE
Jack's Landing Access	37	3.18	Anderson County, SC
Jarrett Access	38	2.0	USACE
Jenkins Ferry Access	39	31.0	USACE
Lake Shore Access	40	0.34	Oconee County, SC
Lawrence Bridge Recreation Area	41	7.0	Oconee County, SC
Long Point Recreation Area	42	37.0	Hart County, SC
Martin Creek Access Area	43	60.0	USACE
Mary Ann Branch Recreation Area	44	16.0	USACE
Mt. Bay Park	45	1.0	Oconee County, SC
Mullins Ford Recreation Area	46	10.0	Oconee County, SC
New Prospect Access	47	34.0	USACE
Poplar Springs Recreation Area	48	24.0	USACE
Port Bass Access	49	2.59	Oconee County, SC
Powderbag Creek Access	50	12.0	USACE
Reed Creek Access	51	10.0	Hart County, GA
Richland Creek Access	52	19.0	USACE
River Forks Recreation Area	53	182.0	Anderson County, SC
Rock Springs Access	54	59.0	USACE
Rocky Ford Access	55	2.99	Hart County, GA
Seneca Creek Access	56	3.99	Oconee County, SC
Singing Pines Recreation Area	57	42.0	USACE
SC River Access	58	4.46	USACE
South Carolina Overlook	59	1.76	USACE
South Carolina Dam Viewing Area	60	1.9	USACE
South Union Access	61	13.99	Oconee County, SC
Spring Branch Access	62	12.0	USACE
Stephens County Park	63	7.0	Stephens County, GA
Sunshine Point Access	64	13.0	SC DNR
Tabor Access	65	20.0	USACE
Timberlake Access	66	18.04	Oconee County, SC

PARK	Map #	TOTAL ACRES	AGENCY
Townville Access	67	23.0	USACE
Twelve Mile Recreation Area	68	26.0	City of Clemson, SC
Walker Creek Access	69	9.0	Stephen County, GA
Weldon Island Recreation Area	70	138.0	Anderson County, SC
White City Access	71	1.26	Anderson County, SC
Coneross Campground	72	136.0	USACE
Crescent Group Campground	73	41.0	USACE
GA River Campground and Rec Area	74	12.0	USACE
Milltown Campground	75	43.0	Hart County, GA
Oconee Point Campground	76	70.0	USACE
Paynes Creek Campground	77	399.0	Hart County, GA
Springfield Campground	78	60.0	USACE
Twin Lakes Campground & Recreation Area	79	152.0	USACE
Watsadler Campground	80	36.0	USACE
Sadlers Creek State Park	81	394.0	SC PRT
Lake Hartwell State Park	82	690.0	SC PRT
Tugaloo State Park	83	396.0	GA DNR
Hart State Park	84	147.0	GA DNR
Big Water Marina	85	49.0	Outgranted
Clemson Marina	86	36.0	Outgranted
Harbor Light Marina Harbor Light Expansion Site	87 88	54.0 40.0	Outgranted
Hartwell Marina	89	22.0	Outgranted
Portman Marina	90	44.0	Outgranted
Hatton’s Ford	91	5.4	USACE

6.0 SPECIAL TOPICS/ISSUES/CONSIDERATIONS

6.1 POLYCHLORINATED BIPHENYL (PCB’s)

The presence of Polychlorinated biphenyl (PCB’s) in Twelve Mile Creek/Hartwell Lake were discovered when surface water, sediment, and fish from the area were sampled in the mid-1970s. The source of this contamination was determined to be the Sangamo-Weston, Inc. capacitor manufacturing plant in Pickens, South Carolina. Sangamo-Weston, Inc. operated the plant from 1955 to 1987. The liabilities associated with that

operation were subsequently assumed by Schlumberger Technology Corporation (STC). Dielectric fluids, used in the manufacture of capacitors until 1977, contained PCBs, and materials containing these fluids were disposed via land burial. In addition, PCBs were present in discharges from the plant to Town Creek (a tributary of Twelve Mile Creek). Surface water and sediment contaminated by the discharged PCBs eventually migrated downstream to Twelve Mile Creek and Hartwell Lake.

In 1994, the United States Environmental Protection Agency (EPA) issued a Record of Decision (ROD) for the Twelve Mile Creek/Hartwell Lake area that included natural recovery of PCB-contaminated sediments. This alternative was supported by studies showing that PCB-contaminated sediments are expected to be continually buried by sediment entering Twelve Mile Creek and Harwell Lake. In addition, the ROD called for ongoing monitoring of biota, adoption of risk-based guidelines for human consumption of Lake Hartwell fish, and a public education program designed to increase public awareness of the current fish consumption advisory.

The U.S. District Court for the District of South Carolina entered a Consent Decree in May 2006 which resolved a natural resource damages claim brought by the natural resource trustees, including the USACE, U.S. Department of Interior, the State of Georgia, and the State of South Carolina, against STC for PCB contamination at or from the site known as Sangamo Weston/Twelve Mile Creek/Hartwell Lake PCB Contamination Superfund Site. Under the terms of the Consent decree STC paid $11,960,000 into the Hartwell Lake Restoration Account which financed projects to restore, replace, and/or protect natural resources damages as a result of the PCB contamination. In addition, STC removed two hydroelectric power dams know as Woodside I and Woodside II on Twelve Mile Creek to address the ecological injury to Twelve Mile Creek and Hartwell Lake.

6.2 COMPETING INTERESTS ON THE NATURAL RESOURCES

The Hartwell Project is a medium sized multi-purpose project with numerous authorized purposes. These authorized purposes have municipal and private users which have developed over time and are reliant on their provided benefits. These benefits are critical to the local and regional economies and are of great interest to the public. As a result, competing interests may attempt to influence the utilization of federal lands and waters. USACE will balance these interests so the public can benefit by implementing sound management practices and minimizing any adverse impacts per USACE environmental stewardship mission.

6.3 PRIVATE EXCLUSIVE USE

Presently, there are five private recreation leases on Hartwell Lake. These are granted to Hartwell Shores Country Club, Swaney’s Landing, Swamp Guinea Dockside Clemson, and Western Carolina Sailing Club. The Hartwell Shores Country Club and Western Carolina Sailing Club have all their facilities on public property. The existing facilities generally consist of restrooms, camp sites, clubhouses, docking facilities, and

other outdoor recreation facilities. There are no structures designed for human habitation on project lands. The leases for Swaney's Landing, Swamp Guinea, and Dockside Clemson are to provide public access to commercial businesses adjacent to the lake that support water-based recreation. These areas (docks) were previously authorized by a shoreline use permit but were converted to leases since the docks are not for private exclusive use as defined in the Shoreline Management Plan. These leases have limited picnic spaces and green space for passive recreation on public land.

Interpretations of current planning regulations have led to the formulation of policy on additional private exclusive use at the Hartwell Project. This policy is to permit only new real estate outgrants to quasi-public groups or municipalities at an existing lease site should one become available, except for areas previously issued a Shoreline Use Permit that was offered an option to convert to a lease. USACE will honor those commitments already made. In instances where project lands are required, such as for utility lines or vehicular access, only the minimal amount necessary will be granted.

6.4 MARINA CONCESSIONS

Originally, there were four leases for commercial recreation sites as marinas granted on Hartwell Lake. These marinas are known as Harbor Light, Portman, Hartwell, and Seneca, later renamed Clemson. The majority of land-based facilities at Harbor Light and Portman Marinas are on private land. Their wet slip storage, gasoline sales, and launch ramps are on public property. Portman also has a restaurant, dry storage, and campground on public property. Clemson and Hartwell are entirely on public property with facilities that include launching ramps, gasoline sales, wet and dry storage, boat and motor service bays, snack bar, general sales, and restrooms. Boat sales are conducted on public land at Clemson and Hartwell Marinas.

A study of marinas on Hartwell Lake completed by USACE in September 1980, was accomplished because of requests from individuals interested in leasing a possible marina site and because of complaints received from the public about lack of dock space at the existing marinas. This study determined the economic feasibility of leasing additional sites for marina concession purposes. The study's recommendation was no additional marinas or related facilities be permitted on the lake at that time.

On 1 July 1982, another review of the feasibility study determined that the need now existed at Hartwell Lake for additional Marina development. In 1983, Big Water Access Area consisting of 49 acres was leased as a marina site, making Big Water Marina the fifth full-service marina on Hartwell Lake. Further development will depend on market conditions.

6.5 OTHER RECREATIONAL OUTGRANTS

The recreation outgrant program also contains eight leases for quasi-public recreation, 19 leases to city, county, and state municipalities for campgrounds, public parks and

recreation including four State Parks and 25 boat ramps. The Hartwell Project has two commercial outgrants for use as campgrounds. The properties are leased to Lake Hartwell Camping and Cabins and Tiger Cove Campground and are used in conjunction with adjacent campgrounds located on private property. These outgrants assist in meeting the demand for recreational facilities at Hartwell Lake. Additional project lands may be outgranted for public recreation purposes.

6.6 NON-RECREATIONAL OUTGRANTS

USACE implemented a nationwide Non-Recreational Outgrant Policy on 20 March 2009 to consistently evaluate non-recreational real estate outgrant requests for use of Civil Works land and waters for roadways and bridges, public utilities (power lines, water lines, intakes, outfalls, and pipelines). This policy recommends designated corridors be established in Project MP's where feasible and new proposals should be limited to these utility corridors. The Hartwell Project has 326 existing easements for such crossings/use of public land therefore designating any new utility corridors is not feasible. All new requests for easements (utilities, roadways, etc.) or proposals to modify or renew existing easements, if approved, will be required to be located within an existing easement right-of-way to limit the installation of additional infrastructure within a previously undisturbed area.

7.0 PUBLIC AND AGENCY COORDINATION

USACE began planning to revise the Hartwell Project MP in the fall of 2017. USACE objectives for a MP revision were to update land classifications to reflect changes in USACE land management policies since 1980, and new agency requirements for MP documents in accordance with ER 1130-2-550, Change 7, January 30, 2013 and EP 1130-2-550, Change 5, January 30, 2013.

The Hartwell Project Office mailed letters in June 2018 to existing lease holders on the Hartwell Project informing them of the impending MP update and solicited comments from these stakeholders. The stakeholders were asked to submit anticipated changes to their existing development plans, such as adding new facilities, as part of this MP update by 20 July 2018.

8.0 SUMMARY OF RECOMMENDATIONS

The following is the recommended course of action necessary to manage Hartwell Project's current and future issues. The factors considered cover a broad spectrum of public use, environmental, socioeconomic, and workload. The revised MP for the Hartwell Project will continue to provide for and enhance recreational opportunities for the public, improve the environmental quality, and continue a management philosophy that recognizes the unique qualities, characteristics, and potentials of the project.

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