

Catawba-Wateree Hydroelectric Relicensing Process DRAFT Resource Committee Report

Shoreline Management Plan Resource Committee Report

1. Purpose

This Resource Committee Report is the bridge by which Catawba-Wateree (C-W) Relicensing study results are delivered to the relicensing stakeholder teams (State Relicensing Teams and Advisory Groups) for their use and consideration as they negotiate to develop the Agreement-In-Principle (AIP). It has been prepared by the Catawba-Wateree Relicensing Recreation/Shoreline Management Resource Committee and supplements the detailed study reports available at <http://www.dukepower.com/community/lakes/cw/library/plans.asp>.

The purpose of this report is to:

- 1) consolidate and summarize key study findings,
- 2) merge the findings of several resource-related studies into a coordinated resource assessment
- 3) identify relationships with other resource areas (e.g., aquatics and terrestrial), and
- 4) provide the Resource Committee's assessment of potential resource protection, mitigation and enhancement opportunities supported by study findings.

2. Contents

This Shoreline Management Plan Resource Committee Report includes:

- For each study within this Resource Committee's overview:
 - A brief summary of each study's purpose(s)
 - A brief summary of the methods/procedure used for each study
 - A brief summary of the Key Findings for each study
- Identification of the interaction of the studies within the SMP RC and other relicensing studies within various other Resource Committees.
- At the Resource Committee level, a coordinated resource assessment of any potential opportunities that are supported by the study findings and a characterization of consensus among the Resource Committee.

3. Study Summary – Purpose, Methods and Findings

a. Shoreline Management Plan Mapping study (SMP01)

i. **Study Purpose** - The objectives of this study are to:

- Refine the shoreline classification maps with the primary product of the study team's work being revised SMP maps.
- Evaluate the existing shoreline classifications and the lake use restrictions associated with these classifications and revise the classifications and lake use restrictions as appropriate.

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- Conduct a change detection analysis of the construction activities in close proximity to the Project boundary
- Develop buildout scenarios for use in determining boat carrying-capacity on six of the Project's lakes.
- Estimate the effects of shoreline development on watercraft use on the six Catawba-Wateree Lakes.
- Develop a model that can be used to predict the watercraft density and use patterns resulting from changes in shoreline development.
- Ensure the information collected as part of this study plan (i.e. SMP 01) will be included in and compatible with the existing Geographic Information System (GIS) developed for previous versions of the SMP maps.
- Include additional information from various other studies in additional data layers in the GIS.
- Make available information (excluding proprietary information (e.g. cultural resource site location data)) included in the GIS through Duke Power in accordance with the Duke Power Public Data Release Process.
- Ensure this information and the associated GIS continue to be a vital tool for use by the licensee, resource management agencies, adjacent property owners and the FERC for review and consideration of approved activities within the Project.

The study area includes:

- The Catawba-Wateree reservoirs and tailwaters immediately downstream of Catawba-Wateree hydroelectric stations contained within the FERC Project boundary
- Duke-owned and privately held islands within the confines of the FERC Project boundary
- Land area within the Project boundary and upland of the Project boundary within 300' of the Project boundary line of all eleven lakes within the Catawba-Wateree Project.

ii. Study Methodology - The study methodology focused on the following tasks:

- Duke Power acquired new high resolution digital orthophotography, ground and airborne Geographical Positioning System/ inertial measuring units (GPS/IMU) control surveying, aerial Light Detection and Ranging (LiDAR) contours, and a stereocompilation-based digital terrain/elevation model and digital elevation and planimetric feature mapping covering the entire Catawba-Wateree Project. These two data sources were provided to Duke Power Lake Management and its GIS contractor to provide the base data for updating the current SMP maps. The updated Project boundary

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line and shoreline contour (2004 LiDAR data) and aerial photography (2004 aerial data) were provided to the GIS contractor to review and organize into the current Duke Power data structure.

- The existing July 2001 SMP Classifications were transferred by the GIS contractor to the LiDAR-developed contour elevation most closely associated with the normal pool elevation of each lake. The organized 2004 aerial photography and the SMP classified 2004 contour data were then provided to Lake Management. The study team utilized these two primary data sources and multiple data layers within the GIS for updating the current shoreline classifications to reflect development activity that had taken place since the 2000 aerial data was acquired.
- Prior to review of the mapping data, staff in each county was contacted and where available, tax parcel data was obtained for the waterfront parcels in the 14 counties that border the Catawba-Wateree Project boundary. Not every county had available digital parcel data. Parcel data was not available from McDowell, Lancaster, Chester, Kershaw and Fairfield counties.
- The aerial photography and contour data and other data layers were analyzed by Lake Management personnel, the GIS contractor and members of the study team to identify and delineate any discrepancies as a result of shoreline development within the Project boundary. During these sessions multiple data layers including the aerial photography (both 2000 and 2004), county parcel data, multiple contour elevations, etc. were available to the review team. During the review sessions preliminary edits were made to GIS layers and detailed notes were kept to document all modifications. Final edits to the database were done by the contractor off-site.
- A Published Map File (PMF) on a series of DVD's was developed for each lake based on the modifications made during each review session. This record of all edits was provided to each of the team members for their review and information.
- To ensure consistency throughout the modification/review process, a Rules Document was developed that identified typical modification scenarios and the basis for the modification. These rules were presented and discussed during the study team meetings and any variations to the rules suggested and agreed to by the study team were applied to the previously reviewed data and incorporated going forward.
- All GIS work was done using Environmental System Research Institute, Inc. (ESRI) Arc/Info or ArcView software. All data was created in a

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format and coordinate system that is compatible with Duke Power's existing GIS database structure and computing platform.

- GIS point data was requested of the two state wildlife resource management agencies (SCDNR and NCWRC) that delineate the location of navigational hazard locations within the Project boundary. The location point information has been incorporated as an additional data layer in the GIS.

iii. Shoreline Management Plan mapping - Key Findings

- Draft versions of the SMP maps are available via the web at <http://www.dukepower.com/community/lakes/cw/library/plans/shoreline.asp>. These draft versions of the maps will be updated periodically as modifications are negotiated as a result of study team decisions and field site visits. The current draft maps and the attached summary tables (see Attachment 1- SMP Distribution by Classification) developed from the draft maps, do not account for the 50' offsets from the Environmental classification, the 200' Narrow Cove modification used to classify the shoreline into Future Uses nor the inclusion of wetland areas identified as part of the Terrestrial 01 Study.
- The shoreline at an approximation of the normal lake level (i.e. 2-4' below full pond) was determined from the contour data developed based on the LiDAR mapping process. This shoreline contour line was used because this is typically the location of the habitat characteristics that comprise the important habitat classifications that were originally mapped as part of the Shallow Water Fish Habitat Survey. The Project boundary line was also determined utilizing the LiDAR mapping process and this line is also represented on the SMP maps as a plain bold line with no symbols.
- By using the LiDAR-determined approximate shoreline contour line as the approximation of the shoreline for each lake of the C-W Project, the Project consists of approximately 1702 miles of shoreline at a normal lake elevation approximately 2-4' below full pond. This is a reduction of approximately 25 miles from the estimate of the Project boundary determined utilizing the aerial photography and approximations of the Exhibit K drawings for the 2001 SMP.
- The total length of the entire Project boundary remains undetermined at this time. Adjustments will have to be made to include the appropriate portions of the Project boundary associated with the hydroelectric stations, Project structures, the Duke-owned public Access Areas and the islands.
- Overall, the highest percentage of shoreline in 2004 was included in the Existing Residential classification. This accounted for 38% (640 miles) of the shoreline within the Project overall.

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- The Future Comm/Non-res (i.e. Future Commercial Marina) classification changed on a Project-wide basis the most significantly over the 5-year period (2000-2004) with a reduction in 2004 of 41 miles. Due in part to: 1) the reclassification of the shoreline to Future Commercial/Residential (eligible for multi-slip marinas); 2) conversion upon approved lake use permitting activities to Existing Residential; 3) reclassification on Lake James as a result of the acquisition of the state park expansion property; and 4) conversion to Future \ Existing Residential (individual piers and shoreline stabilization) as other lake use permitting activities are approved (e.g. commercial marinas).
- The second largest change in classification resulted from the reclassification of shoreline classified as Future Commercial/Residential (i.e. Residential Marina) with a reduction of 30 miles. The lakes with the greatest change resulted in reductions to the Future Commercial/Residential classification from 6 miles on Wylie, 8 miles on Hickory and 11 miles on Norman. Typically, this reclassification resulted from construction of Private facilities or the lowering of the Future Use classification of the shoreline in a development eligible for off-water access once an application for that access had been approved.
- Lakes Rhodhiss, Mountain Island and Fishing Creek have 55%, 46% and 46%, of their shoreline in a protected classification (i.e. Environmental, Natural and Natural Isolated Berm), respectively.
- Lakes James, Mountain Island and Great Falls\Cedar Creek have 41%, 62% and 55%, of their shoreline, respectively, in a protected classification if Future Public Recreation is included in the determination.
- Some changes in the miles and percentages of shoreline classifications can be attributed to a change in geometry of the Project boundary as a result of the use of two different methods for approximating the Project boundary and classified shoreline contours. In the 2001 SMP the Project boundary was determined from a combination of tracing the shoreline visible on the aerial photography and inserting a contour based on the Exhibit K drawings in areas within the boundary but not inundated or visible through the tree canopy. This resulted in a hybrid approximation of the Project boundary line by using the two different data sources. In contrast, the 2004 classified shoreline miles and percentages are based on an approximation of the normal operating lake level derived from the LiDAR-generated contours.
- The carrying capacity analysis provides an estimate of the existing watercraft capacity based on the days when counts were conducted for each of six lakes for the peak weekend and holiday period. Two rates were developed based on Build out Scenarios 3 (S3, the rate of lakeward development over the 5 year period 2000-2004) and 4 (S4, the rate experienced by a particular lake since its creation) and the table below represents the date when the carrying capacity is reached over the entire

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lake. Note that in certain areas within the lake the carrying capacity is exceeded prior to the whole lake reaching its capacity.

Carrying Capacity Analysis			
Lake	Acres/Watercraft	S3	S4
James	6.3	2018	2057
Hickory	7.1	2012	2015
Norman	5.7	2100	2026
Mountain Island	6.8	n.a.	2099
Wylie	6.7	n.a.	2030
Wateree	5.5	2085	2043

- Adjustments have been made to the surface areas used to calculate the boating carrying capacities at Lake James (surface area reduced 3.6 percent), Mountain Island (surface area reduced 21.5 percent), Lake Wateree (surface area reduced 6.8 percent) and Lake Norman (surface area reduced 2.8 percent) based on an analysis of bathymetric data showing shallow water areas that extend beyond 120 feet of the shoreline. There were no additional areas at Lake Wylie and there is no bathymetric data available for Lake Hickory. These adjustments have not drastically changed the results of the analysis because the percentage of change is relatively low for James and Wateree and the areas involved for Mountain Island are mostly upstream of the areas of high concentration.

b. Shoreline Management Guidelines revisions (SMP02)

i. Study Purpose

This effort focused primarily on revising the current version of the Shoreline Management Guidelines (SMG) that has been in effect since June 1, 1996. The composition of the study team allowed input from a wide variety of stakeholders, resource management agencies, and Duke Power. Therefore, the primary product of the SMP02 study team's work is revised criteria within each of the six lake use permitting programs including: 1) Shoreline Stabilization, 2) Private Facilities, 3) Commercial Facilities, 4) Conveyance, 5) Excavation, and 6) Miscellaneous Reservoir Uses. In addition to revisions to each program criteria the study team also evaluated general policies related to lake use permitting activities.

Duke Power has historically allowed Non-Project Uses (e.g. private piers, shoreline stabilization, marinas, water intakes, etc.) of its hydroelectric reservoirs comprising the Catawba-Wateree Project. The licensee, by allowing

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such uses, is subject to the conditional authority granted under the land use article standard in most licenses (i.e. Article 39 of the current Catawba-Wateree License) which indicates the licensee may establish a program for issuing permits for specified types of use and occupancy of Project lands and waters.

ii. Study Methodology

Duke Power has periodically revised its permitting processes and criteria to address lessons-learned, allow stakeholder input, and to ensure regulatory compliance while ensuring the Project meets its primary purpose- the production of electricity. All input from the study team was openly discussed during the study team meetings and was incorporated, as appropriate, within the SMG Criteria. A meeting summary was produced for each study team meeting. These summaries included the discussions and decisions made to the criteria by the study team. These summaries were reviewed and discussed at the following study team meeting to ensure accuracy of the discussions. Throughout the study team review process, Duke Power maintained sole responsibility for accepting/rejecting modifications to the SMG based upon a number of factors including, but not limited to stakeholder input\interest, regulatory compliance and business needs.

This particular revision to the guideline criteria, associated with relicensing of the Catawba-Wateree Project, has been developed with input from the study team (i.e. representative group of stakeholders), and is intended to become effective with the filing of the license application prior to September 1, 2006. Duke Power intends to have revisions to these guidelines finalized by the relicensing stakeholders by November 30, 2005, and provide notification by March 31, 2006 to the general public that enacting revised guidelines is imminent.

iii. Shoreline Management Guidelines – Key Findings

- The revised SMG are based upon the existing guidelines currently in effect for the Project. The guidelines include: 1) general information regarding the purpose of the permitting guidelines; 2) superceded versions of the guidelines (including the current version June 1, 1996); 3) lake use permitting review process; 4) individual permit program- General section, Criteria, Caution, and Consequences for Violations (including examples of specific penalties); a section of general policies that are not lake specific; 5) a glossary; and 6) figures. Based on the discussions during each study team meeting, Duke developed a matrix of significant changes to the permit criteria for each lake use permitting program to specifically identify major edits that were agreed upon by the study team. Ultimately, these edits will be incorporated into a revised guideline brochure that will be provided to all lake use permitting applicants just prior to the effective date of September 1, 2006.

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- A summary of significant changes is listed below with specific changes included in the Draft SMP02 Study Report Matrix of Major Changes and Shoreline Management Guidelines:

SHORELINE STABILIZATION PROGRAM

- **Seawalls not allowed in areas with average bank height of ≤ 3 feet. Stabilization of eroded banks must include Class B or larger size rip rap.**
- A layer of rip-rap (Class B or larger) must be placed along the entire base of all bulkheads.
- Stabilization of eroded banks must include Class B or larger size rip rap with filter cloth and/or significant live staking, planting or other forms of bio-engineering within the rip rap.
- **Applicants are encouraged to avoid activities (including stabilization) that could have an adverse impact upon existing water willow beds.**

EXCAVATION PROGRAM

- Excavation is not allowed within water willow beds except as necessary to maintain access to previously approved facilities.
- Applicants must excavate and disturb only what is absolutely necessary to achieve the excavation project's stated purpose.
- **A copy of the contract between the applicant and the excavation contractor must be provided with the completed Excavation Program Application Form.**
- Excavation activities must be limited to extend no further than the mid-point of the cove if the shoreline on the opposite side of the cove is classified as Environmental or an Environmental offset.

PRIVATE FACILITIES PROGRAM

- Written release to encroach across a projected property line in South Carolina remains valid for the life of the permit. If a permit is authorized with a written release but is not constructed during the 12-month build out, and ownership of the property being encroached upon changes, then authorization from the new owner will be required as part of the issuance of a new permit.
- **Applicants are encouraged to avoid activities that could have an adverse impact upon existing water willow beds.** No floating structures or other extraneous facilities (e.g. gazebos, decks, etc.) may be constructed over water willow beds. The width of walkways over water willow beds will be limited to < three feet.
- **Lake Management will no longer allow boat ramps for private use.**

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- Facilities permitted under previous guidelines that exceed the current maximum allowable square footage will not be allowed to have any additions made to the existing facility.
- Property lines will be projected on reservoirs in accordance with local and state regulations. In South Carolina, property lines are projected and enforced by Duke Power Lake Management in accordance with the General Permits. In North Carolina, local ordinance dictates property line projections and enforcement is the responsibility of the governing entity.
- The bottom portion of gazebos may be enclosed provided the gazebo is not the furthestmost portion of the pier structure.
- Covered boat slips and boat shelters may have one 4' x 6' (or smaller) enclosed storage closet/locker on one of the corners of the structure closest to shore.
- Watercraft used for habitation shall not be permanently moored at private docks.
- Decks, gazebos covered boat slips and boat shelters must be single-story structures.
- **A lot having less than 100 feet of shoreline (as measured along the Project boundary) that is suitable for Residential use will not be considered for a pier or common-use slip unless it was subdivided and recorded prior to August 31, 2006.**
- Duke Power will not authorize the use and placement of any large water-based recreational equipment (see Glossary to note the difference between Water-based Recreational Equipment and Water Toys) within the Project boundary.
- **Lake Management may authorize a single water withdrawal pump for private home use provided the pump has a rated horsepower of ≤ 2 hp and is used exclusively for the adjoining waterfront lot.**

MISCELLANEOUS USES PROGRAM

- Dry Hydrants - In cases where lake topography makes having the intake meet the requirements for submarine utility lines impracticable, the intake and/or intake line may be considered at a lesser depth provided the applicant can provide a Lake Facility Safety Plan that clearly marks along the shoreline and with a buoy(s) the location of the intake and/or intake line.
- Inflatable Recreation Equipment - Duke Power will not authorize the use and placement of any large water-based recreational equipment (see Glossary to note the difference between Water-based Recreational Equipment and Water Toys) within the Project boundary.
- Fish Attractors - Duke does not object to the placing of fish attractors made of natural woody material (*brush, Christmas*

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trees, etc.) or PVC that are securely tied together and properly anchored so as not to become a hazard to navigation and to remain: 1) at a depth greater than five feet below the maximum drawdown or Critical Lake Elevation (CLE); 2) covered by an approved boat docking facility; or 3) in close association with an approved pier. Attractors may be placed underneath the structure or in shallow water areas associated with a pier.

- Minor Water Withdrawals - Lake Management may authorize a single water withdrawal pump for private home use provided the pump has a rated horsepower of ≤ 2 hp and is used exclusively for the adjoining waterfront lot.
- Net Pens and Aqua-culture Operations – Not authorized.

COMMERCIAL FACILITIES PROGRAM

- **Facilities operated as True Public Marina may be considered for a maximum length of 200 feet.**
- Publicly available restrooms and pumpout facilities must be provided as a minimum to be considered a True Public Marina (TPM).
- New expanding or rebuilding Commercial Marina Facilities that dispense gasoline within the Project boundary must provide in-slip petroleum absorbent materials or similar best available technology at all the slips dedicated/available for gasoline dispensing.
- New, expanding or rebuilding Residential Marina facilities that have dedicated slips for boat refueling from single individually-owned containers, must provide petroleum absorbent materials or similar best available technology at all the slips dedicated for refueling. On reservoirs that have no Commercial Marina facilities, all new, expanding or rebuilding Residential Marina slips will be required to provide in-slip petroleum absorbent materials or similar best available technology at all slips in the facility.
- **New or expanding Residential Marina Facilities or Commercial Marina Facilities (except for waivers allowed for expansion of TPM) shall not be located in the backs of coves if any portion of the cove between the proposed marina location and the main channel is ≤ 200 feet in width.**
- New boat ramps for Commercial Marina or Residential Marina facility use shall not be located in the backs of coves if any portion of the cove between the proposed boat ramp location and the main channel is ≤ 200 feet in width.
- Any proposed new or rebuilding Residential Marina Facility or Residential Marina Facility that is renewing or transferring its Project area lease/permit must provide on-site sanitation facilities for pump-out and/or disposal of waste if any of the

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following criteria are met: The facility will have > 65 docking/mooring spaces for watercraft. The facility will moor > 25 watercraft with Marine Sanitation Devices (MSD). The facility will moor watercraft that will be used for human habitation.

- **The applicant may request a maximum of one Residential Marina boat slip/docking/mooring location for each 100 feet of shoreline owned in the development (as measured along the Project boundary) that is suitable for commercial use. The number of eligible slips will be rounded to the nearest whole number. (This criteria is a placeholder discussions are ongoing regarding counting slips for off-water access in a development.)**
- Once a Residential Marina Facility application for a development is approved by Duke Power, the shoreline within the original development cannot be reevaluated for subsequent expansion in number of approved Residential Marina slips
- Facilities that include a boat ramp must also specify the number of car/trailer parking spaces that will be available for boat ramp users and evidence that supports the rate of use of the ramp.
- Facilities that include day storage for boats must also specify the number of boats the storage area can hold plus the number of parking spaces for dry storage users and evidence that supports the rate of use of the storage area ramp.
- Any proposed new, expanding or rebuilding dry storage facility adjoining the Project boundary, Commercial Marina Facility or Commercial Marina Facility that is renewing or transferring its Project area lease/permit must provide a commercially manufactured sanitary pump-out system as a regular and customary service if any of the following criteria are met: The facility will have > 65 docking/mooring/storage spaces for watercraft. The facility will dock/moor/store > 25 watercraft with marine sanitation device (MSD). The facility will include gasoline dispensing equipment (other than hand-carried, portable tanks).

CONVEYANCE PROGRAM

- **Expanding/rebuilding large, permanent water intakes will not be authorized if the proposed action would result in the intake being located at a lake elevation higher than that required for the original intake.**
- New/expanding/rebuilding wastewater effluent outfalls should be completely submerged and fully operational at/below the Critical Lake Elevation (CLE) required for full hydroelectric station operation on the specific lake.

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- New construction of non-public bridges that will cross the full pond contour except that are intended to provide access to privately owned island(s) will not be authorized.
- Conveyance proposals for non-Project use activities should generally avoid crossing a Duke Power-owned public access area.

GENERAL POLICIES

- Storm Damage \ Restoration - A facility may be entirely rebuilt within the current guidelines and consideration given to waiver of any application filing fees if it can be substantiated that the reason for the rebuild is the result of an Act of God (e.g. significant high water, no or low water, high wind, heavy snow, fire as a result of a direct lightening strike) that destroys enough of a facility that it can no longer be used and can not be repaired within what is considered a maintenance activity.
- Lake Uses That Are Not Authorized - Considering the lake management goals and objectives, a number of potential lake uses will not be authorized. The SMG includes a list of some of the more frequently requested lake uses that will not be approved within the full pond contour, the FERC Project boundary, or within any Duke-owned peripheral strip of a Duke-operated lake.
- Vegetated Area Management Requirements - The Duke Power property within the Project boundary shall be maintained in a vegetated forested condition, where existing, that is typical of forested areas of the region. A properly vegetated area shall include canopy trees, sub-canopy trees, shrubs, herbaceous plants and forest floor leaf and humus layers. Access to the lake over Project lands and waters can be accommodated provided a primarily vegetated area is maintained with limited clearing.
- Island Use - Public recreation opportunity support is the primary intended use of all Duke-owned islands, unless specifically identified scenic, environmental or cultural values dictate otherwise or unless the island has a history of misuse or safety concerns that dictate otherwise. Duke Power allows the boating public to pursue lawful recreation activities on all Duke-owned islands at the user's own risk with certain limitation.
- Hunting \ Trapping - Both hunting and trapping are public recreation activities. Hunting and trapping may be pursued at the user's own risk within the full pond contour or on Duke-owned islands within lakes operated by Duke Power. All such hunting and trapping must be done in accordance with the applicable federal, state and local regulations.

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- Handling of Lakeside Buffers and Vegetated Areas, Building Setbacks and Minimum Lot Sizes – Duke Power encourages lake use permit applicants to plan their work to avoid and minimize buffer and Vegetated Area impacts to the maximum practicable extent. Duke Power reserves the right to delay or refuse lake use permit approval, cancel existing permits or take other necessary actions when adjoining property owners violate buffer and/or Vegetated Area restrictions or the vegetation removal or erosion control criteria within local buffer ordinances or state law.
- Shoreline and Aquatic Vegetation Management - Shoreline and aquatic plants are important components of the aquatic life in lakes, rivers, and streams. They provide a number of contributions to the overall health of a water body. Growth of native aquatic and shoreline plants is preferred to the growth of exotic (i.e. non-native) species. Duke Power supports the approved planting of native North Carolina/South Carolina plant species within and adjoining the full pond contours of Duke-owned lakes for the purposes of shoreline stabilization or establishing or restoring wildlife/fisheries habitat.
- Contractor use of Duke-owned Access Areas - Duke Power recognizes the service provided by lake construction contractors to waterfront property owners (e.g., commercial marina operators, individual pier owners, etc.) for facility construction/maintenance and shoreline stabilization activities, and the necessity for lake access for these activities while minimizing environmental impacts. Duke Power further recognizes that these public access areas provide a convenient means for lake construction contractors to obtain access to the lakes to carry out their activities. However, contractors' use of access areas can potentially interfere with the public's use of the access areas, cause damage to the areas, and create liability problems for Duke Power. Therefore, conditional use of these areas is primarily being offered to allow a point of access to the lake with only very limited availability of the site for minor approved staging activities.

c. Habitat Enhancement Program (SMP03)

i. Study Purpose

The Catawba-Wateree Hydro Relicensing effort, although separate from the Habitat Enhancement Program (HEP) developed as part of the Shoreline Management Plan, had a Wildlife Habitat Enhancement Study Plan initiative in place which shared similar interests in the issue of improving wildlife and fish habitats. The initial study plan was modified to provide an efficient mechanism for allowing a broad range of

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public input from within the basin to address the HEP issues. One of the primary goals of the study plan then became to review and provide input for the revision of the HEP and associated fee structure. The composition of the study team changed and relicensing team stakeholders that expressed an interest in participating on the study team were asked to make a time commitment to complete this work or suggest candidates within their organization that would be interested in participating on the study team.

ii. Study Methodology and Key Findings

The original SMP03 study team consisted of ten members but was expanded to 27 to ensure that additional public input was provided in any revision to the HEP. During the three months of discussion and negotiation several significant areas for re-evaluation were addressed including: 1) fee amount(s); 2) Technical Review Committee composition; 3) varying fee amounts based on certain lake use permitting activities; 4) regional and lake specific input through a Lake Advisory Committee; 5) increased financial and/or in-kind contributions by Duke Power and the state wildlife resource agencies to support the program during the initial five years of the program's life, including base funding requirements; and 6) no required payments for pier rebuilds of structures within the footprint of the original facility.

iii. Habitat Enhancement Program – Key Findings

The significant modifications to the Habitat Enhancement Program include:

Funding Structure

1. Duke Power will provide a total of \$160,000 per year to support the HEP. An \$80,000 per year portion of the total will be provided directly to the SCDNR and the \$80,000 per year North Carolina portion of the total will be deposited directly into the HEP fund for North Carolina. Both portions of the total \$160,000 will be provided beginning in 2005 and running for five years. The actual delivery of the funds to each state will begin on mutual agreement between Duke and the states and is contingent on HEP start-up dates.
2. Duke Power will implement effective January 1, 2005 a \$250 HEP fee that would apply to new private pier construction and commercial-residential slips (on a per-slip basis). [Note: Commercial-residential facility applicants that have not filed an application, including application filing fees, as of January 1, 2005, would be subject to the HEP payment.]
3. The HEP fee would not apply to pier or slip repairs or rebuilds that are not expanded or altered from their original permitted "footprint." Rebuilds that are expanded would be subject to a pro-rated fee. Rebuilds that are a result of notification by Duke that a facility has

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- become a public safety or navigation hazard and/or rebuilds that do not replace a pier in its original footprint would be subject to a \$250 fee.
4. The NCWRC and SCDNR would each provide cash or cash-equivalent in-kind services annually for a five-year period. Based on logistical concerns, each state will determine when its HEP program provisions and enhancement activities will begin. However, it is not anticipated that the program would be up and running prior to July 1, 2005.
 5. All non-permitted structures would be required to come into compliance with Duke's guidelines and pay the HEP fees.
 6. Separate annual base funds of approximately \$200,000 consisting of the Duke portion, HEP fees, and agency portions would be devoted to the NCWRC and SCDNR to support their HEP-related projects; funds exceeding the base-fund requirements would be available for HEP projects on a grant basis.
 7. Duke would administer and enforce compliance with the HEP program.
 8. This program proposal including fee and funding would be reviewed prior to the end of the 5th year and every 5 years thereafter for the program life (which is a minimum of 20 years after issuance of a new license for the Catawba-Wateree Project).

Formal Partnerships

What was formerly the Review Board(s) will now be referred to as Technical Review Committee(s) (TRC), and the MOA will be modified to include an HEP Lakes Advisory Committee (LAC) formed in each state. Each LAC will, by their own mechanism, select a member to participate with the HEP TRC.

Management of Funds

A process will be developed, and the MOA updated, as appropriate, to address funding requests. In each state funds in excess of the base amount that are collected on an annual basis may be available for funding additional appropriate non-agency habitat enhancement requests. Enhancement activity areas include the FERC project boundary jurisdictional area and:

- All Duke-owned islands in the vicinity of the Project.
- All Duke-owned Public Recreation Areas in the vicinity of the Project.
- All land and water areas contiguous with the Project Boundary and the river stretches in the Catawba Basin in the counties as noted in Table 1, and for which the NCWRC or the SCDNR or the TRC-approved applicant

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has obtained the land owner's written permission to make fish and wildlife habitat enhancements on their property.

4. Resource Assessment

a. Overall Condition of the Resource

- The distribution of the various Future Use and Existing Use classifications of the shoreline for the entire Catawba-Wateree Project are contained in Appendix 1- SMP Distribution by Classification. Based on the current draft SMP maps the Project shoreline is approximately 28 % and 47 % in the Future Use and Existing Use classifications, respectively. Impact Minimization Zones (IMZ) are included in the Future Use classification unless designated as (IMZ-Dev) which are included as an Existing Use.
- 24 % of the Project shoreline is included in an environmentally important habitat classification (i.e. Environmental, Natural, Natural Isolated Berm) but not including IMZ.
- There are approximately 17,900 individual Private Facilities within the Project boundary. The approximate number of Private Facilities by lake includes:

<u>LAKE</u>	<u># PRIVATE FACILITIES</u>
James	489
Rhodhiss	73
Hickory	1530
Lookout Shoals	312
Norman	9518
Mtn. Island	352
Wylie	3441
Fishing Creek	128
Great Falls \ Cedar Creek	12
Wateree	2108
<u>TOTAL</u>	17,951

- The Change Analysis portion of the SMP01 Study determined the amount of growth from the shoreline to the Project boundary and then 300 feet landward from the Project boundary. The general summary indicates the changes for all lakes that comprise the Catawba Wateree Project. The chart below represents the cumulative growth of each of the feature extraction groups (i.e. Buildings; Transportation; Recreational Areas;

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Trails, Footpaths and Boatramps) for each of the lakes of the Catawba Wateree Project.

- Group with the greatest percent increase for the entire Catawba Wateree is Trails, Footpaths and Boat Ramps group with an increase of 51.32%.
- Group with the smallest percent increase for the entire Catawba Wateree Project is the Transportation Group with an increase of 8.35%
- The average growth rate for all groups combined is 20.72%.

Group Breakdown:

<u>Group</u>	<u>2000 Data in Acres</u>	<u>2004 Data in Acres</u>	<u>Percent Change</u>
Buildings	1,151.47	1,327.77	15.31%
Recreation Area	142.09	163.27	14.91%
Trails, Footpaths and Boat ramps	71.26	107.83	51.32%
Transportation	2,474.26	2,680.74	8.35%
All Groups	3,839.08	4,279.61	11.47%

- The chart below reflects the cumulative growth of each of the aforementioned groups as broken down by county. This data reflects the values from multiple lakes for counties that have multiple lakes that are part of the Catawba Wateree Project.
 - County with the greatest percentage of cumulative growth based on the feature extraction groupings is Iredell with 16.06% increase
 - County with the least percentage of cumulative growth was a tie between Kershaw and Alexander with 4.77%.
 - Average cumulative growth rate for all counties was an increase of 10.73%.
 - County with the greatest amount of cumulative growth acreage based on the 2004 data extraction process is Iredell with 941.3588 acres.
 - o 2000 Acreage: 811.0932
 - o 2004 Acreage: 941.3588
 - o Difference: 130.2656 acres
 - County with the least amount of cumulative group acreage based on the 2004 data extraction process is Lancaster with 22.961 acres
 - o 2000 Acreage: 20.064
 - o 2004 Acreage: 22.961
 - o Difference: 2.897 acres

County Breakdown:

<u>County</u>	<u>2000 Data in Acres</u>	<u>2004 Data in Acres</u>	<u>Percent Change</u>
McDowell	59.6866	68.8289	15.32%

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Burke	121.4828	132.8814	9.38%
Caldwell	82.3617	92.9933	12.91%
Catawba	469.9847	541.5514	15.23%
Alexander	141.8722	148.642	4.77%
Iredell	811.0932	941.3588	16.06%
Lincoln	270.5139	295.5893	9.27%
Mecklenburg	708.0676	760.3313	7.38%
Gaston	235.0359	264.6658	12.61%
York	424.7047	464.5502	9.38%
Lancaster	20.064	22.961	14.44%
Fairfield	198.5879	215.8001	8.67%
Chester	30.9873	34.1154	10.09%
Kershaw	211.0598	221.118	4.77%

- Currently, the HEP fund collections have resulted in a total of approximately \$34,000 dollars being collected by the 21st week of 2005. This includes only 12 weeks of HEP collections because the fund payment requirement was not initiated until March 1, 2005.

2005 HABITAT ENHANCEMENT FEES COLLECTED AS OF 5/25/2005 **Week 21**

Lake	Year To Date	
	Dollars Collected	Number Apps.
James	\$2,750.00	11
Rhodhiss	\$250.00	1
Hickory	\$3,750.00	15
Lookout	\$0.00	0
Norman	\$15,058.50	61
Mtn. Island	\$1,250.00	5
Wylie NC	\$1,500.00	6
Wylie SC	\$2,250.00	16
Fishing Creek & Cedar Creek	\$1,750.00	4
Wateree	\$5,500.00	22
NORTH CAROLINA	\$24,558.50	99
SOUTH CAROLINA	\$9,500.00	42
TOTAL	\$34,058.50	141

b. Resource Problems, Causes, and Needs

- Overall, as a result of discussions during the various study team meetings and on-site lake tours by study team members, the resource is in good condition although concerns have been expressed about degradation of the resource in some fashion if activities currently allowed by the Shoreline Management Plan and Shoreline Management Guidelines continue without modification. In particular, there is concern regarding the impact of the growing popularity by developers to use multi-slip private marinas (i.e. Residential Marina- formerly Commercial/Residential Marina) to provide off-water access beyond that provided by Private Facilities along the waterfront of single-family private lots. Other concerns expressed include:

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- i)** Stabilization utilizing seawalls where other less-hardening techniques (e.g. rip rap, bio-engineering) would be more appropriate.
 - ii)** Allowing lake use permitting activities adjacent to environmentally important habitats without some offset for these activities along the shoreline.
 - iii)** Consideration of marina facilities in narrow ($\leq 200'$ width) coves.
 - iv)** Construction of individual private boat ramps.
 - v)** Excavation activities impacting environmentally important habitats on the opposing shoreline in coves.
 - vi)** Classification of areas along the shoreline that give the indication that some type of access would be allowed, even though accessing the actual shoreline for facility construction could impact environmentally important habitats.
 - vii)** Cumulative effect of gasoline dispensing from commercially available gas pumps and from individual gas canisters.
 - viii)** Minimum lot width requirements for determining eligibility for private access is too low and therefore has the potential to create conflicts for access and adverse environmental impacts as a result of concentration of private facilities.
 - ix)** Land clearing activities both within the Project boundary and upland.
- Issuance of permits for lake use permitting activities (e.g. pier and marina construction, shoreline stabilization, excavation, etc.) is considered to be a contributing factor in the resource concerns that the Project experiences, including water quality degradation, crowding, sedimentation, shoreline erosion, habitat fragmentation, etc.
 - Currently, based on the Recreation Use and Needs Survey (RUNS) conducted as part of the REC01 Study, no lakes exceed the boat carrying capacity even on peak weekends and peak holidays. Lakes Hickory, Mountain Island, James and Norman have carrying capacities of 71%, 64%, 45% and 43%, respectively, on peak use periods (weekends or holidays during the recreation season).
 - The table below provides a comparison of the dates carrying capacity under the rates developed for Scenarios S3 and S4 are expected to be exceeded, and the estimated dates for buildout under the two rates.

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Lake	Acres/ Watercraft	CC	CC	BO	BO
		S3	S4	S3	S4
James	6.3	2018	2057	2058	2212
Hickory	7.1	2012	2015	2024	2031
Norman	5.7	2100	2026	2055	2014
Mountain Island	6.8	n.a.	2099	n.a.	2067
Wylie	6.7	n.a.	2030	n.a.	2033
Wateree	5.5	2085	2043	2075	2038

CC = Carrying Capacity met
BO = Build out complete

- The current classification for vegetated areas \ stream confluence (Environmental) based on the Shallow Water Habitat Survey does not include all areas identified as Jurisdictional Wetlands identified on the National Wetland Inventory (NWI) maps and evaluated as part of the Terrestrial 01 Study Plan. This was evident to study team members (including Duke, NCWRC and SCDNR) that participated in a review \ comparison of the NWI polygon data and the SMP classified arc segments conducted on Lake Wateree on May 27, 2005. Overall, the SMP classifications accurately identify the location of the SWFHS-defined important habitat areas that often include Jurisdictional Wetlands. There are, however, other wetland areas, typically rather small in size that did not meet the SWFHS criteria or larger areas where the arc in a protected classification did not have the same extent as the wetlands polygon and are therefore not afforded protection consistently for the entire area.
- Although the Environmental classification does provide the most protection afforded any of the SMP classifications, the effectiveness of this protection may be diminished by impacts from activities closely located in proximity to these important habitat areas, such as pier construction and the activities associated with their use and the detrimental effects of excavation adjacent to one of these areas.

c. Assessment of Resource Improvement Options

- Revisions to the Shoreline Management Plan and Shoreline Management Guidelines have been negotiated with the members of the two study teams and the Resource Committee. These negotiations and discussions have resulted in the following modifications and improvements that address a number of resource concerns. For those areas where consensus has not been reached, study team and

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committee members are still actively considering acceptable and reasonable alternatives to address those areas of specific concern.

- Improvement options for the Shoreline Management Plan (mapping) include changes to the criteria for the protected classifications, criteria limitations for the Future Use classifications, and modifications to the lake use restrictions associated with specific classifications. For example, the Natural classification was expanded to include narrow isolated berms usually found along riverine portions of the lakes. The Natural classification primarily limits almost all lake use permitting activities within the Project boundary. This limitation will likely be the most prevalent in situations where there is interest in gaining access to the lake in one of these areas. Isolated berms typically have the same lake use restrictions as other areas classified as Natural. In instances where these berms are not isolated by low-lying areas within the Project boundary, the Lake Management Representative may allow Residential Facilities to extend into the reservoir provided there is no other practicable alternative.
- The Environmental classification is further protected in the lake use restrictions and also in the guideline criteria by requiring a 50' offset from the endpoint of this classification as determined by field inspection.
- The opportunity to construct new or expanding existing multi-slip marina facilities in narrow coves, any portion of which is $\leq 200'$ from the marina location out toward the main channel has been eliminated in both the revised maps and revised guidelines.
- The practice of allowing offwater access in addition to individual pier permits for single-family individual waterfront lots (i.e. double counting) in a master planned development continues to be a concern. The SMP02 Study Team is still in the process of evaluating various alternatives that allow continued offwater access through the use of multi-slip private marinas provided a developer is willing to set aside a significant (currently undetermined) contiguous undeveloped percentage of the shoreline in the development in exchange for this type off-water access. These contiguous areas would not include protected habitat classified shoreline and they would effectively displace a percentage of the shoreline typically associated with private single-family type facilities (e.g. piers). The intent is to create undisturbed contiguous shoreline as an enticement to a developer in exchange for some reasonable and economically feasible amount of offwater access.
- The delineation of water willow beds as a protected classification on the SMP maps was not determined to be the most effective method of affording protection while allowing limited access in these areas. Also, because water willow is very prevalent on some lakes while very little exists on others, coupled with the fact that it can spread rather rapidly making mapping/tracking difficult, it was decided to address its existence and minimizing impacts to the beds in the criteria of each of lake use permitting programs.
- Protection of all jurisdictional wetlands, although existing for the areas classified in the SMP as Environmental, is not currently afforded all the jurisdictional areas identified in the NWI. An onsite investigation conducted on May 27, 2005, with study team members representing both state wildlife resource agencies and Duke

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Power, resulted in an agreement to further analyze the aerial photography and other GIS data layers to compare the large habitat polygon areas from the NWI and the protected SMP arc segments. This investigation will involve querying the GIS to identify areas where the protected arc segments are > or < one-half the area represented by the polygon data along the shoreline. Additionally, the query will identify polygon areas where there is no protected arc segment. This GIS-query will provide tabular and spatial representation of both the polygon and arc data. The site investigation revealed that not all NWI identified polygons still contain jurisdictional wetlands. Typically if the area has been altered by past disturbance, which is identified by an Existing Use classification (e.g. Existing Residential, etc.) of the arc segment, then that portion of the shoreline should remain classified in the Existing Use. If, however, the specific arc segment associated with a NWI polygon is classified in a Future Use, then the shoreline should be reclassified to Environmental. Those participating in the site visit on May 27th also agreed it would be acceptable for Duke to work with the GIS contractor to develop an analysis of the remaining classified shoreline that has a > 50' separation from the Project boundary and compare these identified areas to the aerial photography and conduct on-site investigation of a sample of these areas to determine if they could serve wetland-type functions. Including the NWI-identified wetlands will require a slight modification to the criteria for Environmental to include not only the SWFHS criteria but also a criterion that indicates areas identified as Environmental have the functional value of a jurisdictional wetland. This will be necessary since a complete wetland determination \ delineation (based on US Army Corps of Engineers Wetland Manual (1987)) will not be conducted for each area.

- The Resource Committee discussed the results of the carrying capacity analysis presented by Louis Berger & Assoc. on May 20, 2005. The committee members discussed multiple options that attempt to address the fact that over time most, but not all, lakes will exceed the recreational and social carrying capacity prior to build out under the current SMP classification. Options and considerations that were discussed include:
 - i) Manage docks \ piers
 - ii) Manage available parking spaces at AA's
 - iii) More public land equals less crowding
 - iv) Manage AA locations
 - v) Manage the mix of activities (e.g. boating, jetskiing, fishing, sailing, etc.)
 - vi) Consider the remaining undeveloped shoreline
 - vii) Prioritize which lakes require taking action on sooner
 - viii) Manage location of activities
 - ix) Manage use (e.g. time of day use, lake use zoning, odd\even boat registration access, etc.)
 - x) Manage carrying capacity in various parts of the lake as opposed to lake overall
 - xi) Better policing \ enforcement or other initiatives that result in better behavior of lake users thereby increasing carrying capacity

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- xii) Provide destinations for boaters to congregate for related activities (wading \ swimming \ etc.) as opposed to cruising up and down the lake
- xiii) Allow more whitewater on the lake
- xiv) Biases to cluster or disperse activities- which is right?
- xv) Increase water safety through education and increased no-wake zone areas
- xvi) Shoreline use restrictions
- xvii) Land preservation
- xviii) Other jurisdictions have roles \ responsibilities
- xix) Land related to operation and management of the Project
- xx) Favoring multislip marinas as considered under SMP02 can create more boats in peak times
- xxi) Residents have moved to shoulder time so peaks have broader implications
- xxii) Manage for the entire recreation spectrum

There appeared to be consensus among the committee members that of the options and considerations discussed no one specific action could be taken to completely address the carrying capacity issue. There are, however, many opportunities available but their effectiveness, practical implementation and costs must be considered. For example, shoreline classification restrictions associated with the SMP and SMG could be implemented, but even in the most extreme, and to some extent most impractical case (i.e. no further private access), exceeding carrying capacity would still occur with increased demands placed upon public access opportunities including meeting future demands through Duke-owned AA expansions. Land preservation could also effectively address carrying capacity concerns although the amount of land required to significantly alter the current course of carrying capacity would likely prove to be difficult to acquire and cost prohibitive especially if additional upland acreages are required. Other jurisdictions also have roles and responsibilities (e.g. boat registration, upland zoning, etc.) that indirectly affect carrying capacity but implementing enough of these initiatives to be effective will be difficult especially within any reasonable timeframe. There does not appear to be any one “silver bullet” that will address the entire carrying capacity issue nor does there appear to be any single activity or multiple activities that Duke alone or as part of relicensing can undertake that will totally address carrying capacity. Just because implementation of effective means of addressing carrying capacity will be difficult is no reason to avoid taking any actions to address what can reasonably be achieved as part of relicensing, but additional commitments and work will be needed by multiple entities to truly be able to avert exceeding carrying capacity on most of the Catawba-Wateree Project.

- Improvement options for the Shoreline Management Guidelines include specific changes to the criteria associated with each of the six lake use permitting programs (i.e. Private Facilities, Commercial Facilities, Excavation, Shoreline Stabilization, Conveyance and Miscellaneous Uses). Significant modifications to the guidelines are included in Section iii Shoreline Management Guidelines – Key

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Findings of this report and the Matrix of Major Changes included in the SMP02 draft Study Report.

- Duke will continue to explore coordinated upland buffer monitoring and enforcement opportunities as a result of the combined Access Area Improvement Initiative and Shoreline Management meeting conducted with county and municipal planners on February 16, 2005. Under this initiative Duke would develop a protocol for coordinating lake use permitting activities in association with specific city, county and state buffer requirements. Typically, a lake use permit issued by Duke Power would be denied or withheld until county, city, and state buffer requirements are satisfied.
- The Habitat Enhancement Program was developed to provide an effective means of allowing continued private recreational access while providing meaningful habitat creation, enhancement and protection activities for fish and wildlife adjacent to the Catawba River and its reservoirs. The installation of docks/piers displaces the natural woody debris that exists in the area. Even though this habitat comprises only a very small percentage of the total Project shoreline it is higher in occurrence on three lakes including in descending order of occurrence- Lake James, Fishing Creek Lake and Lake Rhodhiss. This program is a means of mitigating the impact of woody debris removal by adjoining property owners by providing funding for enhancement, creation and protection activities within the entire Project boundary and in the vicinity of the Project. These activities will also provide more habitat diversity Project-wide than that provided by significant woody debris on a few lakes.

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APPENDIX

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Appendix 1 – Comparison of Shoreline Classifications (miles and percentages) 2004 vs. 2001

SHORELINE CLASSIFICATION DISTRIBUTION BY MILES FOR SMP2004

LAKE	CM	RM	Private	B/I	PUBREC	PUBINF	PROJOPS	F CM	F RM	F Private	F PUBREC	IMZ	IMZ (DEV)	ENV	NAT	NAT Iso	Brem	IMZ Marina	IMZ Private	TOTALS
JAMES	1.6	4.0	16.8	0.1	0.7	0.5	2.5	37.1	2.8	13.0	30.9	9.3	21.7	7.5			0.0	0.1	0.2	149.0
RHODHISS	0.5	0.3	1.5	0.4	0.4	2.4	0.3	26.5	1.6	5.5	2.2	1.5	26.0	26.6			0.1	0.0	0.1	95.9
HICKORY	1.5	2.2	56.9	1.0	0.7	2.9	1.8	2.5	5.1	13.2	2.8	1.7	16.8	0.1			0.0	0.0	0.5	109.8
LOOKOUT	0.0	0.3	8.3	0.0	0.1	0.4	1.4	2.5	0.5	2.0	2.1	3.5	7.9	3.5			0.2	0.0	0.4	33.1
NORMAN	6.7	21.3	319.5	4.5	2.0	27.5	3.7	8.8	19.5	49.5	26.0	10.2	52.6	5.5			1.8	0.7	2.4	562.2
MT. ISLAND	0.0	0.6	10.2	0.1	0.2	8.8	2.9	0.0	5.1	3.4	15.3	3.1	35.1	4.2			4.4	0.3	1.0	94.6
WYLIE	7.0	3.3	138.3	3.6	3.0	18.9	1.8	6.8	16.1	21.1	9.8	9.0	77.0	23.3			0.5	0.0	1.1	340.7
FISH CRK.	0.1	0.0	3.8	0.2	0.1	1.2	0.8	24.0	0.6	11.5	6.1	0.5	35.7	2.5			3.2	0.0	0.1	90.4
GFALLS/RC	0.0	0.0	0.1	0.1	0.1	1.3	8.4	3.9	0.0	2.1	11.4	0.8	7.6	1.8			0.0	0.0	0.0	37.6
WATEREE	1.7	0.7	84.5	0.0	0.5	1.8	1.2	22.1	8.4	4.0	7.9	7.7	41.9	4.0			1.6	0.0	0.5	188.5
TOTALS	19.2	32.8	639.9	9.9	8.0	65.8	24.6	134.2	59.8	125.3	114.6	47.3	322.3	79.0			11.8	1.2	6.3	1701.8

SHORELINE CLASSIFICATION DISTRIBUTION BY MILES FOR SMP2001

LAKE	CM	RM	Private	B/I	PUBREC	PUBINF	PROJOPS	F CM	F RM	F Private	F PUBREC	IMZ	IMZ (DEV)*	ENV	NAT**	NAT Iso	Brem	IMZ Marina	IMZ Private	TOTALS
JAMES	1.6	4.4	12.5	0.0	0.7	0.7	2.3	60.8	4.0	15.8	10.0	9.5	0.2	20.8	8.1					151.5
RHODHISS	0.4	0.3	0.4	0.4	0.4	1.2	1.0	28.1	1.8	4.9	2.3	1.6	0.0	24.5	36.7					103.9
HICKORY	1.6	2.0	52.7	0.8	0.7	1.2	1.7	5.0	13.4	8.3	2.8	2.2	0.0	18.1	0.1					110.6
LOOKOUT	0.0	0.7	6.8	0.0	0.1	0.4	1.7	3.3	0.7	2.3	2.5	3.9	0.0	8.7	5.1					36.3
NORMAN	6.5	23.9	310.9	2.7	2.6	19.8	3.3	15.7	30.4	50.7	28.2	12.8	0.5	75.7	7.8					591.6
MT. ISLAND	0.0	0.6	9.1	0.1	0.3	8.7	3.2	0.0	7.4	3.3	21.9	3.6	0.7	25.1	2.5					86.5
WYLIE	6.2	1.7	136.9	3.3	3.8	15.1	1.8	10.2	22.1	16.3	9.9	10.0	0.1	67.3	22.8					327.5
FISH CRK.	0.1	0.0	3.6	0.2	0.2	0.9	0.8	23.2	1.5	11.5	4.5	0.5	0.0	18.0	2.2					67.1
GFALLS/RC	0.0	0.0	0.0	0.1	0.1	1.1	8.9	5.0	0.0	1.9	12.0	0.8	0.0	6.0	1.1					37.0
WATEREE	1.6	0.7	82.7	0.1	0.9	1.9	1.1	24.0	8.0	7.0	9.7	8.6	0.1	62.1	6.4					214.9
TOTALS	18.0	34.3	615.6	7.7	9.8	51.0	25.8	175.3	89.3	122.0	103.8	53.5	1.6	326.3	92.8					1727.0

Difference in miles between 2004 and 2001

LAKE	CM	RM	Private	B/I	PUBREC	PUBINF	PROJOPS	F CM	F RM	F Private	F PUBREC	IMZ	IMZ (DEV)	ENV	NAT	NAT Iso	Brem	IMZ Marina	IMZ Private	TOTALS
JAMES	0.00	(0.40)	4.30	0.10	0.00	(0.20)	0.20	(23.70)	(1.20)	(2.80)	20.90	(0.20)	0.10	0.90	(0.60)					(2.50)
RHODHISS	0.10	0.00	1.10	0.00	0.00	1.20	(0.70)	(1.60)	(0.20)	0.60	(0.10)	(0.10)	0.10	1.50	(10.00)					(8.00)
HICKORY	(0.10)	(0.20)	4.20	0.20	0.00	1.70	0.10	(2.50)	(8.30)	4.90	0.00	(0.50)	0.50	(1.30)	0.00					(0.80)
LOOKOUT	0.00	(0.40)	1.50	0.00	0.00	0.00	(0.30)	(0.80)	(0.20)	(0.30)	(0.40)	(0.40)	0.40	(0.80)	(1.40)					(3.20)
NORMAN	0.20	(2.60)	8.60	1.80	(0.60)	7.70	0.40	(6.90)	(10.90)	(1.20)	(2.20)	(2.60)	2.60	(23.10)	(0.50)					(29.40)
MT. ISLAND	0.00	0.00	1.10	0.00	(0.10)	0.10	(0.30)	0.00	(2.30)	0.10	(6.60)	(0.50)	0.60	10.00	6.10					8.10
WYLIE	0.80	1.60	1.40	0.30	(0.80)	3.80	0.00	(3.40)	(6.00)	4.80	(0.10)	(1.00)	1.00	9.70	1.00					13.20
FISH CRK.	0.00	0.00	0.20	0.00	(0.10)	0.30	0.00	0.80	(0.90)	0.00	1.60	0.00	0.10	17.70	3.50					23.30
GFALLS/RC	0.00	0.00	0.10	0.00	0.00	0.20	(0.50)	(1.10)	0.00	0.20	(0.60)	0.00	0.00	1.60	0.70					0.60
WATEREE	0.10	0.00	1.80	(0.10)	(0.40)	(0.10)	0.10	(1.90)	0.40	(3.00)	(1.80)	(0.90)	0.40	(20.20)	(0.80)					(26.40)
TOTALS	1.20	(1.50)	24.30	2.20	(1.80)	14.80	(1.20)	(41.10)	(29.50)	3.30	10.80	(6.20)	5.90	(4.00)	(2.00)					(25.20)
% Change	6.67	(4.37)	3.95	28.57	(18.37)	29.02	(4.65)	(23.45)	(33.03)	2.70	10.40	(11.59)	368.75	(1.23)	(2.16)					(1.46)

(XXX) - indicates a negative number

* The 2001 Classification IMZ (Dev) was split into IMZ Marina and IMZ Private for 2004

** The 2001 Classification NAT was split into NAT and NAT Iso Brem for 2004

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SHORELINE CLASSIFICATION DISTRIBUTION BY PERCENT FOR SMP2004

LAKE	CM	RM	Private	B/I	PUBREC	PUBINF	PROJOPS	F CM	F RM	F Private	F PUBREC	IMZ	IMZ (DEV)	ENV	NAT	NAT Iso	Berm	IMZ Marina	IMZ Private	TOTALS
JAMES	1.1	2.7	11.3	0	0.5	0.4	1.7	24.9	1.9	8.8	20.7	6.2		14.6	5.1		0	0.1	0.1	100
RHODHISS	0.5	0.3	1.6	0.4	0.4	2.5	0.3	27.6	1.7	5.7	2.3	1.6		27.1	27.7		0.1	0	0.1	100
HICKORY	1.3	2	51.8	0.9	0.7	2.6	1.6	2.3	4.7	12	2.5	1.6		15.3	0.1		0	0	0.5	100
LOOKOUT	0	1.1	25	0	0.3	1.2	4.2	7.4	1.6	6.1	6.3	10.6		24	10.5		0.6	0	1.3	100
NORMAN	1.2	3.8	56.8	0.8	0.4	4.9	0.7	1.6	3.5	8.8	4.6	1.8		9.4	1		0.3	0.1	0.4	100
MT. ISLAND	0	0.7	10.7	0.1	0.2	9.3	3	0	5.4	3.6	16.1	3.3		37.1	4.4		4.7	0.3	1	100
WYLIE	2.1	1	40.6	1	0.9	5.6	0.5	2	4.7	6.2	2.9	2.6		22.6	6.8		0.2	0	0.3	100
FISH CRK.	0.1	0	4.2	0.2	0.2	1.3	0.8	26.6	0.7	12.7	6.8	0.5		39.5	2.8		3.5	0	0.1	100
GFALLS/RC	0	0	0.4	0.4	0.2	3.6	22.3	10.3	0	5.5	30.4	2		20.2	4.8		0	0	0	100
WATEREE	0.9	0.4	44.8	0	0.3	0.9	0.6	11.7	4.4	2.1	4.2	4.1		22.2	2.1		0.9	0	0.2	100
TOTALS	1.1	1.9	37.6	0.6	0.5	3.9	1.4	7.9	3.5	7.4	6.7	2.8		18.9	4.6		0.7	0.1	0.4	100

SHORELINE CLASSIFICATION DISTRIBUTION BY PERCENT FOR SMP0701

LAKE	CM	RM	Private	B/I	PUBREC	PUBINF	PROJOPS	F CM	F RM	F Private	F PUBREC	IMZ	IMZ (DEV)	ENV	NAT	NAT Iso	Berm	IMZ Marina	IMZ Private	TOTALS
JAMES	1.1	2.9	8.3	0	0.5	0.5	1.5	40.1	2.6	10.4	6.6	6.3	0.1	13.7	5.3					100
RHODHISS	0.4	0.3	0.4	0.4	0.4	1.2	1	27	1.7	4.7	2.2	1.5	0	23.6	35.3					100
HICKORY	1.4	1.8	47.6	0.7	0.6	1.1	1.5	4.5	12.1	7.5	2.5	2	0	16.4	0.1					100
LOOKOUT	0	1.9	18.7	0	0.3	1.1	4.7	9.1	1.9	6.3	6.9	10.7	0	24	14					100
NORMAN	1.1	4	52.6	0.5	0.4	3.3	0.6	2.7	5.1	8.6	4.8	2.2	0.1	12.8	1.3					100
MT. ISLAND	0	0.7	10.5	0.1	0.3	10.1	3.7	0	8.6	3.8	25.3	4.2	0.8	29	2.9					100
WYLIE	1.9	0.5	41.8	1	1.2	4.6	0.5	3.1	6.7	5	3	3.1	0	20.5	7					100
FISH CRK.	0.1	0	5.4	0.3	0.3	1.3	1.2	34.6	2.2	17.1	6.7	0.7	0	26.8	3.3					100
GFALLS/RC	0	0	0	0.3	0.3	3	24.1	13.5	0	5.1	32.4	2.2	0	16.2	3					100
WATEREE	0.7	0.3	38.5	0	0.4	0.9	0.5	11.2	3.7	3.3	4.5	4	0	28.9	3					100
TOTALS	1	2	35.6	0.4	0.6	3	1.5	10.2	5.2	7.1	6	3.1	0.1	18.9	5.4					100

Difference in percentages between 2004 and 2001

LAKE	CM	RM	Private	B/I	PUBREC	PUBINF	PROJOPS	F CM	F RM	F Private	F PUBREC	IMZ	IMZ (DEV)	ENV	NAT	NAT Iso	Berm	IMZ Marina	IMZ Private	TOTALS
JAMES	0.00	(0.20)	3.00	0.00	0.00	(0.10)	0.20	(15.20)	(0.70)	(1.60)	14.10	(0.10)	0.10	0.90	(0.20)					0.00
RHODHISS	0.10	0.00	1.20	0.00	0.00	1.30	(0.70)	0.60	0.00	1.00	0.10	0.10	0.10	3.50	(7.50)					0.00
HICKORY	(0.10)	0.20	4.20	0.20	0.10	1.50	0.10	(2.20)	(7.40)	4.50	0.00	(0.40)	0.50	(1.10)	0.00					0.00
LOOKOUT	0.00	(0.80)	6.30	0.00	0.00	0.10	(0.50)	(1.70)	(0.30)	(0.20)	(0.60)	(0.10)	1.30	0.00	(2.90)					0.00
NORMAN	0.10	(0.20)	4.20	0.30	0.00	1.60	0.10	(1.10)	(1.60)	0.20	(0.20)	(0.40)	0.40	(3.40)	0.00					0.00
MT. ISLAND	0.00	0.00	0.20	0.00	(0.10)	(0.80)	(0.70)	0.00	(3.20)	(0.20)	(9.20)	(0.90)	0.50	8.10	6.20					0.00
WYLIE	0.20	0.50	(1.20)	0.00	(0.30)	1.00	0.00	(1.10)	(2.00)	1.20	(0.10)	(0.50)	0.30	2.10	0.00					0.00
FISH CRK.	0.00	0.00	(1.20)	(0.10)	(0.10)	0.00	(0.40)	(8.00)	(1.50)	(4.40)	0.10	(0.20)	0.10	12.70	3.00					0.00
GFALLS/RC	0.00	0.00	0.40	0.10	(0.10)	0.60	(1.80)	(3.20)	0.00	0.40	(2.00)	(0.20)	0.00	4.00	1.80					0.00
WATEREE	0.20	0.10	6.30	0.00	(0.10)	0.00	0.10	0.50	0.70	(1.20)	(0.30)	0.10	0.20	(6.70)	0.00					0.00
TOTALS	0.10	(0.10)	2.00	0.20	(0.10)	0.90	(0.10)	(2.30)	(1.70)	0.30	0.70	(0.30)	0.40	0.00	(0.10)					0.00

% Differences	10.00	(5.00)	5.62	50.00	(16.67)	30.00	(6.67)	(22.55)	(32.69)	4.23	11.67	(9.68)	400.00	0.00	(1.85)	#DIV/0!	#DIV/0!	#DIV/0!	0.00
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(XXX) - indicates a negative number

* The 2001 Classification IMZ (Dev) was split into IMZ Marina and IMZ Private for 2004

** The 2001 Classification NAT was split into NAT and NAT Iso Berm for 2004