

2014
SOUTH CAROLINA AQUATIC PLANT
MANAGEMENT PLAN
PART II



Prepared by the
Aquatic Nuisance Species Program
South Carolina Department of Natural Resources
and Approved by the
South Carolina Aquatic Plant Management Council
2014

**2014 SOUTH CAROLINA
AQUATIC PLANT MANAGEMENT COUNCIL**

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PART II - 2014 ANNUAL MANAGEMENT PLAN

INTRODUCTION

The Annual Management Plan for 2014 was developed by application of the procedures described in the Aquatic Plant Management Plan, Part I (Procedural Management Plan). The phases of development of the Annual Management Plan include 1) identification of areas where aquatic plants interfere with water use, 2) development of a description of each problem area, 3) development of a management strategy for each problem area, and 4) determination of the distribution of available funding among problem areas.

Common and Scientific Names of Aquatic Plants Referenced in the Plan

Alligatorweed	<i>Alternanthera philoxeroides</i>
Bladderwort	<i>Utricularia</i> spp.
Brazilian elodea	<i>Egeria densa</i>
Bur Marigold	<i>Bidens</i> spp.
Spatterdock	<i>Nuphar luteum macrophyllum</i>
Cattails	<i>Typha</i> spp.
Coontail	<i>Ceratophyllum demersum</i>
Common reed	<i>Phragmites australis</i>
Creeping rush	<i>Juncus repens</i>
Crested Floating-heart	<i>Nymphoides cristata</i>
Curly-leaf pondweed	<i>Potamogeton crispus</i>
Duckweed	<i>Lemna</i> spp.
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Fanwort	<i>Cabomba caroliniana</i>
Filamentous algae	<i>Pithophora, Lyngbya, Hydrodictyon</i>
Floating bladderwort	<i>Utricularia inflata</i>
Floating heart	<i>Nymphoides</i> spp.
Frog's bit	<i>Limnobium spongia</i>
Giant cutgrass	<i>Zizaniopsis miliacea</i>
Hydrilla	<i>Hydrilla verticillata</i>
Lotus	<i>Nelumbo lutea</i>
Musk-grass	<i>Chara</i> spp.
Pondweed	<i>Potamogeton</i> spp.
Slender naiad	<i>Najas minor</i>
Smartweed	<i>Polygonum densiflorum</i>
Southern naiad	<i>Najas guadalupensis</i>
Spikerush	<i>Eleocharis</i> spp.
Stonewort	<i>Nitella</i>
Variable-leaf pondweed	<i>Potamogeton diversifolius</i>
Waterlily	<i>Nymphaea odorata</i>
Water hyacinth	<i>Eichhornia crassipes</i>
Water lettuce	<i>Pistia stratiotes</i>
Watermilfoil	<i>Myriophyllum</i> spp.
Water pennywort	<i>Hydrocotyle ranunculoides</i>
Water primrose	<i>Ludwigia hexapetala</i>
Watershield	<i>Brasenia schreberi</i>

Aquatic Plant Problem Areas

Areas where aquatic plants interfere with water use were identified from information provided by S.C. Aquatic Plant Management Council members, an aquatic plant survey conducted by the S.C. Department of Natural Resources staff and public input. The identified problem areas listed below are open to access and use by the public and are therefore considered by the Council as eligible for some type of public funding. Acres of infestation (coverage) are approximations based on observations made in 2013. Problematic species may change throughout the current year and inclusion in the plan is no guarantee the listed work will be done this year. All control work is based on existing funding and priority levels of both the invasive species and the water bodies in the plan.

SPECIAL NOTE: Due to 2014 budget constraints and in an effort to continue to serve all of the areas around the state; each water body will only be eligible for up to \$30,000 of cost share money from the SCDNR.

- 1) Water body - Back River Reservoir
 - Location - Berkeley County
 - Surface acres - 850
 - Aquatic plants - Hydrilla, Water hyacinth, Water primrose, Fanwort
 - Coverage - 360 acres
 - Impaired activities- Boating, fishing, hunting, swimming, industrial water supply, municipal water supply, electric power generation, public access
- 2) Water body - Baruch Institute
 - Location - Georgetown County
 - Surface acres - Unknown, adjacent to Winyah Bay
 - Aquatic plants - Phragmites
 - Coverage - 25 acres
 - Impaired activities - Boating, hunting, fishing, public access
- 3) Water body - Black Mingo Creek
 - Location - Georgetown County
 - Surface acres -Unknown
 - Aquatic plants - Alligatorweed, Parrot feather
 - Coverage - 5 acres
 - Impaired activities - Boating, hunting, fishing, public access
- 4) Water body - Black River
 - Location - Georgetown County
 - Surface acres -Unknown
 - Aquatic plants - Alligatorweed
 - Coverage – 10 acres
 - Impaired activities - Boating, hunting, fishing, public access
- 5) Water body - Bonneau Ferry
 - Location - Berkeley County
 - Surface acres -Unknown - Multiple Reserves and impoundments

- Aquatic plants - Water hyacinth, Water primrose, Frog's bit, Lotus, Cat-tails, Cutgrass, Pennywort, Parrotfeather, Fanwort, Coontail
 Coverage - 40 acres
 Impaired activities - Boating, hunting, fishing, public access
- 6) Water Body – Charleston County Parks
 Location – Charleston County (CawCaw and Laurel Hill)
 Surface acres – unknown
 Aquatic plants - Hydrilla, Water primrose, Water hyacinth, Phragmites, Tallow
 Coverage - 10 acres
 Impaired activities – Recreational and public access
- 7) Water body - Combahee River (Borrow pit)
 Location - Colleton County
 Surface acres - approx. 5 acres
 Aquatic plants - Hydrilla, Water primrose, Water hyacinth
 Coverage - 4 acres
 Impaired activities - Boating, hunting, fishing, public access
- 8) Water body - Cooper River (and adjacent ricefields)
 Location - Berkeley County
 Surface acres - Unknown
 Aquatic plants - Hydrilla, Water primrose, Water hyacinth
 Coverage - approx. 2,800 acres
 Impaired activities - Boating, hunting, fishing, public access
- 9) Water body - Donnelley/Bear Island WMA
 Location - Colleton County
 Surface acres - Multiple impoundments and rivers
 Aquatic plants - Cutgrass, Frog's bit, Cattails, Phragmites
 Coverage - 40 acres
 Impaired activities - Hunting, public access
- 10) Water body - Dungannon Plantation Heritage Preserve
 Location - Charleston County
 Surface acres - Unknown
 Aquatic plants - Cutgrass, Frog's bit, Cattails, Water primrose, Swamp loosestrife
 Coverage - 14 acres
 Impaired activities - Wood stork nesting site, public access
- 11) Water body - Goose Creek Reservoir
 Location - Berkeley County
 Surface acres - 600
 Aquatic plants - Water hyacinth, Water lettuce, Water primrose, Hydrilla, Salvinia(*Salvinia minima*)
 Coverage - 180 acres
 Impaired activities - Boating, public access, industrial water supply, floodway
- 12) Water body – Lake Bowen

- Location - Spartanburg County
 Surface acres - 1534
 Aquatic plants – Muskgrass(Chara)
 Coverage - 40 acres
 Impaired activities- Boating, fishing, hunting, swimming, industrial water supply, municipal water supply, public access
- 13) Water body – Lake Cunningham
 Location - Greenville County
 Surface acres -160 acres
 Aquatic plants – Brazilian elodea, Water primrose, Waterlily spatterdock
 Coverage – 10 acres
 Impaired activities - Boating, hunting, fishing, public access
- 14) Water body - Lake Greenwood
 Location -Laurens and Greenwood Counties
 Surface acres - 11,400
 Aquatic plants - Hydrilla, Slender naiad
 Coverage - <5 acres
 Impaired activities – Potential impacts to electric power generation, boating, swimming, vector control, public access
- 15) Water body - Lake Keowee
 Location – Pickens and Oconee Counties
 Surface acres – 18,300 acres
 Aquatic plants - Hydrilla
 Coverage - <5 acres
 Impaired activities - Potential impacts to electric power generation, municipal water supply, boating, swimming, vector control, public access
- 16) Water body - Lake Monticello(Recreation Lake)
 Location - Fairfield County
 Surface acres – 6,700 acres(300 acres)
 Aquatic plants - Hydrilla
 Coverage - 25 acres (Recreation Lake)
 Impaired activities - Boating, swimming, fishing, vector control, public access
- 17) Water body - Lake Murray
 Location - Lexington and Richland Counties
 Surface acres - 50,000
 Aquatic plants - Hydrilla, Illinois pondweed, Water primrose, Alligatorweed
 Coverage - 50 acres
 Impaired activities - Boating, swimming, domestic and municipal water intakes, public access
- 18) Water body - Lake Wateree
 Location – Kershaw County
 Surface acres – 13,710 acres
 Aquatic plants – Hydrilla, cutgrass

- Coverage - <5 acres
- Impaired activities - Potential impacts to boating, swimming, vector control, public access
- 19) Water body - Little Pee Dee River
 - Location - Marion and Horry Counties
 - Surface acres - Unknown
 - Aquatic plants - Alligatorweed
 - Coverage - 30 acres
 - Impaired activities - Boating, hunting, fishing, public access
- 20) Water body - Lumber River
 - Location - Marion and Horry Counties
 - Surface acres - Unknown
 - Aquatic plants - Alligatorweed
 - Coverage - 5 acres
 - Impaired activities - Boating, hunting, fishing, public access
- 21) Water body - Pee Dee River
 - Location - Georgetown County
 - Surface acres - Unknown
 - Aquatic plants - Water hyacinth, Phragmites
 - Coverage - 40 acres
 - Impaired activities - Boating, hunting
- 22) Water body – Prestwood Lake
 - Location – Darlington County
 - Surface acres – 300 acres
 - Aquatic plants - Milfoil, Watershield, Filamentous algae, Water hyacinth
 - Coverage - 195 acres
 - Impaired activities - Boating, fishing, recreation
- 23) Water body - Samworth WMA
 - Location - Georgetown County
 - Surface acres - Unknown
 - Aquatic plants - Phragmites, Water hyacinth
 - Coverage - 50 acres
 - Impaired activities - Hunting, public access
- 24) Water body - Santee Coastal Reserve
 - Location - Georgetown County
 - Surface acres - Unknown
 - Aquatic plants - Phragmites
 - Coverage - 300 acres
 - Impaired activities - Hunting, public access
- 25) Water body - Santee Delta WMA
 - Location - Georgetown County
 - Surface acres - Unknown
 - Aquatic plants - Phragmites

- Coverage - 50 acres
- Impaired activities - Hunting, public access
- 26) Water body - US Army Corps of Engineers - Charleston Harbor/Intracoastal Waterway
 - Location - Charleston County
 - Surface acres - Unknown
 - Aquatic plants - Phragmites
 - Coverage – 200+ acres
 - Impaired activities - Boating, hunting, fishing, public access
- 27) Water body - US Naval Weapons Station
 - Location - Charleston and Berkeley Counties
 - Surface acres - Unknown
 - Aquatic plants - Frog’s-bit, Water primrose, Water hyacinth, Phragmites
 - Coverage - 75 acres
 - Impaired activities - Boating, hunting, fishing, public access
- 28) Water body - Waccamaw River
 - Location - Georgetown and Horry Counties
 - Surface acres - Unknown
 - Aquatic plants - Water hyacinth, Phragmites
 - Coverage - 50 acres
 - Impaired activities - Boating, hunting, fishing, public access
- 29) Water body - Yawkey Wildlife Center
 - Location - Georgetown County
 - Surface acres - Unknown
 - Aquatic plants - Phragmites
 - Coverage - 25 acres
 - Impaired activities - Hunting, public access

Santee Cooper Lakes

- 30) Water body - Lake Marion
 - Location - Sumter, Clarendon, Calhoun, Berkeley, and Orangeburg Counties.
 - Surface acres - 110,000
 - Aquatic plants - Alligatorweed, Brazilian elodea, Hydrilla, Water primrose, Slender naiad, Coontail, Water hyacinth, Filamentous algae, Fanwort, Cutgrass, Crested floating heart
 - Coverage - 2350 acres
 - Impaired activities - Boating, swimming, public access, potential electric power generation, potential irrigation water withdrawals
- 31) Water body - Lake Moultrie
 - Location - Berkeley County
 - Surface acres - 60,400
 - Aquatic plants - Alligatorweed, Water primrose, Brazilian elodea, Hydrilla, Slender naiad, Water hyacinth, Watermilfoil, Fanwort, Cutgrass, Crested floating heart

Coverage - 400 acres

Impaired activities - Potential electric power generation, boating, swimming, public access, potential domestic and irrigation water withdrawals

SC Parks, Recreation and Tourism - State Park Lakes

32) Water body - Aiken State Park

Location - Aiken County

Surface acres - 16

Aquatic plants – Floating heart

Coverage - 10 acres

Impaired activities - Fishing, swimming, aesthetics

33) Water body - Barnwell State Park

Location - Barnwell County

Surface acres - 12

Aquatic plants – Waterlily, Cattails

Coverage - 9 acres

Impaired activities - Fishing, swimming, aesthetics

34) Water body - Charles Towne Landing State Park

Location - Charleston County

Surface acres - 5

Aquatic plants - Duckweed, Alligatorweed, Pennywort, Cyanobacteria, Algae

Coverage - 4 acres

Impaired activities - Fishing, tourism, aesthetics

35) Water body - Cheraw State Park

Location - Chesterfield County

Surface acres - 280

Aquatic plants – Floating heart, Waterlily, Spatterdock, Watermilfoil

Coverage - 20 acres

Impaired activities - Fishing, swimming, aesthetics

36) Water body - Croft State Park

Location - Spartanburg County

Surface acres - 145

Aquatic plants – Hydrilla

Coverage - 50 acres

Impaired activities - Fishing, swimming, aesthetics

37) Water body - H. Cooper Black Recreation Area

Location - Chesterfield County

Surface acres - 2 acres

Aquatic plants - Spatterdock

Coverage - 1 acres

Impaired activities - Recreational activities

- 38) Water body – Hunting Island State Park
Location - Beaufort County
Surface acres - 1
Aquatic plants – Duckweed
Coverage - 1 acres
Impaired activities - Fishing, swimming, aesthetics
- 39) Water body - Huntington Beach SP
Location - Horry County
Surface acres - 15 acres
Aquatic plants - Cutgrass, Phragmites, Cattails
Coverage - 15 acres
Impaired activities - Recreational activities
- 40) Water body – Jones Gap State Park
Location - Greenville County
Surface acres - 1
Aquatic plants – Kudzu
Coverage - 1 acres
Impaired activities - Fishing, swimming, aesthetics
- 41) Water body - Kings Mountain State Park - Crawford Lake
Location - York County
Surface acres - 9
Aquatic plants - Slender naiad
Coverage - 4 acres
Impaired activities - Swimming, boating
- 42) Water body - Lee State Park
Location - Lee County
Surface acres – 1.75
Aquatic plants – Watermilfoil
Coverage – 2 acres
Impaired activities - Fishing, swimming, aesthetics
- 43) Water body - Little Pee Dee State Park
Location - Dillon County
Surface acres - 75
Aquatic plants - Spikerush, Spatterdock
Coverage - 15 acres
Impaired activities - Fishing, boating
- 44) Water body - N.R. Goodale State Park
Location - Kershaw County
Surface acres - 160 acres
Aquatic plants - Waterlily, Watershield
Coverage - 60 acres
Impaired activities - Swimming, recreational activities

- 45) Water body – Paris Mountain State Park
 - Location - Greenville County
 - Surface acres – 9.5
 - Aquatic plants – Slender naiad, Watershield
 - Coverage - 6 acres
 - Impaired activities - Fishing, swimming, aesthetics
- 46) Water body - Poinsett State Park
 - Location - Sumter County
 - Surface acres - 9
 - Aquatic plants – Spatterdock, Cattails
 - Coverage - 5 acres
 - Impaired activities - Fishing, swimming, aesthetics
- 47) Water body - Sesquicentennial State Park
 - Location - Richland County
 - Surface acres - 25 acres
 - Aquatic plants - Waterlily, Watershield
 - Coverage - 12 acres
 - Impaired activities - Swimming, fishing

SC Department of Natural Resources - State Lakes

- 48) Water body - Lake Cherokee
 - Location - Cherokee County
 - Surface acres - 50 acres
 - Aquatic plants - Water primrose
 - Coverage - 5 acres
 - Impaired activities - Boating, fishing
- 49) Water body - Lake Edwin Johnson
 - Location - Spartanburg County
 - Surface acres - 40 acres
 - Aquatic plants - Water primrose, Hydrilla, Pondweed
 - Coverage - 10 acres
 - Impaired activities - Boating, fishing
- 50) Water body - Jonesville Reservoir
 - Location - Union County
 - Surface acres - 25 acres
 - Aquatic plants - Water primrose, Pondweed
 - Coverage - 10 acres
 - Impaired activities - Boating, fishing
- 51) Water body - Mountain Lakes
 - Location - Chester County
 - Surface acres - 70 acres

- Aquatic plants - Water primrose, Alligatorweed, Parrotfeather
- Coverage - 5 acres
- Impaired activities - Boating, fishing
- 52) Water body - Lancaster Reservoir
 - Location - Lancaster County
 - Surface acres - 61 acres
 - Aquatic plants - Water primrose, Alligatorweed
 - Coverage - 8 acres
 - Impaired activities - Boating, fishing, hunting
- 53) Water body - Sunrise Lake
 - Location - Lancaster County
 - Surface acres - 25 acres
 - Aquatic plants - Pondweed
 - Coverage - 15 acres
 - Impaired activities - Boating, fishing
- 54) Water body - Lake Ashwood
 - Location - Lee County
 - Surface acres - 75 acres
 - Aquatic plants - Waterlily
 - Coverage - spotty
 - Impaired activities - Boating, fishing
- 55) Water body - Lake Edgar Brown
 - Location - Barnwell County
 - Surface acres - 100 acres
 - Aquatic plants - Water primrose, Coontail
 - Coverage - 60 acres
 - Impaired activities - Boating, fishing
- 56) Water body - Lake George Warren
 - Location - Hampton County
 - Surface acres - 400 acres
 - Aquatic plants - Cattails, Water primrose, Coontail
 - Coverage - 20 acres
 - Impaired activities - Boating, fishing
- 57) Water body - Lake Thicketty
 - Location - Cherokee County
 - Surface acres - 100 acres
 - Aquatic plants - Hydrilla
 - Coverage - 5 acres
 - Impaired activities - Boating, fishing
- 58) Water body - Dargan's Pond
 - Location - Darlington County
 - Surface acres - 50 acres

Aquatic plants - Pondweed
Coverage - 15 acres
Impaired activities - Boating, fishing

South Carolina Border Lakes

59) Water body - Lake Wylie

Location – York County, SC; Gaston and Mecklenburg County, NC

Surface acres – 13,443 acres

Aquatic plants - Hydrilla

Coverage - <400 acres(all in NC waters)

Impaired activities - Potential impacts include electric power generation, boating, swimming, public access, domestic and irrigation water withdrawals

60) Water body - Lake Thurmond

Location – South Carolina, Georgia Border

Surface acres – 71,100 acres

Aquatic plants - Hydrilla

Coverage - > 7000 acres

Impaired activities - Potential impacts include electric power generation, boating, swimming, public access, domestic and irrigation water withdrawals

AQUATIC PLANT MANAGEMENT STRATEGY

The following management strategies were developed for each identified problem area considered eligible for public funding. Planned expenditures are based on known available federal funds, estimated state funds and anticipated local support as of the date of this plan. For water bodies in which final funding is inadequate to conduct all proposed control operations, the extent of control will be reduced and priority areas and target plants will be determined by the Department of Natural Resources in cooperation with the local sponsor. A summary of proposed expenditures for 2014 and a location map of problem water bodies are located at the end of this section.

SPECIAL NOTE: Due to continuing budget constraints (in an effort to serve all of the areas around the state) each water body will only be eligible for up to \$30,000 of cost share money from the SCDNR.

Public Waters

1. Back River Reservoir (Berkeley County)

Problem plant species

Hydrilla, Water hyacinth, Fanwort, Water primrose, Frog’s bit, Cutgrass

Management objectives

Reduce water hyacinth and water primrose populations throughout the lake to enhance public access, navigation, water flow and minimize impacts to water intakes from floating islands.

Reduce hydrilla in upper Foster Creek area to improve water quality, water flow and navigation.

Reduce hydrilla and fanwort in 62.50 acre area adjacent to SCE&G Williams Station intake to enhance water flow, minimize clogging of water intake, and enhance public boating and fishing use in this area.

Reduce hydrilla and fanwort in a 2 acre area at Bushy Park Landing to enhance public boating and fishing use in this area.

Selected control method

Problem Species	Control Agent
Water hyacinth	Renovate 3, Reward, Clearcast, Galleon SC, Habitat, Glyphosate
Water primrose, Cutgrass	Renovate 3, Reward, Habitat, Clearcast, Glyphosate
Hydrilla	Chelated copper*, Chelated copper*/Reward, Aquathol

May be toxic to fish at recommended treatment rates; however, precautions will be implemented to minimize the risk of fish kills.

Area to which control is to be applied

Renovate 3, Reward, Habitat, Clearcast, Glyphosate and Galleon SC - 300 acres of water hyacinth, water primrose and cutgrass throughout the lake.

Chelated copper*/Reward, Galleon SC - 154 acres of hydrilla; 2 treatments of 62.50 acre area near SCE&G intake, 2 acres of hydrilla adjacent to Bushy Park Landing, 25 acres of hydrilla in Foster Creek arm (2 treatments-12.50 acres each).

Rate of control agents to be applied

Aquathol – 0.500 to 5 ppm

Renovate 3 - 0.500 - 0.750 gallons per acre.

Reward - 0.500 gallons per acre.

Clearcast - 0.250 - 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Chelated copper - up to 1 ppm (about 10- 16 gallons per acre).

Chelated copper*/Reward - 4 gallons/2 gallons per acre

Habitat – 0.250 - 0.750 gallons per acre.

Galleon SC - Submersed 0.174 fl oz/acre foot to achieve minimum effective concentration of 25 to 75 ppb, Floating species – 2 to 6 fl oz/acre as foliar application.

Method of application of control agents

Renovate 3, Reward, Habitat, Clearcast, Glyphosate and Galleon SC - spray on surface of foliage with appropriate surfactant.

Chelated copper, Chelated copper*/Reward, Aquathol - subsurface injection from airboat.

Timing and sequence of control application

Three hundred (300) acres of water hyacinths, water primrose and cutgrass treated with Renovate 3, Clearcast, Habitat, Glyphosate, Galleon SC (May-October), Reward (October, November). The initial treatments are to be followed in 1-2 days with a cleanup treatment.

12.50 acres of hydrilla in Foster Creek to be treated 2 times (April-October) with Aquathol.

Hydrilla and fanwort located adjacent to public boat ramp to be treated with chelated copper.

Hydrilla located near the SCE&G water intake to be treated periodically during the year with Chelated copper, Chelated copper*/diquat (up to three times in the same 62.50 acre area), treatment area may be expanded as control is realized in target are

Other control application specifications

Herbicide used only upon approval by the S.C. Department of Health and Environmental Control.

All herbicide treatments conducted within 1600 feet of the CPW water intake will use Renovate 3 at a rate of 0.5 gallons per acre or less or Galleon SC at a rate of 2 to 6 oz/acre. Reward treatments will be conducted at least 1600 feet from the intake. Following any application of Reward within 1600 feet of the CPW water intake, herbicide residue concentrations may be monitored according to a plan agreed to by the S.C. Department of Natural Resources,

Charleston Commissioners of Public Works(CPW), and the Department of Health and Environmental Control.

If filamentous algae are present on submersed macrophytes, an algaecide, such as K-TEA, will be used in addition to selected herbicides to assist in control.

Control is to be applied in a manner that will not significantly degrade water quality in the treatment area. This may involve treating only a portion of the area at any one time.

Entity to apply control agents

Commercial applicator

Estimated cost of control operations

\$45,000

Potential sources of funding

Water primrose and water hyacinths -

Charleston Commissioners of Public Works 30%

S.C. Electric and Gas Co. 20%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Hydrilla and Cabomba (near SCE&G intake) -

S.C. Electric and Gas Co. 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Hydrilla (Foster Creek, boat ramp, and Back River) -

Charleston Commissioners of Public Works 30%

S.C. Electric and Gas Co. 20%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

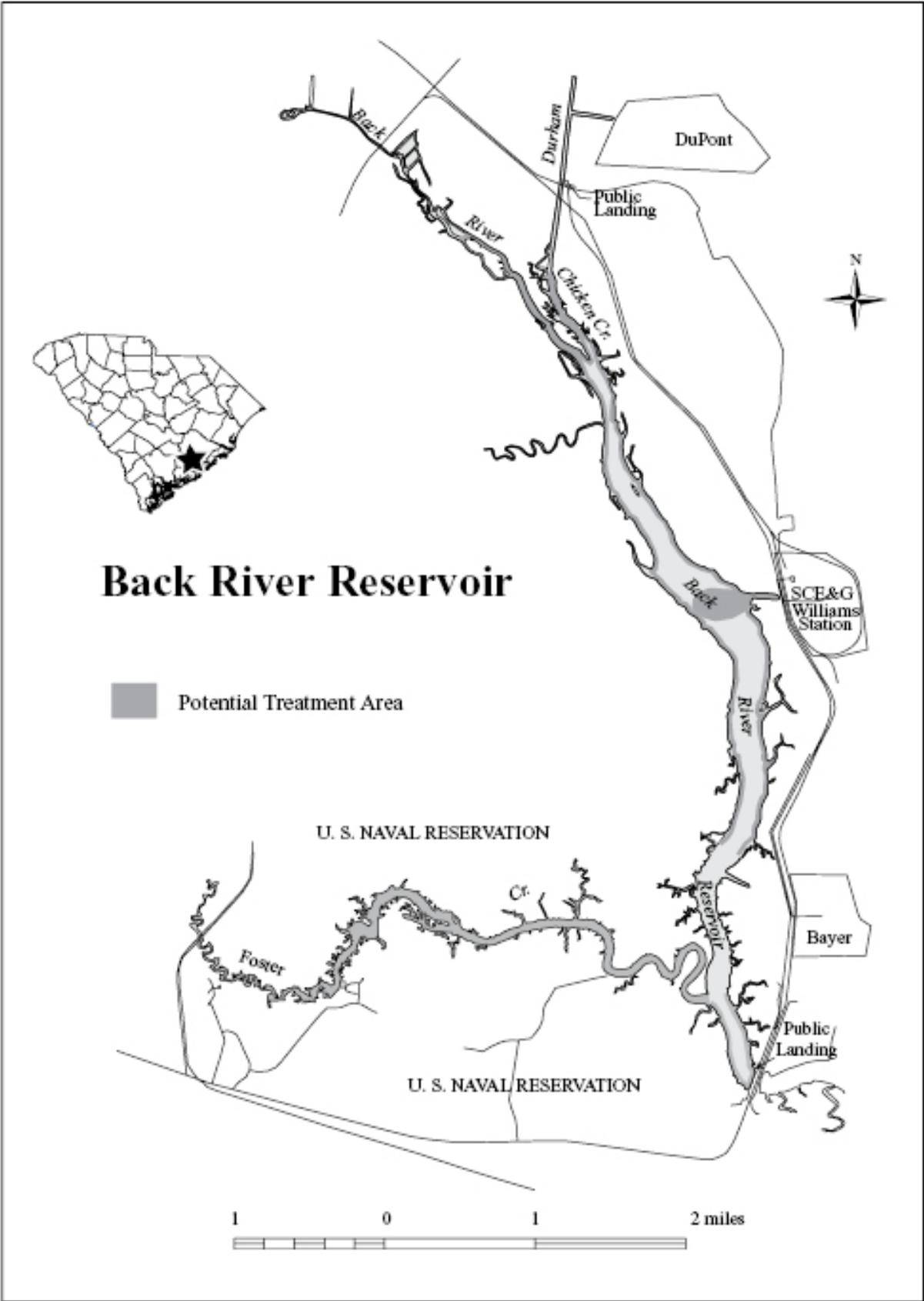
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant

populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Effective long term control of water hyacinth in the reservoir must also include control of this species in the Cooper River to which the reservoir is connected.



2. Baruch Institute (Georgetown County)

Problem plant species

Phragmites

Management objective

Through a comprehensive, multi-year approach; reduce Phragmites populations to the greatest extent possible

Selected control method

Problem Species	Control Agent
Phragmites	Habitat, Glyphosate, Clearcast

Area to which control is to be applied

25 acres of phragmites throughout area

Rate of control agent to be applied

Habitat - 0.250 - 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Clearcast - up to 5 % solution for spot spray.

Method of application of control agent

Helicopter - 25 acres of Habitat, Glyphosate, Clearcast applied to phragmites.

Other applications - Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply when plants are actively growing (July - Oct.).Note: Proceed as funds are available from Baruch Institute.

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$3,000

Potential sources of funding

Baruch Institute 50%

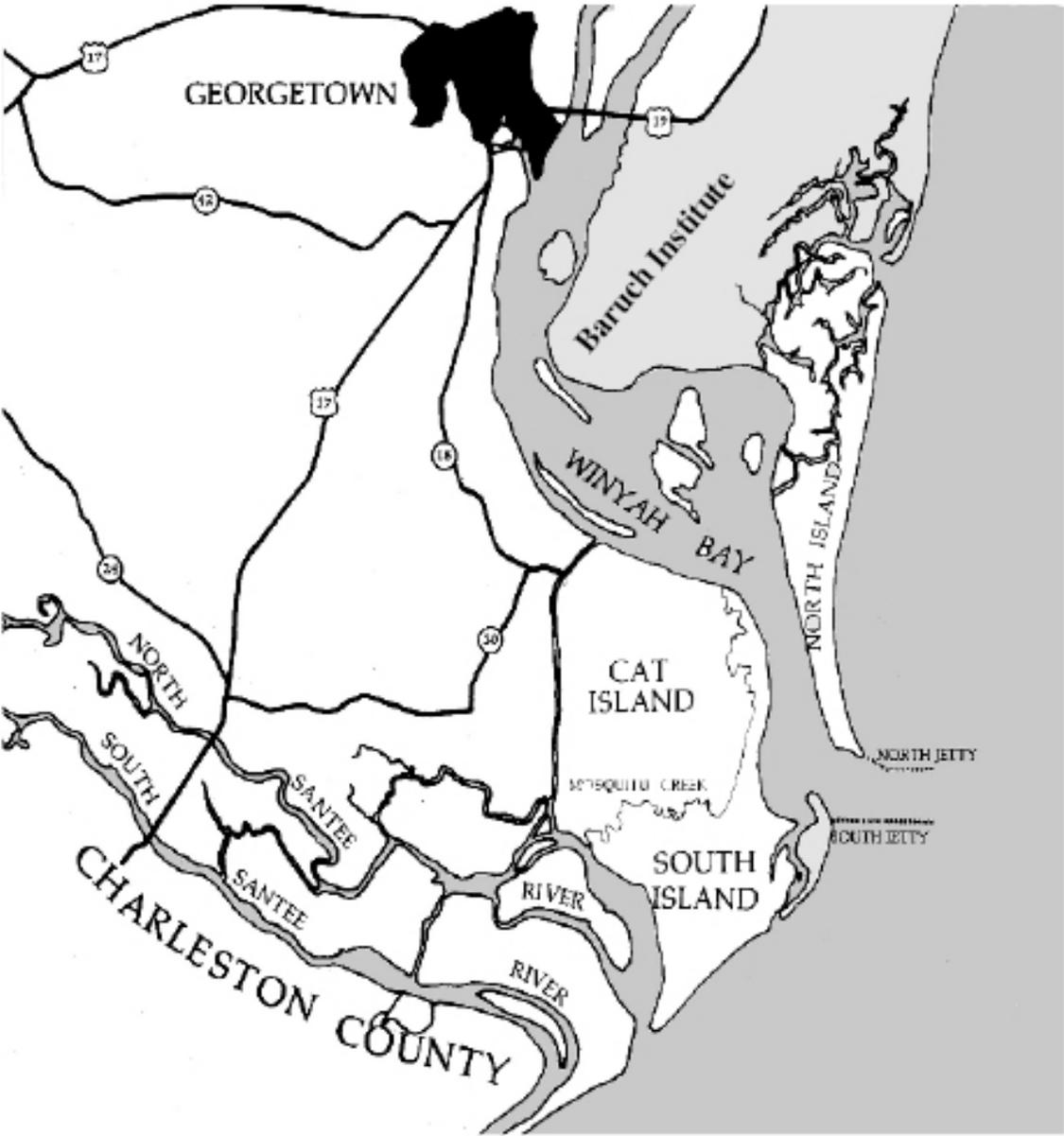
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Continue to coordinate treatment areas with local conservation groups.

Baruch Institute



3. Black Mingo Creek (Georgetown County)

Problem plant species

Alligatorweed, Parrot feather, Frog's bit, Pennywort

Management objective

Reduce or remove nuisance weed infestation at public access points, the main river channel, and connecting lakes to improve water quality and navigation.

Selected control method

Problem Species	Control Agent
Alligatorweed, Pennywort	Renovate 3, Habitat, Clearcast, Glyphosate
Frog's bit, Parrot feather	Reward, Galleon SC

Area to which control is to be applied

5 acres of problematic plants throughout river

Rate of control agent to be applied

Reward - 0.500 gallon per acre.

Renovate 3 - 0.500 to 0.750 gallons per acre.

Habitat - 0.250 - 0.750 gallons per acre.

Clearcast - 1 to 4 pints per acre.

Glyphosate - up to 0.937 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply when plants are actively growing (May - Oct.).

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$900

Potential sources of funding

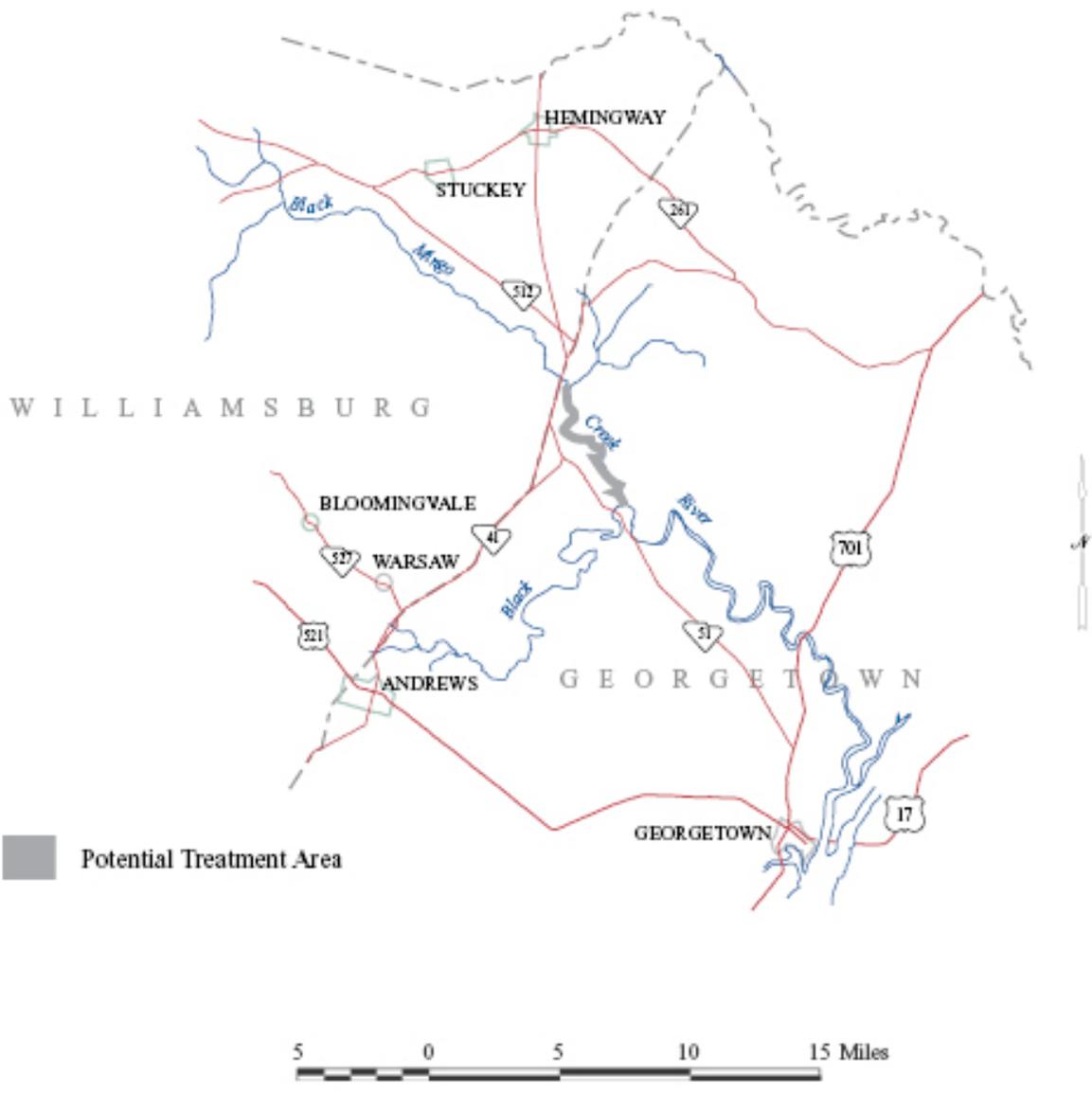
Georgetown County 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Continue to coordinate treatment areas with local conservation groups.

Black Mingo Creek



**4. Black River
(Georgetown County)**

Problem plant species

Alligatorweed, Parrot feather, Frog’s bit, Pennywort, Phragmites

Management objective

Reduce or remove nuisance weed infestation at public access points, the main river channel, and connecting lakes to improve water quality and navigation.

Selected control method

Problem Species	Control Agent
Alligatorweed, Pennywort	Renovate 3, Habitat, Clearcast, Glyphosate
Frog’s bit, Parrot feather	Reward, Galleon SC
Phragmites	Habitat, Clearcast

Area to which control is to be applied

40 acres of problematic plants throughout river

Rate of control agent to be applied

- Reward - 0.500 gallon per acre.
- Renovate 3 - 0.500 to 0.750 gallons per acre.
- Habitat - 0.250 - 0.750 gallons per acre.
- Clearcast - 1 to 4 pints per acre.
- Glyphosate - up to 0.937 gallons per acre.
- Galleon SC - Floating species – 2 to 6 fl oz/acre as foliar application.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply when plants are actively growing (May - Oct.).

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$3,250

Potential sources of funding

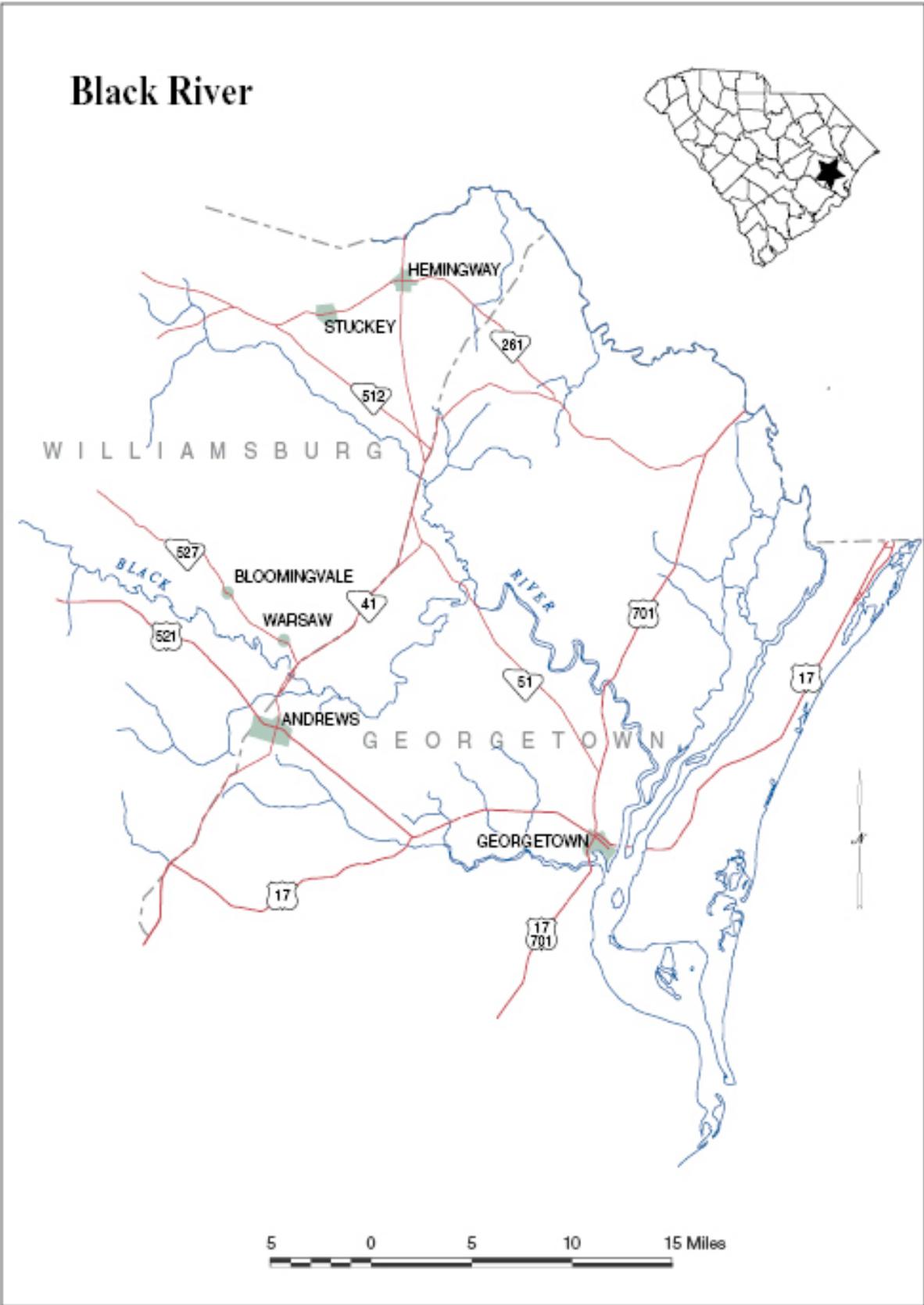
Georgetown County 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Continue to coordinate treatment areas with local conservation groups and State Scenic Rivers Coordinator.



**5. Bonneau Ferry
(Berkeley County)**

Problem plant species

Water Primrose, Water hyacinth, Cattails, Lotus, Cutgrass, Pennywort, Frog’s bit, Parrotfeather

Management objective

Reduce nuisance plant populations to the greatest extent possible throughout Bonneau Ferry impoundments to enhance water quality, water flow, waterfowl habitat, fishing, and hunting opportunities.

Selected control method

Problem Species	Control Agent
Water primrose, Pennywort	Renovate 3, Habitat, Clearcast, Glyphosate
Cattails, Cutgrass, Parrotfeather	Habitat, Clearcast, Glyphosate
Water hyacinth, Frog’s bit	Renovate 3, Reward, Clearcast, and Galleon SC

Area to which control is to be applied

40 acres of problematic plants throughout the reserves and impoundments of Bonneau Ferry.

Rate of control agent to be applied

- Reward - 0.500 gallon per acre.
- Renovate 3 - 0.500 to 0.750 gallons per acre.
- Habitat - 0.250 - 0.750 gallons per acre.
- Clearcast - up to a 5% solution for spot spray.
- Glyphosate - up to 0.937 gallons per acre.
- Galleon SC - Floating species – 2 to 6 fl oz/acre as foliar application, submersed approximately 0.174 gallons/acre foot.

Method of application of control agent

- Helicopter - 20 acres of Habitat, Glyphosate, Clearcast with appropriate surfactant.
- Other applications - Spray on surface of foliage with appropriate surfactant from boat.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$5,750

Potential sources of funding

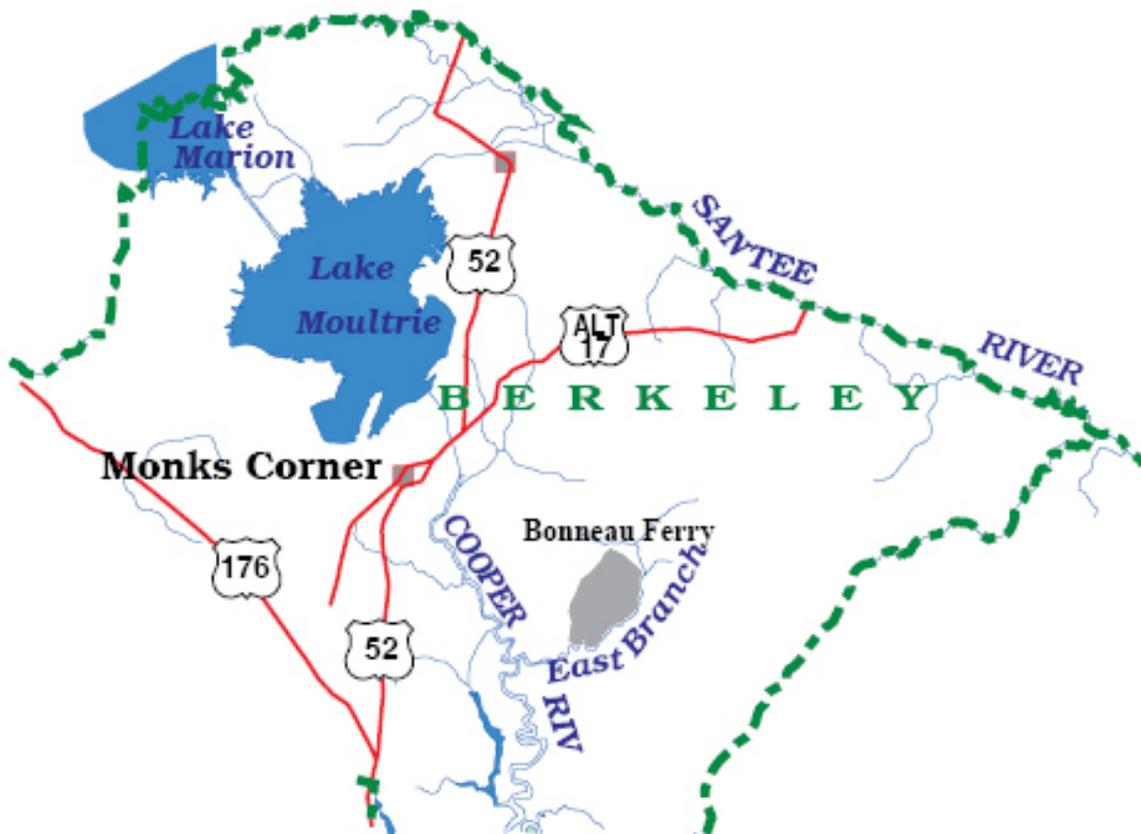
S.C. Department of Natural Resources 100%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

Bonneau Ferry



**6. Charleston County Parks
(Caw Caw Interpretative Center, Laurel Hill Plantation)
(Charleston County)**

Problem plant species

Phragmites, milfoil, waterlily

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Problem Species	Control Agent
Watermilfoil	Hardball, Renovate Max G, Clearcast
Waterlily,	Hardball, Habitat, Glyphosate, Clearcast
Phragmites	Habitat, Glyphosate, Clearcast,

Area to which control is to be applied

5 acres

Rate of control agent to be applied

Habitat - 2 to 3 pints per acre.
Renovate Max G – 200 lbs per acre.
Clearcast - up to 5% solution for spot spray.
Glyphosate - up to 0.937 gallons per acre. Hardball - up to 5 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant and subsurface injection from airboat.
Granular herbicides spread evenly using appropriate rate.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator.

Estimated cost of control operations

\$1,000

Potential sources of funding

Caw Caw Interpretative Center (Charleston Co. Parks) 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

7. Combahee River (Borrow pit) (Colleton County)

Problem plant species

Alligatorweed, Parrot feather, Frog's bit

Management objective

Reduce or remove alligatorweed infestation at public access points, the main river channel, and connecting lakes.

Selected control method

Problem Species	Control Agent
Alligatorweed	Renovate 3, Habitat, Clearcast, Glyphosate
Frog's bit, Parrot feather	Reward, Galleon SC

Area to which control is to be applied

4 acres of problematic plants to be treated 2 times during the growing season.

Rate of control agent to be applied

Reward - 0.500 gallon per acre.

Renovate 3 - 0.500 to 0.750 gallons per acre.

Habitat - 2 to 3 pints per acre.

Clearcast - 1 to 4 pints per acre.

Glyphosate - up to 6 pints per acre.

Galleon SC - Floating species – 2 to 6 fl oz/acre as foliar application.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply when plants are actively growing (May - Oct.).

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$700

Potential sources of funding

Colleton County 50%

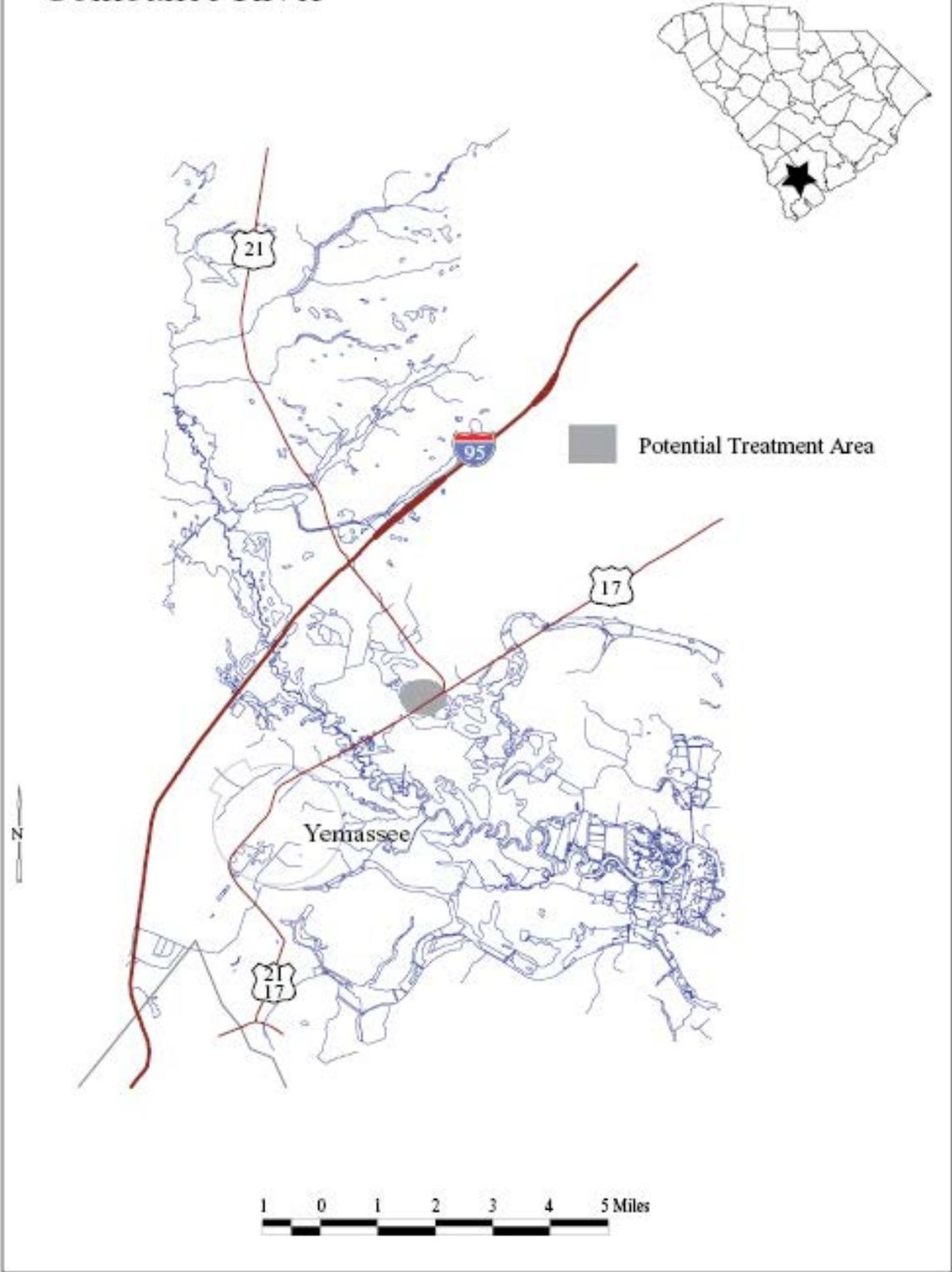
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Continue to coordinate treatment areas with local conservation groups.

Combahee River



8. Cooper River (Berkeley County)

Problem plant species

Hydrilla, Water hyacinth, Water primrose

Management objectives

Reduce water hyacinth populations to the greatest extent possible in the Main River and public ricefields.

Reduce water primrose growth along boat channels to maintain navigation.

Open limited boat trails in hydrilla infested ricefields to enhance public access to the river and selected ricefields.

Selected control method

Problem Species	Control Agent
Water hyacinth	Renovate 3, Reward, Clearcast, Glyphosate, Galleon SC
Water primrose	Renovate 3, Reward, Habitat, Clearcast, Glyphosate
Hydrilla	Chelated copper*

* May be toxic to fish at recommended treatment rates; however, precautions will be implemented to minimize the risk of fish kills.

Area to which control is to be applied

Renovate 3, Reward, Habitat, Clearcast, Glyphosate, Galleon SC - 200 acres of water hyacinth and water primrose throughout river system and in narrow boat channels in French Quarter Creek, Rice Hope Plantation ricefield, and Berkeley Country Club ricefield.

Chelated copper - 48 acres (16 acres treated 3 times yearly, spring and fall) to open boat trails in Pimlico, Berkeley Yacht Club and Rice Hope Plantation ricefields and French Quarter Creek canal.

Rate of control agents to be applied

Habitat - 2 to 4 pints per acre.

Reward - 2 quarts per acre.

Renovate 3 - up to 4 quarts per acre

Clearcast - 1 to 4 pints per acre.

Glyphosate - up to 0.937 gallons per acre.

Chelated copper - up to 1 ppm (about 16 gallons per acre).

Galleon SC - Floating species – 2 to 6 fl oz/acre as foliar application.

Method of application of control agent

Renovate 3, Reward, Habitat, Galleon SC - spray on surface of foliage with appropriate surfactant.

Chelated copper - subsurface injection from airboat.

Timing and sequence of control application

All agents to be applied when plants are actively growing. Chelated copper treatment of boat trails to be conducted as close to low tide as possible to minimize water movement.

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$28,000

Potential sources of funding

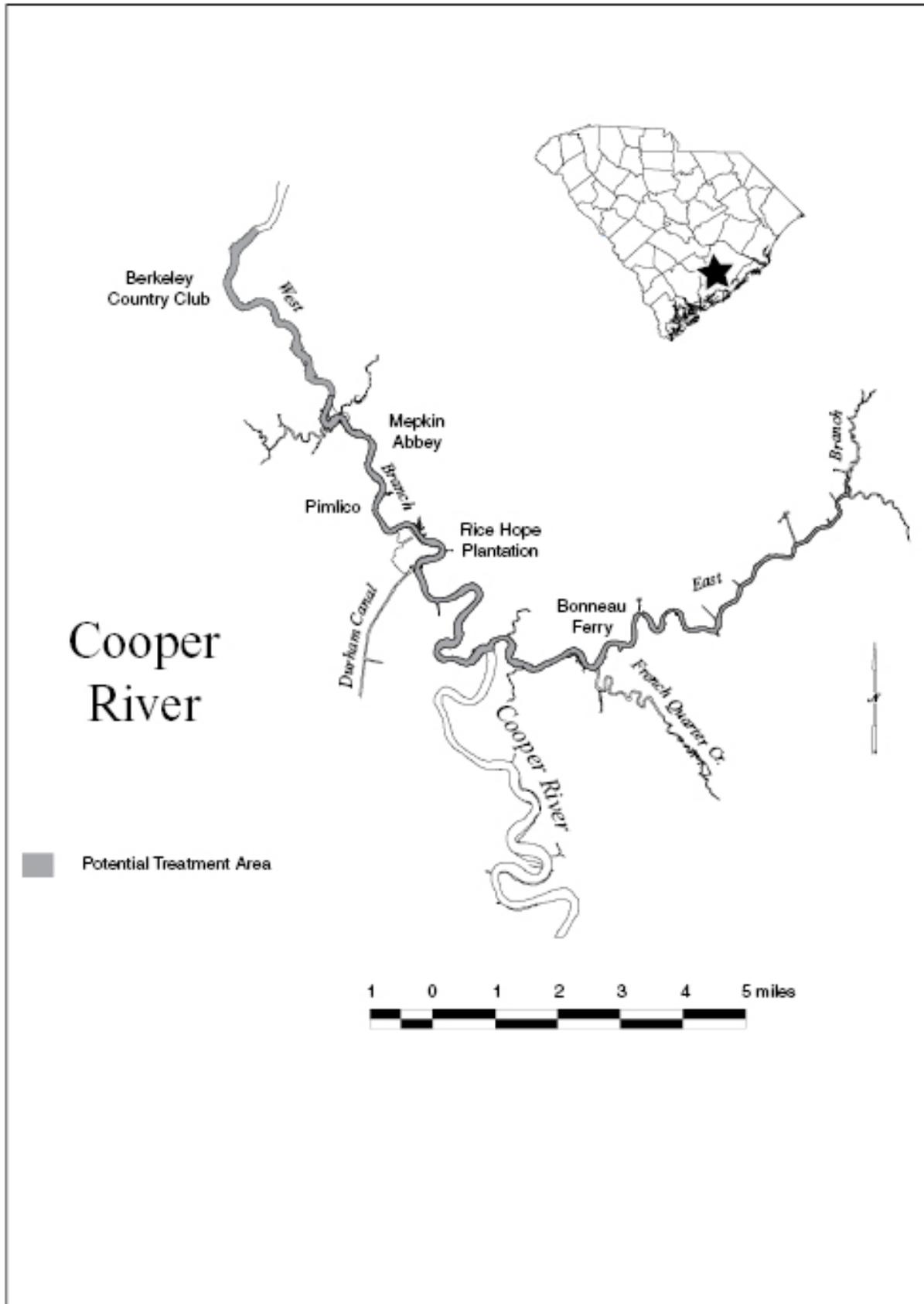
Berkeley County 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Long term management must include consideration of water hyacinth control in many privately owned ricefields to which the public does not have boat access. Water hyacinth from these ricefields can reinfest public areas.



**9. Donnelley WMA/Bear Island WMA/ACE Basin
(Colleton County)**

Problem plant species

Frog’s bit, Cattails, Cutgrass, Phragmites, Swamp loosestrife

Management objective

Reduce problem plant populations to enhance waterfowl habitat, public access and use.

Selected control method

Problem Species	Control Agent
Frog’s bit	Renovate 3, Galleon SC
Phragmites, Cattails	Habitat, Clearcast, Glyphosate
Cutgrass, Swamp loosestrife	Habitat, Clearcast, Glyphosate

Area to which control is to be applied

40 acres of Frog’s bit, Phragmites, Cattails, Cutgrass, and Swamp loosestrife throughout the area.

Rate of control agent to be applied

Renovate 3 - 0.500 to 0.750 gallons per acre

Habitat - 2 to 3 pints per acre.

Clearcast - 1 to 4 pints per acre.

Glyphosate - up to 0.937 gallons per acre.

Galleon SC - Floating species – 2 to 12 fl oz/acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply when plants are actively growing (May - Oct.).

Other control application specifications

Application to be conducted by airboat and helicopter.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$2,900

Potential sources of funding

Donnelley WMA/USF&W 50%

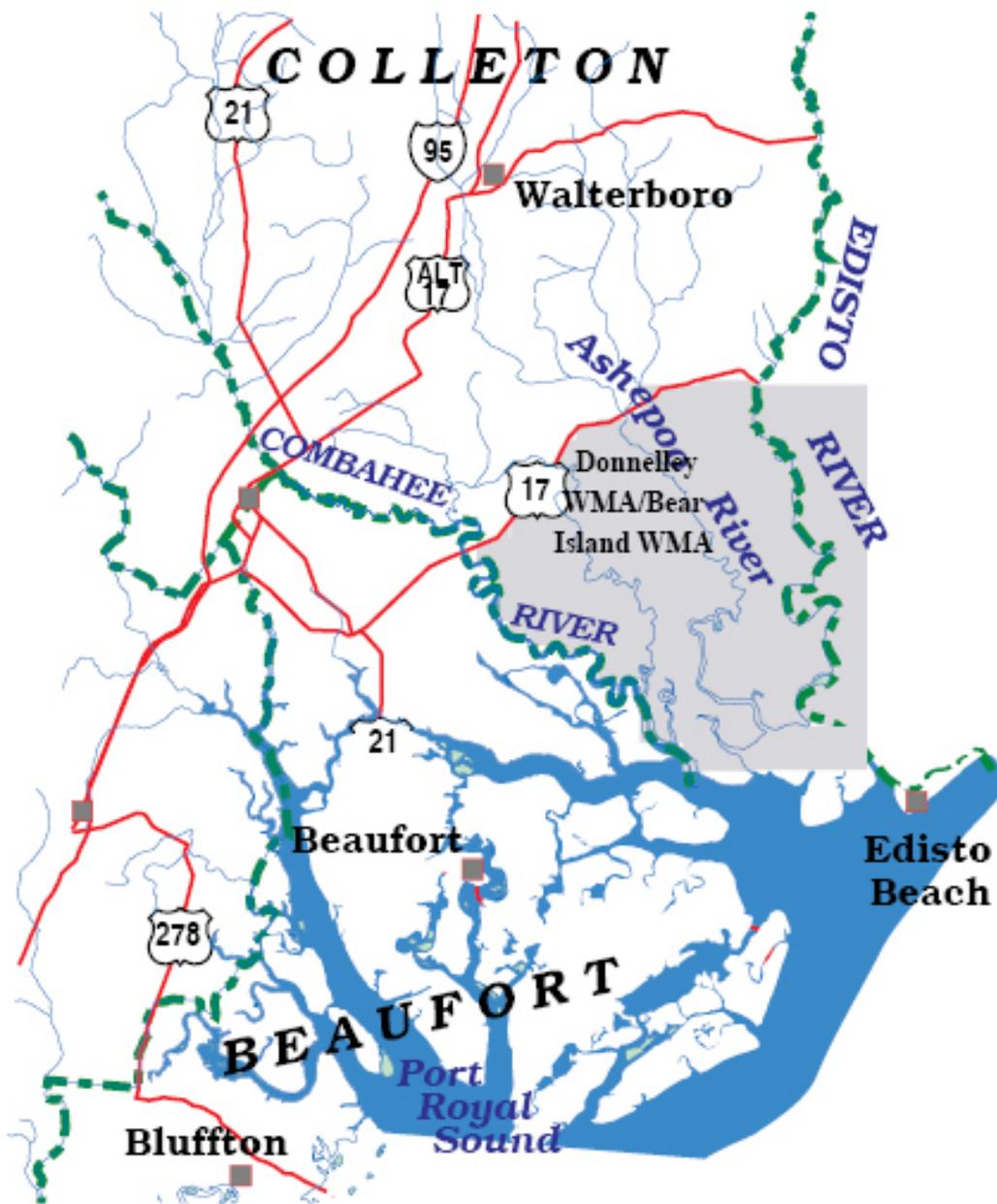
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

Donnelley/Bear Island



10. Dungannon Plantation Heritage Preserve (Charleston County)

Problem plant species

Frog's bit, Cattails, Bur Marigold, Cutgrass, Water Primrose, Swamp loosestrife

Management objective

Reduce problem plant populations to enhance Wood stork nesting habitat, public access and use.

Selected control method

Problem Species	Control Agent
Frog's bit, Water primrose, Bur marigold	Renovate 3, Habitat, Clearcast, Glyphosate, Galleon SC
Cattails	Habitat, Clearcast, Glyphosate
Cutgrass, Swamp loosestrife	Habitat, Clearcast, Glyphosate

Area to which control is to be applied

14 acres of Frog's bit, Water primroses, and Bur marigold

14 acres of Cattails, Cutgrass, and Swamp loosestrife throughout the area.

Rate of control agent to be applied

Renovate 3 - 0.500 to 0.750 gallons per acre.

Habitat - 2 to 3 pints per acre.

Clearcast - 1 to 4 pints per acre.

Glyphosate - up to 6 pints per acre.

Galleon SC - Floating species – 2 to 12 fl oz/acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply when plants are actively growing (May - Oct.).

Other control application specifications

Application to be conducted by airboat and Jon-boat.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$2,000

Potential sources of funding

Donnelley WMA/USF&W 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Enhance aquatic plant communities to benefit waterfowl and to increase nesting activities of Wood storks and other waterfowl.

Dungannon Plantation HP



11. Goose Creek Reservoir (Berkeley County)

Problem plant species

Hygrophila, Water hyacinth, Water primrose, Water lettuce, Hydrilla, Watermilfoil, Fanwort, Salvinia minima, Duckweed

Management objective

Reduce water hyacinth and water lettuce populations to the greatest extent possible throughout the lake.

Reduce water primrose, water lettuce and water hyacinth in the upper portion of the lake to enhance water flow and public access.

Reduce hydrilla growth throughout the lake to minimize its spread within the lake, help prevent its spread to adjacent public waters, and minimize adverse impacts to public use and access.

Reduce duckweed growth throughout populated portions of the lake to minimize adverse impacts to public use and access.

Reduce filamentous algae growth throughout populated portions of the lake to minimize adverse impacts to public use and access.

Maintain diverse aquatic plant community through selective application of control methods.

Selected control method

Problem Species	Control Agent
Water primrose, Hygrophila	Renovate 3, MaxG, Habitat, Clearcast, Glyphosate
Water hyacinth, Water lettuce	Renovate 3, Reward, Galleon SC, Clipper
Watermilfoil, fanwort	Reward, Hardball, Clearcast
Hydrilla, Hygrophila	Aquathol K, chelated copper, triploid grass carp
Duckweed	Sonar, Reward, Galleon SC, Clipper
Filamentous Algae	Captain

Area to which control is to be applied

Renovate 3, Habitat, Clearcast, Glyphosate- 100 acres water primrose in upper reservoir and boat ramp.

Reward - 50 acres of water hyacinth and water lettuce throughout reservoir.

Renovate 3, Reward, Galleon SC - 100 acres of water hyacinth and water lettuce throughout the reservoir.

Reward, Hardball, Galleon SC - 20 acres of submersed growth throughout the reservoir.

Renovate 3, Habitat, Clearcast, Glyphosate, Aquathol – up to 30 acres of Hygrophila throughout the reservoir.

Release triploid grass carp in areas of the lake with greatest hydrilla growth. Grass carp will be released in selected areas, such as boat ramps and park sites, around the reservoir to achieve as even a distribution as practicable.

Sonar, Reward, Galleon SC – 50 acres of duckweed near populated areas of the reservoir.

Captain – 50 acres of filamentous algae near populated areas of the reservoir.

Rate of control agents to be applied

Reward - 0.500 gallon per acre.

Renovate 3 - 0.500 to 0.750 gallons per acre.

Habitat - up to 4 pints per acre.

Clearcast - 1 to 4 pints per acre.

Glyphosate - up to 6 pints per acre.

Hardball - up to 5 gallons per acre.

Clipper – up to 0.09375 gallons per acre

Galleon SC - Submersed 0.174 fl oz/acre foot to achieve minimum effective concentration of 25 to 75 ppb Floating species – 2 to 6 fl oz/acre as foliar application.

*Triploid Grass Carp - 825 fish in the entire reservoir.

*Based on a 32%(825) mortality to maintain existing population.

Method of application of control agents

Renovate 3, Habitat, Glyphosate, Reward, Clipper, Galleon SC - spray on surface of foliage with appropriate surfactant.

Reward, Hardball, Galleon SC - subsurface injection from airboat.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

All agents to be applied when plants are actively growing.

Triploid grass carp to be released as soon as possible in the spring of 2014 (March-May).

RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time. Coordinate all control operations with Charleston Commissioners of Public Works and Goose Creek Reservoir Watershed Task Force.

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments for Goose Creek Reservoir will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake.

The Aquatic Plant Management Council is committed to maintenance stocking of triploid grass carp in Goose Creek Reservoir to provide long-term control of hydrilla. A maintenance stocking plan approved for other water bodies provided for stocking a small number of grass carp, 1 carp

to 8 or 10 surface acres, to control hydrilla while encouraging the expansion of a diverse, native aquatic plant community.

. Hydrilla populations will be carefully monitored and in the event that significant regrowth occurs during the year the Aquatic Plant Management Council may consider the need for additional grass carp or treat with herbicides to give short-term control as needed.

Entity to apply control agents

Herbicides - Commercial Applicator

Triploid Grass Carp - S.C. Public Service Authority and/or a commercial supplier with supervision by the SCDNR.

Estimated cost of control operations

\$34,500

Potential sources of funding

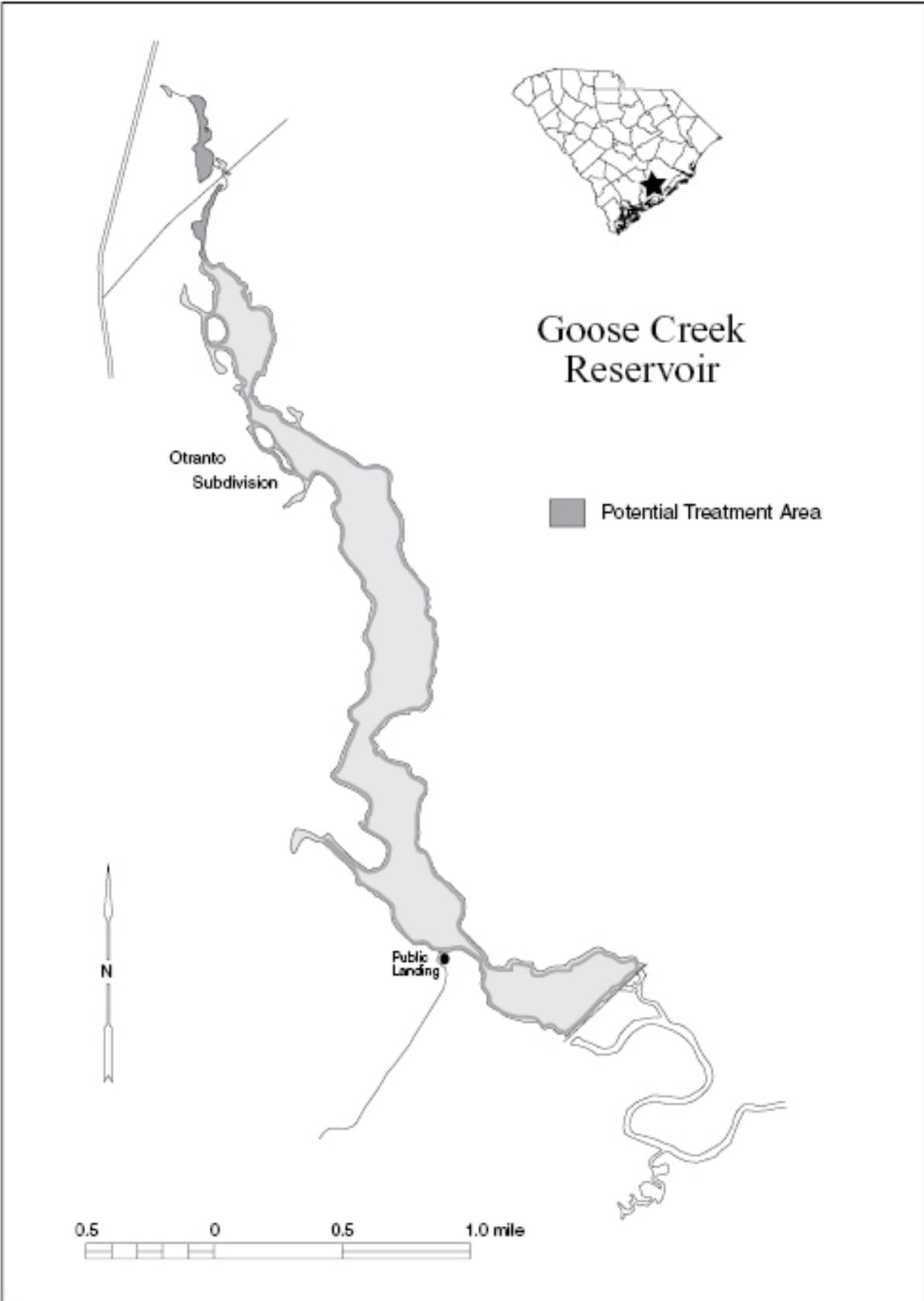
Charleston Commissioner of Public Works 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species



12. Lake Bowen (Spartanburg County)

Problem plant species

Chara

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Triploid grass carp

Chelated copper

Area to which control is to be applied

40 acres in lake.

Rate of control agent to be applied

*Triploid Grass Carp - 155 fish in the entire reservoir.

* Triploid grass carp – Stock to maintain 1 fish per 10 surface acre density when population levels dictate.

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Chelated copper - up to 1 ppm

Method of application of control agents

Chelated copper- subsurface application by airboat.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest chara growth.

Timing and sequence of control application

Herbicide - Apply when plants are actively growing.

Triploid grass carp to be released as soon as possible in the spring of 2014 (March-May).

RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

Other control application specifications

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments for Lake Bowen will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake and additional incremental stockings may be necessary based on the possibility of escape via the outflow at the dam

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$1,400

Potential sources of funding

Spartanburg CPW 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) A long-term integrated management strategy has been implemented to control submersed nuisance species. Triploid grass carp have been stocked to control submersed nuisance species growth lake-wide and approved aquatic herbicides are used to control localized growth in priority use areas. Future plans include annual maintenance stocking of grass carp to maintain the population at a level that is sufficient to maintain control of submersed nuisance species but to minimize impacts on desirable native plant populations.
- d) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- e) Periodically revise the management strategy and specific control sites as new environmental data, management agents and techniques, and public use patterns become available.

**13. Lake Cunningham
(Greenville County)**

Problem plant species

Brazilian elodea, Fragrant water-lily, Water primrose, Spatterdock

Management objective

Reduce nuisance plant populations to the greatest extent possible throughout lake to enhance water quality, water flow, waterfowl habitat, fishing, and hunting opportunities.

Selected control method

Problem Species

Control Agent

Brazilian elodea	Chelated copper, triploid grass carp
Water primrose,	Renovate 3, Habitat, Clearcast,
Fragrant waterlily, spatterdock	Renovate 3, Habitat, Clearcast,

Area to which control is to be applied

8 acres of problematic plants throughout Lake Cunningham.

Rate of control agent to be applied

Renovate 3 - 0.500 to 0.750 gallons per acre.
Habitat - 2 to 3 pints per acre.
Clearcast - 1 to 4 pints per acre.
Chelated copper – up to 1 ppm.
Triploid grass carp – Stock to maintain 1 fish per 10 surface acre density when population levels dictate.

Method of application of control agent

Herbicides spray on surface of foliage with appropriate surfactant from boat or subsurface injection from airboat.
Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest Brazilian elodea growth.

Timing and sequence of control application

Herbicide - Apply when plants are actively growing.
Triploid grass carp to be released as soon as possible in the spring of 2014 (March-May).
RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

Other control application specifications

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments for Lake Cunningham will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake and additional incremental stockings may be necessary based on the possibility of escape via the outflow at the dam

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$2,000

Potential sources of funding

Greer CPW 50%
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) A long-term integrated management strategy has been implemented to control Brazilian elodea. Triploid grass carp have been stocked to control Brazilian elodea growth lake-wide and approved aquatic herbicides are used to control localized growth in priority use areas. Future plans include annual maintenance stocking of grass carp to maintain the population at a level that is sufficient to maintain control of Brazilian elodea but to minimize impacts on desirable native plant populations.
- d) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- e) Periodically revise the management strategy and specific control sites as new environmental data, management agents and techniques, and public use patterns become available.

Lake Cunningham



14. Lake Greenwood (Greenwood and Laurens County)

Problem plant species

Slender naiad, Hydrilla, Water primrose

Management objectives

Maintain reduced hydrilla growth throughout the lake to minimize its spread within the lake, help prevent its spread to adjacent public waters, and minimize adverse impacts to drinking water withdrawals and public use and access.

Monitor water primrose growth and consider control options if impacts are greater than anticipated.

Maintain diverse aquatic plant community through selective application of control methods and introduction of desirable native plant species.

Selected control method

Triploid grass carp stocked in previous years have substantially reduced hydrilla coverage in Lake Greenwood through 2012. Consequently, no additional grass carp stockings are planned for these areas in 2014. However, hydrilla regrowth will be carefully monitored and in the event that survey results and regrowth warrant, the Aquatic Plant Management Council may reconsider the need for additional grass carp.

Aquatic herbicides - selected areas of water primrose infestation to provide public access.

Problem Species

Slender naiad, Hydrilla

Water primrose

Control Agent

Aquathol K, Sonar, Triploid Grass Carp, chelated copper*

Renovate 3, Glyphosate, Habitat, Clearcast

Area to which control is to be applied

If needed, release triploid grass carp in areas of the lake with greatest hydrilla growth.

Use aquatic herbicides to provide control at high priority public access points, such as boat ramps and park sites

Rate of control agents to be applied

Aquathol K - 0.500 to 4 ppm (about 3 to 8 gallons per acre depending on depth)

Habitat – 0.250 – 0.750 gallons per acre

Clearcast - -up to 5% spot spray

Sonar - 0.075 to 0.250 ppm

Chelated Copper- up to 1 ppm

Sonar Q, Sonar PR - up to .40 ppm (approx 10 pounds/acre)

Triploid Grass Carp – Stock to maintain 1 to 10 surface acres density when population dictates.

Method of application of control agents

Aquathol K, Sonar, chelated copper* - Subsurface application by airboat with adjuvant.

Renovate 3, Glyphosate, Habitat, Clearcast - spray on surface of foliage with appropriate surfactant.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

Agent to be applied when plants are actively growing.

Agent to be applied to hydrilla when plants are actively growing but prior to tuber production.

Triploid grass carp to be released as soon as possible in the spring of 2014 (March-May).

Other control application specifications

Herbicide used only upon approval by the S.C. Department of Health and Environmental Control.

Treatment of control area is to be conducted in a manner that will not significantly degrade water quality. Survey and final determination of treatment areas to be conducted in conjunction with the South Carolina Department of Natural Resources district fisheries biologist. In general, treatment will be limited to developed shoreline areas, public access sites, and areas of high public use.

Hydrilla may require multiple treatments.

Entity to apply control system

Commercial applicator

Estimated cost of control operations

\$6,000

Potential sources of funding

Greenwood County 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

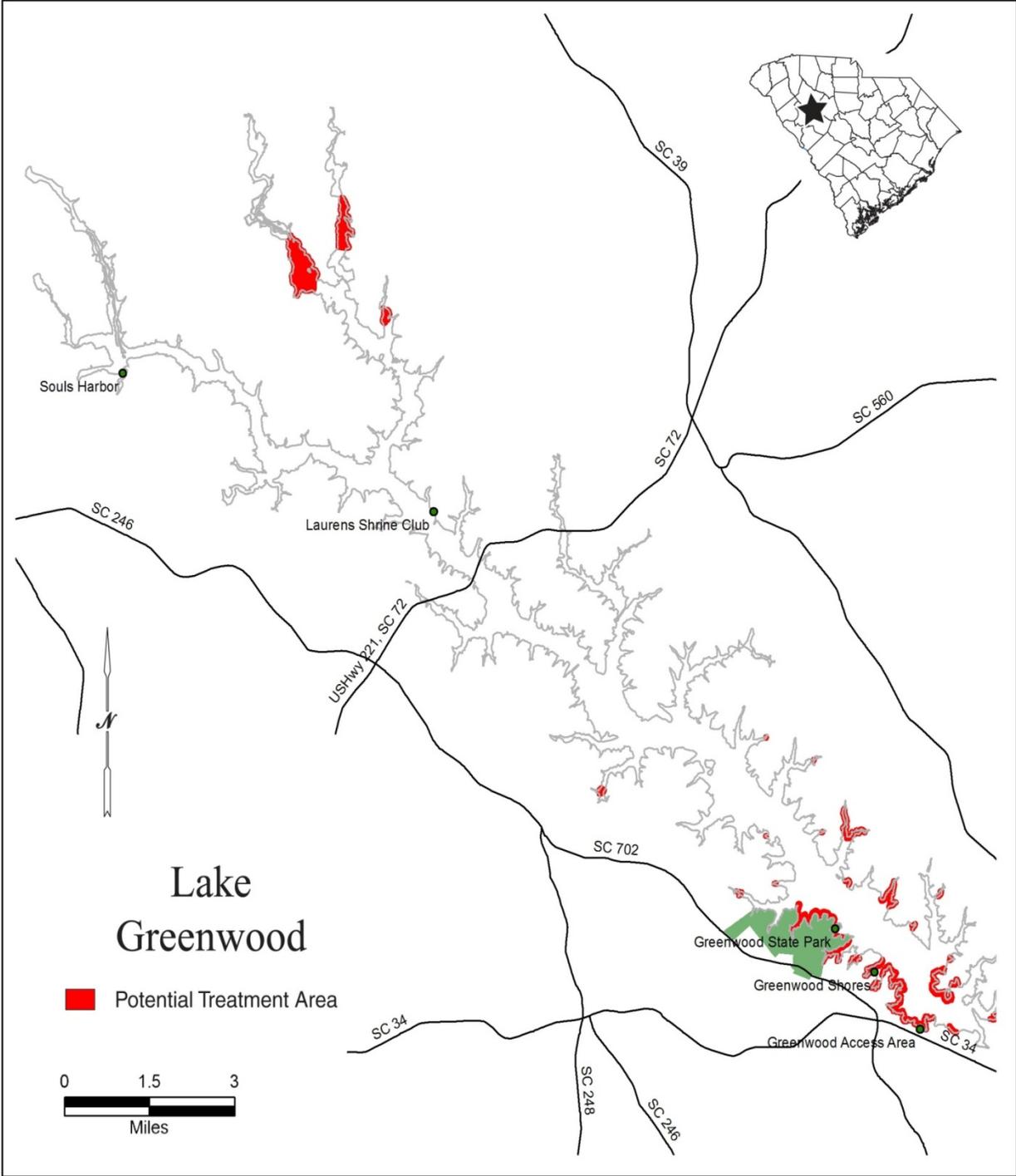
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant

populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.



15. Lake Keowee (Pickens and Oconee County)

Problem plant species

Hydrilla

Management objectives

Keep hydrilla growth suppressed to minimize its spread within the lake, help prevent its spread to adjacent public waters and minimize adverse impacts to water use activities.

Selected control method

Chelated copper *

Fall/winter water level drawdown

* May be toxic to fish at recommended treatment rates; however, precautions will be implemented to minimize the risk of fish kills.

Area to which control is to be applied

Chelated copper - 5 acres

Drawdown - entire lake

Rate of control agent to be applied

Chelated copper - up to 1 ppm (about 16 gallons per acre)

Drawdown - to the greatest extent possible within project limits.

Method of application of control agent

Chelated copper - subsurface injection by airboat with adjuvant.

Drawdown - draw lake down.

Timing and sequence of control application

Herbicide application - when plants are actively growing.

Drawdown - Drawdown Lake from October through February.

Other control application specifications

Herbicide application - Herbicide used only upon notification of all local potable water supply authorities and approval by S.C. Department of Health and Environmental Control. Treatment of control area will be conducted in a manner that will not significantly degrade water quality.

Drawdown - Extent and duration of drawdown is dependent on operational limits of hydroelectric project, Federal regulations, electric demand, precipitation, and inflow.

Entity to apply control system

Herbicide application - Commercial applicator or Duke Power Company

Drawdown - Duke Power Company

Estimated cost of control operations

Herbicide application - \$0.00 (Hydrilla has not been observed in several years on Lake Keowee, therefore no applications are needed at this time.)

Drawdown - Undetermined

Potential sources of funding

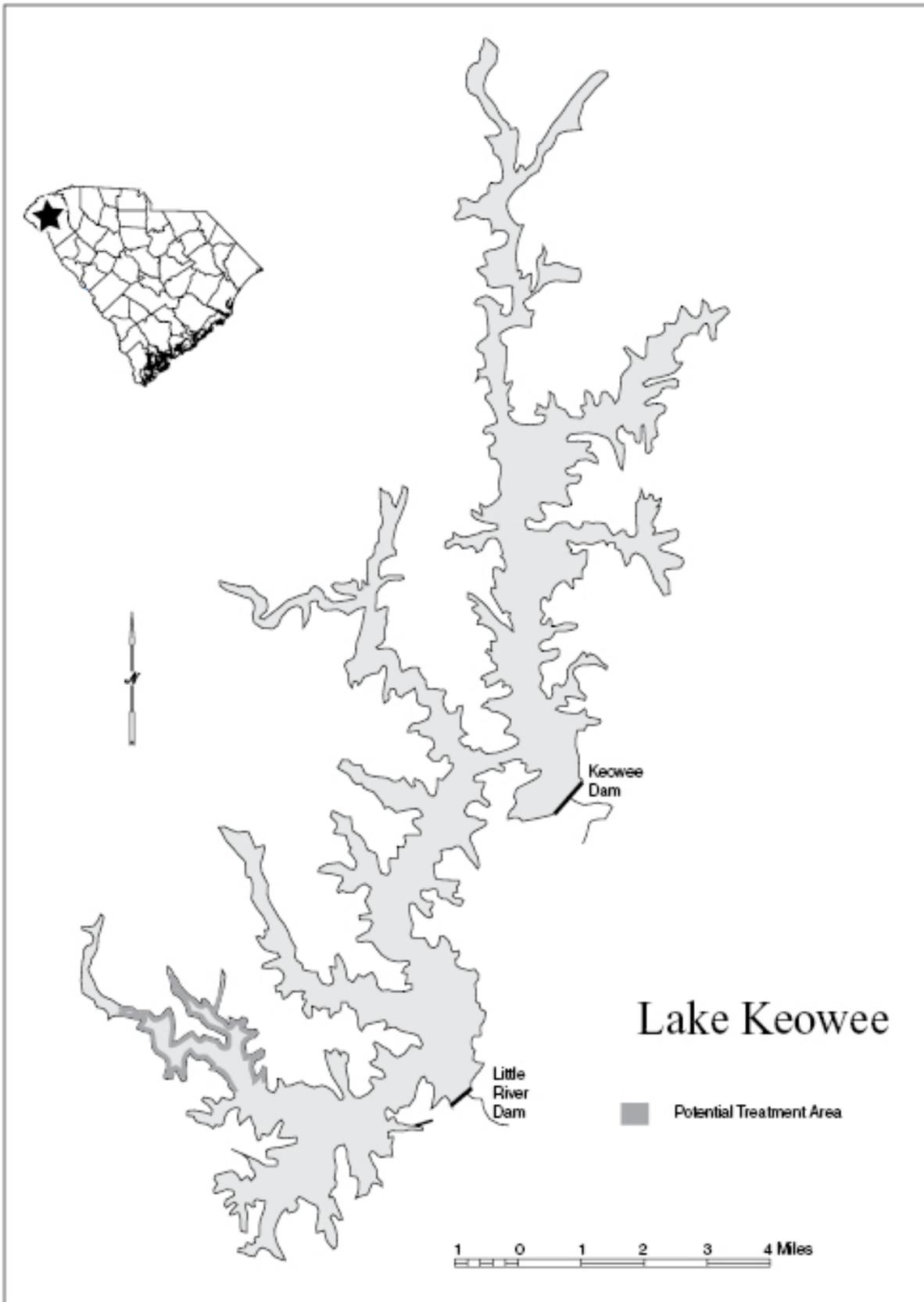
Duke Power Company 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.



16. Lake Monticello (Recreation Lake) (Fairfield County)

Problem plant species

Hydrilla

Management objectives

Manage hydrilla growth throughout the Recreation Lake section to minimize its spread to Lake Monticello, help prevent its spread to adjacent public waters, and minimize adverse impacts to agricultural irrigation withdrawals, and public use and access.

Selected control method

Problem Species

Hydrilla

Control Agent

Aquathol K, Sonar, Triploid Grass Carp,
chelated copper*

Area to which control is to be applied

Hydrilla - Stock Triploid Grass Carp at maintenance rates (1 per 10 acres- 30 carp) to provide long term control option.

Rate of control agents to be applied

Aquathol K - 0.500 to 4 ppm (about 3 to 8 gallons per acre depending on depth)

Sonar - 0.075 to 0.250 ppm

Chelated Copper- up to 1 ppm

Sonar Q, Sonar PR - up to .40 ppm (approx 10 pounds/acre)

Triploid Grass Carp – Perform maintenance stocking in future years (1 per 10 acres- 30 carp) to provide long term control option.

Method of application of control agents

Aquathol K, Sonar, chelated copper* - Subsurface application by airboat with adjuvant.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

Agent to be applied to hydrilla when plants are actively growing but prior to tuber production.

Maintenance stocking of Triploid grass carp to be released in subsequent years as population dictates. RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

Other control application specifications

Herbicide used only upon approval by the S.C. Department of Health and Environmental Control.

Treatment of control area is to be conducted in a manner that will not significantly degrade water quality. Survey and final determination of treatment areas to be conducted in conjunction with the South Carolina Department of Natural Resources district fisheries biologist.

In general, treatment will be limited to developed shoreline areas, public access sites, and areas of high public use.

Hydrilla may require multiple treatments.

Entity to apply control system

Commercial applicator

Estimated cost of control operations

\$0

Potential sources of funding

Triploid grass carp

S.C. Electric and Gas Company, Lexington and Richland Counties 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

Mechanical harvester, S.C. Electric and Gas Company, Commercial marina operators, and residential property owners.

Aquatic herbicides

S.C. Electric and Gas Company, Lexington and Richland Counties 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

17. Lake Murray (Lexington, Newberry, Richland and Saluda Counties)

Problem plant species

Hydrilla, Water Primrose

Management objectives

Minimize hydrilla growth throughout the lake to prevent its spread within the lake, help prevent its spread to adjacent public waters, and avoid adverse impacts to drinking water withdrawals and public use and access.

Monitor water primrose growth and consider control options if impacts are greater than anticipated.

Maintain diverse aquatic plant community through selective application of control methods and introduction of desirable native plant species.

Selected control method

Triploid grass carp – stock 1,100 sterile grass carp yearly to maintain a 1 carp to 10 surface acre ratio.

Aquatic herbicides - selected areas of water primrose infestation to provide public access.

Problem Species	Control Agents
Hydrilla	Chelated copper (Nautique)
Water primrose	Renovate 3, Habitat, Clearcast

Area to which control is to be applied

Release approximately one-half of the triploid grass carp on the north side of the lake and one-half on the south side.

Use aquatic herbicides to provide control at high priority public access points, such as boat ramps and park sites.

Rate of control agent to be applied

1,100 sterile grass carp to maintain a density of 1 grass carp per 10 surface acres (4,800 fish).

Water primrose treatment:

Renovate 3 - 0.500 to 0.750 gallons per acre.

Habitat - 2 to 4 pints per acre.

Clearcast - 1 to 4 pints per acre.

Method of application of control agent

Triploid grass carp - See section 3 above.

All agents to be applied when plants are actively growing.

Timing and sequence of control application

Additional grass carp should be stocked in the spring following Council approval.

Apply herbicides to aquatic vegetation as it becomes problematic.

Other control application specifications

If needed, all sterile grass carp will be a minimum of 12 inches in length. All sterile grass carp shipments for Lake Murray will be examined by the SCDNR for sterility, size, and condition at the Campbell Fish Hatchery in Columbia prior to stocking in the lake.

Control by Residential/Commercial Interests:

This plan is designed to provide relief from noxious aquatic vegetation for the public at large. Private entities such as lake-front residents and commercial interests may have site specific concerns not addressed immediately by the use of grass carp or mechanical harvesters at public access areas. Residential and commercial interests may remove nuisance aquatic vegetation manually or by use of mechanical harvesting devices. Of the three major control methods the following conditions apply.

- 1) Mechanical harvesters – Commercial aquatic plant harvesting services may be hired to remove hydrilla and Illinois pondweed from areas adjacent to residential and commercial property after notification of SCE&G. Harvesting precautions as stated in item above must be adhered to.
- 2) Aquatic herbicides – SCE&G opposes regular or general application of herbicides in Lake Murray, therefore, aquatic herbicides may not be applied in the lake by lake front property owners.
- 3) Sterile grass carp - A sufficient number of grass carp have been stocked by SCDNR to control nuisance aquatic vegetation. Stocking additional grass carp in Lake Murray without written consent by the SCDNR is prohibited.

Entity to apply control agent

Triploid grass carp - Commercial supplier with supervision by the SCDNR.

Aquatic herbicides - Commercial applicator under supervision by the SCDNR.

Estimated cost of control operations

Triploid grass carp - \$8000

Aquatic herbicides - \$0

Potential sources of funding

Triploid grass carp if needed.

S.C. Electric and Gas Company, Lexington and Richland Counties 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

Mechanical harvester, S.C. Electric and Gas Company, Commercial marina operators, and residential property owners.

Aquatic herbicides

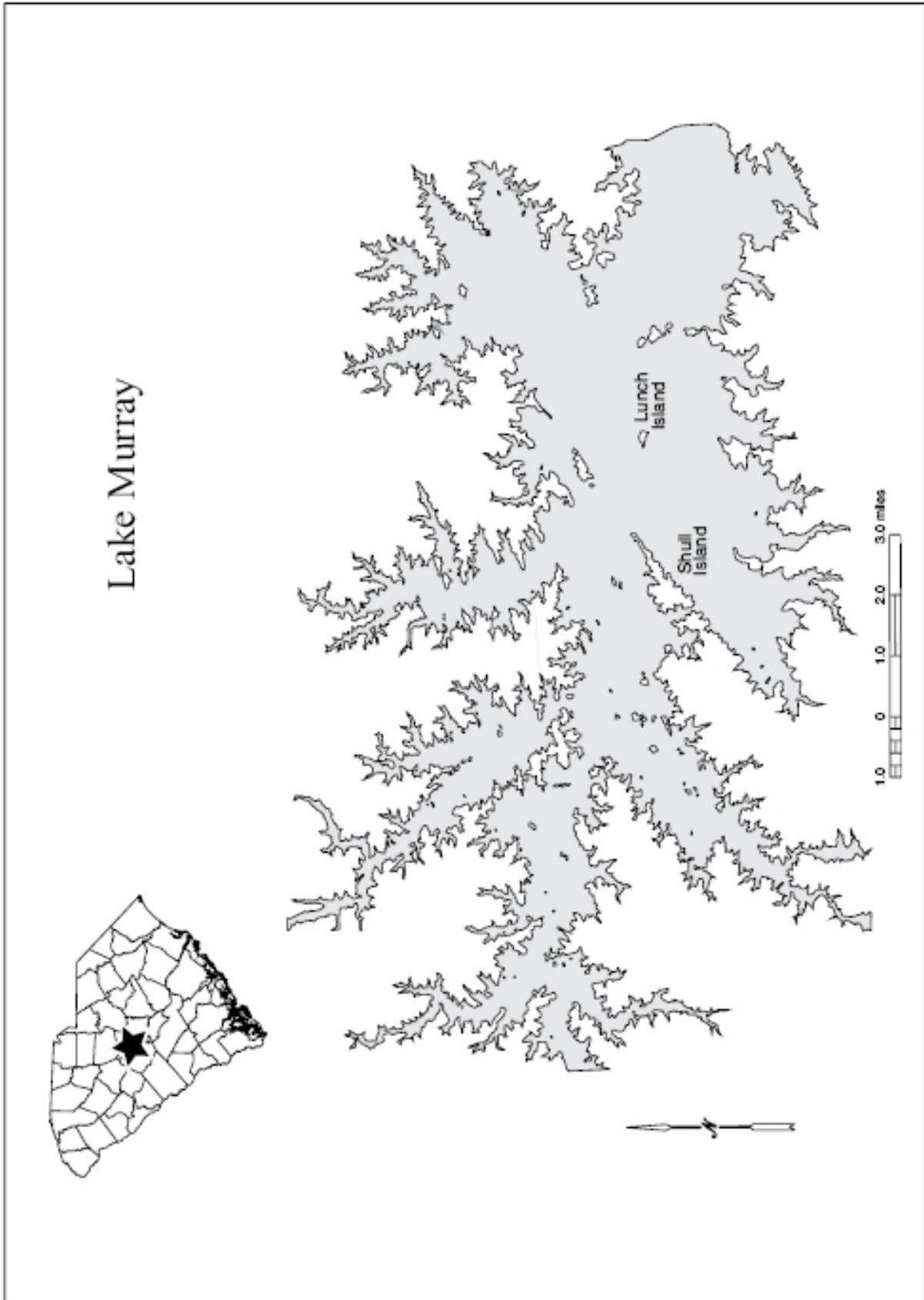
S.C. Electric and Gas Company, Lexington and Richland Counties 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Improve public awareness and understanding of aquatic plant management activities through the maintenance of the Lake Murray Aquatic Plant Management web site. The web site includes up-to-date information on annual management plans, dates and locations of current and historical control operations, locations of habitat enhancement activities, and other pertinent information.
- e) Periodically revise the management strategy and specific control sites as new environmental data and control agents and techniques become available and public use patterns change.



18. Lake Wateree (Fairfield, Kershaw and Lancaster Counties)

Problem plant species

Hydrilla, Filamentous algae

Management objective

Keep hydrilla growth suppressed to prevent its spread within the lake, help prevent its spread to adjacent public water, and minimize adverse impacts to water use activities.

Maintain diverse aquatic plant community through selective application of control methods and introduction of desirable native plant species.

Selected control method

Fall/winter water level drawdown

Aquatic herbicides - selected areas of invasive plant infestation to provide public access.

Problem Species

Hydrilla

Filamentous algae

Control Agent

Aquathol K, Sonar, Triploid Grass Carp,
chelated copper*

Chelated copper

Area to which control is to be applied

Use aquatic herbicides to provide control at high priority public access points, such as boat ramps and park sites

Drawdown - Entire Lake

Rate of control agent to be applied

Aquathol K – up to 4 ppm (about 8 gallons per acre depending on depth)

Sonar - 0.075 to 0.250 ppm

Chelated Copper- up to 1 ppm

Sonar Q, Sonar PR - up to .40 ppm (approx 10 pounds/acre)

Drawdown - To the greatest extent possible within project limits.

Method of application of control agent

Aquathol K, Sonar, chelated copper* - Subsurface application by airboat with adjuvant.

Chelated copper - spray on surface of foliage with appropriate surfactant.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Drawdown - Draw lake down

Timing and sequence of control application

Agent to be applied when plants are actively growing.

Agent to be applied to hydrilla when plants are actively growing but prior to tuber production.

Drawdown - Drawdown lake from October through February.

Other control application specifications

Herbicide used only upon notification of all local potable water supply authorities and approval by S.C. Department of Health and Environmental Control. Treatment of control area will be conducted in a manner that will not significantly degrade water quality.

Drawdown - Extent and duration of drawdown is dependent on operational limits of hydroelectric project, Federal regulations, electric demand, precipitation, and inflow.

Entity to apply control agent

Herbicide application - Commercial applicator or Duke Power Company

Drawdown - Duke Power Company

Estimated cost of control operations

Herbicide application - \$0.00 (Hydrilla has not been observed in several years on Lake Wateree, therefore no applications are needed at this time.)

Drawdown - Undetermined

Potential sources of funding

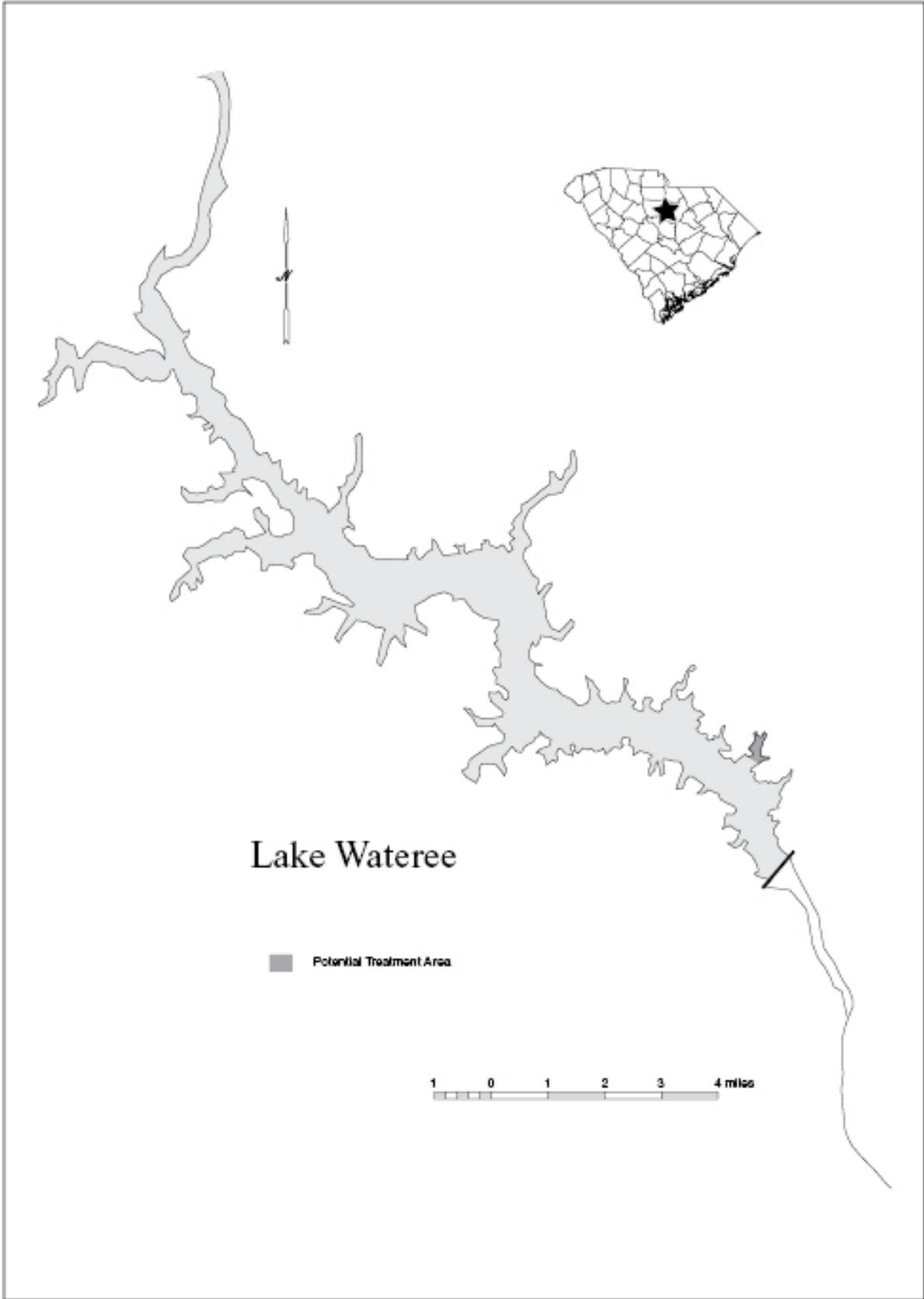
Duke Power Company 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.



**19. Little Pee Dee River
(Marion and Horry Counties)**

Problem plant species

Alligatorweed, Water hyacinth

Management objective

Through a comprehensive, multi-year approach; reduce water hyacinth and alligatorweed populations to the greatest extent possible

Selected control method

Problem Species	Control Agent
Water hyacinth	Renovate 3, Reward, Clearcast, Glyphosate, Galleon SC
Alligatorweed	Renovate 3, Reward, Habitat, Clearcast, Glyphosate
Biological Control -	Alligatorweed flea beetles, <i>Agasicles hygrophila</i>

Area to which control is to be applied

30 acres of alligatorweed and water hyacinth throughout river

Rate of control agent to be applied

- Habitat - 0.250 to 0.750 gallons per acre.
- Reward - 0.500 gallons per acre.
- Renovate 3 - 0.250 to 0.750 gallons per acre.
- Clearcast - 0.125 to 0.750 gallons per acre.
- Glyphosate - up to 0.937 gallons per acre.
- Galleon SC - 2 to 6 fluid ounces per acre as foliar application.

Method of application of control agent

- Herbicide - Spray on surface of foliage with appropriate surfactant.
- Biological Control - Release in the vicinity of alligatorweed populations to supplement existing populations of alligatorweed flea beetles

Timing and sequence of control application

Apply after plants are actively growing (May - Oct.).

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$1,500

Potential sources of funding

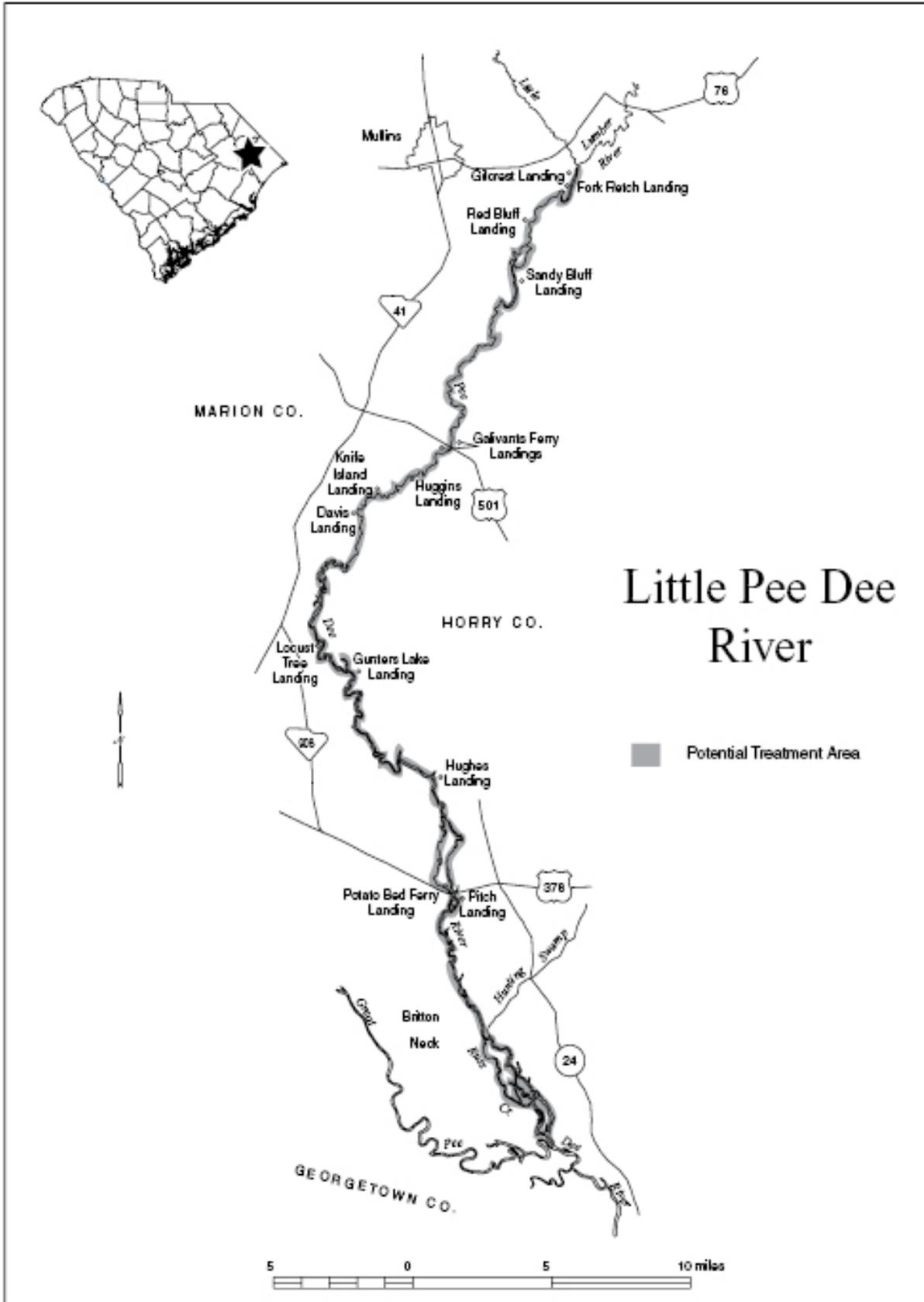
Horry and Marion Counties 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Continue to coordinate treatment areas with local conservation groups and State Scenic Rivers Coordinator.



20. Lumber River (Marion and Horry Counties)

Problem plant species

Alligatorweed

Management objective

Reduce or remove alligatorweed infestation at public access points, the main river channel, and connecting lakes.

Selected control method

Herbicides - Renovate 3, Habitat, Clearcast, Glyphosate, Galleon SC

Biological Control - Alligatorweed flea beetles, *Agasicles hygrophila*

Area to which control is to be applied

20 5acres of problematic plants throughout river

Rate of control agent to be applied

Renovate 3 - 0.500 to 0.750 gallons per acre.

Habitat - 0.250 to 0.750 gallons per acre.

Clearcast - 0.250 to 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Galleon SC - 2 to 6 fluid ounces per acre as foliar application.

Method of application of control agent

Herbicide - Spray on surface of foliage with appropriate surfactant.

Biological Control - Release in the vicinity of alligatorweed populations to supplement existing populations of alligatorweed flea beetles

Timing and sequence of control application

Apply after plants are actively growing (May - Oct.).

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$500

Potential sources of funding

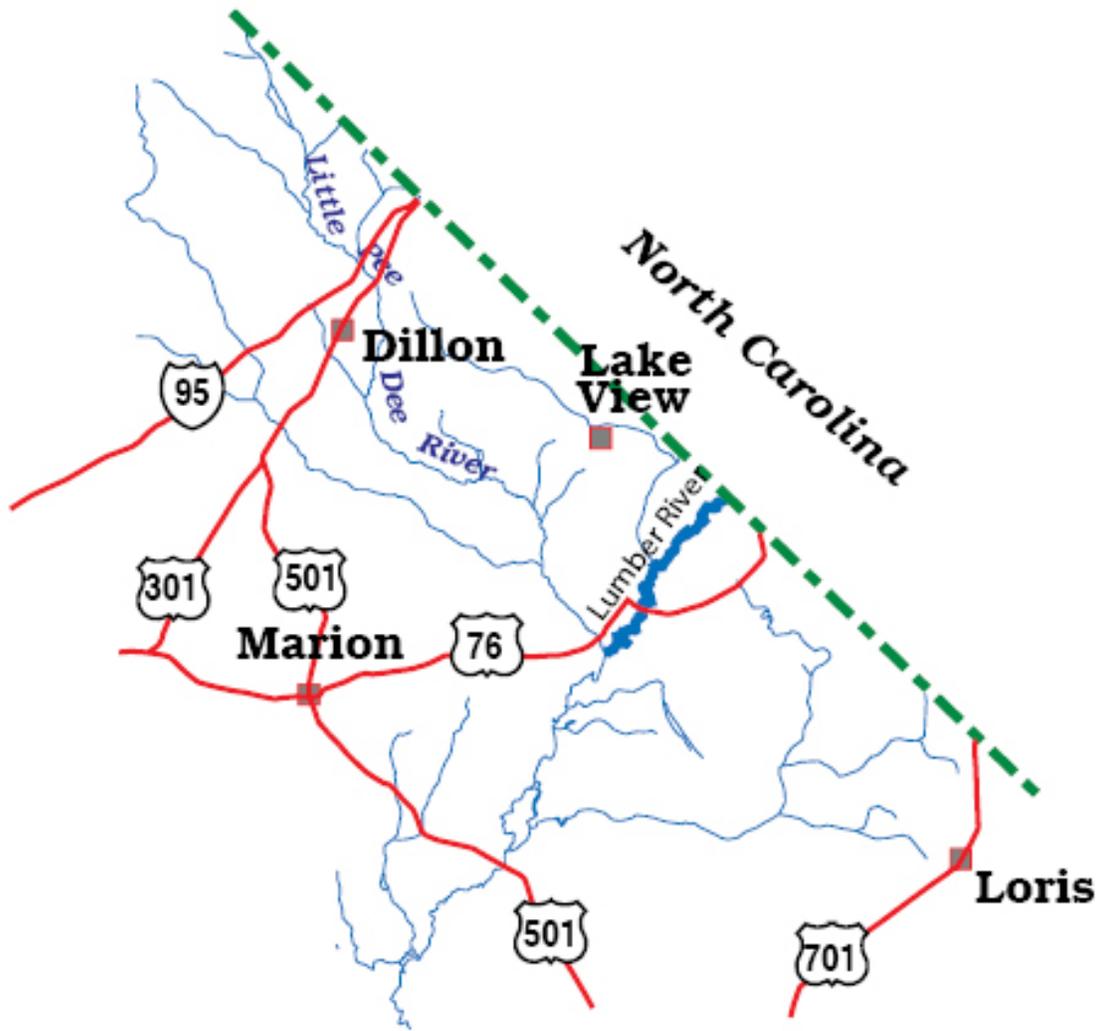
Horry and Marion Counties 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Continue to coordinate treatment areas with local conservation groups and State Scenic Rivers Coordinator.

Lumber River



21. Pee Dee River (Georgetown County)

Problem plant species

Water hyacinth, Phragmites

Management objective

Through a comprehensive, multi-year approach; reduce water hyacinth and Phragmites populations to the greatest extent possible

Selected control method

Problem Species	Control Agents
Water hyacinth	Reward, Renovate 3, Clearcast, Habitat, Galleon SC
Phragmites	Habitat, Glyphosate, Clearcast

Area to which control is to be applied

25 acres of water hyacinth throughout river and adjacent public ricefields.

5 acres of phragmites in the Sandy Island area.

Rate of control agent to be applied

Reward - 0.500 gallons per acre.

Glyphosate – up to 0.937 gallons per acre

Renovate 3 - 0.500 to 0.750 gallons per acre.

Habitat - 0.250 to 0.750 gallons per acre.

Clearcast - 0.250 to 0.750 gallons per acre.

Galleon SC - 2 to 6 fluid ounces per acre as foliar application.

Method of application of control agent

Helicopter, airboat - 35 acres of herbicide applied to water hyacinth (Sandy Island Area 10 acres). 5 acres of Habitat applied to phragmites (Sandy Island Area 5 acres).

Timing and sequence of control application

Reward, Renovate 3, Clearcast, Habitat, Glyphosate, Galleon SC - to be applied periodically to water hyacinth from May through October.

Habitat, Clearcast, Glyphosate - Apply when plants are actively growing.

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$5,500

Potential sources of funding

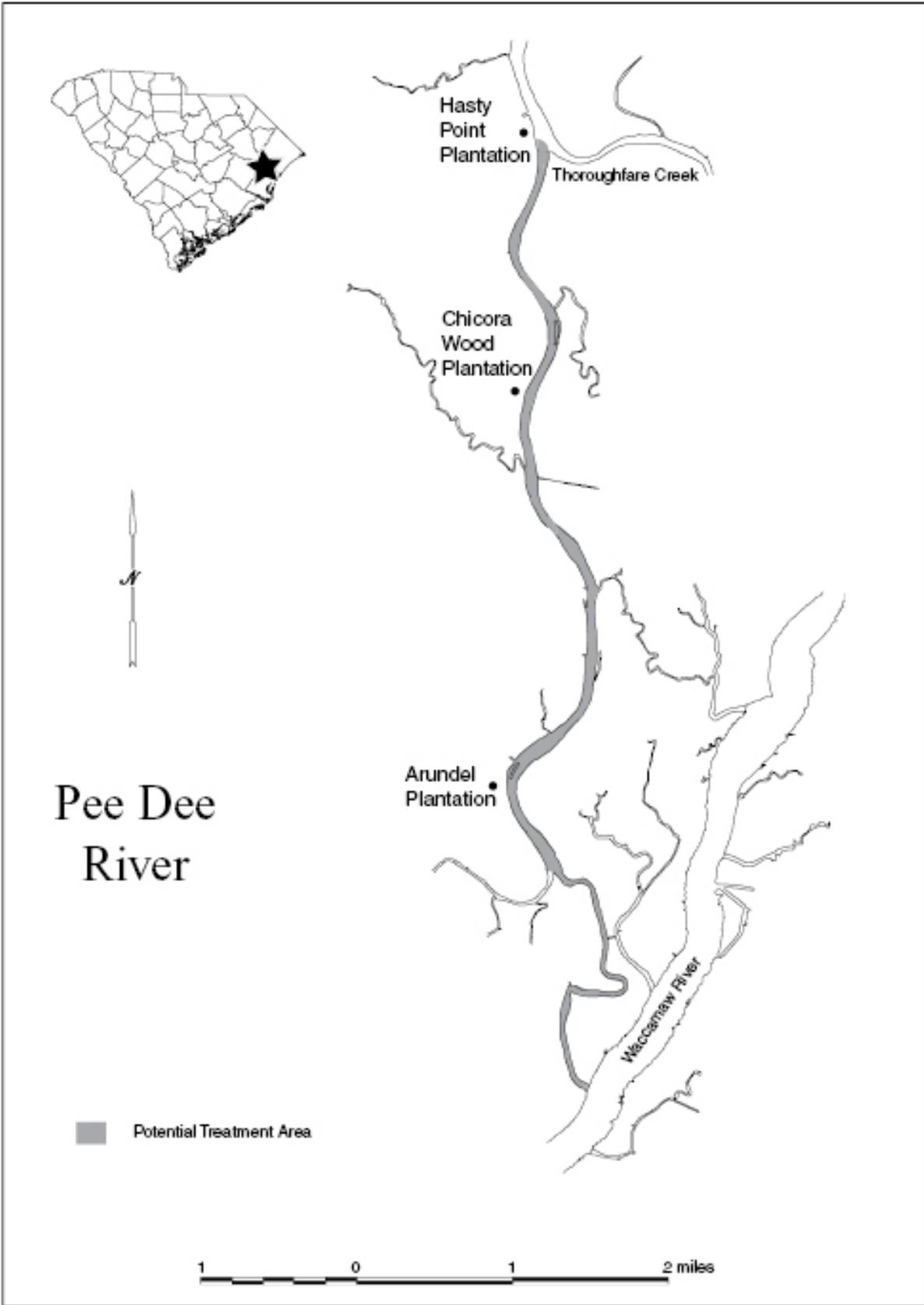
Georgetown County 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.



22. Prestwood Lake (Darlington County)

Problem plant species

Milfoil, Watershield, Filamentous algae, Water hyacinth

Management objective

Maintain diverse aquatic plant community through selective application of control methods and introduction of desirable native plant species.

Selected control method

Aquatic herbicides - selected areas of invasive plant infestation to provide public access.

Problem Species	Control Agent
Filamentous algae	Chelated copper
Water milfoil	Clearcast, Clipper, Hardball, Renovate OTF Renovate Max G, Reward, Triploid Grass Carp
Water hyacinth	Clearcast, Renovate, Renovate Max G, Reward
Watershield	Hardball, Renovate OTF, Renovate Max G

Area to which control is to be applied

Use aquatic herbicides to provide control at high priority public access points, such as boat ramps and park sites

Rate of control agent to be applied

Chelated Copper – up to 1 ppm.

Clearcast – up to 0.500 gallons per acre.

Clipper – 200 to 400 ppb

Hardball - up to 5 gallons per acre.

Renovate – up to 1 gallon per acre

Renovate Max G - up to 200 pounds per acre.

Renovate OTF – 40 pounds per acre

Reward - 2 gallons per acre.

*Triploid Grass Carp – 500 fish in the entire reservoir

*Based on a 32% mortality to maintain existing population

Method of application of control agent

Chelated copper, Clearcast, Hardball, Reward - Subsurface application by airboat with adjuvant.

Chelated copper - spray on surface of foliage with appropriate surfactant.

Renovate Max G, Renovate OTF - Granular broadcast evenly from airboat.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest milfoil growth.

Timing and sequence of control application

Agent to be applied when plants are actively growing.

Other control application specifications

Herbicide used only upon notification of all local potable water supply authorities and approval by S.C. Department of Health and Environmental Control as needed. Treatment of control area will be conducted in a manner that will not significantly degrade water quality.

Entity to apply control agent

Herbicide application - Commercial applicator

Estimated cost of control operations

\$8,000

Herbicide application - \$4,000.00

Triploid Grass Carp – \$4,000

Potential sources of funding

City of Hartsville 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

23. Samworth WMA (Georgetown County)

Problem plant species

Water hyacinth, Phragmites

Management objective

Through a comprehensive, multi-year approach; reduce water hyacinth and Phragmites populations to the greatest extent possible

Selected control method

Problem Species	Control Agents
Water hyacinth	Reward, Renovate 3, Clearcast, Habitat, Galleon SC
Phragmites	Habitat, Clearcast, Glyphosate

Area to which control is to be applied

30 acres of water hyacinth throughout river and adjacent public ricefields.

10 acres of phragmites in the Sandy Island area and Samworth WMA.

Rate of control agent to be applied

Reward - 0.500 gallons per acre.

Renovate 3 - 0.500 to 0.750 gallons per acre.

Glyphosate – up to 0.937 gallons per acre.

Habitat - 0.250 to 0.750 gallons per acre.

Clearcast - 0.250 to 0.750 gallons per acre.

Galleon SC - 2 to 6 fluid ounces per acre as foliar application.

Method of application of control agent

Helicopter, airboat - 40 acres of herbicide applied to water hyacinth. 10 acres of Habitat, Glyphosate applied to phragmites.

Timing and sequence of control application

Reward, Renovate 3, Clearcast, Habitat, Glyphosate, Galleon SC - to be applied periodically to water hyacinth from May through October.

Habitat, Clearcast, Glyphosate - Apply when plants are actively growing.

Other control application specifications

None

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$5,000

Potential sources of funding

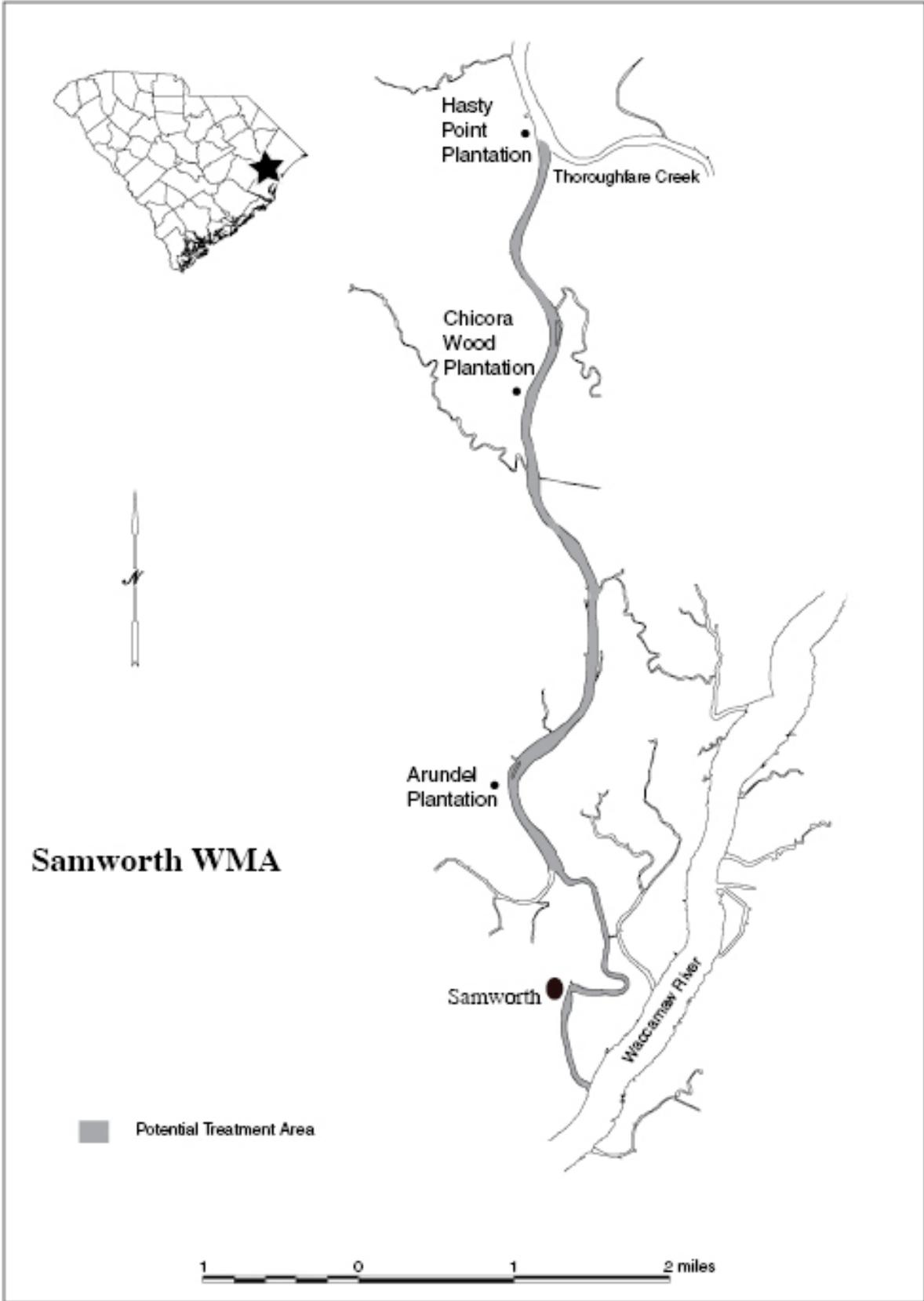
Samworth WMA 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.



24. Santee Coastal Reserve (Charleston and Georgetown Counties)

Problem plant species

Phragmites

Management objective

Through a comprehensive, multi-year approach; reduce Phragmites populations to the greatest extent possible throughout the Santee Coastal Reserve.

Selected control method

Habitat, Clearcast, Glyphosate

Area to which control is to be applied

200 acres of phragmites throughout the ricefields.

Rate of control agent to be applied

Habitat - 0.500 to 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Clearcast - 0.500 to 0.750 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply after plants are actively growing (May - Oct.).

Other control application specifications

Application to be conducted by ground application or airboat. Helicopter applications should be utilized at a minimum of every 3 years or when substantial regrowth occurs.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$31,000

Potential sources of funding

Santee Coastal Reserve 50%

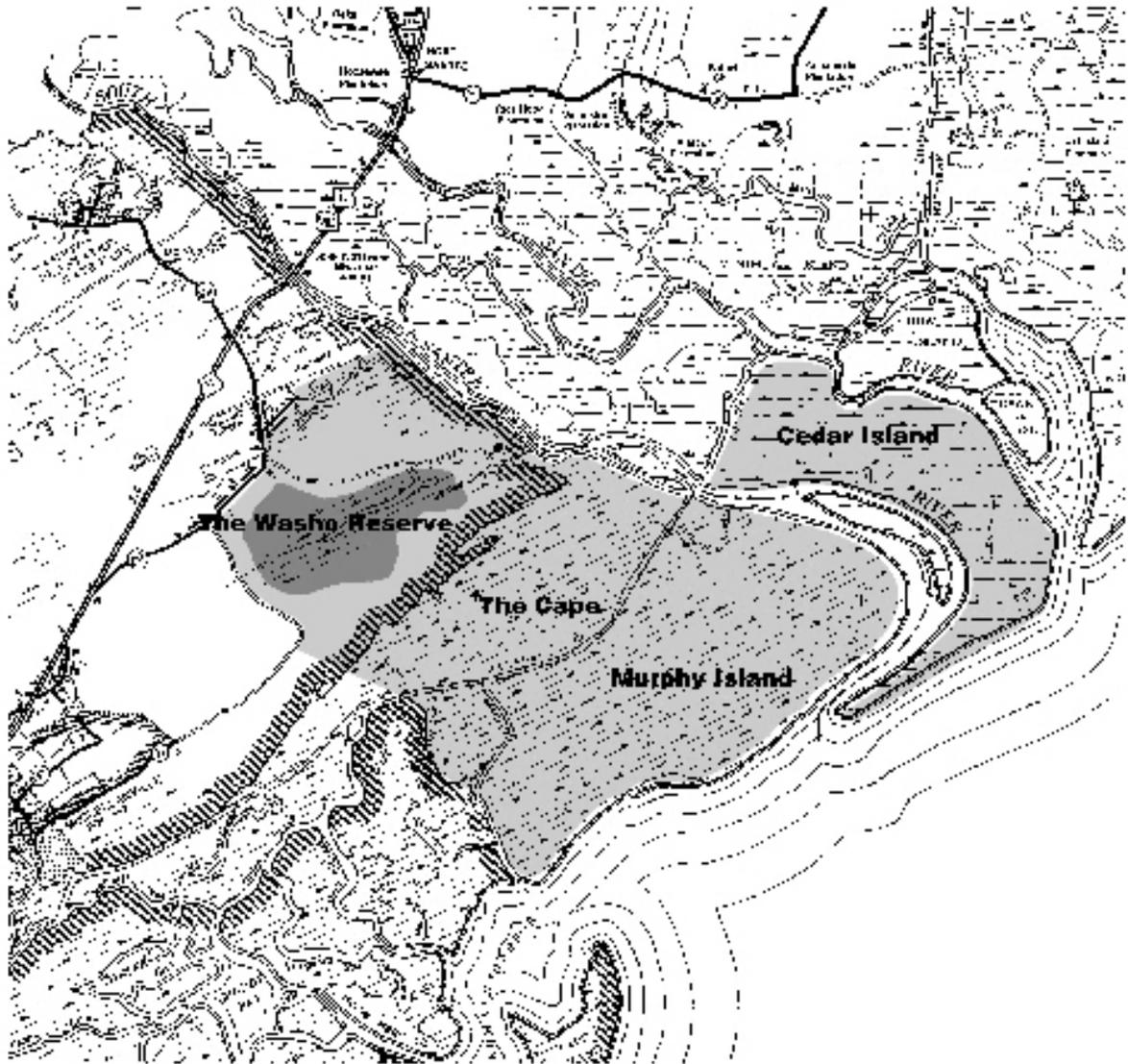
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

Santee Coastal Reserve



25. Santee Delta WMA (Georgetown County)

Problem plant species

Phragmites

Management objective

Through a comprehensive, multi-year approach; reduce Phragmites populations to the greatest extent possible.

Selected control method

Habitat, Clearcast, Glyphosate

Area to which control is to be applied

10 acres of Phragmites throughout the ricefields.

Rate of control agent to be applied

Habitat - 0.500 to 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre
Clearcast - 0.500 to 0.750 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply after plants are actively growing (May - Oct.).

Other control application specifications

Application to be conducted by ground application or airboat. Helicopter applications should be utilized at a minimum of every 3 years or when substantial regrowth occurs.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$1,500

Potential sources of funding

Santee Coastal Reserve 50%

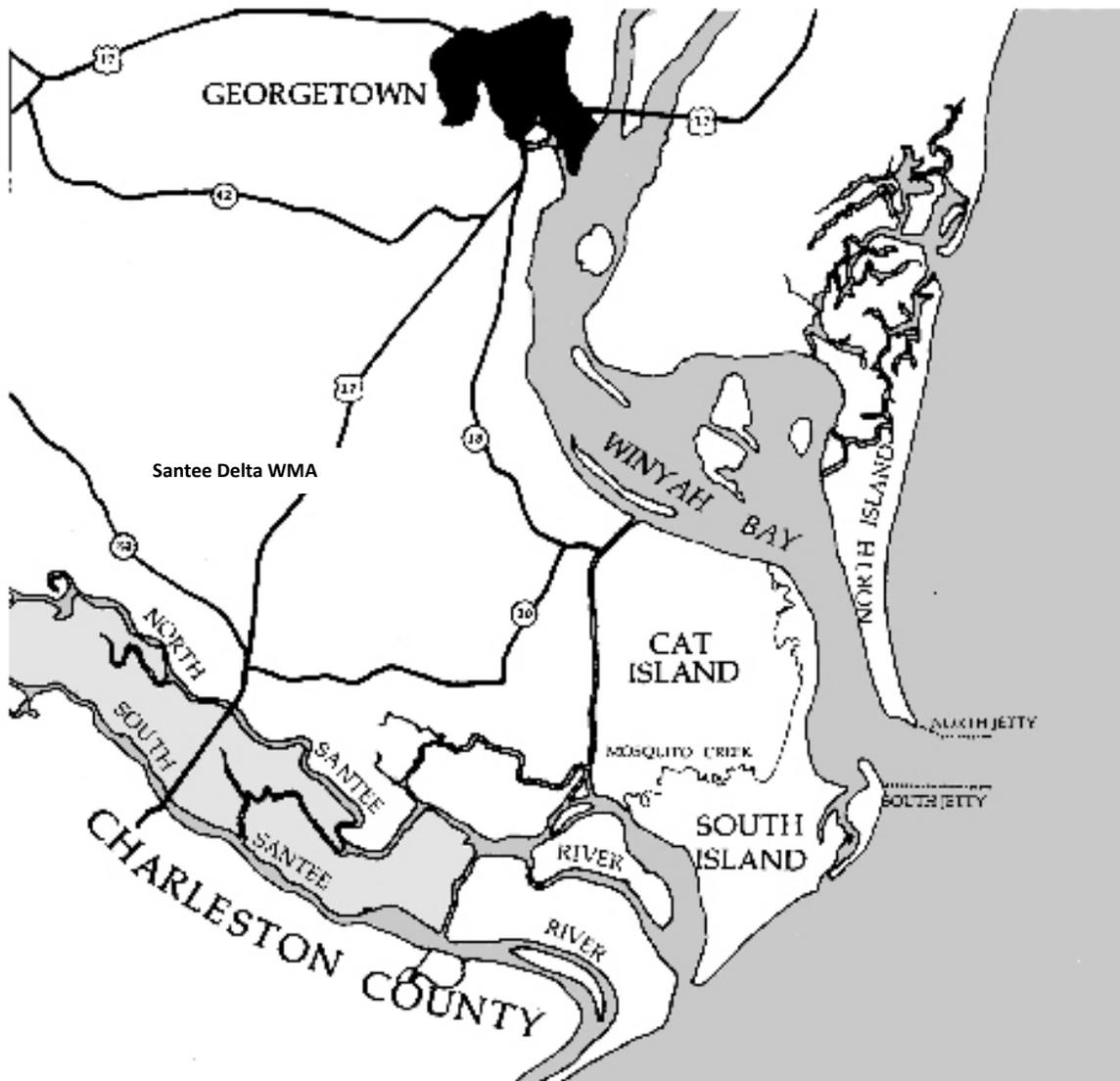
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

Santee Delta WMA



**26. U.S. Army Corps of Engineers
Charleston Harbor/Intracoastal Waterway
(Charleston County)**

Problem plant species

Phragmites

Management objective

Through a comprehensive, multi-year approach; reduce Phragmites populations to the greatest extent possible

Selected control method

Problem Species	Control Agent
Phragmites	Habitat, Clearcast, Glyphosate

Area to which control is to be applied

200 acres of phragmites throughout area

Rate of control agent to be applied

Habitat - 0.500 to 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Clearcast – 0.500 to 0.75 gallons per acre.

Method of application of control agent

Helicopter - 200 acres of Habitat applied to phragmites.
Other applications - Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply when plants are actively growing (July - Oct.).

Entity to apply control agent

Commercial applicator

Other control application specifications

None

Estimated cost of control operations

\$31,000

Potential sources of funding (Currently no funding available)**

U.S. Army Corps of Engineers (Charleston Harbor Funds) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d) Continue to coordinate treatment areas with local conservation groups.

Charleston Harbor Dredge Spoil Areas



27. US Navy, Naval Weapons Station (Charleston, Berkeley County)

Problem plant species

Phragmites

Management objective

Through a comprehensive, multi-year approach; reduce Phragmites populations to the greatest extent possible in spoil areas and control invasive.

Selected control method

Problem Species	Control Agent
Phragmites	Habitat, Clearcast, Glyphosate

Area to which control is to be applied

50 acres of Phragmites populations in dredge spoil areas.

Rate of control agent to be applied

Habitat - 0.500 to 0.750 gallons per acre.
Clearcast - 0.500 to 0.750 gallons per acre.
Glyphosate - up to 0.937 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply after plants are actively growing (May - Oct.).

Other control application specifications

Application to be conducted by helicopter, airboat and jon-boat.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$7,500

Potential sources of funding

US Naval Weapons Station 50%
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

US Navy Naval Weapons Station



NO MAP AVAILABLE

28. Waccamaw River (Horry County)

Problem plant species

Water hyacinth, Phragmites

Management objective

Through a comprehensive, multi-year approach; reduce water hyacinth and Phragmites populations to the greatest extent possible

Selected control method

Problem Species	Control Agents
Water hyacinth	Reward, Renovate 3, Clearcast, Galleon SC
Phragmites	Habitat, Clearcast

Area to which control is to be applied

50 acres throughout river system where needed.

Rate of control agent to be applied

Reward - 0.500 gallons per acre.
Renovate 3 - 0.500 to 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Habitat - 0.500 to 0.750 gallons per acre.
Clearcast - 0.500 to 0.750 gallons per acre.
Galleon SC - 2 to 6 fluid ounces per acre as foliar application.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant

Timing and sequence of control application

Herbicide to be applied to water hyacinth periodically from late May through November.

Other control application specifications

Herbicide used only upon approval by S.C. Department of Health and Environmental Control. Treatment of control area will be conducted in a manner that will not significantly degrade water quality.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$ 4,000

Potential sources of funding

Horry County 25%

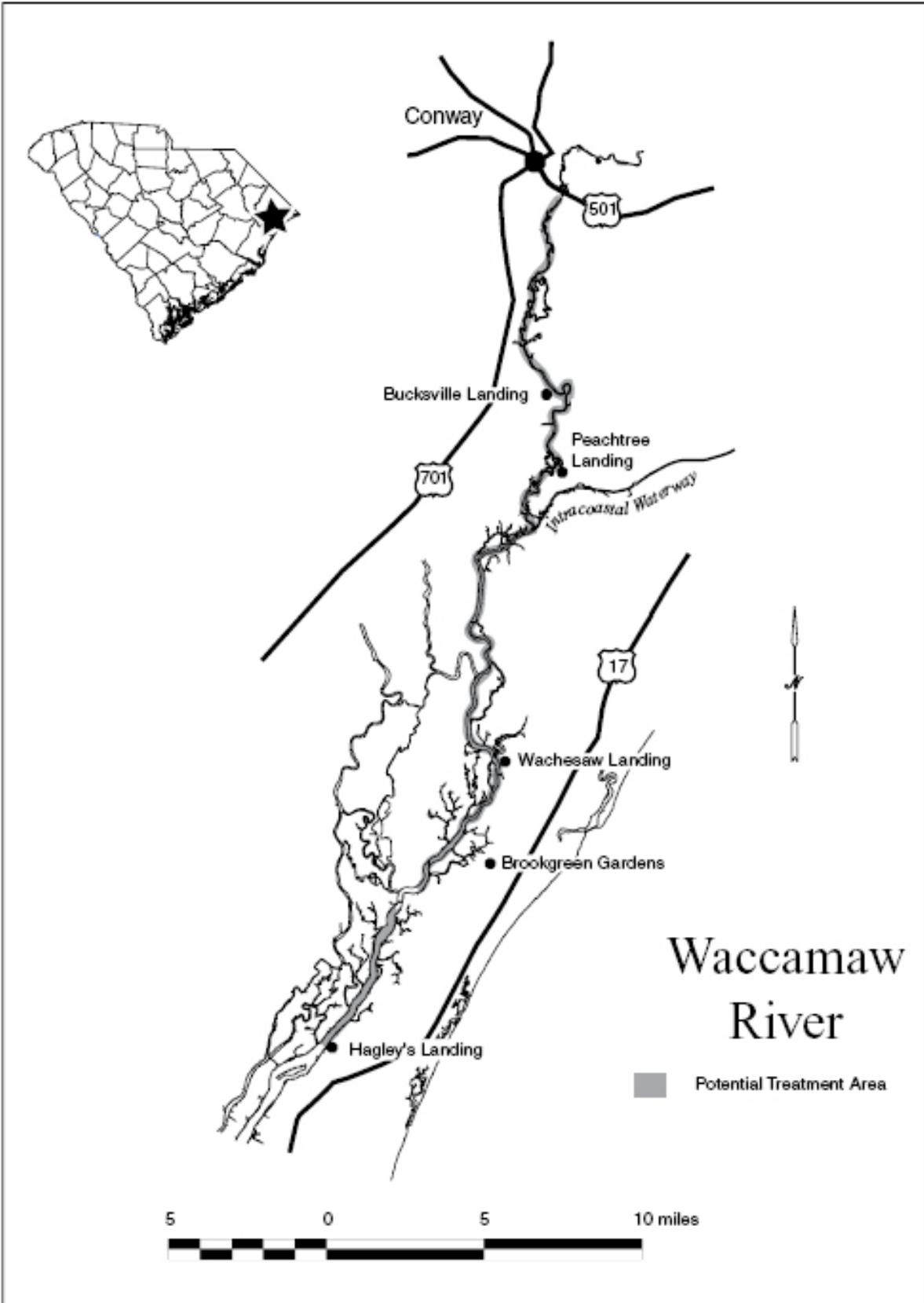
Brookgreen Gardens 25%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.



29. Yawkey Wildlife Center (Georgetown County)

Problem plant species

Phragmites, Cattails, Cutgrass

Management objective

Through a comprehensive, multi-year approach; reduce Phragmites populations to the greatest extent possible.

Selected control method

Habitat, Clearcast, Glyphosate

Area to which control is to be applied

25 acres of Phragmites, cattails, and cutgrass throughout the ricefields.

Rate of control agent to be applied

Habitat - 0.500 to 0.750 gallons pints per acre.

Clearcast - 0.500 to 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply after plants are actively growing (May - Oct.).

Other control application specifications

Application to be conducted by airboat, ground, or helicopter. Phragmites control in impounded areas should only occur where drainage has left areas moderately dry

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$3,850

Potential sources of funding

Yawkey Foundation 50%

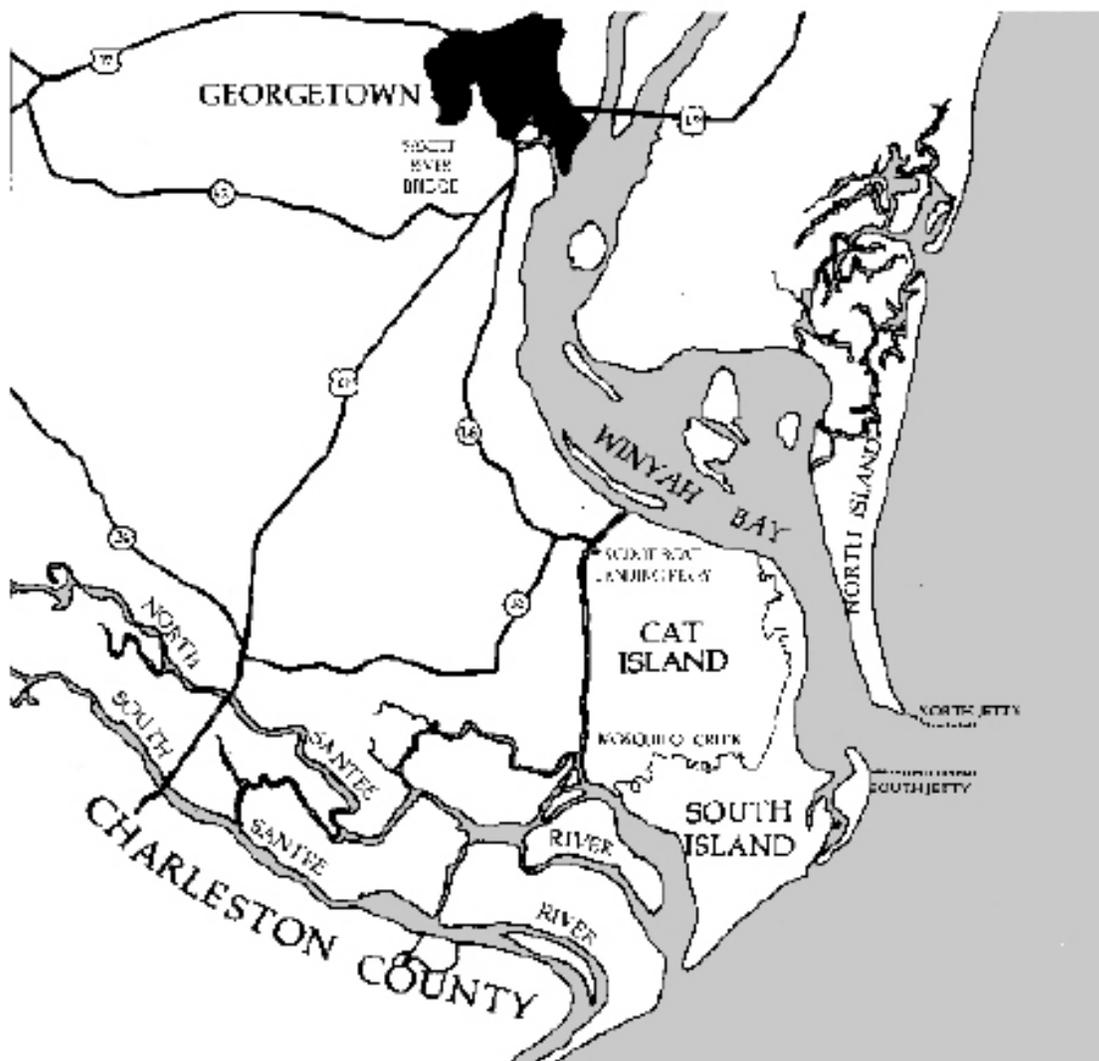
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

Yawkey Wildlife Center



Santee Cooper Lakes

30. Lake Marion

(Calhoun, Clarendon, Orangeburg, Berkeley, and Sumter Counties)

31. Lake Moultrie

(Berkeley County)

NOTE: The following management plan applies to both lakes.

Problem plant species

Hydrilla, Alligatorweed, Fanwort, Water willow, Water hyacinth, Slender naiad, Water primrose, Giant cutgrass, Coontail, Filamentous algae (Lyngbya), Slender pondweed, Crested floating heart, Fragrant waterlily, Watermilfoil

Management objectives

Foster a diverse aquatic plant community through selective treatment of nuisance aquatic vegetation (to avoid adverse impacts to existing native plant species) and the introduction of desirable native plant species when and where appropriate.

Manage hydrilla growth throughout the main lakes and subimpoundments to minimize its spread within the lakes, help prevent its spread to adjacent public waters, and minimize adverse impacts to electric power generation, agricultural irrigation withdrawals, and public use and access.

Reduce water hyacinth populations throughout the lakes to enhance boating, fishing, hunting, public access and prevent spread to other areas of the lake.

Reduce Crested floating heart populations throughout the lakes to enhance boating, fishing, hunting, public access and prevent spread to other areas of the lake.

Reduce giant cutgrass populations throughout the lakes, especially in Wildlife Management Areas and upper Lake Marion, to enhance wildlife habitat and hunting opportunities.

Reduce Crested floating heart, fragrant waterlily, American lotus and Giant cutgrass populations throughout Wildlife Management Areas to enhance wildlife habitat and hunting opportunities.

Reduce other nuisance aquatic vegetation in priority use areas, such as electric power generation facilities, public and commercial access sites (boat ramps, piers, swimming areas, marinas) and residential shoreline areas in the main lake and subimpoundments.

Selected control method

Problem Species	Control Agents
Hydrilla	Aquathol K, Sonar, chelated copper*, Triploid grass carp
Lyngbya	chelated copper*, peroxygen compounds
Water hyacinth	Tribune, Renovate 3, Clearcast, 2,4-d
Fanwort	Clipper, sonar

Coontail, slender naiad, slender pondweed	Aquathol K, Sonar, Tribune
Water primrose, alligatorweed, giant cutgrass	Glyphosate, Habitat, Renovate 3, Clearcast
Crested floating heart	Aquathol K, Hydrothol 191, Clearcast / Glyphosate, Renovate Max G, Sonar

* May be toxic to fish at recommended treatment rates; however, precautions will be implemented to minimize the risk of fish kills.

Area to which control is to be applied

Water hyacinth - Approximately 4000 acres throughout the system but mostly in the upper lake area above I-95 Bridge.

Hydrilla - Approximately 1100 acres in priority areas such as electric power generation facilities, public and commercial access sites (boat ramps, piers, swimming areas, marinas) and residential shoreline areas in the main lake and sub-impoundments. If conditions warrant, release triploid grass carp in close proximity to areas of the lake with the greatest hydrilla growth and use herbicide applications to provide immediate short-term control of localized growth in those areas.

Crested floating heart - Approximately 4000 acres in priority areas such as public and commercial access sites (boat ramps, piers, swimming areas, marinas, and residential shoreline areas in the main lake), and State and Federal wildlife management areas.

Giant Cutgrass - Approximately 400 acres along shoreline areas throughout lake system, as well as within State and Federal wildlife management areas.

Other target species - Approximately 100 acres in priority areas such as electric power generation facilities, public and commercial access sites (boat ramps, piers, swimming areas, marinas) and residential shoreline areas in the main lake and sub-impoundments.

Sub-Impoundments -

Dean's Swamp Impoundment, Potato Creek Impoundment, Church Branch Impoundment, Taw Caw Impoundment, Jack's Creek Impoundment

The general management strategy is to transition from hydrilla dominated plant communities to ones dominated by native plant species, which are beneficial to wildlife, by use of aquatic herbicides. Specific control methods for the sub-impoundments will be determined cooperatively between Santee Cooper and SCDNR staffs. Methods and goals will be consistent with both groups' interests for control of invasive plant species such as hydrilla while promoting vegetation beneficial to wildlife and waterfowl through other habitat enhancement projects.

Rate of control agents to be applied

Aquathol K - 5 to 10 gallons per acre (dependent on water depth).

Tribune - 0.500 gallons per acre for floating plants; 2 gallons per acre for submersed plants.

Renovate 3 - 0.375 to 0.750 gallons per acre for emergent species, per label for submersed plants.

Habitat - 0.250 to 0.750 gallons per acre.

Sonar AS - 10 to 30 ppb.

Chelated Copper- up to 1 ppm.
Glyphosate - up to 1.25 gallons per acre.
Sonar Q, Sonar PR, sonar One - up to 40 ppb (approx 10 pounds/acre).
Clearcast - 0.250 to 1.00 gallons per acre.
Renovate Max G – up to 320 pounds per acre.

Triploid grass carp – During 2013, hydrilla decreased from 7200 acres down to 1100 acres. The significant decrease in vegetation cannot be solely attributed to Triploid carp herbivory as there were other environmental factors which came into play. Higher than normal flows from increased rainfall caused severe turbidity in the Santee system which was also a limiting factor for both hydrilla growth as well as other species. Based on this current information, the Aquatic Plant Management Council, with recommendations from DNR and Santee Cooper staff, agreed that the adaptive stocking plan should be suspended. However, consideration should be given to resuming the adaptive plan at a later date as more data becomes available throughout the growing season, and if the Council determines stocking to be appropriate later in 2014.

SCDNR and Santee Cooper Staff will carefully monitor Lake Marion and Lake Moultrie for additional increases in hydrilla acreage or loss of native vegetation. Herbicide treatments will be used to provide temporary control of hydrilla until results from grass carp feeding become apparent. Changes to the strategy will be implemented if survey results, regrowth, or habitat loss warrant.

Method of application of control agents

Aquathol K, chelated copper, Sonar - subsurface application by airboat or surface application by helicopter.

Tribune - (water hyacinth) spray on surface of foliage using handgun from airboat or by helicopter with appropriate surfactant ;(submersed plants) subsurface application.

Renovate 3, Glyphosate, Habitat, Clearcast - spray on surface of foliage with appropriate surfactant.

Renovate Max G – Distribute granular product evenly over the surface at the prescribed rate.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

Herbicide applications - All herbicide applications to be applied when plants are actively growing. Water hyacinth and hydrilla treatments should be initiated in spring when plant growth begins and continued regularly during the year as needed to reduce biomass as much as possible.

Triploid grass carp, if needed, to be released as soon as possible in 2014 (March-October).
RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

Hydrilla, Water hyacinth and Crested floating heart treatments will be considered a high priority to minimize spread to other areas of the lake system. Treatments should be conducted wherever the plants occur and access by boat is feasible. Areas inaccessible by boat or large acreages will be treated aerially. Frequent treatments in these areas will be necessary to meet management objectives.

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments for the Santee Cooper Lakes will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake.

Entity to apply control agents

Herbicide application - S.C. Public Service Authority and/or commercial applicator.

Triploid Grass Carp -

Commercial supplier with supervision by S.C. Public Service Authority and/or SCDNR.

Estimated cost of control operations

\$1,400,000

Note: The budgeted amount is based on aquatic plant coverage and treatment needs from previous years. Actual expenditures will depend on the extent of noxious aquatic plant growth in 2014 and available funds provided by South Carolina Public Service Authority.

Potential sources of funding

S.C. Public Service Authority 50%

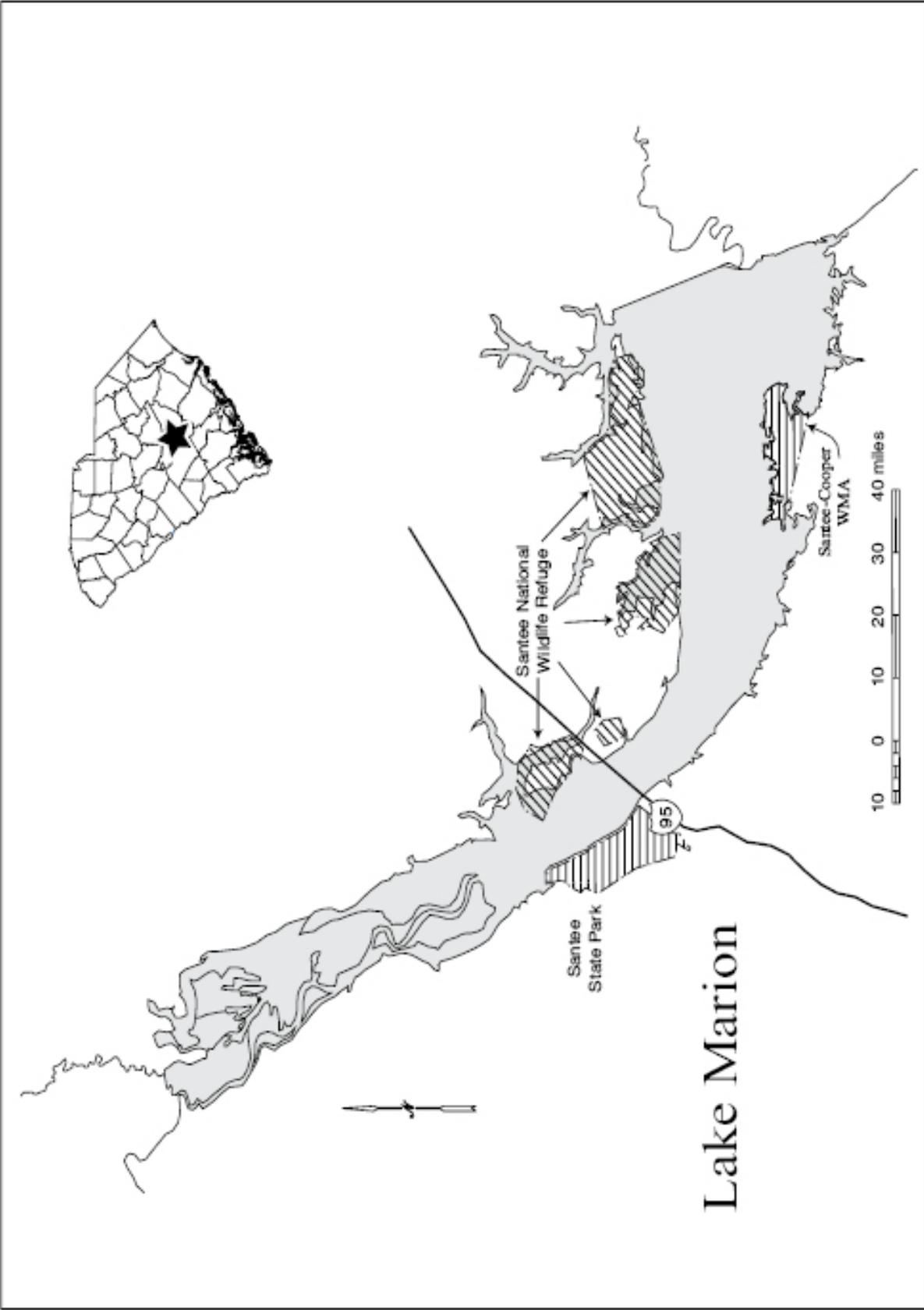
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

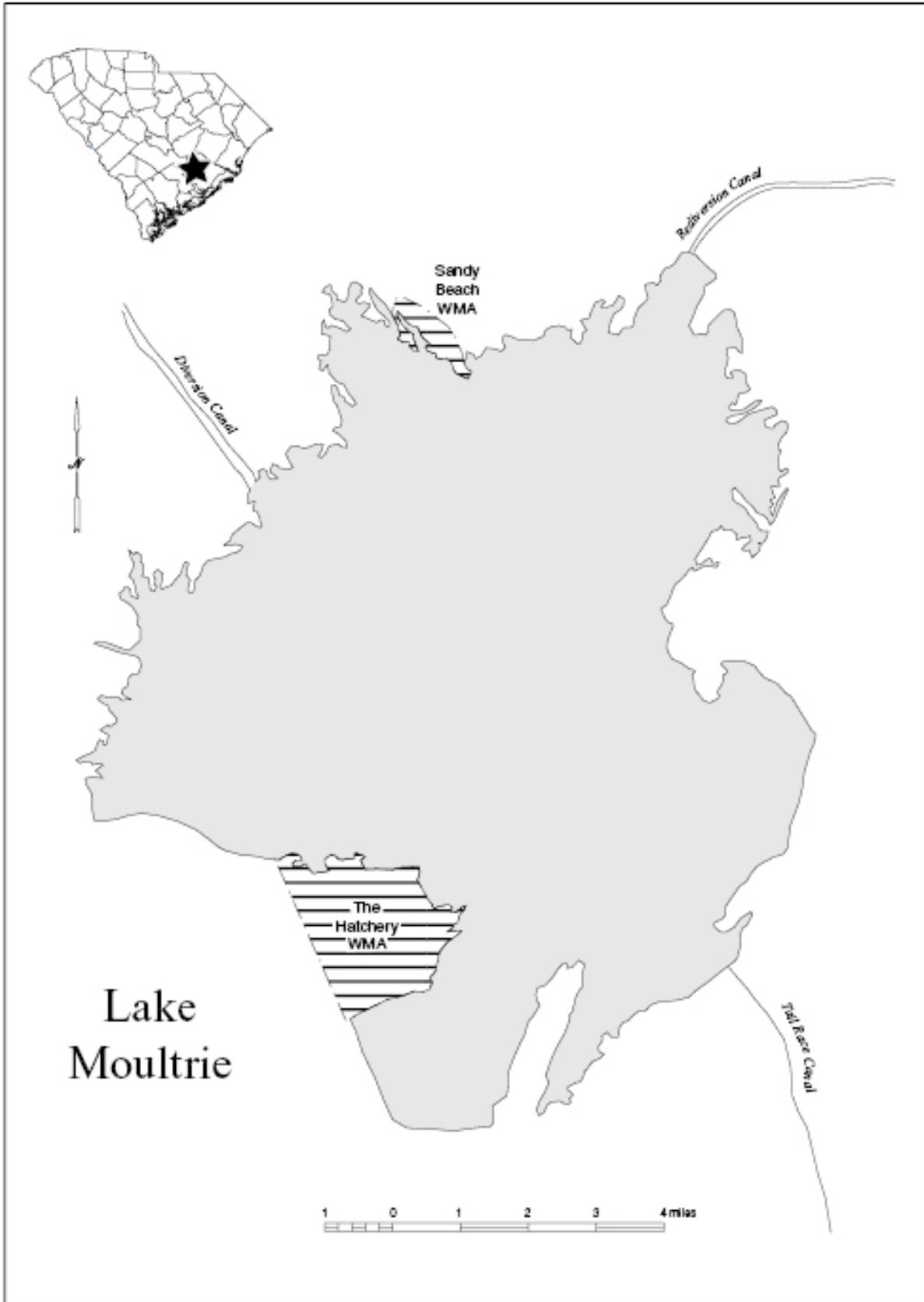
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Support the management goals established by the DNR and Santee Cooper (Appendix E) which attempts to achieve a diverse assemblage of native aquatic vegetation in a minimum of 10% of the total surface area of the lake and to effectively control non-native invasive species.
- b) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- c) A long-term integrated adaptive management strategy has been implemented to control hydrilla. Triploid grass carp have been stocked to control hydrilla growth lake-wide and approved aquatic herbicides are used to control localized growth in priority use areas. Future plans include annual stocking of grass carp to maintain the population at a level that is sufficient to maintain control of hydrilla but to minimize impacts on desirable native plant populations.

- d) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- e) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- f) Periodically revise the management strategy and specific control sites as new environmental data, management agents and techniques, and public use patterns become available.





**South Carolina Department of Parks, Recreation and Tourism
State Park Lakes**

**32. Aiken State Park
(Aiken County)**

Problem plant species

Floating Heart, Cattails

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Floating Heart – Renovate Max G

Cattails – Habitat, Glyphosate

Area to which control is to be applied

10 acres in three lakes

Rate of control agent to be applied

Renovate Max G – 200 lbs per acre.

Habitat – 0.500 – 0.750 gallons per acre.

Glyphosate – up to 0.937 gallons per acre.

Method of application of control agent

Foliar application using appropriate surfactant from airboat. Granular herbicides spread evenly using appropriate rate.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$6,000

Potential sources of funding

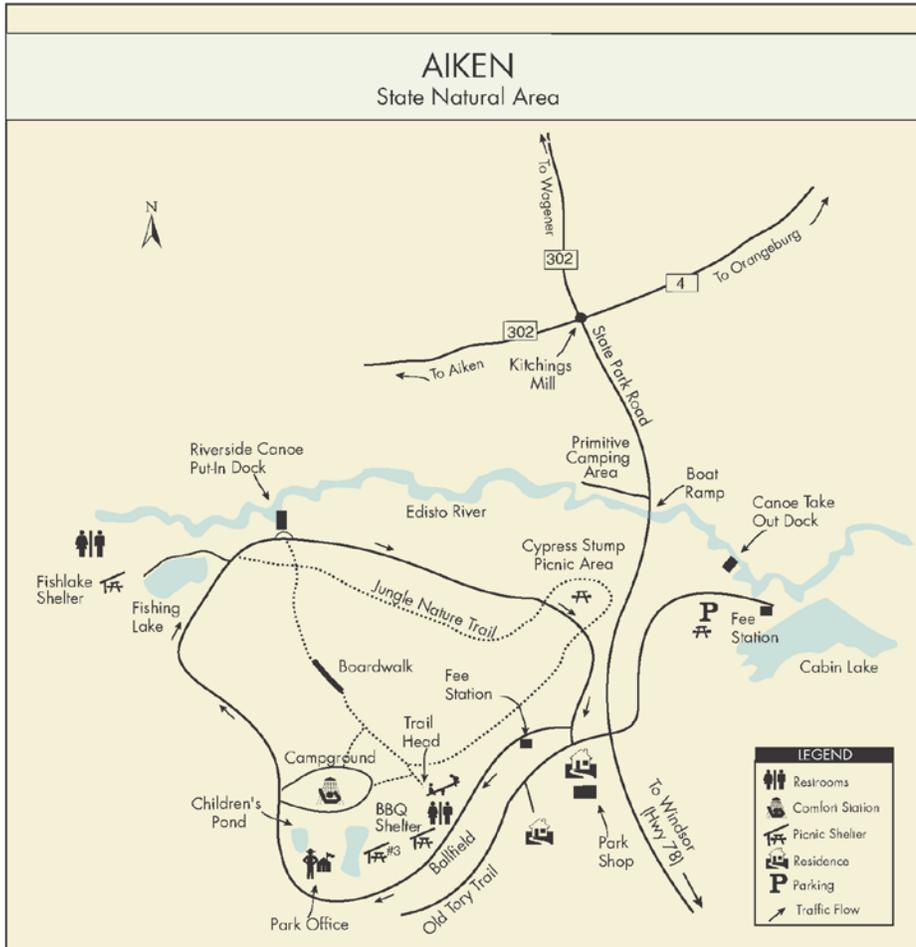
S.C. Department of Parks, Recreation and Tourism 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.



33. Barnwell State Park (Swimming Lake) (Barnwell County)

Problem plant species

Waterlily, Cattails

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Waterlily – Renovate Max G

Cattails – Habitat, Glyphosate

Area to which control is to be applied

3 acres in swimming lake.

6 acres in Upper lake.

Rate of control agent to be applied

Renovate Max G – 200 lbs per acre.

Habitat – 0.500 – 0.750 gallons per acre.

Glyphosate – up to 0.937 gallons per acre.

Method of application of control agent

Foliar application using appropriate surfactant from airboat. Granular herbicides spread evenly using appropriate rate.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$6,000

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

Barnwell State Park Swimming Lake



34. Charles Towne Landing State Park (Charleston County)

Problem plant species

Duckweed, Alligatorweed, Pennywort

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Problems species	Control Agent
Duckweed	Fluridone, Clipper, Galleon SC
Alligatorweed	Renovate 3, Habitat, Clearcast, Glyphosate
Pennywort	Renovate 3, Habitat, Clearcast, Glyphosate

Area to which control is to be applied

Fluridone, Galleon SC - 3 acres

Renovate 3, Habitat, Clearcast, Glyphosate - 4 acres

Rate of control agents to be applied

Fluridone - 0.125 gallons per acre.

Habitat – 0.250 – 0.750 gallons per acre.

Clearcast – 0.500 – 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Renovate - 0.500 to 0.750 gallons per acre.

Clipper – up to 0.09375 gallons per acre

Galleon SC - 2 to 12 fl oz per acre.

Method of application of control agents

Fluridone, Galleon SC - Apply subsurface throughout lake

Glyphosate, Clipper, Renovate - Spray on surface of foliage with appropriate surfactant

Timing and sequence of control application.

Herbicides to be applied when plants are actively growing

Other control application specifications

None

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$1,000

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

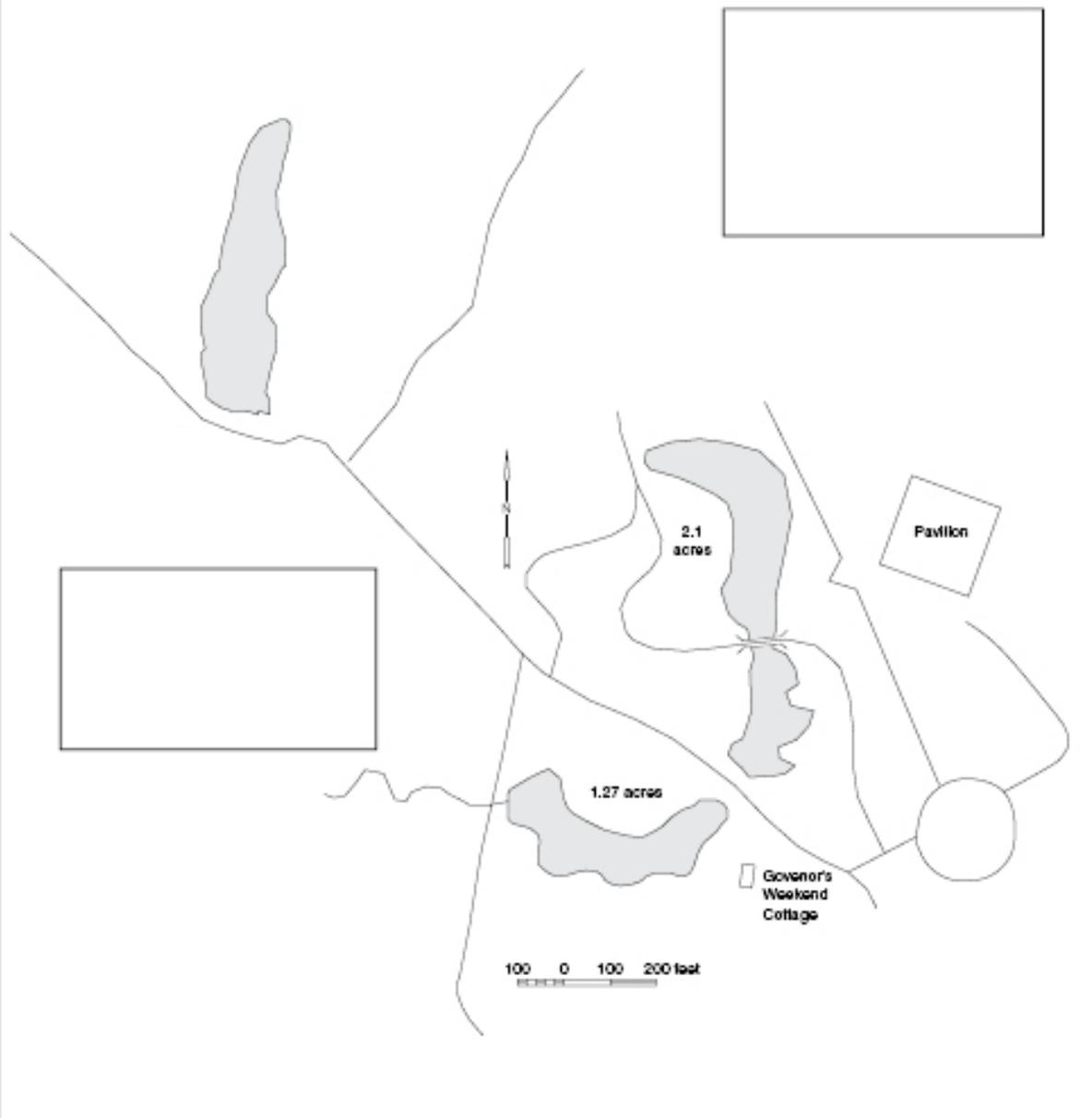
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

Charles Towne Landing State Park



35. Cheraw State Park (Lake Juniper) (Chesterfield County)

Problem plant species

Floating heart, Waterlily, Spatterdock, Watermilfoil

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Floating heart, Waterlily, Spatterdock, Watermilfoil – Renovate Max G

Floating heart, Spatterdock – Habitat, Glyphosate

Area to which control is to be applied

20 acres along boardwalk, main swimming area, and swimming areas at Camps Forest & Juniper

Rate of control agent to be applied

Renovate Max G – 200 lbs per acre.

Habitat – 0.500 – 0.750 gallons per acre.

Glyphosate – up to 0.937 gallons per acre.

Method of application of control agent

Foliar application using appropriate surfactant from airboat. Granular herbicides spread evenly using appropriate rate.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$12,000

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

36. Croft State Park (Spartanburg County)

Problem plant species

Hydrilla

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Hydrilla – Triploid Grass Carp

Area to which control is to be applied

50 acres

Rate of control agent to be applied

Triploid Grass Carp – 25 fish per vegetated acre

Method of application of control agent

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

Triploid grass carp to be released as soon as possible in the spring of 2014 (March-May).
RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$12,000

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

37.H. Cooper Black State Recreation Area (Chesterfield County)

Problem plant species

Waterlily, Watershield

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Hardball, Habitat, Clearcast, Glyphosate

Area to which control is to be applied

2 acres in lake.

Rate of control agent to be applied

Habitat – 0.250 – 0.750 gallons per acre.
Clearcast – 0.500 – 0.750 gallons per acre.
Glyphosate - up to 0.937 gallons per acre.
Hardball – up to 5 gallons per acre.

Method of application of control agent

Subsurface injection from airboat.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$375

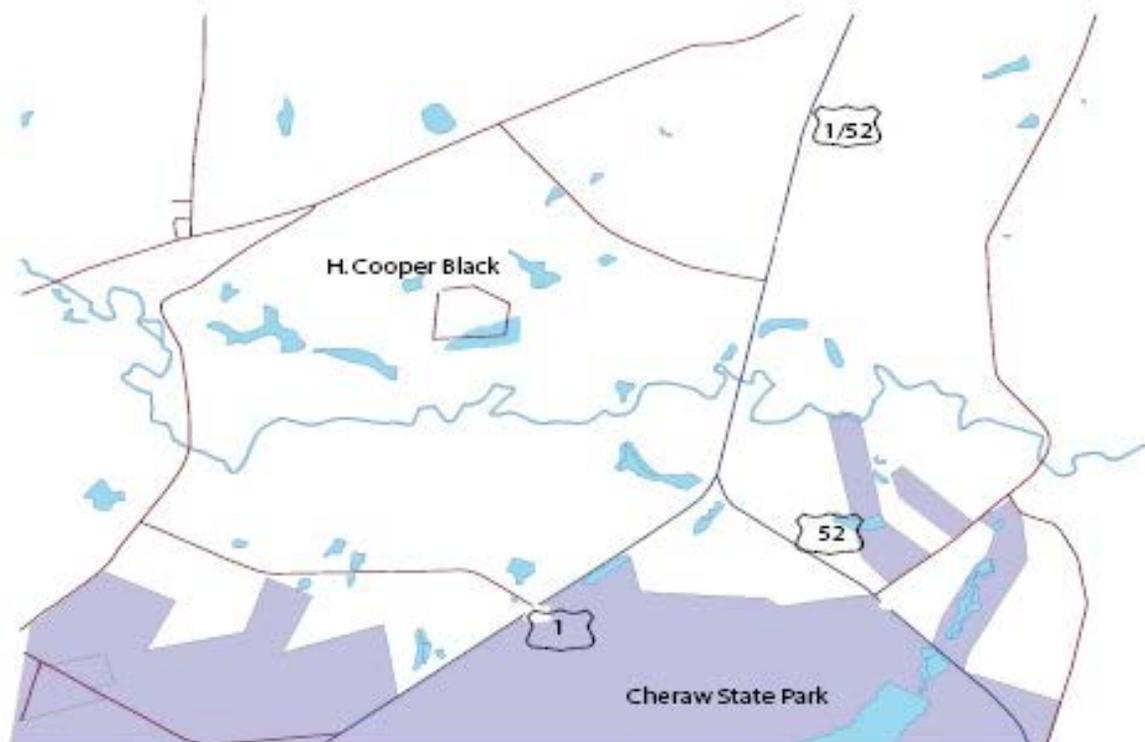
Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

H. Cooper Black Recreation Area



38. Hunting Island State Park (Beaufort County)

Problem plant species

Duckweed

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Fluridone, Clipper, Galleon SC

Area to which control is to be applied

2 acres adjacent to the parks use area

Rate of control agent to be applied

Fluridone - 0.125 gallons per acre.
Clipper – up to 0.09375 gallons per acre
Galleon SC - 2 to 12 fl oz per acre.

Method of application of control agent

Herbicide - Spray on surface of foliage with appropriate surfactant or subsurface injection broadcast evenly from airboat.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$1,200

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

39. Huntington Beach State Park (Georgetown County)

Problem plant species

Phragmites, Cutgrass, Cattails

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Habitat, Clearcast, Glyphosate

Area to which control is to be applied

10 acres in 3 different lakes.

Rate of control agent to be applied

Habitat - 0.500 – 0.750 gallons per acre.

Clearcast - 0.500 – 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply after plants are actively growing (May - Oct.).

Other control application specifications

Application to be conducted by airboat, ground, or helicopter. Phragmites control in impounded areas should only occur where drainage has left areas moderately dry

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$1,100

Potential sources of funding

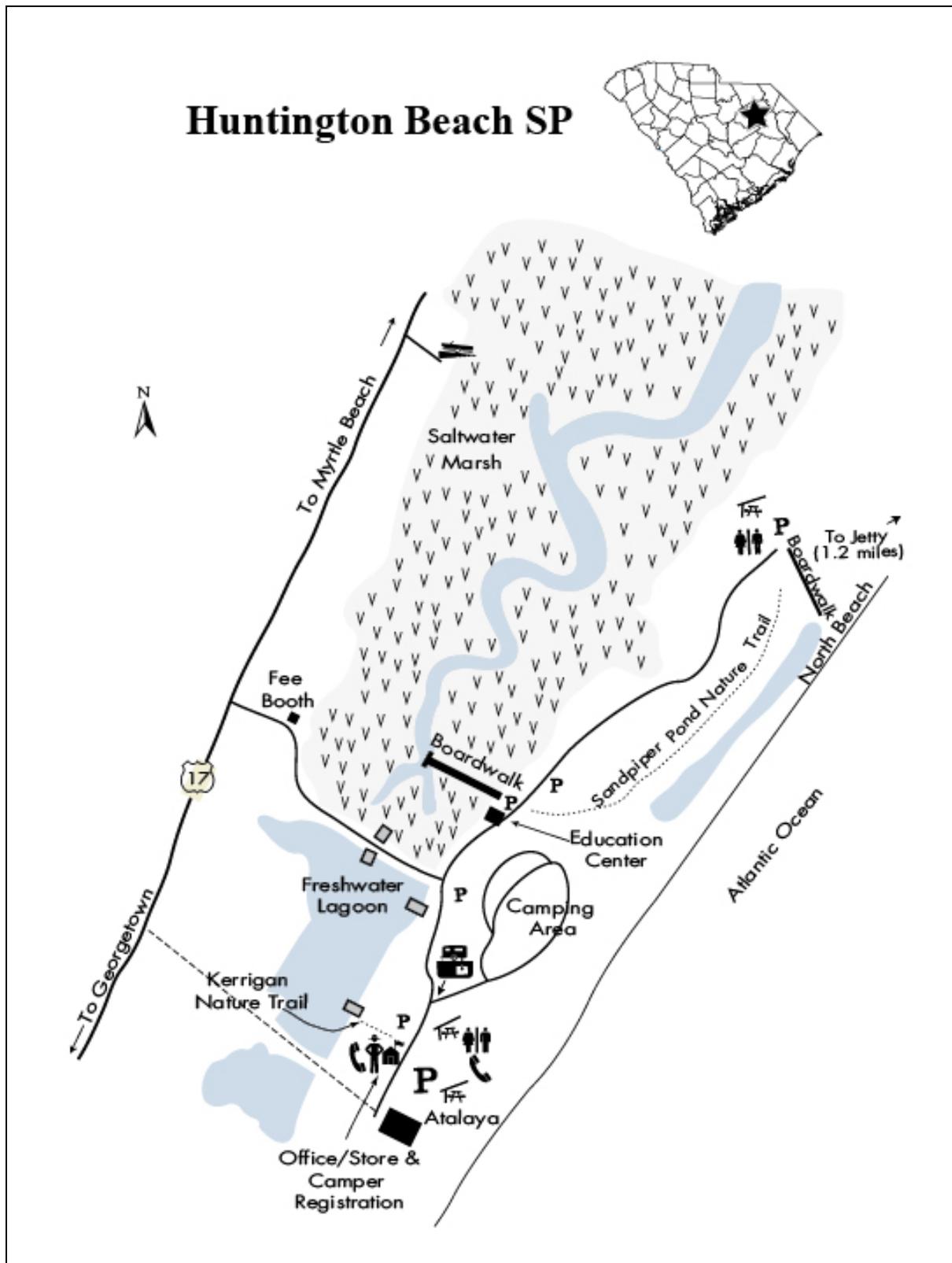
S.C. Department of Parks, Recreation and Tourism 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

Huntington Beach SP



40. Jones Gap State Park (Greenville County)

Problem plant species

Kudzu

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Renovate 3, 2,4-D

Area to which control is to be applied

1 acre in marsh.

Rate of control agent to be applied

Renovate 3 – 0.500 gallons per acre.

2,4-D - 0.250 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply after plants are actively growing (May - Oct.).

Other control application specifications

Application to be conducted by ground, or helicopter.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

\$240

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.

- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

41. Kings Mountain State Park - Crawford Lake (York County)

Problem plant species

Slender naiad

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Aquathol K

Area to which control is to be applied

4 acres in swimming and paddle boat area

Rate of control agent to be applied

Four (4) gallons per acre.

Method of application of control agent

Apply subsurface throughout lake

Timing and sequence of control application

Apply in May or June when naiad growth is initiated.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$1,050

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

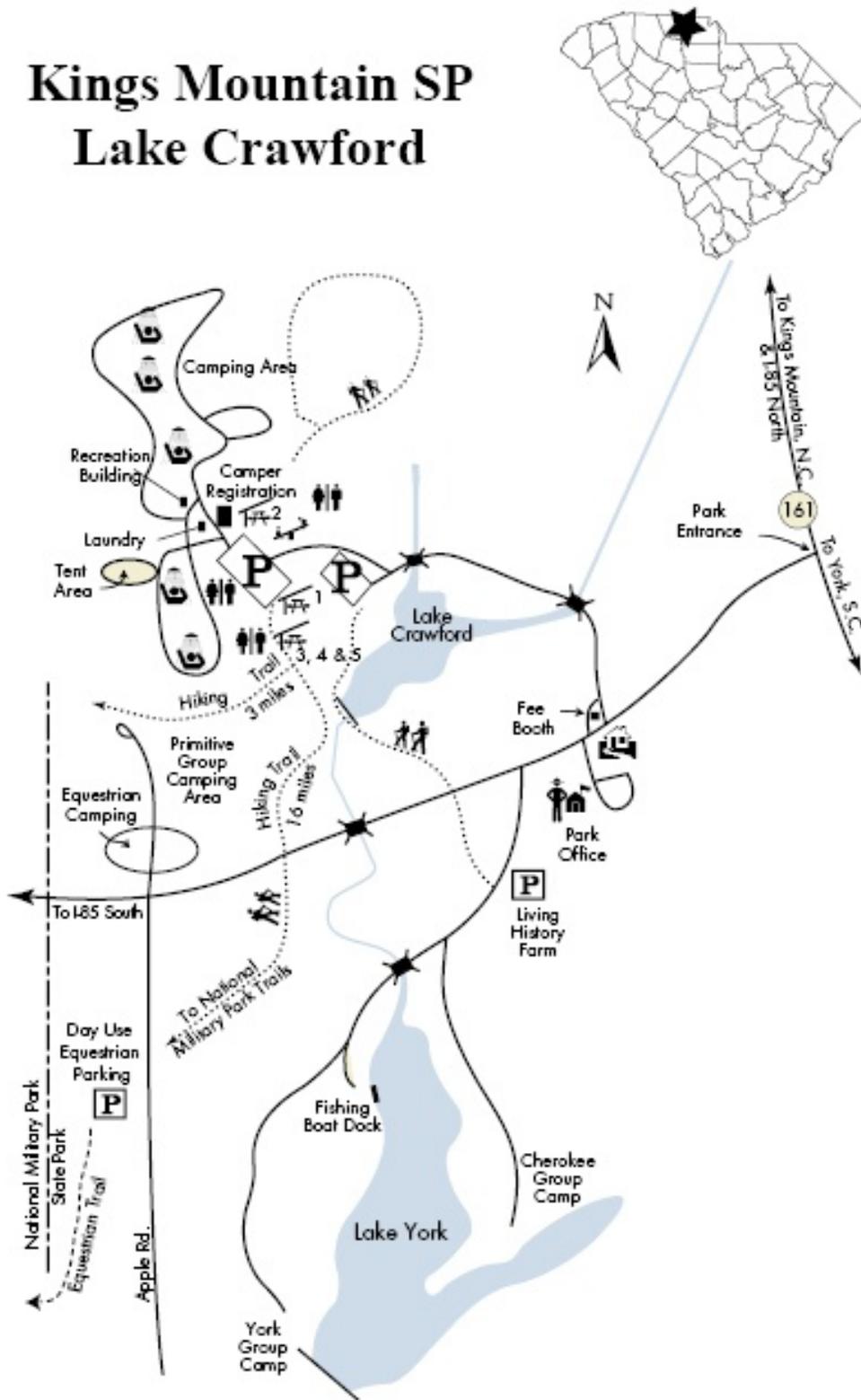
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.

- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

Kings Mountain SP Lake Crawford



42. Lee State Park (Lee County)

Problem plant species

Watermilfoil

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Renovate Max G,

Area to which control is to be applied

3 acres adjacent to the parks day use area, along the park dam and adjacent to the campground

Rate of control agent to be applied

Renovate Max G - 200 lbs per acre.

Method of application of control agent

Herbicide - Spray on surface of foliage with appropriate surfactant. Granular broadcast evenly from airboat.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$1,810

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

d) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.

- e) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- f) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

43. Little Pee Dee State Park (Dillon County)

Problem plant species

Spatterdock, Spatterdock, Water lily, Watershield,

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Renovate Max G, Clearcast, Glyphosate, Habitat

Area to which control is to be applied

10 acres adjacent to the parks day use area, along the park dam and adjacent to the campground

Rate of control agent to be applied

Renovate Max G - 200 lbs per acre.
Clearcast – 0.500 – 0.750 gallons per acre.
Habitat - 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.

Method of application of control agent

Herbicide - Spray on surface of foliage with appropriate surfactant. Granular broadcast evenly from airboat.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$3,000

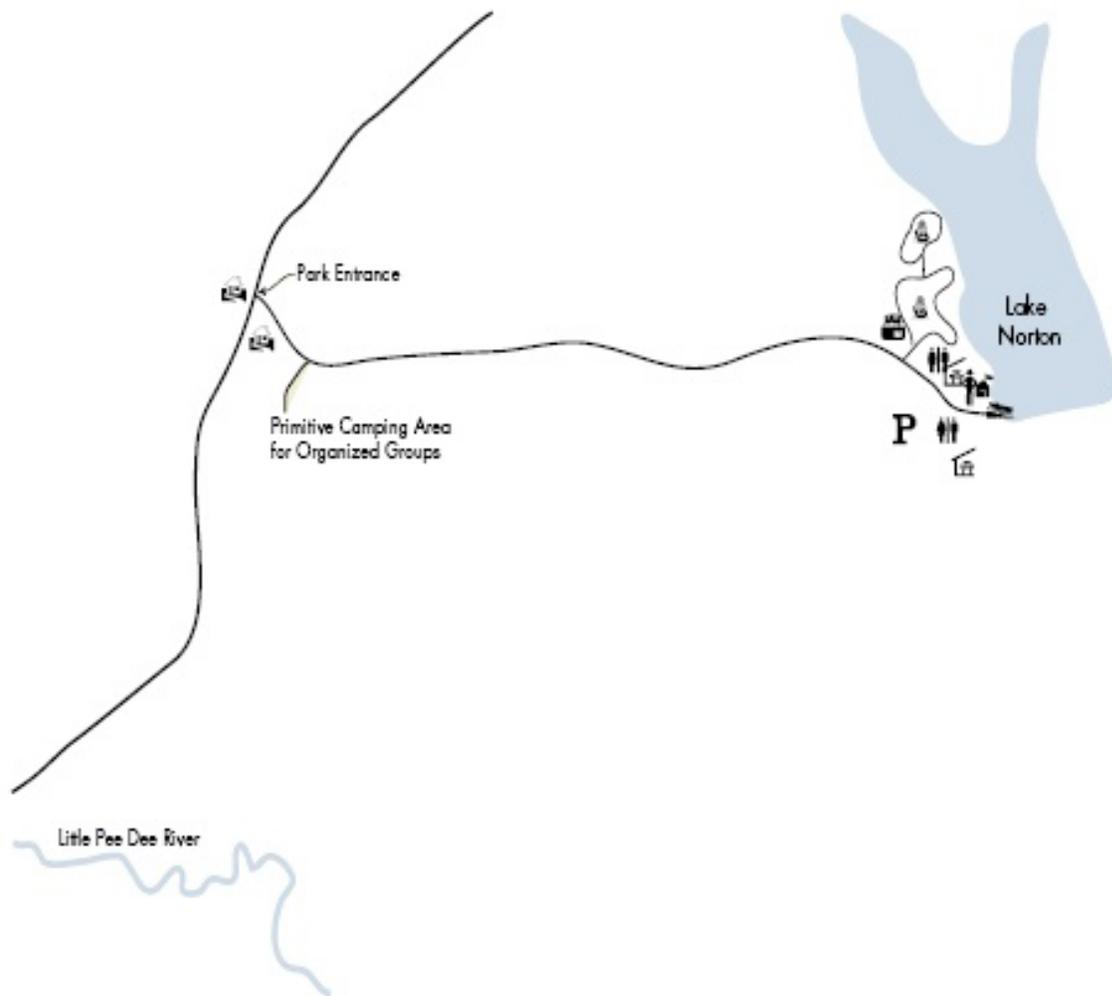
Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

Little Pee Dee SP Lake Norton



44. N.R. Goodale State Park (Kershaw County)

Problem plant species

Waterlily, Watershield

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Hardball, Renovate Max G

Area to which control is to be applied

5 acres in lake.

Rate of control agent to be applied

Hardball - Up to 5 gallons per acre.
Renovate Max G – 200 lbs per acre.

Method of application of control agent

Herbicide - Spray on surface of foliage with appropriate surfactant. Granular broadcast evenly from airboat.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$3,000

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

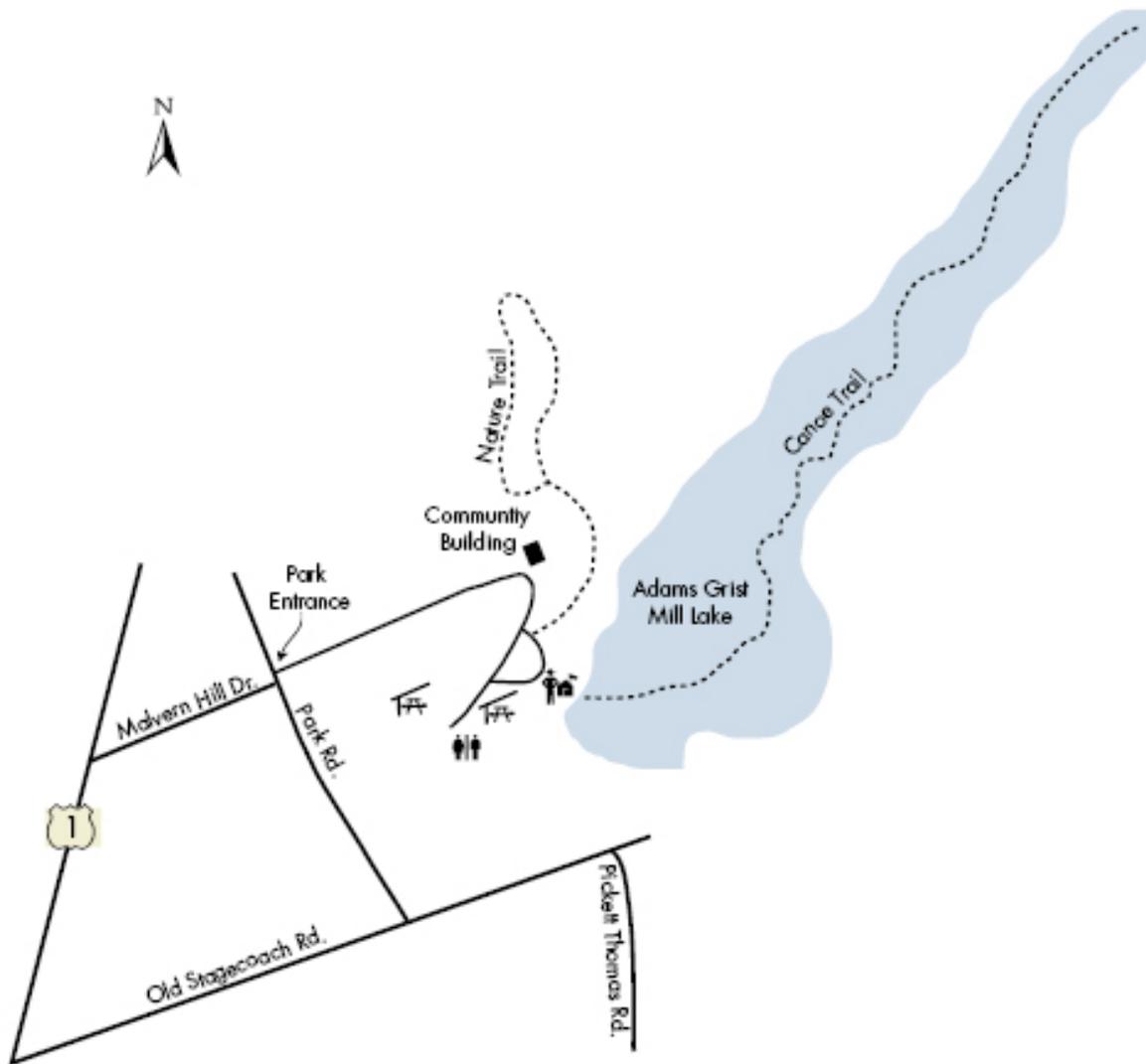
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

N.R. Goodale State Park



45. Paris Mountain State Park (Greenville County)

Problem plant species

Slender Naiad, Watershield,

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Renovate Max G, Clearcast, Glyphosate, Habitat

Area to which control is to be applied

Lake Placid: slender naiad 5 acres - Treat with grass carp

Lake Buckhorn: Watershield, pondweed treat 1 acre

Rate of control agent to be applied

Triploid Grass Carp – 15 fish per vegetated acre

Renovate Max G - 200 lbs per acre.

Method of application of control agent

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Herbicide - Spray on surface of foliage with appropriate surfactant. Granular broadcast evenly from airboat.

Timing and sequence of control application

Triploid grass carp to be released as soon as possible in the spring of 2014 (March-May).

RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

Herbicide - Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment. Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$1,300

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

46. Poinsett State Park (Sumter County)

Problem plant species

Spatterdock, Cattails

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Habitat, Glyphosate, Clearcast, Renovate Max G

Area to which control is to be applied

5 acres in swimming and bank fishing portions of the lake.

Rate of control agent to be applied

Clearcast - Up to 1 gallon per acre.
Habitat - Up to 0.750 gallons per acre.
Glyphosate - Up to 0.750 gallons per acre.
Renovate Max G – 200 lbs per acre.

Method of application of control agent

Herbicide - Spray on surface of foliage with appropriate surfactant. Granular broadcast evenly from airboat.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$1,500

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)
(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

47. Sesquicentennial State Park (Richland County)

Problem plant species

Waterlily, Watershield

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Hardball, Renovate Max G

Area to which control is to be applied

5 acres in swimming and bank fishing portions of the lake.

Rate of control agent to be applied

Hardball - Up to 5 gallons per acre.
Renovate Max G – 200 lbs per acre.

Method of application of control agent

Herbicide - Spray on surface of foliage with appropriate surfactant. Granular broadcast evenly from airboat.

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Commercial applicator contracted and monitored by SCPRT.

Estimated cost of control operations

\$3,000

Potential sources of funding

S.C. Department of Parks, Recreation and Tourism 50%

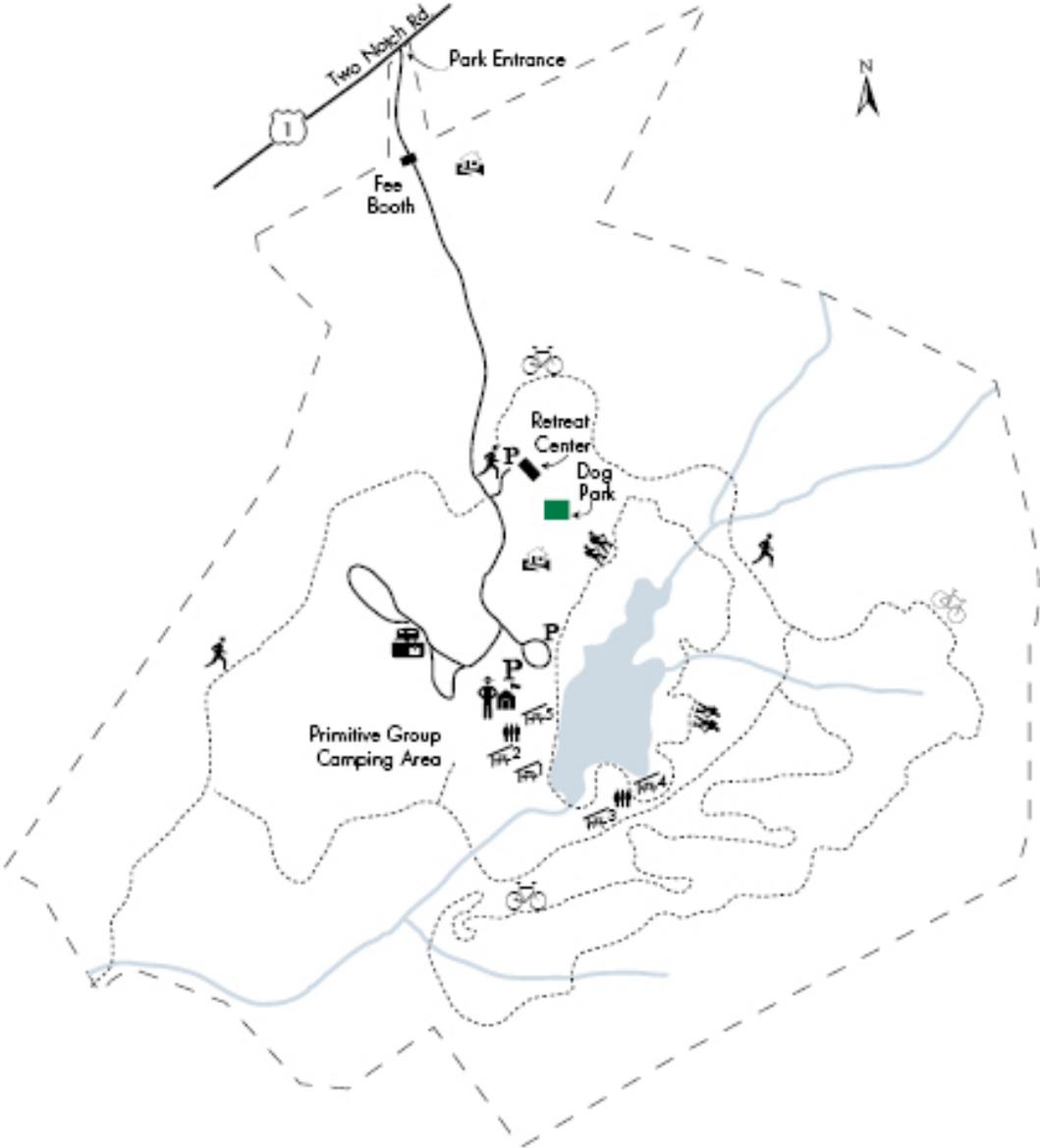
S.C. Department of Natural Resources 50% (up to \$30,000 cost share per waterbody)

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

Sesquicentennial State Park



**South Carolina Department of Natural Resources
State Lakes**

*Total price and cost share is for herbicide costs only based on state contract costs. Freshwater Fisheries staff will apply based on label rates.

**48. Lake Cherokee
(Cherokee County)**

Problem plant species

Water primrose

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Renovate 3

Area to which control is to be applied

5 acres in lake, two (2) times per year.

Rate of control agent to be applied

Renovate 3 - 0.500 - 0.750 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

SCDNR-Wildlife and Freshwater Fisheries Division, Lake Management staff.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

**49. Lake Edwin Johnson
(Spartanburg County)**

Problem plant species

Water primrose, Hydrilla, Pondweed

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Problems species	Control Agent
Water Primrose	Renovate 3
Pondweed	Komeen/Reward
Hydrilla	Triploid Grass Carp, Komeen/Reward

Rate of control agent to be applied

Renovate 3 - 0.500 - 0 gallons per acre.

Komeen/Reward - 4 gallons per acre / 2 gallons per acre.

Triploid Grass Carp – 25 fish per vegetated acre.

Area to which control is to be applied

Primrose - 7 acres in lake two (2) times per year.

Hydrilla/Pondweed - 4 acres in lake two (2) times per year.

If conditions warrant, release triploid grass carp in close proximity to areas of the lake with the greatest problematic growth and use herbicide applications to provide immediate short-term control of localized growth in those areas. 100 Triploid Carp

Method of application of control agent

Spray on surface of foliage with appropriate surfactant. Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

Apply when plants are actively growing.
Triploid grass carp – If conditions warrant, triploid grass carp to be released as soon as possible.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake.

Entity to apply control agent

Herbicide application – SCDNR Wildlife and Freshwater Fisheries Division, Lake Management staff and/or commercial applicator.

Triploid Grass Carp - SCDNR Wildlife and Freshwater Fisheries Division, Lake Management staff and/or a commercial supplier with supervision by the SCDNR.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

50. Jonesville Reservoir (Union County)

Problem plant species

Water primrose, Pondweed

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Renovate 3, Glyphosate

Area to which control is to be applied

10 acres in lake.

Rate of control agent to be applied

Renovate 3 - 0.500 – 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

SCDNR-Wildlife and Freshwater Fisheries Division, Lake Management staff.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

**51. Mountain Lakes
(Chester County)**

Problem plant species

Water primrose, Alligatorweed, Parrotfeather

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Renovate 3, Glyphosate

Area to which control is to be applied

5 acres in lake.

Rate of control agent to be applied

Renovate 3 - 0.500 - 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

SCDNR-Wildlife and Freshwater Fisheries Division, Lake Management staff.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

**52. Lancaster Reservoir
(Lancaster County)**

Problem plant species

Water primrose, Alligatorweed

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Renovate 3, Glyphosate

Area to which control is to be applied

8 acres in lake.

Rate of control agent to be applied

Renovate 3 - 0.500 - 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

SCDNR-Wildlife and Freshwater Fisheries Division, Lake Management staff.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

**53. Sunrise Lake
(Lancaster County)**

Problem plant species

Pondweed

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Glyphosate

Area to which control is to be applied

15 acres in lake.

Rate of control agent to be applied

Glyphosate - up to 0.937 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

SCDNR-Wildlife and Freshwater Fisheries Division, Lake Management staff.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

54. Lake Ashwood (Lee County)

Problem plant species

Waterlily

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Renovate Max G

Area to which control is to be applied

<5 acres of spotty coverage

Rate of control agent to be applied

200 pounds per acre

Method of application of control agent

Spray on surface of foliage with appropriate surfactant

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

SCDNR-Wildlife and Freshwater Fisheries Division, Lake Management staff.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

55. Lake Edgar Brown (Barnwell County)

Problem plant species

Water primrose, Coontail, water hyacinth

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities. Control efforts will extend into the Turkey Creek area adjacent to the Barnwell Hatchery.

Selected control method

Habitat, Glyphosate

Area to which control is to be applied

60 acres in lake.

Rate of control agent to be applied

Habitat - up to 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant

Timing and sequence of control application

Apply when plants are actively growing.

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

SCDNR-Wildlife and Freshwater Fisheries Division, Lake Management staff.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

**56. Lake George Warren
(Hampton County)**

Problem plant species

Water primrose, Cattails, Coontail, Naiad

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Glyphosate, Habitat, Triploid Grass Carp

Area to which control is to be applied

20 acres in lake.

Rate of control agent to be applied

Glyphosate - up to 0.937 gallons per acre.

Habitat - 0.250 - 0.500 gals/ac

If conditions warrant, release triploid grass carp in close proximity to areas of the lake with the greatest problematic growth and use herbicide applications to provide immediate short-term control of localized growth in those areas.

Method of application of control agent

Spray on surface of foliage with appropriate surfactant. Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

Apply when plants are actively growing.

Triploid grass carp – If conditions warrant, triploid grass carp to be released as soon as possible.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake.

Entity to apply control agent

Herbicide application – SCDNR Wildlife and Freshwater Fisheries Division, Lake Management staff and/or commercial applicator.

Triploid Grass Carp - SCDNR Wildlife and Freshwater Fisheries Division, Lake Management staff and/or a commercial supplier with supervision by the SCDNR.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant

populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

57. Lake Thicketty (Cherokee County)

Problem plant species

Hydrilla

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Hydrilla Triploid grass carp, chelated copper

Area to which control is to be applied

5 acres in lake.

Rate of control agent to be applied

Approximately 5 acres in priority areas such as, public access sites (boat ramps, piers, swimming areas, marinas) and residential shoreline areas. If conditions warrant, release triploid grass carp in close proximity to areas of the lake with the greatest hydrilla growth and use herbicide applications to provide immediate short-term control of localized growth in those areas. 20 fish per vegetated acre.

Chelated copper - up to 1 ppm Glyphosate- up to 1 gallon per acre.

Method of application of control agents

Chelated copper- subsurface application by airboat.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

All herbicides to be applied when plants are actively growing.

Triploid grass carp – If conditions warrant, triploid grass carp to be released as soon as possible.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake.

Entity to apply control agent

Herbicide application – SCDNR Wildlife and Freshwater Fisheries Division, Lake Management staff and/or commercial applicator.

Triploid Grass Carp - SCDNR Wildlife and Freshwater Fisheries Division, Lake Management staff and/or a commercial supplier with supervision by the SCDNR.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

**58. Dargan's Pond
(Darlington County)**

Problem plant species

Pondweed

Management objective

Reduce or remove problem plants to the extent they do not interfere with recreational opportunities.

Selected control method

Glyphosate, Triploid Grass Carp

Area to which control is to be applied

15 acres in lake.

Rate of control agent to be applied

Glyphosate - up to 0.937 gallons per acre.

Triploid Grass Carp – 25 fish per vegetated acre

Method of application of control agents

Glyphosate - subsurface application by airboat.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

All herbicides to be applied when plants are actively growing.

Triploid grass carp – If conditions warrant, triploid grass carp to be released as soon as possible.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

If available, all sterile grass carp will be a minimum of 12 inches in length. Sterile grass carp shipments will be certified by the SCDNR for sterility and checked for size and condition prior to stocking in the lake.

Entity to apply control agent

Herbicide application – SCDNR Wildlife and Freshwater Fisheries Division, Lake Management staff and/or commercial applicator.

Triploid Grass Carp - SCDNR Wildlife and Freshwater Fisheries Division, Lake Management staff and/or a commercial supplier with supervision by the SCDNR.

Estimated cost of control operations

\$*

Potential sources of funding

S.C. Department of Natural Resources (WFF division) 100%

S.C. Department of Natural Resources 0%

(Percentage of match subject to change based on availability of Federal and State funding.)

Long term management strategy

- a) Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b) Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c) Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

South Carolina Border Lakes

Approval for Lake Wylie was accomplished by SCDNR staff in conjunction with staff from North Carolina Natural Resource agencies, Duke Energy staff, and the Lake Wylie Marine Commission.

59. Lake Wylie

(York County, SC; Gaston and Mecklenburg County, NC)

Problem plant species

Hydrilla

Management objective

Reduce hydrilla growth lake-wide and prevent the spread of hydrilla to other systems.

Achieve measurable reduction of hydrilla within two or three years and once hydrilla has been controlled, prevent it from reestablishing.

Control hydrilla by using a low enough density of triploid grass carp that potentially other forms of native vegetation can become established.

Selected control method

Triploid (sterile) grass carp used lake wide for long-term control.

Registered and properly applied herbicides should be used for initial suppression and by home owners for spot treatments.

Area to which control is to be applied

Triploid grass carp will be released from boat ramps near the greatest concentration of hydrilla.

Rate of control agent to be applied

Recommendation for supplemental grass carp stocking in the spring of 2014. Because of the loss of sterile grass carp to mortality (disease, predation, fishing, bow hunting, etc.) we recommend 576 grass carp, be stocked in the lake during the spring of 2014. This is a supplemental stocking of 32% (average of national grass carp annual mortality curves, Phil Kirk pers com) of the original 1800 grass carp introduced in 2009. Duke Energy will continue to monitor the effectiveness of the introduced fish.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Method of application of control agents

Herbicide- subsurface application by airboat.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

Herbicide applications - To be applied when plants are actively growing.

Triploid grass carp to be released as soon as possible in the spring of 2014 (March-May) and yearly at the same time for at least the next three years. RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS. After hydrilla has been controlled, follow up stocking, currently estimated at maintaining triploid grass carp stocking densities of approximately 1 fish per every 8 surface acres of Lake Wylie will be continued using mortality estimates derived from the population and population models.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

Triploid grass carp will be a minimum of 12 inches total length. All shipments will be examined for condition and length specified in the contract with the vendor.

Estimated cost of control operations

All work to be done in North Carolina Section of the lake.

Entity to apply control agent

Herbicide application - Commercial applicator or Duke Power Company

Drawdown - Duke Power Company

Potential sources of funding

Duke Power Company 100% - All control work at present time is in North Carolina.

Long term management strategy

- a) Manage hydrilla's potential adverse impacts to the Lake Wylie ecosystem using primarily triploid grass carp after initial suppression using approved herbicides.
- b) Maintain or enhance native aquatic vegetation by maintaining the lowest possible stocking rates of triploid grass carp, especially once major stands of hydrilla have been controlled.
- c) Seek to prevent further introduction and distribution of problem aquatic species through public education and enforcement of existing laws and regulations.
- d) Periodically revise management plans and strategy as new environmental data becomes available.
- e) Plan for long-term control of hydrilla, once control has been achieved, by maintaining very low densities of triploid grass carp. Stockings will be determined from mortality estimates generated from triploid grass carp collected on Lake Wylie and the use of age-structure population models developed for fisheries.

60. Lake Thurmond (South Carolina - Georgia)

Lake Thurmond is a U.S. Army Corps of Engineers (USACOE) lake which borders South Carolina and Georgia. The control and maintenance issues associated with this lake fall under the jurisdiction of the USACOE. The USACOE coordinate with both Georgia and SC natural resource agencies on a variety of issues that effect natural resource management. A consensus has not been reached by the entities involved on management activities for invasive species, specifically hydrilla. Ongoing meetings and correspondence will continue on this and many other subjects.

NOTE: The following description is not binding for management activities but represents the Aquatic Plant Management Council's opinion on managing hydrilla in Lake Thurmond.

Problem plant species

Hydrilla

Management objective

Reduce hydrilla growth lake-wide and prevent the spread of hydrilla to other systems.

Achieve measurable reduction of hydrilla within two or three years and once hydrilla has been controlled, prevent it from reestablishing.

Control hydrilla by using a low enough density of triploid grass carp that potentially other forms of native vegetation can become established.

Selected control method

Triploid (sterile) grass carp used lake wide for long-term control.

Registered and properly applied herbicides should be used for initial suppression and by home owners for spot treatments.

Area to which control is to be applied

Triploid grass carp will be released from boat ramps near the greatest concentration of hydrilla.

Rate of control agent to be applied

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Method of application of control agents

Herbicide- subsurface application by airboat.

Triploid grass carp – Using standard techniques to minimize loss, stock sterile grass carp in areas of the lake with the greatest hydrilla growth.

Timing and sequence of control application

Herbicide applications - To be applied when plants are actively growing.

Triploid grass carp to be released as soon as possible. RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS. After hydrilla has been controlled, follow up stocking,

currently estimated at maintaining triploid grass carp stocking densities of approximately 1 fish per every 8 surface acres of Lake Thurmond will be continued using mortality estimates derived from the population and population models.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

Triploid grass carp will be a minimum of 12 inches total length. All shipments will be examined for condition and length specified in the contract with the vendor.

Estimated cost of control operations

No estimate available

Entity to apply control agent

Herbicide application - Commercial applicator or USACOE

Drawdown - USACOE

Potential sources of funding

USACOE 100%

Long term management strategy

- a) Manage hydrilla's potential adverse impacts to the Lake Thurmond ecosystem using primarily triploid grass carp after initial suppression using approved herbicides.
- b) Maintain or enhance native aquatic vegetation by maintaining the lowest possible stocking rates of triploid grass carp, especially once major stands of hydrilla have been controlled.
- c) Seek to prevent further introduction and distribution of problem aquatic species through public education and enforcement of existing laws and regulations.
- d) Periodically revise management plans and strategy as new environmental data becomes available.
- e) Plan for long-term control of hydrilla, once control has been achieved, by maintaining very low densities of triploid grass carp. Stockings will be determined from mortality estimates generated from triploid grass carp collected on Lake Thurmond and the use of age-structure population models developed for fisheries.

Additional Control Activities

Control efforts for Island Applesnails, which costs are shouldered by SCDNR, will be conducted in Horry County **and Charleston County**. Herbicides based on the active ingredient Copper will be utilized. Product names include Natrix, Captain, and copper sulfate. Rates will be based on the lowest possible label rates published by the manufacturer.

Problem species

Island Applesnail

Management objective

Achieve measurable reduction of Island Applesnails within two or three years and once controlled, prevent them from reestablishing.

Selected control method

Registered and properly applied herbicides should be used for initial suppression and for spot treatments.

Area to which control is to be applied

Local ponds in Horry County near Socastee and in Charleston County near Mount Pleasant

Rate of control agent to be applied

Herbicide will be applied at the low end of the label rate.

Method of application of control agents

Herbicide- application by hand held sprayers of small boats.

Timing and sequence of control application

Herbicide applications - To be applied when snails are actively growing.

Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

Estimated cost of control operations

Costs may vary significantly

Entity to apply control agent

Herbicide application - Commercial applicator or SCDNR

Potential sources of funding

SCDNR 100%

Long term management strategy

- a) Manage Island Applesnail's potential adverse impacts to the local ecosystem using approved herbicides. Prevent IAS from expanding its range into adjacent Waccamaw National Wildlife Refuge
- b) Seek to prevent further introduction and distribution of problem aquatic species through public education and enforcement of existing laws and regulations.
- c) Periodically revise management plans and strategy as new environmental data becomes available.

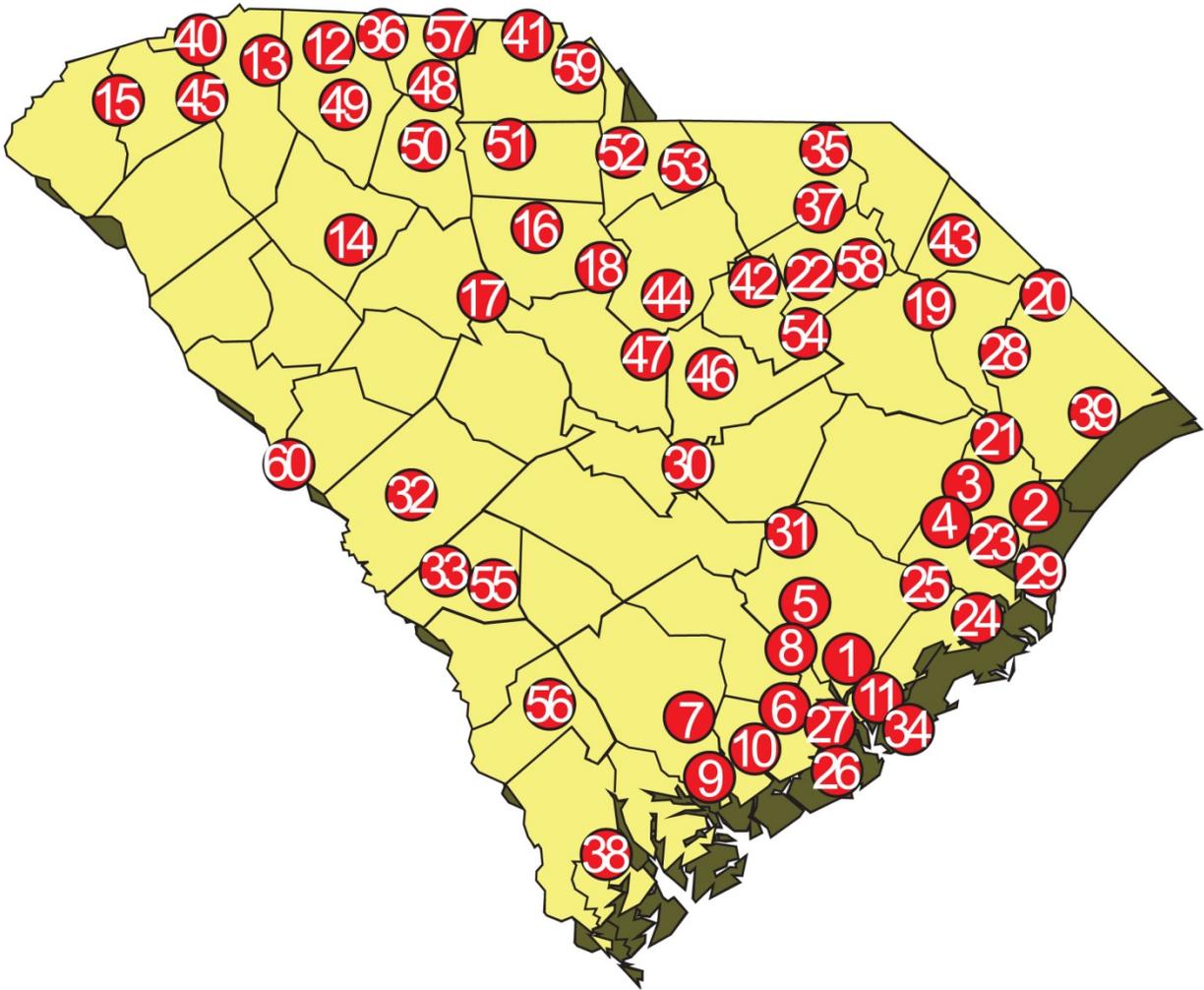
Summary of Proposed Management Operation Expenditures for 2014

	Water Body Name	Total Cost	Local	State	Federal	Local Sponsor
1	Back River Reservoir	\$45,000	\$22,500	\$22,500	\$0	SCE&G, CPW
2	Baruch	\$3,000	\$1,500	\$1,500	\$0	Baruch
3	Black Mingo Creek	\$900	\$450	\$450	\$0	Georgetown Co.
4	Black River	\$3,250	\$1,625	\$1,625	\$0	Georgetown Co.
5	Bonneau Ferry WMA	\$5,750	\$2,875	\$2,875	\$0	SCDNR
6	Charleston Co. Parks	\$1,000	\$500	\$500	\$0	Charleston Parks
7	Combahee River	\$700	\$350	\$350	\$0	Colleton Co.
8	Cooper River	\$28,000	\$14,000	\$14,000	\$0	Berkeley Co.
9	Donnelley/ACE Basin	\$2,900	\$1,450	\$1,450	\$0	SCDNR,USF&W
10	Dungannon WMA	\$2,000	\$1,000	\$1,000	\$0	SCDNR, USF&W
11	Goose Creek Reservoir	\$34,500	\$17,250	\$17,250	\$0	CPW
12	Lake Bowen	\$1,400	\$700	\$700	\$0	Spartanburg CPW
13	Lake Cunningham	\$2,000	\$1,000	\$1,000	\$0	Greer CPW
14	Lake Greenwood	\$6,000	\$3,000	\$3,000	\$0	Greenwood Co.
15	Lake Keowee	\$0	\$0	\$0	\$0	Duke Energy
16	Lake Monticello(Rec. Lake)	\$0	\$0	\$0	\$0	SCE&G
17	Lake Murray	\$8,000	\$4,000	\$4,000	\$0	SCE&G, Lex. Co.
18	Lake Wateree	\$0	\$0	\$0	\$0	Duke Energy
19	Little Pee Dee River	\$1,500	\$750	\$750	\$0	Horry Co.
20	Lumber River	\$500	\$250	\$250	\$0	Horry Co.
21	Pee Dee River	\$5,500	\$2,750	\$2,750	\$0	Georgetown Co.
22	Prestwood Lake	\$8000	\$4000	\$4000		City of Hartsville
23	Samworth WMA	\$5,000	\$2,500	\$2,500	\$0	SCDNR
24	Santee Coastal Reserve	\$200	\$100	\$100	\$0	SCDNR
25	Santee Delta WMA	\$1,500	\$750	\$750	\$0	SCDNR
26	USACOE AICWW/Chas. Harbor	\$3,100	\$0	\$0	\$3,100	USACOE
27	US Naval Weapons Sta.	\$7,500	\$0	\$0	\$7,500	US Navy
28	Waccamaw River	\$4,000	\$2,000	\$2,000	\$0	USF&W/Horry Co.
29	Yawkey Wildlife Center	\$3,850	\$1,925	\$1,925	\$0	SCDNR
	Santee Cooper Lakes					
30	Lake Marion	\$1,000,000	\$1,000,000	\$0	\$0	Santee Cooper
31	Lake Moultrie	\$400,000	\$400,000	\$0	\$0	Santee Cooper
	State Parks					
32	Aiken State Park	\$6,000	\$3,000	\$3,000	\$0	SCPRT
33	Barnwell SP	\$6,000	\$3,000	\$3,000	\$0	SCPRT
34	Charlestown Landing SP	\$1,000	\$500	\$500	\$0	SCPRT
35	Cheraw SP	\$12,000	\$6,000	\$6,000	\$0	SCPRT
36	Croft SP	\$10,000	\$5,000	\$5,000	\$0	SCPRT

37	H Cooper Black SP	\$375	\$188	\$188	\$0	SCPRT
38	Hunting Island SP	\$1,200	\$600	\$600	\$0	SCPRT
39	Huntington Beach SP	\$1,100	\$550	\$550	\$0	SCPRT
40	Jones Gap SP	\$240	\$120	\$120	\$0	SCPRT
41	Kings Mountain SP	\$1,050	\$525	\$525	\$0	SCPRT
42	Lee SP	\$1,810	\$905	\$905	\$0	SCPRT
43	Little Pee Dee SP	\$3,000	\$1,500	\$1,500	\$0	SCPRT
44	NR Goodale	\$3,000	\$1,500	\$1,500	\$0	SCPRT
45	Paris Mountain SP	\$1,500	\$750	\$750	\$0	SCPRT
46	Poinsett SP	\$1,500	\$750	\$750	\$0	SCPRT
47	Sesquicentennial SP	\$3,000	\$1,500	\$1,500	\$0	SCPRT
*	48-58 done entirely by SCDNR State Lakes Program, budget not provided					
	59-60 are border lakes with either Federal or other State jurisdictions, budget not provided					
	SCDNR Total	\$185,050	\$87,225	\$87,225	\$10,600	
	State Park Lake Total	\$52,776	\$26,388	\$26,388	\$0	
	Santee Cooper Total	\$1,400,000	\$1,400,000	\$0	\$0	
	SCDNR/State Parks Total	\$237,825	\$113,613	\$113,613	\$10,600	
	Grand Total	\$1,637,825	\$1,513,613	\$113,613	\$10,600	

NOTE: Planned expenditures are based on anticipated aquatic plant problems. The extent of proposed management operations will be modified depending on actual aquatic plant growth and funding availability in 2014 (Percentage of match subject to change based on availability of Federal and State funding.) * Control operations on Lakes Marion and Moultrie may receive federal funds from the Corps of Engineers St. Stephen Plant if control activities are directly related to maintaining operation of the St. Stephen Hydropower Facility. Those funds should be used whenever possible instead of APC cost-share funds from the Charleston District.

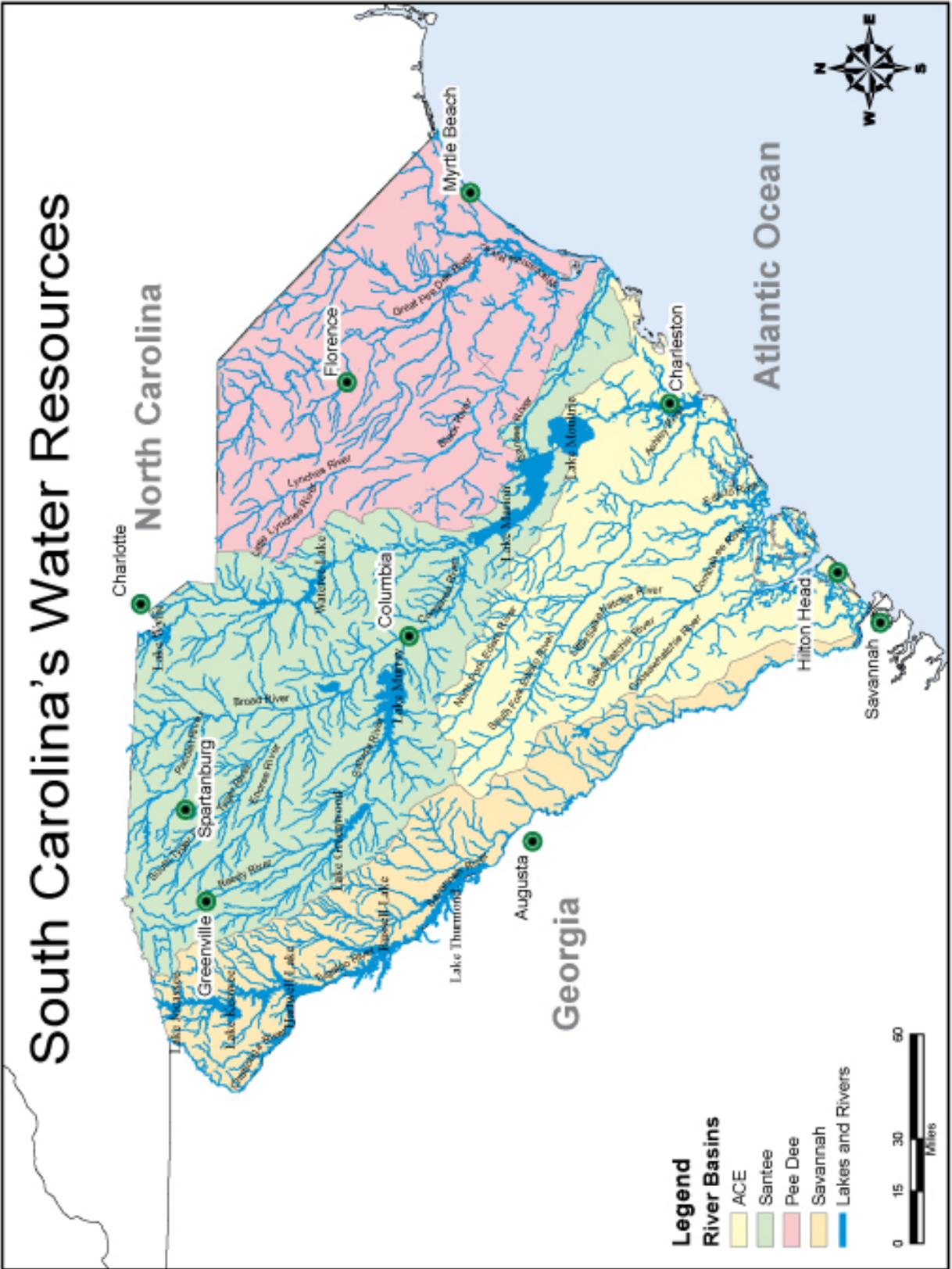
Location of 2014 Management Sites



Appendices

APPENDIX A

Major River Basins in South Carolina



APPENDIX B
Additional Documentation for NPDES General Permit

NPDES Required Information Details

1) Aquatic Nuisance Species Program Emergency Numbers

SCDNR Main Street Office	803-734-4036	Radio Room – Law Enforcement	803-955-4000
SCDNR Emergency Number	800-922-5431	DHEC Local Number – Columbia	803-253-6488
Poison Control Hotline	800-222-1222	National Response Center	800-424-8802
Chemical Spill/Fish Kill Emergency Number (DHEC)		888-481-0125	
Clemson Department of Pesticide Regulation		864-646-2150	
<p>Chris Page Program Manager Aquatic Nuisance Species Program SC Department of Natural Resources 2730 Fish Hatchery Road West Columbia, SC 29172 803-755-2836 Voice 803-600-7541 Cell</p>		<p>Michael Hook Field Supervisor Aquatic Nuisance Species Program SC Department of Natural Resources 2730 Fish Hatchery Road West Columbia, SC 29172 803-755-2872 Voice 803-667-1249 Cell</p>	
<p>Daniel Hood Technician Aquatic Nuisance Species Program SC Department of Natural Resources 2730 Fish Hatchery Road West Columbia, SC 29172 803-351-6718 Cell</p>		<p>Bob Cernuda Vice President-Southeast Division PLM Lake and Land Management Corp. 46 Veronica Road Georgetown, SC 29440 866 PRO-LAKE Toll Free-866 776-5253 843 545-1114 Voice 866 899-1627 Toll Free Fax 843 458-3022 Cell</p>	

DNR Region	Counties	Land, Water & Conservation	Freshwater Fisheries Fish Kills	Wildlife Wildlife Problems	Law Enforcement	Marine Resources	Support Services
Region I (Clemson) 311 Natural Resources Drive Clemson, SC 29631 (864) 654-1671	Abbeville Anderson Cherokee Edgefield Greenville Greenwood Laurens McCormick Oconee Pickens Spartanburg Union	<u>Marc Cribb</u> 803-734-6367 803-331-1568 (Cell)	<u>Dan Rankin</u> 864-654-1671 Ext. 12 864-982-2175 (Cell)	<u>Tom Swaynham</u> 864-654-1671 Ext. 21 864-982-2921 (Cell)	CPT Jamie Landrum 864-654-8266 Ext 18 864-982-1707 (Cell)	None Assigned	<u>Don Winslow</u> 803-734-3672 (Main Columbia Office) <u>Greg Lucas</u> 864-654-1671 Ext 22 864-380-5201 (Cell)
Region II (Florence) 2007 Pisgah Rd Florence, SC 29501 (843) 661-4766	Chester Chesterfield Darlington Dillon Fairfield Florence Lancaster Kershaw Lee Marion Marlboro Williamsburg York	<u>Marc Cribb</u> 803-734-6367 803-331-1568 (Cell)	<u>Robert Stroud</u> 843-661-4767 803-609-7018 (Cell)	<u>Sam Stokes</u> 843-870-3771 (Cell)	CPT Sandy Young 843-616-4290 (Cell)	None Assigned	<u>Scott Speares</u> 803-734-3624 (Main Columbia Office)
Region III (Columbia) PO Box 167 1000 Assembly St. Columbia, SC 29202 (803) 734-4303	Aiken Allendale Bamberg Barnwell Calhoun Clarendon Lexington Newberry Orangeburg Richland Saluda Sumter	<u>Marc Cribb</u> 803-734-6367 803-331-1568 (Cell)	<u>Hal Beard</u> 803-955-0462 803-609-7024 (Cell)	<u>Brett Moule</u> 803-734-3940 803-609-6988 (Cell)	CPT Harvin Brock 803-734-4303 803-260-6716 (Cell)	None Assigned	<u>DeAnne Gray</u> 803-734-3902 (Main Columbia Office) <u>Richard Byrd</u> 803-734-3998 (Main Columbia Office) 803-360-0252 (cell)
Region IV (Charleston) PO Box 12559 217 Ft. Johnson Rd. Charleston, SC 29412 (843) 953-9307	Beaufort Berkeley Charleston Colleton Dorchester Georgetown Hampton Horry Jasper	<u>Marc Cribb</u> 803-734-6367 803-331-1568 (Cell)	<u>Scott Lamprecht</u> 843-953-5160 843-870-5810 (Cell)	<u>Sam Chappellear</u> 843-953-5291 843-870-5777 (Cell)	CPT Gentry Thames 843-953-9307 843-870-5641 (Cell)	<u>David Whitaker</u> 843-953-9392 843-442-2093 (Cell)	

- 2) Pest Management Area Description
(See AQUATIC PLANT MANAGEMENT STRATEGY section for Specific Water body.)
- 3) Control Measure Description
(See AQUATIC PLANT MANAGEMENT STRATEGY section for Specific Water body.)
- 4) Schedules and Procedures
(See AQUATIC PLANT MANAGEMENT STRATEGY section for Specific Water body.)
- 5) PESTICIDE SPILL POLICY AND PROCEDURES
 - a. Put on protective clothing as may be appropriate: rubber boots, aprons, gloves, mask, and respirator. Use special caution if two different materials are spilled and mix together. They may react chemically to form noxious fumes.
 - b. Immediately contain the spill. Use absorbents, dikes, mops or brooms, dirt or sand to retard the spread of the spill.

- c. Notify your Contacts listed above or person in charge.
- d. Recover the spill into containers (usually 5 gallon buckets or 30 gallon drums). Each warehouse should have at least one clean, empty 30-gallon drum for the purpose.
- e. After sealing each recovered material container, mark it or attach a tag clearly to identify its contents, approximate quantity and date.
- f. Move containers of spilled materials to a secure area.
- g. Prepare a spill report giving relevant information including date; location; material spilled; approximate quantity; actions taken; location of recovered material; cause or circumstances leading to spill; and recommendations on how to avoid this problem in the future.
- h. Contact the office for disposal instructions.

DO NOT USE OR DISPOSE OF SPILLED MATERIALS WITHOUT PRIOR REVIEW.

- i. Depending on the circumstances, the best disposal method will differ. Some potential alternatives are:
 - 1. Use in the normal course of business;
 - 2. Dilute and wash into sanitary sewer;
 - 3. Shipment to an approved hazardous waste facility; neutralization / detoxification on site.
 - 4. Since a decision on how best to dispose of a spill may be quite complex, we may want input from manufacturers, regulatory officials or technical advisors. Consult the office before acting.

6) SPILL RESPONSE

Purpose: To ensure the safety of all individuals participating in or affected by herbicide use, to minimize the SCDNR's and Contractor's exposure to liability, to ensure the appropriate and effective application of herbicides as a management tool, and to minimize detrimental effects to the environment.

<i>The following information will provided following the discovery and initial telephonic reporting of the spill:</i>	
1.	Time spill occurred or was first observed: _____
2.	Name of person first observing spill: _____
3.	Location of initial spill and present location if moving: _____
4.	Type of spilled material: _____

5.	Estimate of amount spilled or rate of release if continuing: _____
6.	Environmental conditions e.g., wind direction and speed, wave action, and currents: _____
7.	If from mobile container (e.g., 2.5, 5, 15, 30, 55, tote): _____
8.	Description of area likely to be affected by spill --e.g., riverbanks, lakes, land areas, wildlife areas: _____
9.	Cause of spill, if determined: _____
10.	Action taken to combat spill, if any: _____
11.	Activities or authorities notified: _____ _____ _____

SPILL KIT CONTENTS

A spill kit is required to be assembled and placed in locations where pesticides are mixed, and on vehicles, which transport pesticides.

Shop Kit Quantity	Vehicle Kit Quantity	Item
1 (55 gal)	1 (5 gal)	open-head drum
1	1	pesticide spill policy and procedures

4	2	pairs of nitrile gloves
2	1	pairs of unvented goggles
2	1	respirator and pesticide cartridges
2	1	aprons (chemical resistant)
2	1	pairs of rubber boots
2	1	pairs of tyvek coveralls
1	1	dustpan
1	1	shop brush
12	6	heavy ply, polyethylene bags w/ties
1	1	first aid kit
80	10	lbs absorbent material
1	1	dozen blank labels
0	1	portable eyewash
1	0	synthetic fiber push broom
1	0	square-point "D" handle shovel

7) SCDNR Required Practices

Required practices, described below, are designed to ensure that the SCDNR's standards for use of herbicides meet or exceed the U.S. EPA's Worker Protection Standard for Agricultural Pesticides.

- a. Prior to implementing use of any herbicide, the need for its use relative to management goals shall be described in the S.C. Aquatic Plant Management Plan, and/or in a Weed Plan specific to the site.
- b. Only employees or contractors, who are certified/licensed by state and/or local regulations, are authorized to apply herbicides.
- c. Application techniques, monitoring strategies, and impacts/progress toward goals and required reporting information shall be documented.
- d. Standard safety practices for storage, mixing, transportation, disposal of containers and unused herbicide, and spill management will be followed.
- e. Herbicide containers and related equipment will be stored in a secure containment area away from people, animals and food. Herbicide containers will be stored closed and inspected periodically. Hazardous waste will be labeled appropriately and include accumulation start dates.
- f. Additional training required for the proper use and maintenance of personal protective equipment (PPE) and other equipment or required by the Occupational Safety and Health Administration (OSHA) shall be coordinated.
- g. The point(s) of contact and threshold size for spills that must be reported shall be verified in advance with the appropriate local agency. This information and other

emergency related information shall be provided to all applicators and initial responders through a written contingency plan.

- h. Directions and contact numbers of the nearest emergency medical treatment facility will be provided to all applicators.
 - i. Investigations of herbicide related accidents and receipt of employee suggestions or complaints relating to safety and health issues involving herbicides will be used as a feedback mechanism that can be used to improve the program.
 - j. Decontamination kits must be readily available, and must include two one-gallon (or more) containers filled with potable water, eyewash kits or eyewash bottles with buffered isotonic eyewash, hand or body soap, paper or other disposable towels, a full Tyvek coverall with foot covers, and a map and directions to the nearest medical facility. Whenever possible, those who apply herbicides shall have access (within 15 minutes travel time or at the nearest vehicle access point, whichever is closest) to an eyewash kit and either a 1) shower or large sink, or 2) emergency decontamination and first aid kits.
 - k. Treated areas should be closed to public access until they are judged safe for re-entry (or until the herbicide dries or for the minimum period required by the product label, whichever is longer). Posting is not required in most places, but where it is required (usually by local statute), place notices at points of entry or the perimeter of treated areas. Posting notices should include a statement that the area has been or will be treated, name of the herbicide, date of treatment, appropriate precautions to be taken or the date when re-entry is judged to be safe, and a phone number for additional information. Notices should be removed after it is judged safe to re-enter the area.
 - l. Under the NPDES Permit requirements, the SCDNR is required to maintain records for all herbicide application activities. These records shall include information on site(s), purpose(s), name(s) and amount(s) of product(s) used, name(s) of applicator(s), and licensing requirements for all herbicide applications in the previous 12 months. In addition, a yearly report shall include the same information, with estimates for the upcoming 12 months.
- 8) Adverse Incident Response

Any incident which results in adverse impacts to fish, wildlife, or non target plant species will be reported to the appropriate contacts as listed in the Section 1 contacts table. Additionally, the causes of the adverse impact will be determined through a scientific assessment to prevent or mitigate future problems.

9) Pesticide Monitoring Requirements

- a. While there are no specific pesticide residue monitoring requirements the SCDNR will maintain the following information along with any required monitoring data:
- b. Records of equipment maintenance and calibration are to be maintained only by the entity performing the pest application activity (on behalf of self or client).
- c. A copy of the NOI submitted to the Department and any correspondence exchanged between you and the Department specific to coverage under this permit;
- d. The date on which you knew or reasonably should have known that you would exceed an annual treatment area threshold during any calendar year, as identified in Part 1.2.2;

- e. Surveillance method(s) used, date(s) of surveillance activities, and findings of surveillance;
- f. Target pest(s);
- g. Pest density prior to pesticide application;
- h. Company name and contact information for pesticide applicator;
- i. Pesticide application date(s);
- j. Description of treatment area, including location and size (acres or linear feet) of treatment area and identification of any waters, either by name or by location, to which you discharged any pesticide(s)(a GIS record of the specific area where discharge of herbicide occurs);
- k. Name of each pesticide product used including the EPA registration number;
- l. Quantity of pesticide applied (and specify if quantities are for the pesticide product as packaged or as formulated and applied);
- m. Concentration (%) of active ingredient in formulation;
- n. For pesticide applications directly to waters, the effective concentration of active ingredient required for control;
- o. Any unusual or unexpected effects identified to non-target organisms;
- p. Documentation of any equipment cleaning, calibration, and repair (to be kept by pesticide application equipment operator); and
- q. A copy of your PDMP, including any modifications made to the PDMP during the term of this permit.

10) General Specifications

- a. The Contractor and SCDNR shall utilize equipment specifically designed for commercial application of herbicides. Equipment shall be kept in good operating condition at all times and must meet or exceed all safety requirements for this type of work. The equipment must be calibrated to disperse herbicides at the prescribed rate as outlined in the plan and records of said calibration shall be maintained. As a minimum requirement, the equipment shall meet the following conditions:
- b. The Contractor shall have a minimum of two watercraft (airboats) and a skiff with a “mudmotor” capable of traveling through heavily vegetated waterways. The watercraft shall be equipped with depth finders capable of locating vegetation underwater, such as an Eagle Ultra or equivalent make and model. The Contractor shall also have a computerized herbicide delivery spray system which is calibrated and has Global Positioning System capability on each watercraft capable of recording exact positions of all treatments. Such unit shall be capable of creating a file, such as a shape file, which will be capable of being imported into a Geographic Information System program such as ESRI’s ArcView or any ArcInfo based software and will provide SCDNR with a copy of such file in a timely manner. All data will become the property of SCDNR. The watercraft shall be capable of operation by one or two persons and shall be set up for underwater injection, handgun application, or granular broadcast application. A helicopter contract or access must also be available to the Contractor for performing aerial application of herbicides as needed at specified sites when needed.

- c. SCDNR reserves the right to inspect and approve all equipment to be utilized prior to the award. Non-conformance of equipment to SCDNR standards shall be reason for rejection of daily work.
- d. Regulations and Standards:
- e. The work shall comply with all laws, ordinances, and regulations of all legally constituted authorities that have jurisdiction over any part of this work. These requirements supplement these specifications and shall take precedence in case of conflict.
- f. All work shall be performed and completed in a thoroughly workman like manner in accordance with best modern practices and any permit requirements, regardless of any omissions from the attached specifications and/or drawings.

11) Qualifications

- a. The Contractor must have a minimum of five years of professional experience in the area of chemical aquatic weed control on large public waterbodies.
- b. All persons applying chemicals must be certified by the Clemson University Department of Pesticide Regulation in Category 5 (Aquatic Pest Control) or must work under the direct supervision of a person so tested and present on the spray boat.
- c. All persons applying chemicals must be capable of identifying target plants in the field.
- d. The Contractor must maintain liability insurance coverage of at least Five Million Dollars (\$5,000,000) to fulfill requirements of PART II.A.12.

APPENDIX C

Enabling Legislation

South Carolina Code of Laws Section 49-6-10/40

Title 49 – Waters, Water Resources and Drainage

CHAPTER AQUATIC PLANT MANAGEMENT

SECTION 49-6- Purpose; administering agency.

There is hereby created the South Carolina Aquatic Plant Management Program for the purpose of preventing, identifying, investigating, managing, and monitoring aquatic plant problems in public waters of South Carolina. The program will coordinate the receipt and distribution of available federal, state, and local funds for aquatic plant management activities and research in public waters.

The Department of Natural Resources (department) is designated as the state agency to administer the Aquatic Plant Management Program and to apply for and receive grants and loans from the federal government or such other public and private sources as may be available for the Aquatic Plant Management Program and to coordinate the expenditure of such funds.

SECTION 49-6-20. Aquatic Plant Management Trust Fund.

There is created the South Carolina Aquatic Plant Management Trust Fund which must be kept separate from other funds of the State. The fund must be administered by the department for the purpose of receiving and expending funds for the prevention, management, and research of aquatic plant problems in public waters of South Carolina. Unexpended balances, including interest derived from the fund, must be carried forward each year and used for the purposes specified above. The fund shall be subject to annual audit by the Office of the State Auditor.

The fund is eligible to receive appropriations of state general funds, federal funds, local government funds, and funds from private entities including donations, grants, loans, gifts, bond issues, receipts, securities, and other monetary instruments of value. All reimbursements for monies expended from this fund must be deposited in this fund.

SECTION 49-6-30. Aquatic Plant Management Council; membership; duties.

There is hereby established the South Carolina Aquatic Plant Management Council, hereinafter referred to as the council, which shall be composed of ten members as follows:

The council shall include one representative from each of the following agencies, to be appointed by the chief executive officer of each agency:

- (a) Water Resources Division of the Department of Natural Resources;
- (b) South Carolina Department of Health and Environmental Control;
- (c) Wildlife and Freshwater Fish Division of the Department of Natural Resources;
- (d) South Carolina Department of Agriculture;
- (e) Coastal Division of the Department of Health and Environmental Control;
- (f) South Carolina Public Service Authority;
- (g) Land Resources and Conservation Districts Division of the Department of Natural Resources;

(h) South Carolina Department of Parks, Recreation and Tourism;

(i) Clemson University, Department of Fertilizer and Pesticide Control.

The council shall include one representative from the Governor's Office, to be appointed by the Governor.

The representative of the Water Resources Division of the Department of Natural Resources shall serve as chairman of the council and shall be a voting member of the council.

The council shall provide interagency coordination and serve as the principal advisory body to the department on all aspects of aquatic plant management and research. The council shall establish management policies, approve all management plans, and advise the department on research priorities.

SECTION 49-6-40. Aquatic Plant Management Plan.

The department, with advice and assistance from the council, shall develop an Aquatic Plant Management Plan for the State of South Carolina. The plan shall describe the procedures for problem site identification and analysis, selection of control methods, operational program development, and implementation of operational strategies. The plan shall also identify problem areas, prescribe management practices, and set management priorities. The plan shall be updated and amended at appropriate intervals as necessary; provided, however, problem site identification and allocation of funding shall be conducted annually. In addition, the department shall establish procedures for public input into the plan and its amendments and priorities. The public review procedures shall be an integral part of the plan development process. When deemed appropriate, the department may seek the advice and counsel of persons and organizations from the private, public, or academic sectors.

The council shall review and approve all plans and amendments. Approval shall consist of a two-thirds vote of the members present. The department shall have final approval authority over those sections which do not receive two-thirds approval of the council.

Some of the Specific State Laws which pertain to Illegal, Noxious, or Nuisance Species:

Title 46, Chapter 9 - State Crop Pest Act

The State Crop Pest Commission is authorized by law (Section 46-9-40) to promulgate and enforce reasonable regulations to eradicate or prevent the introduction, spread or dissemination of plant pests. Plant pests are by definition (Section 46-9-15(5)) any living state of insects, mites, nematodes, slugs, animals, protozoa, snails or other invertebrate animals, bacteria, weeds, fungi, other parasitic plants...which directly or indirectly may injure or cause disease or damage in plants...and which may be a serious agricultural threat to the State, as determined by the Director.

The State Crop Pest Commission is responsible for control of plant pests which constitute a threat to production agriculture. In so doing, the Commission is the primary contact point for cooperation with the Animal and Plant Health Inspection Service (APHIS), U. S. Department of Agriculture.

The Commission has designated certain organisms as plant pests. These organisms are already designated as noxious weeds by state and/or federal authorities or are under domestic federal

quarantine. Once a plant pest has been designated, the Commission has the authority to impose control measures, up to and including, quarantine of the premises. However, the Director, as the Commission's designee, retains the discretion to determine that a plant pest has become so widespread that further control measures are not warranted.

Title 46, Chapter 23 - South Carolina Noxious Weed Act

Provides far reaching powers to seize, quarantine, treat, destroy, apply other remedial measures, to export, return to shipping point, or otherwise dispose of in such a manner as (it) deems appropriate, any noxious weed or any product or article of any character whatsoever or any means of conveyance which (it) has reason to believe contains or is contaminated with any noxious weed, offered for movement, moving, or has moved into or through the state or intrastate. To further deter persons from spreading nuisance aquatic weeds the law includes fines not exceeding \$500 and/or imprisonment not exceeding one year.

SECTION 50-13-1415 -Importation, possession, or placing water hyacinth and hydrilla in waters of the state.

No person shall possess, sell, offer for sale, import, bring, or cause to be brought or imported into this State, or release or place into any waters of this State any of the following plants:

- (1) Water Hyacinth
- (2) Hydrilla

Provided, however, that the department may issue special import permits to qualified persons for research purposes only.

The department shall prescribe the methods, control, and restrictions which are to be adhered to by any person or his agent to whom a special permit under the provisions of this section is issued. The department is authorized to promulgate such regulations as may be necessary to effectuate the provisions of this section and the department, by regulation, is specifically authorized to prohibit additional species of plants from being imported, possessed, or sold in this State when, in the discretion of the department, such species of plants are potentially dangerous.

SECTION 50-13-1630. Importing, possessing or selling certain fish unlawful; special permits for research; Department shall issue rules and regulations.

(A) A person may not possess, sell, offer for sale, import, bring, or cause to be brought or imported into this State or release into the waters of this State the following fish or eggs of the fish:

- (1) carnero or candiru catfish (*Vandellia cirrhosa*);
- (2) freshwater electric eel (*Electrophorus electricus*);
- (3) white amur or grass carp (*Ctenopharyngodon idella*);
- (4) walking catfish or a member of the Clariidae family (*Clarias*, *Heteropneustea*, *Gymnallabes*, *Channallabes*, or *Heterobranchus* genera);
- (5) piranha (all members of *Serrasalmus*, *Rooseveltiella*, and *Pygocentrus* genera);
- (6) stickleback;
- (7) Mexican banded tetra;
- (8) sea lamprey;

- (9) rudd (*Scardinius erythrophthalmu*-Linnaeus); and
- (10) snakehead (all members of family Channidae).

(B) The department may issue special import permits to qualified persons for research and education only.

(C) (1) The department may issue special permits for the stocking of sterile white amur or grass carp hybrids in the waters of this State. The special permits must certify that the permittee's white amur or grass carp hybrids have been tested and determined to be sterile. The department may charge a fee of one dollar for each white amur or grass carp hybrid that measures five inches or longer or twenty-five cents for each white amur or grass carp hybrid that measures less than five inches. The fee collected for sterility testing must be retained by the department and used to offset the costs of the testing.

(2) The department is authorized to promulgate regulations to establish a fee schedule to replace the fee schedule contained in item (1) of this subsection. Upon these regulations taking effect, the fee schedule contained in item (1) of this subsection no longer applies.

(D) The department may issue special permits for the importation, breeding, and possession of nonsterile white amur or grass carp hybrids. The permits must be issued pursuant to the requirements contained in Chapter 18 of this title. Provided, however, that no white amur or grass carp hybrids imported, bred, or possessed pursuant to a special permit issued pursuant to this section may be stocked in the waters of this State except as provided in subsection (C) of this section.

(E) It is unlawful to take grass carp from waters stocked as permitted by this section. Grass carp caught must be returned to the water from which it was taken immediately.

(F) The department must prescribe the qualifications, methods, controls, and restrictions required of a person or his agent to whom a special permit is issued. The department must condition all permits issued under this section to safeguard public safety and welfare and prevent the introduction into the wild or release of nonnative species of fish or other organisms into the waters of this State. The department may promulgate regulations necessary to effectuate this section and specifically to prohibit additional species of fish from being imported, possessed, or sold in this State when the department determines the species of fish are potentially dangerous.

APPENDIX D

Aquatic Plant Problem Identification Form

Aquatic Plant Problem Site Identification Form

Name and location of affected water body

GPS Location (LAT/LONG or UTM. specify projection)

Public or private water

Name of problem plant (if known)

Does the plant grow above or below the surface of the water?

Approximate area of water covered by the problem plant

Type of water use(s) affected by the plant

Length of time problem has existed

Plant control methods that have been used

Contact for additional information: _____

Name _____

Address _____

Phone _____

Please Return To: Aquatic Nuisance Species Program

S.C. Department of Natural Resources

2730 Fish Hatchery Road

West Columbia, South Carolina 29170

(803) 755-2836 email: invasiveweeds@dnr.sc.gov

*** Please include a sample of the plant, if possible, or a detailed digital image. Wrap the plant in a moist towel and place in a "baggie". The sample or photo should include flowers, if visible, along with leaf structure and stem. A photo or drawing of the affected area with an approximate acreage should also accompany this form.*

APPENDIX E

Aquatic Plant Control Agents

Aquatic Plant Control Agents

Listed below are the major aquatic plant control agents which are currently available for use in South Carolina. While the list is not all inclusive, it does contain those agents considered most useful for aquatic plant management. Costs for the agents are approximations and will vary somewhat depending on the source and amount purchased. Application costs are approximations of commercial applicator rates.

I. Chemical Control

A. Diquat (Reward, Tribune, Solera)

Target Plants

Submersed species - Bladderwort, coontail, elodea, naiad, pondweeds, watermilfoil, and hydrilla.
Floating species - Pennywort, Salvinia, water hyacinth, water lettuce, and duckweed.

Application Rate

Submersed species - One to two gallons per surface acre. Floating species - One half to one gallon per surface acre, depending on target species.

Cost - Diquat costs approximately \$99 per gallon. Assuming an application rate of two gallons per acre and an application cost of \$41 per acre, the total cost would be \$239 per acre per application for submersed species. The treatment cost for floating species at one-half gallon per acre rate would be \$90 per acre.

Use Considerations - Diquat is not toxic to fish or wildlife at normal use concentrations. It is non-volatile and nonflammable, but can cause irritation to eyes and skin upon contact. Its effectiveness is greatly reduced at temperatures below 50-60°F, by overcast conditions, and by turbid waters.

Water Use Restrictions - Water treated with Diquat cannot be used for drinking for up to 3 days, livestock consumption for one day, irrigation of food crops for 5 days, and irrigation of turf and ornamentals for up to 3 days depending on application rate or until approved analysis indicates that diquat ion concentrations are less than 0.02 ppm. There are no fishing or swimming restrictions. Do not apply this product within 1600 feet upstream of an operating water intake in flowing water bodies (rivers, streams, canals) or within 400 feet of an operating water intake in standing water bodies (lakes, reservoirs). To make applications within these restricted areas, the intake must be turned off for the time periods specified on the Federal label for the appropriate use category (Drinking, Livestock consumption, Irrigation) or until the treated area contains less than 0.02 ppm of diquat dibromide.

B. 2,4-D (Aqua-Kleen, Navigate, Hardball, Sinkerball, Renovate Max G)

Target Plants

Emergent species - Broadleaf species such as water primrose, waterlily, spatterdock, watershield, smartweed, pondweeds, and floating heart. Submersed species - Watermilfoil, bladderwort, and coontail. Floating species - Water hyacinth.

Application Rate

Granular form (2,4-D BEE) - 150 to 200 pounds per acre depending on target species. Liquid form - (2,4-D DMA) - 5 gallons per acre.

Cost

The granular form of 2,4-D costs about \$36 per pound. Assuming an application rate of 200 pounds per acre and an application cost of \$47 per acre, the total cost would be \$519 per application. The liquid form of 2,4-D costs approximately \$31 per gallon. Assuming an application rate of 5 gallons per acre and an application cost of \$41 per acre, the total cost would be \$196 per application

Use Considerations - The recommended formulations of 2,4-D are not toxic to fish or wildlife at normal use concentrations. This chemical is nonflammable and noncorrosive.

Water use Restrictions - Do not apply to waters used for irrigation, agricultural sprays, watering dairy animals, or domestic water supplies.

C. Chelated Copper (Cutrine Plus, Clearigate, Komeen, K-TEA, Nautique, Captain, Natrix)

Target Plants

Algae - Cutrine Plus, K-TEA, Captain

Submersed species (Hydrilla, Brazilian elodea, pondweed and southern naiad) - Komeen, Nautique, Cutrine Plus, Clearigate, and Captain

Application Rate

Algae - Treatment concentration of 0.2-0.5 parts per million of copper. Submersed species - 0 part per million of copper (12-16 gallons per acre) or mix two gallons of copper complex and two gallons of Diquat per acre.

Cost - Copper products cost about \$17 per gallon. Assuming an application rate of 16 gallons per acre and an application cost of \$41 per acre, the total cost would be \$313 per acre.

Use Considerations - Copper may be toxic to fish and aquatic invertebrates at recommended application rates, especially in soft water. Copper-based product should be carefully applied and monitored to minimize the risk of fish kills.

Water Use Restrictions - Copper complexes may be used in domestic and irrigation water supplies without water use restrictions.

D. Endothall - (Aquathol, Aquathol K, Aquathol Super K granular, Hydrothol 191 granular and liquid)

Target Plants

Aquathol products are effective for submersed species such as naiads, bladderwort, coontail, watermilfoil, pondweed, hydrilla, and cabomba

Hydrothol 191 is effective on the species listed above as well as filamentous and macrophytic algae.

Application Rate

Aquathol

Liquid form (Aquathol K) - three gallons or more per acre depending on the target species. Granular form - Aquathol: 54-323 pounds per acre depending on water depth and the target species.

Aquathol Super K: 22-66 pounds per acre depending on the water depth and the target species.

Hydrothol 191

Heavy Infestations - Evenly spread 160 - 270 pounds per acre foot of water (0 - 0 ppm) applied evenly. Moderate or light infestations - Use 55 - 110 pounds per acre foot (0 - 0 ppm) applied evenly.

Cost

Aquathol

Aquathol K costs approximately \$57 per gallon. Assuming an application rate of 5 gallons per acre and an application cost of \$41 per acre, the total cost would be \$326 per acre. Aquathol Super K costs about \$15 per pound at an application rate of 30 pounds per acre and an application cost of \$47 per acre, the total cost would be \$510 per acre.

Hydrothol 191

Hydrothol 191 costs approximately \$64 per gallon. Assuming an application rate of 7 gallons per acre and an application cost of \$41, the total cost would be \$492 per acre.

Hydrothol 191 granular costs approximately \$78 per pound. Assuming an application rate of 240 pounds per acre and an application cost of \$47, the total cost would be \$714 per acre.

Use Considerations - Concentrated endothall formulations are toxic to man if ingested or absorbed through the skin. They are also irritating to the skin and eyes. Avoid contact with or drift to other crops or plants as injury may result. Generally not toxic to fish at normal use concentrations, however, fish may be killed by dosages of Hydrothol 191 in excess of 0.3 ppm.

Water Use Restrictions - Water treated with endothall cannot be used for watering livestock, preparing agricultural sprays for food crops, for irrigation or domestic purposes for 7 to 25 days after treatment (depending on treatment concentration) or until such time that the water does not contain more than 0.2 ppm of endothall. Do not use fish from treated areas for feed or food for three days after treatment.

E. Glyphosate (Rodeo, Aquastar, Touchdown Pro, Glypro)

Target Plants - Emergent broadleaf plants and grasses such as alligatorweed, water primrose, smartweed, and Phragmites.

Application Rate - Up to 7 1/2 pints per acre, the specific rate depending on the target species.

Cost - Glyphosate products range in price from \$21-\$39 per gallon. At an application rate of 5 pints per acre and an application cost of \$41 per acre, the total would range from \$63-\$78 per acre per application.

Use Considerations - Glyphosate is not toxic to mammals, birds or fish at recommended use concentrations. Glyphosate products with aquatic labels can be used in and around aquatic sites, including all bodies of fresh and brackish water which may be flowing or nonflowing.

Water Use Restrictions - Do not apply within 0.5 miles upstream of potable water intakes unless water intake is shut off for 48 hours. There are no restrictions on water use for irrigation or recreation after treatment.

F. Flumioxazin (Clipper)

Target Plants – Duckweed, water meal, water lettuce, frog's-bit, water fern, alligatorweed

Application Rate - Up to 12 ounces of formulated product per acre, on surface applications or 200 - 400 ppb for subsurface treatment.

Cost - Flumioxazin products range in price from \$120-140 per pound. At an application rate of 12 ounces per acre and an application cost of \$41 per acre, the total would range from \$131-\$146 per acre per application.

Use Considerations - Flumioxazin is not toxic to mammals, birds or fish at recommended use concentrations. Flumioxazin products with aquatic labels can be used in and around aquatic sites, including all bodies of fresh and brackish water which may be flowing or nonflowing.

Water Use Restrictions There are no restrictions on potable water use or recreation after treatment. Treated water may not be used for irrigation purposes on food crops until at least five (5) days after application. Do not use in water utilized for crawfish farming. Do not re-treat the same section of water with *Clipper* Herbicide more than 6 times per year. Do not exceed 400 ppb of *Clipper* Herbicide during any one application. On surface spray applications of less than 3 feet of depth there is a 12 hour restriction for irrigation of turf and landscape ornamentals and a restriction of subsurface treatment applications of 1 to 3 days depending on the concentration used. There is also a 5 day restriction for ornamentals grown for production in greenhouses and nurseries for both surface and subsurface application.

G. Fluridone (Sonar, Avast)

Target Plants - Primarily submersed plants, such as hydrilla, Brazilian elodea, watermilfoil, pondweeds, duckweeds and naiads; also effective on lilies and some grasses.

Application Rate Liquid form (Sonar AS, Avast) - 1-4 pints per acre depending on water depth. Pellet forms (Sonar PR, Sonar SRP, Avast SRG) - 15 to 80 pounds per acre depending on water depth.

Cost - The liquid formulation ranges from \$1468-\$1650 per gallon. Assuming an application rate of 5 pints per acre (2 pounds active ingredient per acre) and an application cost of \$40 per acre, the total cost would be \$349 per acre per application. The pellet formulations range in price from \$200-\$200 per pound. Assuming an application rate of 20 pounds per acre (2 pounds active ingredient per acre) and an application cost of \$47 per acre, the total cost would be \$567 per acre per application.

Use Considerations - In large lakes and reservoirs fluridone should be applied to areas greater than five acres. This herbicide requires a long contact time and is not effective in sites with significant water movement or rapid dilution. Fluridone is slow acting and may require 30 to 90 days to achieve desired control under optimal conditions. Unlike other aquatic herbicides, fluridone has proven effective in inhibiting viable hydrilla tuber production.

Water Use Restrictions - Do not apply within 1/4 mile of a functioning potable water intake unless concentrations are less than 20 ppm. Water treated with fluridone cannot be used for irrigation for 7-30 days depending on target crop.

H. Imazapyr (Habitat)

Target Plants - Phragmites, Alligatorweed, Water primrose, and Cutgrass.

Application Rate - 1 to 6 pints per acre depending on target species.

Cost - Habitat (Imazapyr) costs \$245 per gallon. Assuming the application rate of 16 oz. per acre and an application cost of \$41 per acre, the total cost would be \$78 per acre.

Use Considerations - Applications to public waters can only be made by federal, state, or local agencies or those applicators which are licensed or certified as aquatic pest control applicators and are authorized by state or local agencies. Do not use in close proximity to hardwoods.

Water Use Restrictions - Do not apply within ½ mile of potable water intakes. For applications within ½ mile of a potable water intake, the intake must be turned off for a minimum of 48 hours. Do not apply within 1 mile of active irrigation intakes on still or slow moving waters. Irrigation water usage may be continued 120 days after application or when Habitat (Imazapyr) residue levels are determined by laboratory analysis to be 0 ppb or less.

Aerial Applications may only be made by helicopter.

I. Imazamox (Clearcast)

Target Plants - Phragmites, Alligatorweed, Water primrose, and Cutgrass.

Application Rate - 1 to 6 pints per acre depending on target species.

Cost -Clearcast (Imazamox) costs \$175 per gallon. Assuming the application rate of 16 oz. per acre and an application cost of \$41 per acre, the total cost would be \$63 per acre.

Use Considerations - Applications to public waters can only be made by federal, state, or local agencies or those applicators which are licensed or certified as aquatic pest control applicators and are authorized by state or local agencies. Can be used in close proximity to hardwoods

Water Use Restrictions - Do not apply within ½ mile of potable water intakes. For applications within ½ mile of a potable water intake, the intake must be turned off for a minimum of 48 hours. Do not apply within 1 mile of active irrigation intakes on still or slow moving waters. Irrigation water usage may be continued 120 days after application or when Habitat (Imazapyr) residue levels are determined by laboratory analysis to be 0 ppb or less.

Aerial Applications may only be made by helicopter.

J. Triclopyr (Renovate 3, Tahoe)

Target Plants - Alligatorweed, Eurasian watermilfoil, water hyacinth, parrotfeather, and water primrose.

Application Rate - 2-8 qts. per acre depending on target species.

Cost - Triclopyr products cost \$96 per gallon. Assuming the application rate of 2 qts per acre and an application cost of \$41 per acre, the total cost would be \$89 per acre.

Use Considerations - Triclopyr is not toxic to fish or wildlife at normal use concentrations. It can cause severe irritation to eyes and skin upon contact. It is suggested that it is used in a manner to reduce the possibility of drift. The proper personal protective equipment should be used as prescribed by the Federal label.

Water Use Restrictions - For floating and emergent applications do not apply within 200 feet of operating potable water intakes when using 4 - 8 qts. per acre. There are no setback restrictions for potable water intakes when 2 qts. per acre or less is applied to emergent vegetation. To make applications within these restricted areas, follow the label directions. There are no restrictions on the use of treated water for recreational purposes or for livestock consumption.

K. Penoxsulam (Galleon SC)

Target Plants

Submersed species – Hydrilla, Cabomba, Egeria, Eurasian watermilfoil

Floating species – Floating species – Water hyacinth, Water lettuce, Water fern, Duckweed, Frog's bit, Mosquito fern

Application Rates

0.174 fl oz per acre foot to achieve minimum effective concentration of 25 – 75 ppb.

Floating species – 2- 6 fl oz per acre as foliar application.

Cost – Penoxsulam costs approximately \$1650 per gallon. Assuming an application rate of 11 fl oz per acre and an application cost of \$41 per acre, total cost would be \$183 per acre for submersed plants. Assuming an application rate of 6 fl oz per acre, and an application cost of \$41 per acre, total cost would be \$113 per acre for emergent plants.

Use considerations – Penoxsulam has no potable water restrictions or irrigation restrictions except for irrigation of food crops. It must have prolonged contact times similar to fluridone (>21 days).

Water Use Restrictions - Food crop irrigation waters cannot be used if penoxsulam concentrations are above 1ppb

II. Biological Control

Alligatorweed Flea Beetle (*Agasicles hygrophila*)

Target Plant - Alligatorweed

Stocking Rate - 600-1,000 per acre.

Cost - The U.S. Army Corps of Engineers office in Palatka, Florida will provide lots of 6,000 flea beetles for the cost of shipping which is about \$50 per shipment. Flea beetles may also be obtained from the U.S. Department of Agriculture.

Use Considerations - Flea beetles feed only on alligatorweed and pose no threat to desirable plant species. They produce no adverse impact on the aquatic environment. As with all biological control agents, flea beetles may not remain in the area where stocked but may migrate to other areas of alligatorweed infestation. These insects are not able to survive severe winters and may require occasional restocking. The effectiveness of these insects may be enhanced by use with an aquatic herbicide such as 2, 4-D, or Rodeo.

Alligatorweed Stem Borer Moth (*Vogtia malloi*)

Target Plant - Alligatorweed

Cost - Approximately the same as for flea beetle.

Use Considerations - Same as for flea beetle.

Alligatorweed Thrip (*Amynothrips andersonii*) - This insect feeds on alligatorweed and has been stocked in South Carolina. It has failed to become established in the State and is considered less desirable than flea beetles or stem borers for control of alligatorweed.

D. Triploid White Amur or grass carp (*Ctenopharygodon idella*)

Target Plant - Primarily submersed plants including Brazilian elodea, hydrilla, bladderwort, coontail, naiads, pondweeds.

Cost - Triploid white amur cost \$4 to \$7 each. At a stocking rate of 15 to 25 fish per vegetated acre, the total cost could range from \$60 to \$175 per acre.

Use Considerations - Only the triploid (sterile) white amur may be stocked in South Carolina for aquatic weed control. Introduction and stocking of this fish is regulated by the S.C. Department of Natural Resources and requires a permit. Escapement over some dams may occur during high flow periods. Use of barriers in some lakes should prevent fish loss. While grass carp are effective on a wide variety of submersed plants, they generally do not provide effective control of watermilfoil species. Plants should be carefully identified prior to stocking to ensure proper stocking rates and potential efficacy.

E. Tilapia (*Tilapia* sp.) - Several species of this herbivorous fish have been used to control filamentous algae and submersed macrophytes. Tilapia cannot overwinter in South Carolina. Introduction of fish is regulated by the S.C. Department of Natural Resources.

III. Mechanical Control

Harvesters, Cutters, Dredges and Draglines

Target Plants - All species

Cost - Harvesters range in cost from \$5,000 to over \$150,000 for the initial investment. Operating cost range from \$300 to \$700 per acre.

Use Consideration - Harvesters can be used in irrigation and drinking water supplies without water use restrictions. They may actually spread some plants such as Brazilian elodea and hydrilla by dispersing plant fragments which form new colonies. Harvesting requires the availability of a land disposal site for harvested plants. These devices cannot be used on water bodies which have debris and obstructions which interfere with operation. Harvesters are slow, with a maximum coverage of about five acres per day.

Fiberglass Bottom Screens

Target Plants - All species which root in the bottom.

Cost \$10,000 per acre.

Use Considerations - Bottom screens may be detrimental to bottom-dwelling aquatic organisms. Due to high cost, use is usually restricted to beaches and other swimming areas where a relatively small area of control is required.

IV. Environmental Alterations

Water Level Manipulation - Some species of aquatic plants can be controlled by a periodic raising or lowering of water level. Shoreline grasses, cattails, and Phragmites can be controlled, to some extent, by maintaining higher than normal water levels during the plant growing season. Periodic lowering of water and drying of the bottom can reduce abundance of a number of submersed and emersed species. Disadvantages are that water level fluctuation can adversely affect water uses such as recreation, hydroelectric power production, wildlife protection, and others. Also, some plant species may actually be favored by water level variations. Many factors must be considered before using this method for aquatic plant control.

Reduction in Sedimentation and Nutrient Loading - Sedimentation decreases depth of the water body and increased the area where aquatic plants can grow. Nutrient enrichment resulting from man's activities usually does not create aquatic plant problems, but does contribute to existing problems. Reduction in these two environmental factors can assist in aquatic plant management,

but is not a sufficient control method by itself. The mechanism for control of these factors is through implementation of Best Management Practices for Control of Non-Point Source Pollution developed by the S.C. Department of Health and Environmental Control, and through the wastewater discharge permitting program (NPDES) also administered by the S.C. Department of Health and Environmental Control.

APPENDIX F

SCDNR and Santee Cooper

Aquatic Plant and Habitat Management Goals for the Santee Cooper Lakes

S.C. Department of Natural Resources and Santee Cooper Aquatic Plant and Habitat Management Goals for the Santee Cooper Lakes

MEMORANDUM OF AGREEMENT
BETWEEN SANTEE COOPER AND
SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES
REGARDING AQUATIC PLANT AND HABITAT MANAGEMENT GOALS
FOR THE SANTEE COOPER LAKES

This AGREEMENT (hereinafter "Agreement") is between Santee Cooper (hereinafter "S-C") and the South Carolina Department of Natural Resources (hereinafter "DNR"). This Agreement is effective on the date of the last signatory to the Agreement.

WHEREAS, S-C and DNR recognize Lakes Marion and Moultrie (hereinafter "Lakes") as a significant natural resource of the State of South Carolina, and

WHEREAS, in order to provide balanced benefits to natural resources and the multiple uses of the Lakes, DNR and S-C (hereinafter "Parties") agree to cooperate in the management of aquatic vegetation and the habitat that it provides, and

WHEREAS, the Parties' goal is to maintain, at a minimum, 10% of the surface area of the Lakes as beneficial vegetated habitat for waterfowl, wildlife, fish and other aquatic organisms,

THEREFORE, in order to achieve this goal, the Parties agree to the following:

- 1) The aquatic plant management goal for the Lakes is to achieve a diverse assemblage of native aquatic vegetation in and on, at a minimum, 10% of the total surface area of the Lakes and to effectively control non-native invasive species. The aquatic plant coverage should include a combination of submerse, floating leaf, and emergent plant species that provide habitat and food to game and non-game fish and wildlife species. The goal would be for this vegetation to be distributed throughout the Lakes.
- 2) S-C will annually monitor the vegetative community and extent of coverage. This monitoring may include aerial photography, visual surveys, hydro-acoustic transects and other appropriate measures as deemed necessary by the Parties in the annual work plan, in order to map plant species and coverage. An annual report of the monitoring results will be completed at the end of each growing season and provided to the Parties prior to preparation of the work plan for the following year.
- 3) The Parties will cooperate in monitoring the health of the fishery and in monitoring of wintering waterfowl populations. Wintering waterfowl population monitoring may consist of aerial or other census techniques as deemed appropriate by the Parties. When waterfowl census is utilized, DNR will provide personnel and prepare an annual report to be distributed to both agencies, and S-C will provide the flight time.
- 4) Sterile grass carp will continue to be a major component of the long-term management strategy in controlling hydrilla (*Hydrilla verticillata*). The Parties will meet at least annually to review the monitoring data and to develop recommendations for maintenance stocking levels and other control strategies. These recommendations will be jointly presented to the South Carolina

Aquatic Plant management Council (hereinafter "Council"). The implementation of these recommendations will be subject to approval by the Council.

- 5) Aquatic vegetation will not be controlled in Santee Cooper Project water bodies that are totally isolated from the Lakes unless it conflicts with specific water uses or is identified as a state or federal noxious weed and poses a threat to the Lakes.
- 6) Localized aquatic vegetation control using approved chemical or mechanical methods may be necessary in areas where vegetation interferes with hydroelectric power production or other legitimate uses of the Lakes regardless of plant coverage and distribution.
- 7) In order to enhance native plant growth and habitat throughout the lake system, the Parties will cooperate in implementing innovative management techniques. These techniques could include such measures as, introducing desirable native plant species, enhancing wildlife/waterfowl management areas, and implementing strategic lake level management measures.
- 8) The Parties will meet annually to review the results of monitoring and treatment programs to determine the effectiveness of the programs, and to develop annual work plans.
- 9) Every five years the Parties will meet to conduct a comprehensive review of the programs and to determine the success in meeting the overall management goals. Based upon this review, the provisions of this agreement may be modified, as deemed appropriate, by the mutual consent of the Parties.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement as of the date hereof.

SANTEE COOPER

By: R.M. Singleton, III

Date: 2/3/2010

SOUTH CAROLINA DEPARTMENT OF
NATURAL RESOURCES

By: John Grant

Date: 2-22-10

APPENDIX G

Summary of Aquatic Plant Control Expenditures - NOTE: The table for 2013 needs revision based on incomplete data compilation which is not yet available

SUMMARY OF AQUATIC PLANT CONTROL EXPENDITURES – (1981 THROUGH CURRENT)

During 1981, the Council received \$60,000 in Federal matching funds through the U.S. Army Corps of Engineers. The Council allocated \$57,000 of these funds to the S.C. Public Service Authority for plant management at Lake Marion. The Authority used these funds to chemically treat approximately 500 acres of the area uplake of the Rimini railroad trestle. The herbicide diquat was used to treat for Brazilian elodea and other submersed weed species. The remainder of the Federal funds were used to assist in development of the Council's management program.

During 1982, \$30,000 in Federal funds were allocated to the S.C. Public Service Authority for control of hydrilla and other nuisance plants at Lake Marion. An additional \$13,500 was allocated to Berkeley County for control of water hyacinths at Goose Creek Reservoir.

During 1983, \$155,000 in Federal matching funds were allocated to the S.C. Public Service Authority for plant control at Lake Marion. These funds were used to treat approximately 1,400 acres of upper Lake Marion with diquat, endothall and fluridone for control of Brazilian elodea, hydrilla and other submersed plants. The Council also provided \$4,500 in Federal matching funds to Berkeley County for maintenance control of water hyacinths at Goose Creek Reservoir.

During 1984, \$249,500 in Federal funds and \$40,500 in State funds were allocated to the S.C. Public Service Authority for aquatic weed control at Lake Marion. The S.C. Electric and Gas Company was allocated \$25,000 for control of hydrilla and other submersed aquatic weeds at Back River Reservoir. Berkeley County was allocated \$5,000 for maintenance control of water hyacinth at Goose Creek Reservoir.

Calendar year 1985 represented the first year of significant funding for aquatic plant management in South Carolina since the establishment of the Aquatic Plant Management Program in 1980. Funding was available from State and Federal sources over separate fiscal years. A total expenditure of \$701,349 was used to control nuisance aquatic plant populations on 29 water bodies around the State. Of this expenditure, \$98,377 was used for biological control by triploid grass carp and \$602,972 was used for chemical control operations.

During 1986, a mild winter coupled with low lake levels and clear water due to a severe drought resulted in an abundance of submersed aquatic plants. Hydrilla populations in Lake Marion and Back River Reservoir increased in coverage and new populations were discovered in the Cooper River ricefields. A total of 38 water bodies (4,925 acres) were managed for aquatic weeds at a cost of \$704,090. Herbicide applications were made on 33 lakes (4,441 acres) at a cost of \$673,979. Biological controls were implemented on nine water bodies around the State at a cost of \$30,111.

During 1987, a total of \$604,695 in State and Federal funds were expended for aquatic weed control in public waters. Chemical control work amounting to \$599,445 was conducted in 26 public water bodies. Biological control, including stocking triploid grass carp and alligatorweed flea beetles, was conducted at eight water bodies for a total expenditure of \$5,250.

During 1988, a total of \$631,164 in State, Federal, and local funds were expended for aquatic plant control activities in 25 water bodies. Because of reductions in the amount of Federal match from 70

percent to 50 percent of total control cost, local sponsors were for the first time required to provide at least 15 percent of control costs. Approved aquatic herbicides were applied to 3,258 acres on 21 water bodies at a total cost of \$583,764. Biological controls were implemented on four water bodies at a cost of \$47,400.

During 1989, a total of \$827,630 in Federal, State, and local funds were expended for aquatic plant control operations in 23 water bodies. Aquatic herbicides were applied to 2620 acres on 21 water bodies at a cost of \$422,009. A three year triploid grass carp stocking project was initiated on Lake Marion with the release of 100,000 sterile grass carp. Because this represents the largest such stocking in the country to date, biological control expenditures were substantially higher than in previous years, totaling \$405,621.

During 1990, a total of \$944,194 were expended for aquatic plant control activities on 24 water bodies. Herbicide treatments were made to all water bodies (2850 acres) at a cost of \$524,194. Lake Marion received its second installment of 100,000 triploid grass carp at a cost of \$420,000. Because of limited federal funds and a substantial increase in local funds (primarily from Santee Cooper), this was the first year that there were insufficient federal funds available to match all planned control operations. The Corps of Engineers provided 47 percent of total funding, while state and local entities provided 16 percent and 37 percent, respectively.

In 1991, aquatic plant management operations were conducted on 18 public water bodies at a total cost of \$1,965,387. The exceptionally large expenditure was a result of emergency control operations to alleviate blockage of the St. Stephen Hydroelectric facility on Lake Moultrie by hydrilla. A record high 6838 acres was treated with aquatic herbicides at a cost of \$1,505,771. Biological control agents were used on five lakes at a cost of \$459,615. Most of this included the third stocking of triploid grass carp in upper Lake Marion. While 50 percent of program funding was provided by the U.S. Army Corps of Engineers, 9 percent was provided by the State and 41 percent by local entities.

In 1992, 22 water bodies received control operations at a total cost of \$1,859,709. While last year's expenditures were higher, over 1,000 acres were treated by Santee Cooper at a cost of over \$200,000 but were not cost shared through the State program. Fifty percent of funding was provided by the U.S. Army Corps of Engineers, 8 percent by the State, and 42 percent by local entities. About 6,888 acres were treated with aquatic herbicide at a cost of \$1,447,864. Biological control agents (sterile grass carp and Tilapia) were introduced to six water bodies at a cost of \$411,845. This was the first year in which widespread hydrilla control was evident in upper Lake Marion from the grass carp. Hydrilla was controlled in over 6,500 acres in Stumphole, Low Falls, Elliotts Flats, and tree line areas. Compared to 1990 coverage, this represents an 80 percent reduction.

During 1993, a total of \$2,050,736 were expended for aquatic plant control activities on 27 water bodies. Forty-six percent of the funding was provided by the U.S. Army Corps of Engineers, 5 percent by the Department of Natural Resources, and 49 percent by various local sponsors. Aquatic herbicide treatments were made on 23 water bodies (8,125 acres) at a total cost of \$1,828,335. Biological control agents (grass carp and tilapia) were used on 11 lakes at a cost of \$222,400. Grass

carp stocked in upper Lake Marion in 1989-92 provided control (over 9,000 acres) for the second consecutive year. As a result of this success, stocking efforts were initiated in Lake Moultrie with the release of 50,000 grass carp. Hydrilla was discovered in Lake Murray this year resulting in unplanned treatment operations at several boat ramps and swimming beaches.

During 1994, aquatic plant management operations were conducted on 28 water bodies at a total cost of \$2,876,763. The U.S. Army Corps of Engineers provided 50 percent of all funds, while the State provided 7 percent and local entities provided 43 percent. Aquatic herbicide treatments were conducted on all water bodies (9,090 acres) at a cost of \$2,370,025. Grass carp were stocked in five lakes to control 10,242 acres at a cost of \$506,738. Lake Moultrie received the most grass carp (150,000 fish) to help increase the number of fish to target levels. Grass carp continue to control over 9,000 acres in upper Lake Marion for the third straight year. This year hydrilla was found in Lake Wateree for the first time resulting in unplanned treatments to attempt to eliminate it.

In 1995, a total of \$2,804,206 were expended for aquatic plant control activities on 30 water bodies. Fifty percent of the funding was provided by the U.S. Army Corps of Engineers, 44 percent was provided by local sponsors, and the state contributed 6 percent. Some level of herbicide treatment occurred on all the water bodies totaling about 9,710 acres at a cost of \$2,367,622. A total of 97,526 grass carp were stocked in five lakes at a total cost of \$435,084. Most of these were stocked in the Santee Cooper lakes (91,000) and Goose Creek Reservoir (6,000). Hydrilla was found in Lake Keowee for the first time this year which resulted in an unplanned treatment. Also *Salvinia molesta*, a federal noxious weed, was discovered in a private pond in Colleton County. Efforts were made to eradicate the infestation with treatments by the landowner and the state. Grass carp continue to provide excellent control in over 9,000 acres in upper Lake Marion; however, floating water hyacinths now infest much of this area impacting primarily shoreline and swamp areas.

Control expenditures in 1996 were about one-half of those in 1995 due in part to successful results from control efforts in previous years and in part to reductions in federal funding. A total of 19 water bodies were managed for nuisance species at a total cost of \$1,151,501; the Corps of Engineers provided 31%, the State provided 10%, and local entities provided 59%. Herbicide treatments were conducted in 4,920 acres at a cost of \$888,685; biocontrol agents were used in four lakes at a cost of \$262,816. Hydrilla coverage on the Santee Cooper lakes (Lakes Marion and Moultrie) declined by almost 80% due apparently to the successful stocking of sterile grass carp. As a result, herbicide treatments of hydrilla were reduced by a comparable amount. Hydrilla coverage has been essentially eliminated on Lake Wateree and substantially reduced on Lake Keowee through a combination of herbicide treatments and drawdowns. A large drawdown and treatment on Lake Murray this year is hoped to have similar results.

During 1997, aquatic plant management operations were conducted on 21 water bodies at a total cost of \$459,783. This represents a 60% reduction from control costs in 1996 due to very successful hydrilla management efforts on the Santee Cooper lakes and Lake Murray coupled with limited Federal matching funds. Matching funds from the Corps of Engineers composed only 2 percent of total costs, while State and Local funds made up 38 percent and 60 percent, respectively. Sterile grass carp were stocked in five lakes to control 292 acres of submersed plants at a cost of \$15,951.

Aquatic herbicides were used to treat 3,762 acres at a total cost of \$443,832. Most herbicide treatments (58%, 2,181 acres) were focused on water hyacinth which has expanded its range and now is found on six major water bodies. Water hyacinth treatments on the Ashepoo River were greater than originally planned and treatments on the Waccamaw River were unanticipated. Hydrilla coverage on the Santee Cooper lakes continued to decline in 1997 due to successful control by sterile grass carp resulting in sharp reductions in management expenditures. The drawdown and herbicide treatment on Lake Murray in 1996 resulted in better than anticipated hydrilla control this year. Hydrilla acreage was reduced 88 percent with a 45 percent reduction in shoreline miles.

Limited hydrilla coverage on the Santee Cooper Lakes, Lake Murray and Goose Creek Reservoir during 1998 helped reduce overall control expenditures for the third consecutive year. Total control cost for 1998 were 40% less than in 1997. A total of 1,862 acres on 17 water bodies were managed at a cost of \$273,223. The Department of Natural Resources provided 47% of total funding, while 25% was provided by the Corps of Engineers, and 28% by various local entities. Sterile grass carp are effectively controlling hydrilla growth in the Santee Cooper Lakes and Goose Creek Reservoir. About one-half of all herbicide treatments (940 ac.) were focused on water hyacinth control on coastal rivers and impoundments.

A total of 3,259 acres on 19 water bodies were managed in 1999 at a total cost of \$453,071. Funding support was 34% State (SCDNR), 21% Federal (USACOE), and 45% local match. Most herbicide treatments (1506 acres, 46%) were directed at controlling the growth of water hyacinth in seven water bodies. Hydrilla growth remains limited statewide due to control operations in previous years. Grass carp in the Santee Cooper Lakes (Lakes Marion and Moultrie) and Goose Creek Reservoir are effectively controlling hydrilla growth in those lakes. Hydrilla regrowth was evident in Lake Murray at the end of the year; however, higher than normal lake levels restricted herbicide treatments. Therefore, significant regrowth is expected next year.

During 2000, aquatic plant management operations were conducted on 21 water bodies at a total cost of \$483,236. State budget cuts at the end of the calendar year reduced control efforts by 21% of planned expenditures and shifted costs to local sponsors. Seventy percent of total costs were borne by local entities with the state paying the rest. Most of the control effort was focused on water hyacinth (31%), followed by hydrilla (25%) and Pithophora (19%). Hydrilla regrowth was significant on Lake Murray as predicted. Grass carp continue to control hydrilla on Goose Creek Reservoir and Lake Marion and Lake Moultrie.

During 2001, aquatic plant management operations were conducted on 2,775 acres on 25 water bodies at a total cost of \$508,075. Due to State budget cuts virtually all control costs were paid for with federal (41%) and local funds (59%). Hydrilla treatments were up this year (1,550 acres) because of a resurgence of hydrilla growth on Lake Murray; however, water hyacinth treatments were especially low (186 acres) due to a very cold period in December. Grass carp continue to provide effective control of hydrilla on Goose Creek Reservoir and the Santee Cooper Lakes.

During 2002, aquatic plant management operations were conducted on 2,239 acres on 17 water bodies at a total cost of \$297,236. Due to State budget cuts virtually all control costs were paid for with federal (37%) and local funds (63%). Water hyacinth treatments were up this year (1,186 acres)

because of a milder than normal winter; however, hydrilla treatments were especially low (390 acres) due to the inability to treat Lake Murray. Grass carp continue to provide effective control of hydrilla on Goose Creek Reservoir and the Santee Cooper Lakes.

In 2003, aquatic plant management operations were conducted on 61340 acres in 12 water bodies at a total cost of \$639,328. Due to state budget cuts all control costs were paid for with federal (38%) and local funds (62%). Included in this total are the stocking of 64,500 sterile grass carp in Lake Murray to control 4300 acres of hydrilla at a cost of \$369,529. About 57% of all herbicide treatments (1005 ac.) were focused on water hyacinth control on coastal rivers and impoundments. Grass carp continue to provide effective control of hydrilla on Goose Creek Reservoir and the Santee Cooper Lakes.

A total of 2764 acres were treated in 2004 at a total cost of \$470,815. Local sponsors provided 41% of the cost, while the Corps of Engineers provided 30%. Funds from the State's Water Recreational Resource Fund (boat gas tax) paid for 29% of all control costs. The focus of most control was on water hyacinth (931 acres) and Phragmites (710 acres). Grass carp continue to provide effective control of hydrilla on Goose Creek Reservoir and the Santee Cooper Lakes. Preliminary surveys of Lake Murray indicate that grass carp stocked in 2003 are beginning to provide some control of hydrilla. The drawdown on Lake Murray over the past two years is also providing good hydrilla control in the drawdown zone.

In 2005 the focus of the Aquatic Nuisance Species Program was Phragmites control in coastal South Carolina, 1983 acres were treated at a cost of \$349,174. In all, a total of \$655,535 was spent on 3,935 acres of control of invasive plants. Local sponsors provided 32% of the cost, while the Corps of Engineers provided 35%. Funds from the State's Water Recreational Resource Fund (boat gas tax) paid for 33% of all control costs. Grass carp continue to provide effective control of hydrilla on the Santee Cooper Lakes and have provided excellent control on Lake Murray.

For 2006, Phragmites control was center stage and once again led the control efforts with 1950 acres treated at a cost of \$352,804. This is second only to last year's acreage of phragmites treated. In total 3983 acres of invasive species were treated at a cost of \$722,316. Funding from the Corps of Engineers was not available this year and the costs were almost evenly split between the local cost share monies and Water Recreation funds. Additional funding was used from the U.S. Navy, Naval Weapons Station in Goose Creek. Included in that total was 242 acres of Phragmites and about 70 acres of pond work in the Marrington Recreation area. Findings in Goose Creek Reservoir and the Santee Cooper Lakes indicate that additional stockings of triploid grass carp may need to be reconsidered in 2007.

Increasing hydrilla and the abundance of native submersed vegetation in 2007 brought about maintenance stocking of Triploid Grass Carp in Lake Marion, Lake Moultrie, and Goose Creek Reservoir. A total of 2620 sterile carp were stocked in the Santee Cooper Lakes with an additional 185 fish stocked into Goose Creek Reservoir. In total 4208 acres of invasive species were treated at a cost of \$773,263. Costs were almost evenly split between the local cost share monies and Water Recreation funds. Additional funding was used from the U.S. Navy, Naval Weapons Station in Goose Creek and U. S. Army Corps of Engineers for treatment of phragmites on spoil areas in Charleston

Harbor and the Intracoastal Waterway. Santee coastal WMA managers should now have gained the upper hand with an additional 714 acres treated on Santee Coastal. Yawkey continued treatment of phragmites (120 acres) with several problem areas which remain persistent throughout treatment. Additionally 904 acres of phragmites have been treated from Colleton County through Georgetown County.

2008 showed a rebound of hydrilla across the state. Hydrilla was discovered in several new sites and at some old sites this highly invasive species increased abundantly. Triploid grass carp maintenance stocking plans are being reconsidered because of the increased levels of hydrilla in the Santee Cooper Lakes and Goose Creek Reservoir. Cooperative efforts with Duke Energy, Lake Wylie Marine Commission, South Carolina DNR, and North Carolina wildlife agencies produced a management plan for the border lake, Lake Wylie. 3335 acres of invasive species were treated at a cost of \$641,791. Costs were split approximately 44% local cost share monies and 56% Water Recreation funds. Phragmites sites continued to decline in acreage and new cooperative agreements were put in place for water hyacinth control on public and private areas along the Pee Dee and Waccamaw Rivers. This agreement includes SCDNR, the U.S. Fish and Wildlife Service, the Nature Conservancy, and private landowners. New problems tackled by the ANS program include a highly invasive snail species in the Socastee area of Horry County (111 acres at \$3,671) and a toxic algae problem in Hopeland Gardens in Aiken, S.C.

Budget problems in 2009 limited state level cost-share. In all 65% of total costs for control in South Carolina was absorbed by the local entities, along with 35% State Water Recreational Resource funds and 2% Federal funds. Through innovative control measures and perseverance by ANS staff, control efforts were not severely hampered. Triploid grass carp were stocked for the first time in Lake Greenwood to control an ever increasing hydrilla population. This stocking had limited success as hydrilla numbers grew throughout the summer months to double the original acreage. Maintenance stocking of the Santee Cooper Lakes and Goose Creek Reservoir was accomplished. In 2009 2,867 acres of control work was done at a total cost of \$572,588. Santee Cooper control was about 38% of the total acreage treated. Phragmites control was a key component of habitat restoration for waterfowl and other species and resulted in 424 acres of control efforts which is down from previous years because of efficacy of previous control efforts.

During FY 2010, aquatic plant management operations by the ANS Program were conducted on 28 different management sites at a cost of \$271,003 using local and State Water Recreation Resource funds. Field operation expenditures for the SCDNR decreased by 2% from FY 2009-2010 while acres controlled (2091, +18%) increased. This occurred by utilizing more efficient survey and treatment schedules along with the increased efficacy of newer herbicides brought about by a renewed state contract. Budget problems in 2010 limited state level cost-share. In all, 42% of total costs for control in South Carolina were absorbed by the local entities along with 58% State Water Recreational Resource funds. Through innovative control measures and perseverance by ANS staff, control efforts were not severely hampered. Triploid grass carp stocked in Lake Greenwood had good success as hydrilla acreage numbers plummeted to near zero. Maintenance stocking of the Santee Cooper Lakes and Goose Creek Reservoir was accomplished; with results in Goose Creek

Reservoir showing decreased submerged invasives and the results are pending based on aerial GIS surveys to be completed on Santee Cooper. 2,091 acres of control work was done in state waters. Habitat restoration for waterfowl and other species continues on Santee Coastal, Yawkey, Samworth, Donnelley, and Santee Delta. Early reports from those areas show an increase in useable habitat for waterfowl with increased bird numbers. Santee Cooper, which received no cost share funding, completed 2,438 acres at a cost of \$785,621. Acreage increases statewide and on Santee Cooper are almost entirely based on significant expansion of two new highly invasive species, *Nymphoides cristata* (crested floating heart) and *Pomacea insularum* (Island Applesnail). In all 4,519 acres of invasives were treated in South Carolina public waters at a total cost of \$1,056,624.

Hydrilla showed a 160 % increase in acreage on the Santee Cooper Lakes in 2011 prompting the Council to forego the maintenance stocking approach for an adaptive management strategy. The new plan calls for a total number of 109,000 triploid grass carp to be stocked in 2014 to reach a target rate of 129,000 carp. Aquatic plant management operations were conducted on 27 different management sites at a cost of \$201,849 using local and State Water Recreation Resource funds. Field operation expenditures for the SCDNR decreased by 26% from FY 2010, while acres controlled was 1228. Phragmites control is a key component of habitat restoration for waterfowl and other species and resulted in 390 acres of control efforts which is down from previous years because of efficacy of previous control efforts and the fact that the phragmites population has been reduced to mostly scattered pods. The cooperative effort to control the spread of the highly invasive Island apple snail appears to have continued success as populations continue to decline and expansion has not materialized.

In 2012 Hydrilla on the Santee Cooper Lakes increased again to 7210 acres up from 3244 acres in 2011. While this was occurring native submerged species acreage numbers also increased to 9.2 % coverage of the total 160,000 acre system. Lake Greenwood and Murray are still stable with no reported growth of hydrilla and will not require stocking in 2012. Several other areas, mostly in the upstate region, of the state have experience an increase in hydrilla growth and were treated accordingly. In all Santee Cooper and SCDNR expended \$1.15 million for control of 4929 acres of invasive species.

2013 brought about similar results to 2012 in the Santee Cooper Lakes. An adaptive hydrilla management plan was still in effect as 114,000 carp were stocked into Santee Cooper Lakes. Santee Cooper and SCDNR expended \$1.646 million for control of 6763 acres of invasive species with the SCDNR share of that coming in at \$238,377 for 1413 acres.

Table 2013-A. Summary of Expenditures by Source for Control Operations During 2013.

	Water Body Name	Total Cost	Local	State	Local Sponsor
1	Back River Reservoir	\$67,681.50	\$33,840.75	\$33,840.75	SCE&G, Charleston CPW
2	Bonneau Ferry	\$6,686.07	\$0.00	\$6,686.07	SCDNR
3	Charleston Co. Parks	\$878.00	\$439.00	\$439.00	Charleston Parks
4	Cooper River	\$16,310.30	\$8,155.15	\$8,155.15	Berkeley Co.
5	Donnelly	\$1,361.89	\$0.00	\$1,361.89	SCDNR
6	Dungannon HP	\$661.68	\$0.00	\$661.68	SCDNR
7	Goose Creek Reservoir	\$21,466.91	\$10,733.46	\$10,733.46	Charleston CPW
8	Lake Bowen	\$1,280.00	\$640.00	\$640.00	Spartanburg CPW
9	Lake Monticello	\$4,800.00	\$2,400.00	\$2,400.00	SCE&G
10	Lake Prestwood	\$17,574.50	\$8,787.25	\$8,787.25	Hartsville City
11	Little Cypress *	\$0.00	\$0.00	\$0.00	SCDNR
12	Morris Village	\$674.70	\$337.35	\$337.35	SCDMH
13	Mountain Lake	\$1,280.00	\$0.00	\$1,280.00	SCDNR
14	Socastee	\$5,303.55	\$0.00	\$5,303.55	SCDNR
15	Waccamaw River	\$2,351.05	\$0.00	\$2,351.05	SCDNR
16	Whitehall	\$0.00	\$0.00	\$0.00	SCDNR
17	Hatchery WMA	\$45,941.92	\$0.00	\$45,941.92	SCDNR
18	Santee Cooper WMA (40 acre pond)	\$21,276.74	\$0.00	\$21,276.74	SCDNR
19	Santee Cooper WMA (Snow Bottom)	\$14,151.88	\$0.00	\$14,151.88	SCDNR
20	Potato Creek	\$2,516.43	\$0.00	\$2,516.43	SCDNR
21	Sandy Beach WMA	\$3,971.75	\$0.00	\$3,971.75	SCDNR
22	Misc.	\$2,208.36	\$0.00	\$2,208.36	SCDNR
	Santee Cooper Lakes				
23	Lake Marion	\$736,104.92	\$736,104.92	\$0.00	Santee Cooper
24	Lake Moultrie	\$82,373.58	\$82,373.58	\$0.00	Santee Cooper
	Impoundments	\$20,046.29	\$20,046.29	\$0.00	Santee Cooper
26	State Parks				
25	H. Cooper Black State Park	\$0.00	\$0.00	\$0.00	SCPRT
	SCDNR Total	\$238,377.23	\$65,332.96	\$173,044.28	
	State Park Total	\$0.00	\$0.00	\$0.00	
	Santee Cooper Total	\$838,524.79	\$838,524.79	\$0.00	
	SCDNR/ State Park Total	\$238,377.23	\$65,332.96	\$173,044.28	
	Grand Total	\$1,076,902.02	\$903,857.75	\$173,044.28	
	Santee Total w/Carp	\$1,407,384.79			
	Grand Total w/Carp	\$1,645,762.02			

Table 2013-8 Summary of S.C. Aquatic Nuisance Species Control Operations and Expenditures During 2013										
Waterbody	Target Plants	Acres	Total Cost	Cost/Acre	Control Agent	Rate	Management Objective	Control Effectiveness		
1 Back River Reservoir	Hydrilla	130.94	\$32,079.14	\$244.99	Konsee, Komeen/diquat	16 gal/ac, 4 gal/ac, 2 gal/ac	Reduce problem plants to enhance public access, use, water quality, and maintain habitat, public access and use.	> 95% control Reward/Komeen mix proved to be more effective 90% control		
	Water hyacinth	402.00	\$35,602.36	\$88.56	Renovate3, Habitat/(Glyphosate)	0.500 gal/ac, 0.500 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	> 95% control > 95% control > 95% control		
	TOTAL:	532.94	\$67,681.50	\$127.00						
2 Bonneau Ferry	Water primrose	30.00	\$1,848.90	\$61.63	Habitat/(Glyphosate)	0.500 gal/ac, 0.500 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	> 95% control > 95% control		
	Bladderwort, water lily	15.00	\$3,700.30	\$246.69	Nautique/diquat, Clearcast	4.000 gal/ac, 0.500 gal/ac				
	Cattails, loosestrife	14.00	\$1,136.87	\$81.21	Habitat/(Glyphosate)	0.500 gal/ac, 0.500 gal/ac				
	TOTAL:	59.00	\$6,686.07	\$113.32						
3 Charleston Co. Parks	Phragmites	4.00	\$878.00	\$219.50	Clearcast	0.750 gal/ac	Reduce phragmites to enhance water fowl habitat, public access and use.	>90% control		
4 Cooper River	Hydrilla	34.39	\$13,269.20	\$385.87	Komeen	16 gal/ac	Reduce phragmites to enhance water fowl habitat, public access and use.	90% control		
	Water primrose, Hyacinth	40.00	\$3,041.10	\$76.03	Habitat/(Glyphosate, Renovate	0.250 gal/ac, 0.500 gal/ac				
	TOTAL:	74.39	\$16,310.30	\$219.26						
5 Donnelly	Frog's bit	11.00	\$1,361.89	\$123.81	Habitat/(Glyphosate, Clearcast	0.250 gal/ac, 0.375 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	> 95% control		
	TOTAL:	11.00	\$1,361.89	\$123.81						
6 Dunganon HP	Swamp loosestrife	8.00	\$661.68	\$82.71	Habitat/(Glyphosate)	0.500 gal/ac, 0.500 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>95% control		
	TOTAL:	8.00	\$661.68	\$82.71						
7 Goose Creek Reservoir	Hydrilla	26.00	\$5,440.00	\$151.11	Triploid Grass Carp	850	Reduce problem plants to enhance public access, use and water quality.	90% control		
	Water hyacinth	28.50	\$4,270.99	\$149.86	Galleon/Clipper	0.03125 gal/ac, 0.125 lb/ac				
	Water lettuce	81.00	\$1,082.03	\$13.36	Galleon/Clipper	0.03125 gal/ac, 0.125 lb/ac				
	Water primrose	10.00	\$673.89	\$67.39	Habitat/(Glyphosate)	0.250 gal/ac, 0.250 gal/ac				
	TOTAL:	155.50	\$21,466.91	\$138.06						
8 Lake Bowen	Chara	13.00	\$1,280.00	\$98.46	Triploid Grass Carp	200	Reduce problem plants to enhance water fowl habitat, public access and use.	90% control		
	TOTAL:	13.00	\$1,280.00	\$98.46						
9 Lake Monticello	Hydrilla	25.00	\$4,800.00	\$192.00	Triploid Grass Carp	750	Reduce problem plants to enhance water fowl habitat, public access and use.	95% control		
	TOTAL:	25.00	\$4,800.00	\$192.00						
10 Lake Prestwood	Misc.	26.00	\$17,574.50	\$675.94	Renovate OTF, Triploid Grass	40 lb 8/ac, 2000	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	TOTAL:	26.00	\$17,574.50	\$675.94						
11 Little Cypress *	Misc.	18.00	\$0.00	\$0.00	Habitat/(Glyphosate, Galleon	0.500 gal/ac, 0.06875 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	TOTAL:	18.00	\$0.00	\$0.00						
12 Morris Village	Watershield	14.00	\$629.72	\$44.98	Renovate OTF, Sonar PR	2.74 lb 8/ac, 8.57 lb 8/ac	Reduce problem plants to enhance water fowl habitat, wood stork rookery	>90% control		
	Water lily	1.00	\$44.98	\$44.98	Renovate Max G	200 lb 8/ac				
	TOTAL:	15.00	\$674.70	\$44.98						
13 Mountain Lake	Hydrilla	2.00	\$1,280.00	\$640.00	Triploid Grass Carp	200	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	TOTAL:	2.00	\$1,280.00	\$640.00						
14 Socastee	Island apple snail	41.32	\$5,303.55	\$128.35	Natrix	2.50 gal 8/ac to 3.247 gal/ac	Reduce invasive species of snails to enhance habitat, public access and use.	>90% control		
	TOTAL:	41.32	\$5,303.55	\$128.35						
15 Waccamaw River	Water hyacinth	26.00	\$2,351.05	\$90.43	Renovate 3	0.500 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	TOTAL:	26.00	\$2,351.05	\$90.43						
16 Whitehall	Misc.	15.19	\$0.00	\$0.00	Habitat/(Glyphosate)	0.500 gal/ac, 0.375 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	TOTAL:	15.19	\$0.00	\$0.00						
17 Hatchery WMA	Hydrilla	154.00	\$45,941.97	\$298.32	Sonar 1, Sonar PR	6.79 gal/ac, 1.70 lb 8/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	TOTAL:	154.00	\$45,941.97	\$298.32						
18 Santee Cooper WMA	Hydrilla	53.00	\$14,514.14	\$273.85	Sonar 1, Sonar PR	6.79 gal/ac, 1.70 lb 8/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	40 Acre Pond	53.00	\$6,762.60	\$127.60	Sonar 1	4.900 lb 8/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	Crested Floating Heart	106.00	\$24,276.74	\$228.02						
	TOTAL:	212.00	\$45,553.48	\$214.55						
19 Santee Cooper WMA	Hydrilla	72.00	\$14,151.88	\$195.17	Sonar products	3.247-4.176 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	Snow bottom									
	TOTAL:	72.00	\$14,151.88	\$195.17						
20 Potato Creek	Hydrilla	11.00	\$2,516.43	\$228.77	Komeen/diquat	4.000 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	TOTAL:	11.00	\$2,516.43	\$228.77						
21 Sandy Beach WMA	Water primrose, misc.	40.00	\$3,971.75	\$99.29	Habitat/(Glyphosate, Clearcast	0.500 gal/ac, 0.375 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	TOTAL:	40.00	\$3,971.75	\$99.29						
22 Misc Herbicides	Misc.	0.00	\$2,208.36	\$0.00	Habitat/(Glyphosate, Clearcast	0.500 gal/ac, 0.375 gal/ac	Reduce problem plants to enhance water fowl habitat, public access and use.	>90% control		
	TOTAL:	0.00	\$2,208.36	\$0.00						
	SCDNR TOTAL:	1409.34	\$236,377.23	\$169.14						

Table 2013-8 Summary of S.C. Aquatic Nuisance Species Control Operations and Expenditures During 2013										
Waterbody	Target Plants	Acres	Total Cost	Cost/Acre	Control Agent	Rate	Management Objective	Control Effectiveness		
23 Santee Cooper Lakes Lake Marion	Crested Floating Heart Giant Cutgrass, Cattail Lyngbya, Pithophora, Spirogyra Water Hyacinth Water Primrose, Alligatorweed Water Willow Duckweed Milfoil TOTAL: American Lotus Valisneria Crested Floating Heart Cabomba Maidencane Hydrilla Pithophora Water Primrose, Alligatorweed Slender Najas Pondweed Hyacinth Milfoil TOTAL:	304.9	\$185,306.45	\$607.86	Aquaithol K Liquid Clearcast, Touchdown PRO Sonar PR	5.5 - 10.5 gal/ac 1.0 gal/ac / 0.5 gal/ac 5-15 lbs/ac	Provide access to open water and shoreline areas for public use and prevent spread to other areas of the lake	>95% in shallow coves with Aquaithol K, 80% - 85% in areas treated with Clearcast / Touchdown PRO Note: Sonar PR test plots will be evaluated in early 2014 for effectiveness.		
		7.8	\$1,337.42	\$172.57	Habitat, Touchdown PRO	.25 gal/ac / .50 gal/ac	Reduce plant encroachment on lake-front property and public access areas. Removal from areas where plant is blocking commercial fisheries in lake.	>95% control of plant at end of season		
		1.3	\$287.05	\$220.81	Captain XTR, Cutrine Ultra	4.0 - 5.0 gal/ac	Reduce algal mats to enhance recreational use of water	90% control of plant at end of season		
		463.71	\$527,619.67	\$114.28	Tribune Renovate 3 Clearcast	0.5 gal/ac 0.375 - 0.5 gal/ac / .25 gal/ac	Remove non-native, invasive plant population to prevent spread to other areas of the lake	>90% control of plants after treatment		
		124.6	\$17,065.70	\$137.02	Touchdown PRO Renovate 3	1.0 - 1.25 gal/ac .0625 gal/ac / .375 gal/ac	Reduce shoreline plant populations to enhance recreation and navigation	>85% control of plant at end of season. Some late season regrowth noted.		
		4.0	\$505.46	\$126.37	Renovate 3	.75 gal/ac	Reduce problem plants in residential areas where navigation and recreation is adversely affected.	>85% control of plant at end of season		
		2.2	\$369.25	\$167.84	Clipper Tribune	7.5 lbs/ac 0.5 - 1.0 gal/ac	Reduce plant population to prevent spread to other quiescent areas of the lake.	90% control of plant at end of season		
		7.0	\$3,613.92	\$516.27	Renovate 3	4.0 gal/ac	Reduce plant population to prevent spread to other quiescent areas of the lake			
		5069	\$796,104.92	\$145.28						
		0.5	\$77.83	\$155.66	Touchdown PRO Renovate	1.25 gal/ac 0.5 gal/ac	Reduce problem plants in residential areas where recreation is adversely affected	>95% control of plant at end of season		
0.1	\$37.36	\$373.60	Hydrothol 191, Liquid, Cutrine Ultra	5.0 gal/ac, 2.5 gal/ac	Provide access to open water areas for public use.	85% control of plant at end of season, treatment site now de-watered				
56.8	\$27,446.89	\$483.22	Aquaithol K Liquid Touchdown PRO, Clearcast	5.0 - 10.0 gal/ac 0.5 gal/ac, 1.0 gal/ac	Remove problem plants adjacent to boat landings and residential areas to prevent spread to other areas of the lake	>95% in shallow coves with Aquaithol K, >80% in areas treated with Clearcast / Touchdown PRO Note: Sonar PR test plots will be evaluated in early 2014 for effectiveness.				
38.2	\$33,032.09	\$864.71	Clipper	5.8 - 6.7 lbs/ac	Reduce problem plants in residential areas where recreation is adversely affected	>95% control of plant after treatment				
1.5	\$233.13	\$155.42	Aquaithol Super K Granular	70 lbs/ac	Reduce problem plants in residential area where recreation are adversely affected.					
64.1	\$8,024.44	\$125.19	Sonar ONE	4.4 lbs/ac	Reduce problem plant population to prevent spread to other areas of the lake. Maintain level until adequate grass carp population from restocking can maintain control	>95% control in treated areas (Duck Pond)				
1.63	\$295.67	\$181.95	Captain XTR	5.0 gal/ac	Reduce algal mats on shoreline and in dead-end coves where navigation and recreation is adversely affected	>95% control of plant after treatment				
42.60	\$9,170.42	\$215.27	Renovate MAX G Touchdown PRO Renovate 3	1.90 - 200 lbs/ac 1.25 gal/ac .0625 gal/ac	Reduce problem plants in residential areas where recreation is adversely affected	>90% control of Primrose, very little control of Alligatorweed with MAX G, 85% with Touchdown PRO, Renovate tank mix. Some late season regrowth noted.				
1.6	\$539.06	\$344.89	Renard, Cutrine Ultra	2.0 gal/ac, 4.0 gal/ac	Reduce problem plants in residential area where recreation are adversely affected.	100% control after treatment, area now de-watered				
1.6	\$539.05	\$344.99	Tribune, Nautique Clipper	2.0 gal/ac, 3.5 gal/ac 5.0 lbs/ac 2.5 gal/ac	Reduce problem plants in residential area where recreation are adversely affected.	>85% control after treatment				
2.10	\$207.86	\$98.98	Touchdown PRO	1.25 gal/ac	Reduce problem plants in public and residential areas where recreation is adversely affected and prevent spread to other areas of the lake.	>95% control after treatment				
3.10	\$2,769.78	\$893.48	Clipper	6.7 lbs/ac	Reduce problem plants in residential area where recreation is adversely affected.	>95% control after treatment				
214	\$82,373.58	\$385.37								

Table 2013-8 Summary of S.C. Aquatic Nuisance Species Control Operations and Expenditures During 2013									
Waterbody	Target/Plants	Acre	Total Cost	Cost/Acre	Control/Agent	Rate	Management Objective	Control Effectiveness	
Wantee Cooper Impoundments									
Taw Caw Impoundment									
	Water Primrose, Alligatorweed	16.4	\$3,616.33	\$220.51	Touchdown PRO Renovate 3	1.0 - 1.25 gal/ac gal/ac	Reduce problem plant population to provide public and shoreline access	>85% control of plant at end of season	
	Giant Cutgrass, Cattail	0.5	\$67.36	\$134.72	Touchdown PRO Renovate 3	1.0 - 1.25 gal/ac gal/ac	Reduce problem plant population to provide public and shoreline access	>95% control of plant at end of season	
	Lyngbya, Pithophora	5.0	\$866.30	\$173.26	Cutrine-Ultra	4 - 6 gal/ac	Remove algae to improve access and use of water for property owners.	>85% control of plant at end of season	
	Smartweed	4.0	\$368.08	\$92.02	Habitat / Touchdown PRO	0.25 gal/ac / 0.5 gal/ac	Reduce problem plants in residential area where navigation and recreation are adversely affected.	>95% control of plant in areas treated at end of season	
	TOTAL:	25.9	\$4,918.07	\$189.69					
Dean Swamp Impoundment									
	Water Primrose, Alligatorweed	8.5	\$865.30	\$101.56	Touchdown PRO Renovate 3	1.0 - 1.25 gal/ac gal/ac	Reduce problem plant population to provide public and shoreline access	>90% control of plant at end of season Some late season regrowth noted	
	Lyngbya, Pithophora	8.0	\$1,629.52	\$203.69	Cutrine Ultra Captain XTR	4.0 - 6.0 gal/ac	Remove algae to improve access and use of water for property owners.	>90% control of algal mats at end of season	
	TOTAL:	16.5	\$2,492.82	\$151.08					
Church Branch Impoundment									
	Water Primrose, Alligatorweed	3.0	\$521.06	\$173.69	Touchdown PRO Renovate 3	1.0 - 1.25 gal/ac gal/ac	Reduce problem plant population to provide public and shoreline access	>95% control of plant at end of season	
	Spargyia	0.3	\$99.29	\$397.16	Cutrine Ultra	4.0 - 6.0 gal/ac	Remove algae to improve access and use of water for property owners.	>90% control of algal colonies at end of season	
	Water Milfoil	11.0	\$10,353.74	\$945.55	Clipper	4.0 - 7.0 lbs/ac	Reduce problem plant population to provide public and shoreline access	>95% control of plant in areas treated at end of season	
	TOTAL:	14.2	\$10,974.09	\$772.82					
Fountain Lake Impoundment									
	Water Primrose, Alligatorweed	6.5	\$533.20	\$80.49	Touchdown PRO Renovate 3	1.0 - 1.25 gal/ac gal/ac	Reduce problem plant population to provide public and shoreline access	>90% control of plant at end of season Some late season regrowth noted	
	Fragrant Water Lily	1.0	\$115.06	\$202.48	Touchdown PRO	1.0 - 1.25 gal/ac	Provide access to open water and shoreline areas for public use	>95% control of plant in areas treated at end of season	
	Crested Floating Heart	0.25	\$81.57	\$304.61	Clearcat	1.0 gal/ac	Reduce problem plant in residential area where navigation and recreation are adversely affected.	>90% control of plant. Late season application did not allow for additional treatment. Regrowth will be monitored in spring 2014.	
	Water Shield	2.7	\$928.48	\$124.23	Touchdown PRO	0.5 gal/ac	Prevent further spread in impoundment. Areas plant located was adjacent to water control structure	>85% control of plant	
	TOTAL:	10.4	\$1,661.31	\$159.74					
SC State Parks									
25 H. Cooper Black State Park	Spatterdock	4.00	\$0.00	\$0.00	Renovate 3	1.000 gal/ac	Reduce problem plants to enhance waterfowl habitat, public access and use.	95% control	
	TOTAL:	4.00	\$0.00	\$0.00					
STATE PARKS TOTAL		4.00	\$0.00	\$0.00					
SCDNR TOTAL		1409.34	\$238,377.23	\$169.14					
SANTEE COOPER TOTAL		5949.45	\$838,524.79	\$139.27					
STATE PARKS TOTAL		4.00	\$0.00	\$0.00					
SANTEE CARP TOTAL*			\$ 568,860.00	4.99		114000	*triploid grass carp		
GRAND TOTAL		6762.79	\$1,645,782.02						

Table 2012-A. Summary of Expenditures by Source for Control Operations During 2012.

	Water Body Name	Total Cost	Local	State	Local Sponsor
1	Back River Reservoir	\$24,172.35	\$12,086.18	\$12,086.18	SCE&G, Charleston CPW
2	Bonneau Ferry	\$795.50	\$0.00	\$795.50	SCDNR
3	Caw Caw	\$206.15	\$103.08	\$103.08	Charleston Parks
4	Cherokee Lake	\$2,145.00	\$0.00	\$2,145.00	SCDNR
5	City Lake Pickens	\$5,720.00	\$2,860.00	\$2,860.00	Pickens CPW
6	Cooper River	\$13,031.28	\$6,515.64	\$6,515.64	Berkeley Co.
7	Donnelly	\$9,980.80	\$0.00	\$9,980.80	SCDNR
8	Dungannon HP	\$4,466.52	\$0.00	\$4,466.52	SCDNR
9	Eutawville WMA	\$55,678.40	\$0.00	\$55,678.40	SCDNR
10	Goose Creek Reservoir	\$33,411.70	\$16,005.85	\$16,005.85	Charleston CPW
11	Lake Bowen	\$1,430.00	\$715.00	\$715.00	Spartanburg CPW
12	Lake Cunningham	\$1,400.00	\$700.00	\$700.00	Greer CPW
13	Lake Monticello	\$6,890.00	\$3,445.00	\$3,445.00	SCE&G
14	Morris Village	\$3,775.50	\$1,887.75	\$1,887.75	SCDMH
15	Mountain Lake	\$715.00	\$0.00	\$715.00	
16	Potato Creek	\$27,940.00	\$0.00	\$27,940.00	SCDNR
17	Samworth	\$1,383.30	\$0.00	\$1,383.30	SCDNR
18	Santee Coastal	\$48,617.40	\$0.00	\$48,617.40	SCDNR
19	Socastee	\$8,274.32	\$0.00	\$8,274.32	SCDNR
20	Stoney Bay	\$3,609.45	\$0.00	\$3,609.45	SCDNR
21	Misc.	\$655.00	\$327.50	\$327.50	
Santee Cooper Lakes					
22	Lake Marion	\$648,285.50	\$648,285.50	\$0.00	Santee Cooper
23	Lake Moultrie	\$209,531.79	\$209,531.79	\$0.00	Santee Cooper
State Parks					
24	SP Aiken	\$3,170.80	\$1,585.40	\$1,585.40	SCPRT
25	SP Barnwell	\$1,258.50	\$629.25	\$629.25	SCPRT
26	SP Cheraw	\$12,585.00	\$6,292.50	\$6,292.50	SCPRT
27	SP Croft	\$1,350.50	\$675.25	\$675.25	SCPRT
28	SP Hickory Knob	\$1,337.50	\$668.75	\$668.75	SCPRT
29	SP Lake Croft	\$8,937.50	\$4,468.75	\$4,468.75	SCPRT
30	SP Lake Placid	\$536.25	\$268.13	\$268.13	SCPRT
31	SP Little Pee Dee	\$6,292.50	\$3,146.25	\$3,146.25	SCPRT
32	SP Poinsett	\$1,887.75	\$943.88	\$943.88	SCPRT
SCDNR Total		\$254,297.67	\$44,645.99	\$208,251.68	
State Park Total		\$37,356.30	\$18,678.15	\$18,678.15	
Santee Cooper Total		\$857,817.29	\$857,817.29	\$0.00	
SCDNR/ State Park Total		\$291,653.97	\$63,324.14	\$226,929.83	
Grand Total		\$1,149,471.26	\$921,141.43	\$226,929.83	
Santee Total w/Carp		\$1,401,727.29			
Grand Total w/Carp		\$1,656,024.96			

Table 2012-18 Summary of S.C. Aquatic Nuisance Species Control Operations and Expenditures During 2012									
Waterbody	Target/Plants	Acres	Total Cost	Cost/Acre	Control/Agent	Rate	Management Objective	Control Effectiveness	
1	Back River Reservoir	65.50	\$15,752.25	\$240.49	Komeen, Komeen/diquat	16 gal/ac, 4 gal/ac 2 gal	Reduce problem plants to enhance public access, use, water quality, and maintain electric power generation and minimize	> 95% control	Reward/Komeen mix proved to be more effective
	Hydrilla	96.00	\$8,420.10	\$87.71	Renovate3, Habitat/Glyp	0.500 gal/ac, 0.500 gal/ac	Reduce problem plants to enhance waterfowl	> 95% control	
	TOTAL:	161.50	\$24,172.35	\$149.67					
2	Bonneau Ferry	10.00	\$795.50	\$79.55	Habitat/Glyphosate		Reduce phragmites to enhance waterfowl	> 50% control	
	TOTAL:	10.00	\$795.50	\$79.55					
3	Caw Caw	2.00	\$206.15	\$103.08	Habitat/Glyphosate		Reduce phragmites to enhance waterfowl	> 95% control	
	TOTAL:	2.00	\$206.15	\$103.08					
4	Cherokee Lake	12.00	\$2,145.00	\$178.75	Triplold Grass Carp		300 Provide boat trails to main channel through hydrilla. Reduce problem plants to enhance	> 95% control	
	TOTAL:	12.00	\$2,145.00	\$178.75					
5	Cooper River	34.29	\$12,753.63	\$371.96	Komeen	16 gal/ac	Reduce phragmites to enhance waterfowl habitat, public access and use.	90% control	
	TOTAL:	34.29	\$12,753.63	\$371.96					
6	Donnelly	80.00	\$9,890.80	\$124.76	Galleon	0.0625 gal/ac	Reduce water hyacinth & water lettuce to greatest extent possible.	> 95% control	
	TOTAL:	80.00	\$9,890.80	\$124.76					
7	Dungannon HP	12.00	\$3,992.32	\$332.69	Galleon	0.166 gal/ac	Eradicate or reduce problematic snail populations to protect human health and sensitive areas	> 60% control	
	TOTAL:	12.00	\$3,992.32	\$332.69					
8	Eutawville WMA	178.00	\$55,678.40	\$312.80	Clearcast/Glyphosate	1 gal/ac 0.500 gal/ac	Reduce problem plants to enhance public	90% control	
	TOTAL:	178.00	\$55,678.40	\$312.80					
9	Goose Creek Reservoir	36.00	\$6,435.00	\$178.75	Triplold Grass Carp	900	Reduce problem plants to enhance public	90% control	
	Hydrilla	121.00	\$8,920.39	\$73.72	Diquat, Renovate 3	0.250 gal/ac, 0.500 gal/ac	Reduce phragmites to enhance public access, use and water quality.	90% control	
	TOTAL:	157.00	\$15,355.39	\$97.54					
	Water lettuce	146.00	\$14,889.36	\$101.98	Galleon/Clipper	0.03125 gal/ac 0.125 lb/ac			
	TOTAL:	18.00	\$1,066.95	\$59.28	Habitat/Glyphosate	0.250 gal/ac 0.250 gal/ac			
	TOTAL:	321.00	\$31,311.70	\$97.54					
10	Misc	20.00	\$2,755.00	\$137.75	Clipper, Habitat	15 lbs, 10 gals	Reduce problem plants to enhance public	90% control	
	TOTAL:	20.00	\$2,755.00	\$137.75					
11	Lake Bowen	13.00	\$1,430.00	\$110.00	Triplold Grass Carp	200	Reduce phragmites to enhance waterfowl habitat, public access and use.	90% control	
	TOTAL:	13.00	\$1,430.00	\$110.00					
12	Lake Cunningham	6.00	\$1,400.00	\$233.33	Habitat/Glyphosate	0.750 gal/ac 0.750 gal/ac	Reduce problem plants to enhance waterfowl habitat, public access and use.	95% control	
	TOTAL:	6.00	\$1,400.00	\$233.33					
13	Lake Monticello	25.00	\$6,890.00	\$275.60	Nautique/diquat	4 gal/ac 2 gal/ac	Reduce hyacinth to minimize spread and impacts to public access and use.	95% control	
	TOTAL:	25.00	\$6,890.00	\$275.60					
14	Morris Village	6.00	\$3,775.50	\$629.25	Renovate Max G	200 lbs/ac	Reduce phragmites and problem plants to enhance waterfowl habitat, public access and use.	> 90% control	
	TOTAL:	6.00	\$3,775.50	\$629.25					
15	Mountain Lake	2.00	\$715.00	\$357.50	Triplold Grass Carp	100			
	TOTAL:	2.00	\$715.00	\$357.50					
16	Samworth	12.00	\$1,383.30	\$115.28	Habitat/Glyphosate	0.250 gal/ac 0.250 gal/ac			
	TOTAL:	12.00	\$1,383.30	\$115.28					
17	Santee Coastal	312.00	\$48,617.40	\$155.83	Habitat/Glyphosate	0.750 gal/ac 0.750 gal/ac			
	TOTAL:	312.00	\$48,617.40	\$155.83					
18	Socastee	83.34	\$100,716.40	\$99.28	Natrix	2.50 gals/ac to 3.247 gal/ac			
	TOTAL:	83.34	\$100,716.40	\$99.28					
19	Whitehall	14.00	\$0.00	\$0.00	Habitat/Glyphosate	0.250 gal/ac 0.250 gal/ac			
	TOTAL:	14.00	\$0.00	\$0.00					
20	Potato Creek	140.00	\$27,940.00	\$199.57	Sonar One	12 lbs/ac			
	TOTAL:	140.00	\$27,940.00	\$199.57					
21	Stoney Bay	52.00	\$55,890.00	\$69.41	Habitat/Glyphosate	0.500 gal/ac 0.500 gal/ac			
	TOTAL:	52.00	\$55,890.00	\$69.41					
	SCDR TOTAL:	1508.13	\$393,290.30	\$260.78					

Waterbody	Target Plants	Acres	Total Cost	Cost/Acre	Control/Agent	Rate	Management Objective	Control Effectiveness
22 Santee Cooper Lakes Lake Marion	American Lotus	2.0	\$510.44	\$255.22	Touchdown PRO, Renovate 3, Renovate MAX G	.75 gal/ac, .50 gal/ac, 150 - 200 lbs/ac	Provide access to open water and shoreline areas for public use	>95% control of plant at end of season
	Vallisneria	9.3	\$4,075.43	\$440.59	Hydrothol 191 Liquid, Nautique	5.0 gal/ac, up to 10.0 gal/ac	Provide access to open water and shoreline areas for public use	85% control of plant after treatment
	Crested Floating Heart	1886.0	\$542,149.39	\$321.56	Aquathol K Liquid, Clearcast, Touchdown PRO, Renovate MAX G, Sonar Q, Sonar PR	2.5 - 7.0 gal/ac, 1.0 gal/ac, 0.5 gal/ac, 150 - 300 lbs/ac, 14.0 lbs/ac, 3.25 lbs/ac	Provide access to open water and shoreline areas for public use and prevent spread to other areas of the lake	>95% in shallow coves with Aquathol K 80% in open water areas with Clearcast / Touchdown PRO, 100% in quiescent cove with Sonar
	Chara	44.0	\$4,864.95	\$110.57	Captain, Cynet Plus, Captain XTR	4.0 - 5.0 gal/ac, 2.0 - 5.0 gal/ac	Reduce problem plants in residential areas where navigation and recreation is adversely affected.	>95% control of plant at end of season
	Giant Cugrass, Cattail	7.8	\$890.98	\$114.97	Habitat, Touchdown PRO	0.25 gal/ac, 0.50 gal/ac	Reduce plant encroachment on lake-front property and public access areas. Restoration of waterfowl habitat.	100% control of plant at end of season
	Hydrilla	70.0	\$35,188.40	\$502.69	Aquathol K Liquid, Nautique	6.0 - 8.0 gal/ac, 1.0 gal/ac	Reduce problem plant population to prevent spread to other areas of the lake. Maintain level until adequate grass carp population from restocking can maintain control	>90% control of plant after treatment
	Lyngbya, Pithophora	38.1	\$7,122.35	\$186.94	Captain, Cynet Plus, Captain XTR, Curline Ultra	4.0 - 6.0 gal/ac, 0.5 gal/ac, 4.0 - 6.0 gal/ac	Reduce algal mats to enhance recreational use of water	90% control of plant at end of season
	Water Primrose, Alligatorweed	52.0	\$16,483.64	\$316.59	Clearcast, Touchdown PRO, Renovate MAX G	.5 gal/ac, 25 gal/ac, 150 - 200 lbs/ac	Reduce shoreline plant populations to enhance recreation and navigation	>75% control of plant at end of season. Some late season reoccur with noted.
	Water Willow	35.3	\$4,687.17	\$132.97	Renovate 3	.375 gal/ac	Reduce problem plants in residential areas where navigation and recreation is adversely affected.	>85% control of plant at end of season
	Pondweed	3.4	\$1,375.57	\$410.62	Aquathol K, Captain	5.0 - 9.0 gal/ac, 0.95 gal/ac	Reduce problem plants in residential areas where navigation and recreation is adversely affected.	>75% control of plant at end of season
Duckweed	0.25	\$125.42	\$501.68	Reward	1.0 gal/ac	Reduce plant population to prevent spread to other adjacent areas of the lake	90% control of plant at end of season	
TOTAL:		1968	\$617,493.74	\$316.99				
18 Lake Maultrie	American Lotus	9.6	\$1,654.67	\$170.28	Renovate	0.5 gal/ac	Reduce problem plants in residential areas where recreation is adversely affected	>95% control of plant at end of season
	Fragrant Water Lily	2.8	\$464.44	\$168.89	Touchdown PRO	1.0 gal/ac	Reduce problem plants in residential areas where recreation is adversely affected	>95% control of plant at end of season
	Vallisneria	0.5	\$381.41	\$662.82	Nautique, Cynet Plus	Up to 10.0 gal/ac, 0.25 gal/ac	Provide access to open water areas for public use	85% control of plant at end of season, treatment site now de-watered
	Crested Floating Heart	7.8	\$2,982.06	\$384.78	Clearcast, Touchdown PRO, Renovate MAX G	1.0 gal/ac, 0.5 gal/ac, 150 - 300 lbs/ac	Remove problem plants adjacent to boat landing to prevent spread to other areas of lake	>95% control of plant at end of season (in canal area only)
	Calomba	9.0	\$6,659.08	\$739.90	Clipper	5.0 lbs/ac	Reduce problem plants in residential areas where recreation is adversely affected	100% control of plant after treatment
	Giant Cugrass, Cattail	0.8	\$135.37	\$180.49	Habitat / Touchdown PRO	0.25 gal/ac / 0.50 gal/ac	Reduce problem plants in residential areas where recreation is adversely affected	100% control of plant at the end of season
	Hydrilla	450.0	\$221,263.79	\$492.70	Aquathol K Liquid, Nautique	7.0 gal/ac, 1.0 gal/ac	Reduce problem plant population to prevent spread to other areas of the lake. Maintain level until adequate grass carp population from restocking can maintain control	90% control of plant after treatment
	Lyngbya, Pithophora, Spirogyra	5.5	\$1,383.30	\$247.87	Captain, Cynet Plus, Captain XTR, Curline Ultra	4.0 - 6.0 gal/ac, 0.5 gal/ac, 4.0 - 6.0 gal/ac (XTR, Ultra)	Reduce algal mats on shoreline and in dead-end coves where navigation and recreation is adversely affected	85% control of plant after treatment
	Chara	0.5	\$84.70	\$169.40	Captain XTR	2.5 gal/ac	Reduce problem plant population to provide public and shoreline access.	90% control of plant after treatment
	Water Primrose, Alligatorweed	27.6	\$11,565.15	\$419.79	Clearcast, Touchdown PRO, Renovate MAX G	.5 gal/ac, 25 gal/ac, 200 - 300 lbs/ac	Reduce problem plants in residential areas where recreation is adversely affected	>75% control of plant at end of season. Some late season reoccur with noted.
Water Willow	0.25	\$65.82	\$223.28	Renovate 3	.375 gal/ac	Reduce problem plants in residential areas where recreation is adversely affected	90% control of plant at end of season	
Slender Najas	1.5	\$274.52	\$183.01	Nautique, Cynet Plus	5.0 gal/ac, 0.25 gal/ac	Reduce problem plants in residential areas where recreation is adversely affected	100% control after treatment, area now de-watered	
Pondweed	1.5	\$407.30	\$271.53	Nautique, Cynet Plus	5.0 gal/ac, 0.25 gal/ac	Reduce problem plants in residential areas where recreation is adversely affected	80% control after treatment	
Milfoil	8.3	\$1,356.55	\$645.37	Clipper, Renovate MAX G	5.0 lbs/ac, 80 - 200 lbs/ac	Reduce problem plants in residential areas where recreation is adversely affected.	90% control of plant at end of season	
TOTAL:		525	\$252,598.16	\$488.69				

Waterbody	Target Plants	Acres	Total Cost	Cost/Acre	Control/Agent	Rate	Management Objective	Control Effectiveness
Taw Caw Impoundment	Hydrilla	171.0	\$19,897.34	\$174.84	Sonar One	6.5 lbs/ac	Reduce plant population to provide public access to shoreline, coves and open water areas and prevent spread of plant to other areas of the lake.	>95% control of plant at the end of season
	Water Primrose, Alligatorweed	2.5	\$574.10	\$229.64	Clearcast, Touchdown PRO	.5 gal/ac, 25 gal/ac	Reduce problem plant population to provide public and shoreline access.	>75% control of plant at end of season. Some late season regrowth noted.
	Giant Quagress, Cattail	1.0	\$191.37	\$191.37	Habitat/ Touchdown PRO	.25 / .50 gal/ac	Reduce plant encroachment on lake-front property and public access areas. Restoration of waterfowl habitat.	No Treatment
Potato Creek Impoundment	TOTAL:	174.5	\$20,662.81	\$175.72				
	Hydrilla	145.0	\$16,714.42	\$184.24	Sonar One	6.8 lbs/ac	Reduce plant population to provide public access to shoreline, coves and open water areas and prevent spread of plant to other areas of the lake.	>95% control of plant at the end of season
Dean Swamp Impoundment	TOTAL:	145.0	\$26,724.42	\$184.24				
	Hydrilla	116.0	\$16,412.30	\$141.49	Sonar One	5.2 lbs/ac	Reduce plant population to provide public access to shoreline, coves and open water areas and prevent spread of plant to other areas of the lake.	>95% control of plant at the end of season
	Water Primrose, Alligatorweed	5.0	\$927.40	\$185.48	Clearcast, Touchdown PRO	.5 gal/ac, 25 gal/ac	Reduce problem plant population to provide public and shoreline access.	>85% control of plant at end of season. Some late season regrowth noted.
Church Branch Impoundment	Lyngbya, Pithophora	18.0	\$3,472.56	\$192.92	Captain, Cygnat Plus, Captain XTR, Curfina Ultra	4.0 - 6.0 gal/ac, 0.5 gal/ac, 4.0 - 6.0 gal/ac (XTR, Ultra)	Remove algae to improve access and use of water for property owners.	>75% control of algal mats at end of season.
	TOTAL:	138.0	\$20,812.26	\$149.73				
	Colomba	3.7	\$2,768.01	\$748.11	Clipper	5.4 lbs/ac	Reduce plant population to provide public access to shoreline, coves and open water areas and prevent spread of plant to other areas of the lake.	100% control of plant at the end of season.
Fountain Lake Impoundment	Water Primrose, Alligatorweed	1.3	\$260.99	\$208.79	Clearcast, Touchdown PRO	.5 gal/ac, 25 gal/ac	Reduce problem plant population to provide public and shoreline access.	>90% control of plant at end of season. Some late season regrowth noted.
	Fragrant Water Lily	2.0	\$1,590.19	\$795.10	Glyphosate, Renovate	.75 gal/ac, .50 gal/ac	Provide access to open water and shoreline areas for public use.	No Treatment
	Lyngbya, Pithophora	10.5	\$1,518.82	\$182.74	Captain, Cygnat Plus, Captain XTR, Curfina Ultra	4.0 - 6.0 gal/ac, 0.5 gal/ac, 4.0 - 6.0 gal/ac (XTR, Ultra)	Remove algae to improve access and use of water for property owners.	>75% control of plant at end of season. Some late season regrowth noted.
	Water Milfoil	4.0	\$3,180.39	\$795.10	Renovate	.50 - 1.0 gal/ac	Reduce problem plant population to provide public and shoreline access.	>85% control of plant in areas treated at end of season.
	Slender Najas	20.0	\$5,945.06	\$292.25	Aquathol K Liquid	5 - 6 gal/ac	Eliminate plant population to provide public access to coves and open water areas and prevent spread to other areas of lake.	<50% reduction of plant biomass in areas treated at the end of season.
	Pondweed	30.0	\$2,767.60	\$292.25	Aquathol K Liquid, Neutique	4.75 gal/ac, 0.6 gal/ac	Reduce problem plant population to provide public and shoreline access.	>70% control of plant at end of season. Some late season regrowth noted.
	Water Shield	0.8	\$104.84	\$139.79	Touchdown PRO	1.0 gal/ac	Remove plants to improve access and use of water for property owners.	>95% control of plant in areas treated at end of season.
	TOTAL:	72.2	\$24,455.90	\$338.45				
	Chara	1.0	\$310.47	\$310.47	Captain, Cygnat Plus	4.0 gal/ac, 1.0 gal/ac	Remove algae to improve access and use of water for property owners.	>95% control of plant in areas treated at end of season.
	Water Primrose, Alligatorweed	2.0	\$404.96	\$202.48	Clearcast, Touchdown PRO	.5 gal/ac, 25 gal/ac	Reduce problem plant population to provide public and shoreline access.	>75% control of plant at end of season. Some late season regrowth noted.
Fragrant Water Lily	1.0	\$304.61	\$304.61	Clearcast, Touchdown PRO	.5 gal/ac, 25 gal/ac	Provide access to open water and shoreline areas for public use.	>95% control of plant in areas treated at end of season.	
Lyngbya, Pithophora	4.0	\$496.91	\$124.23	Captain, Cygnat Plus	4.0 gal/ac, 1.0 gal/ac	Remove algae to improve access and use of water for property owners.	Remove algae to improve access and use of water for property owners.	
Pondweed	5.0	\$1,427.32	\$285.46	Neutique	2.5 gal/ac	Eliminate plant population to provide public access to coves and open water areas and prevent spread to other areas of lake.	>75% control of plant at end of season. Some late season regrowth noted.	
Water Shield	3.0	\$933.85	\$304.62	Clearcast, Touchdown PRO	.5 gal/ac, 25 gal/ac	Provide access to open water and shoreline areas for public use.	>95% control of plant in areas treated at end of season.	
TOTAL:	16.0	\$5,858.12	\$241.13					
SANTEE COOPER TOTAL:	3020.10	\$876,335.41	\$323.35					

Waterbody	TargetPlants	Acres	TotalCost	Cost/Acre	Controlligent	Rate	ManagementObjective	ControlEffectiveness
SC State Parks								
SP Aiken	Bladderwort	7.00	\$1,832.75	\$261.82	Sonar 1	8.57 lbs/ac	Reduce problem plants to enhance public access, use and water quality.	>95% control
	Floating heart	2.00	\$1,258.50	\$629.25	Renovate Max G	200 lbs/ac	Reduce problem plants to enhance public access, use and water quality.	>95% control
	Misc	1.00	\$79.55	\$79.55	Habitat/Glyphosate	0.500 gal/ac 0.500 gal/a	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	10.00	\$3,170.80					
SP Barnwell	Watershield	2.00	\$1,258.50	\$629.25	Renovate Max G	200 lbs/ac	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	2.00	\$1,258.50	\$629.25				
SP Cheraw	Water lily	20.00	\$12,585.00	\$629.25	Renovate Max G	200 lbs/ac	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	20.00	\$12,585.00	\$629.25				
SP Croft	Hydrilla	5.00	\$1,350.50	\$270.10	Nautique/Diquat	4 gal/ac 2 gal/ac	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	5.00	\$1,350.50	\$270.10				
SP Hickory Knob	Hydrilla	4.00	\$890.00	\$224.50	Sonar 1/Sonar Genesis	5 lbs/ac 0.500 gal/ac	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	4.00	\$890.00	\$224.50				
SP Lake Croft	Hydrilla	2.00	\$357.50	\$178.75	Triploid Grass Carp	50	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	2.00	\$357.50	\$178.75				
SP Lake Croft	Hydrilla	50.00	\$8,897.50	\$178.75	Triploid Grass Carp	1250	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	50.00	\$8,897.50	\$178.75				
SP Lake Placid	Hydrilla	3.00	\$536.25	\$178.75	Triploid Grass Carp	75	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	3.00	\$536.25	\$178.75				
SP Little Pee Dee	Water lily	10.00	\$6,292.50	\$629.25	Renovate Max G	200 lbs/ac	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	10.00	\$6,292.50	\$629.25				
SP Poinssett	Misc	3.00	\$1,887.75	\$629.25	Renovate Max G	200 lbs/ac	Reduce problem plants to enhance public access, use and water quality.	95% control
	TOTAL:	3.00	\$1,887.75	\$629.25				
	STATE PARKS TOTAL	109.00	\$37,356.30	\$342.72				
	SCDNR TOTAL	15.0813	\$99,290.30	\$260.78				
	SANTEE COOPER TOTAL	3020.10	\$976,535.41	\$313.35				
	STATE PARKS TOTAL	109.00	\$37,356.30	\$342.72				
	SANTEE CARP TOTAL		\$ 545,910.00					
	GRAND TOTAL	4637.23	\$1,951,062.01					

APPENDIX H

Summary of Public Comments, Responses, and Plan Modifications to the Draft South Carolina Aquatic Plant Management Plan

Summary of Public Comments, Responses, and Plan Modifications to the Draft 2014 South Carolina Aquatic Plant Management Plan

Santee Cooper Lakes

14 Comments

Comments

Opposed:

Supported:

As a member of the Goat Island boat Club, I am very interested in health of our lake system. I am in favor of the plan as written. Thank you for your time and commitment. Sincerely, Jennifer Conlin
Miller H. Robert Miller
Jennifer Miller [jconmil@gmail.com]

I am in total support of DNR's actions to control the invasive weeds choking out the shoreline of our lake. I remember the terrible Hydrilla problem many years ago and now we have it and Floating Crested Heart choking out many of the coves on the lake. As a sportsman that has enjoyed hunting and fishing on both lakes I hope that DNR can find a solution to control the invasive weeds as well as support the fishing and wildlife habitat. Jerry McCown
[McCown, William J \(Jerry\) \[William.McCown@workflowone.com\]](mailto:William.McCown@workflowone.com)

First off, thanks to the Aquatic Plant Management Council for the outstanding work you do trying to rid our lakes of invasive weeds. My one comment on the Aquatic Plan Management Plan as posted on your web site is that I prefer that you develop a more robust annual maintenance stocking plan for triploid grass carp in the Santee Cooper Lakes to eliminate the spikes in hydrilla growth when the grass carp numbers in the lakes decline. Suspending the stocking of grass carp because the current level of hydrilla has declined will only put the lakes in another period of hydrilla growth the Council will have to face in the future.

Looking at Appendix G, Summary of Plant Control Expenditures:

1989 - stocked 100,000 grass carp in Lake Marion

1990 - stocked 100,000 grass carp in Lake Marion

1991 - third stocking of grass carp

1992 - reported widespread control of hydrillia in Lake Marion

1993 - reported control over 9000 acres of hydrillia in Lake Marion

1994 - stocked 150,000 grass carp in Lake Moultrie

1995 - stocked 91,000 grass carp in Santee Cooper Lakes

1996 - reported hydrillia declined by 80%

1997 - 2005 reported widespread control of hydrillia, no mention of additional stocking, assume there was none

2006 - growth of hydrilla indicates additional stocking of grass carp would be required

2007 - maintenance stocking of 2620 grass carp in Santee Cooper Lakes

2008 - reported hydrilla rebounded across the state and maintenance restocking of grass carp would be reconsidered

2009 - maintenance stocking of grass carp in Santee Cooper Lakes

2010 - maintenance stocking of grass carp in Santee Cooper Lakes

2011 - reported hydrilla growth increased by 160%, forced to forego maintenance stocking of grass carp for an adaptive management strategy, 109,000 grass carp to be stocked

2012 - reported hydrilla increased to 7210 acres

2013 - reported hydrilla acreage down to 1100 acres

Clearly this shows the positive effects of stocking large numbers of grass carp to effectively control hydrilla. Just as apparent is the rapid growth of hydrilla once there are insufficient grass carp in the lakes to maintain control of the invasive weed. I believe a robust annual maintenance stocking plan is the correct path to follow, but there must be sufficient fish added each year to keep the numbers in the lakes at a level to control or eradicate the hydrilla altogether. Not adding any fish or an insufficient number is surely a recipe for aggressive hydrilla growth.

Thanks for allowing me to comment on your plan. Other than my one concern over suspending the grass carp stocking plan for the Santee Cooper Lakes, you have my full support.

Dale Cozart

306 Broad River Drive

Santee, SC 29142

843 697-2103

Dale Cozart [cozartd@gmail.com]

I am submitting this comment to ask that you pay particular attention to the coves and inlets south of the I-95 Bridge. In the DRAFT 2014 SOUTH CAROLINA AQUATIC PLANT MANAGEMENT PLAN regarding Lake Marion (Calhoun, Clarendon, Orangeburg, Berkeley, and Sumter Counties), Water Hyacinth is identified as a problem plant species. The stated goal in the plan is to “Reduce water hyacinth populations throughout the lakes to enhance boating, fishing, hunting, public access and prevent spread to other areas of the lake.”

Unfortunately, the plan states that there are approximately 4000 acres of Water Hyacinth throughout the lake, but “*mostly in the upper lake area above I-95 Bridge.*” There may be a lot of Water Hyacinth north of the I-95 Bridge, but there is also a great deal below the Bridge in coves and inlets that are choking the ability of residents and visitors alike from access to Lake Marion.

The plan states that Water Hyacinth treatments will be considered a *high priority to minimize spread to other areas of the lake system.* I would especially like to emphasize this point – Water Hyacinth does travel by wind and currents to infest coves and inlets south of the I-95 Bridge and must be vigorously treated and to prevent its continuing expansion.

Thank you for soliciting comments – please listen! Mike Kirk Santee, S.C.

Michael Kirk [mkk@att.net]

I, Sandra J. Rolland, President of the Goat Island Boat Club, am in total support of this program, I want what's best for our waters, and safety for our boats, swimmers etc, please, please keep up

what you are, and have been doing, in the past!!

I'am in total Support!! Thank You, for hearing me out! Sandra J. Rolland
Robin Rolland [rjroll@bellsouth.net]

Thank you to everyone involved in the making of the Aquatic Plant Management Plan for 2014. All of your hard work is greatly appreciated. My one concern is the decision to temporarily suspend the stocking of triploid carp in Santee Cooper Lakes. I have witnessed the rapid growth of hydrilla in the past and I do not want to see that happen again. I'm concerned that we may find ourselves in a position of playing 'catch up'. With that being said, I have faith that the very knowledgeable staff of SCDNR and Santee Cooper will diligently monitor for a resurgence of hydrilla and will respond with herbicides and a restocking of triploid carp. Again, thank you all for all your hard work.

Debra Gleaton
1043 Autumn Lane
Summerton, SC 29148
Debra Gleaton [dgleaton@ftc-i.net]

As a home owner living on lake Marion, I have always supported the control of non-native weeds in our lake and always will. I am 66 years old and since I can remember the highlight of my earlier years was looking forward to getting away and going fishing for bream on lake Marion. Just the thought of fishing for these fighters (and other species), and the over all beauty of this lake was the main reason I retired here. In 1998 when I did retire here, I started to realize the problems of home owners living on the lake concerning these unwelcomed non-native weeds. For such a long time, you could not even pull your boat (or recreational vehicle) up to your on dock. Boat landings were closed because of the weed hydrilla. As I have stated, I very much support the efforts of DNR in controlling these aquatic plants that do not belong on our lake.

Winston Hinds
Proud member of Goat Island Boat Club
MarleHin@aol.com

I'm writing to thank you for the work you have done on the invasive weed program and pledge my support for the future. Please do not hesitate to call on me or the Goat Island Boat Club for support. Thank you again for the work you have done.

Carl Cagle
1321 Holland Rd.
Summerton, SC 29148
carlmcagle@FTC-I.NET

I fully support the 2014 S.C. Aquatic Plant Management Plan.
Eddie V. Gleaton, Jr.
1043 Autumn Lane
Summerton, SC 29148
Eddie Gleaton [manningit@cityofmanning.org]

As residents who live on the lake and enjoy all recreational activities the lake has to offer, we support all efforts to control the invasive weeds. The weeds often severely detract from the recreational value of the lake. It is disturbing that in recent years, new species have appeared that require constant and expensive defensive measures. We think the cost is necessary to preserve this valuable resource.

Thank you for your assistance in this matter,

William and Wanda Johnson

wanda@whjohnsonlaw.com

Re: 2014 South Carolina Aquatic Plant Management Plan

The Santee National Wildlife Refuge (NWR) would like to express support for the 2014 South Carolina Aquatic Plant Management Plan developed by the SC Aquatic Plant Management Council and SCDNR. The plan is consistent with U. S. Fish and Wildlife Service (Service) policy on control and removal of exotic, invasive organisms that have harmful impacts on aquatic natural resources and on the human use of these resources. Additionally, the plan is consistent with the Santee NWR Comprehensive Conservation Plan goals and objectives. The occurrence and spread of exotic, invasive, and nuisance plant and animal species has been identified by Service staff and intergovernmental partners as one of the priority management issues facing Santee NWR.

We support your efforts to enhance the biological integrity, desirable native vegetation, compatible public uses, and control of aquatic invasive species on the refuge and contiguous ecosystems.

Thank you for the opportunity to comment.

Sincerely,

Marc Epstein, Refuge Manager

U. S. Fish and Wildlife Service

Santee National Wildlife Refuge

2125 Fort Watson Road

Summerton, SC 29148

<http://www.fws.gov/santee/> - marc_epstein@fws.gov

As a fourteen (14) year resident of the Lake Marion area and a member of the Goat Island Boat Club, I feel I must express my appreciation to you, the SCDNR, and Mr. Larry McCord of Santee Cooper for your continued efforts to control the spread of invasive and nuisance weeds that reside in our beautiful lake. Having said that, please count me as a supporter of the DNR 2014 SC Aquatic Plant Management Plan. I firmly believe the plan always has and continues to strike a balance between the needs of both fisherman and recreational boaters.

Hal White

1021 Carving Trace

Manning S.C. 29102

The purpose of this letter is to express my support for your Draft 2014 Aquatic Plant Management Plan. I believe that your current plan for control of nuisance weeds is geared to minimizing the impact the weed control will have on fishing while insuring that recreational activities on the lake will not be impacted.

Michael T. Young
1061 Carving Trace
Manning S.C. 29102

I have reviewed the DNR's Draft 2014 Aquatic Plant Management Plan and support the plan as it is written. As a recreational bass fisherman I frequently visit the many piers and sloughs around Wyboo Creek and can attest to both the quantity and quality of the fish that populate this area of our lake. I appreciated that the SC DNR has an invasive weed control program that allows excellent fishing opportunities and, at the same time, is compatible with recreational boating.

John V. Hall
1042 Carving Trace
Manning S.C. 29102

Comments and Revisions:

Response:

Most of the problems that were commented on are solely contributed to the problematic water hyacinth that got pushed out of the upper lake's swamps in 2014 by extremely high flows. That was an unusual situation as heavy rainfall dominated the areas climate last year. That rainfall also led to poor growing conditions for submersed plants and made it extremely difficult to survey for said plants. With the absence of the large acreage in 2013 surveys we find it problematic to continue stocking at the same rate as in 2013. As the season progresses and we can further analyze the acreage and composition of the submersed species we have the option available to stock additional triploid carp if conditions warrant. Our goal through adaptive management techniques is to return to a maintenance mode for the stocking of grass carp.

Plan Modifications:

None at present time.

The South Carolina Department of Natural Resources prohibits discrimination on the basis of race, color, national origin, disability, age, sex, or religion. Direct all inquiries to the

Office of Human Resources,

P.O. Box 167, Columbia, SC 2920

Revised: 3/26/2014