2019-2020
ANNUAL SOUTH CAROLINA
AQUATIC PLANT MANAGEMENT PLAN

DRAFT

Prepared by the
Aquatic Nuisance Species Program
South Carolina Department of Natural Resources
and Approved by the
South Carolina Aquatic Plant Management Council
2019

2019 SOUTH CAROLINA
AQUATIC PLANT MANAGEMENT COUNCIL

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PART II – 2019-20 ANNUAL MANAGEMENT PLAN

INTRODUCTION

The Annual Management Plan for 2019 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 l) 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			
Common Name	***Scientific Name***	**Common Name**	***Scientific Name***
Alligatorweed	*Alternanthera philoxeroides*	**Giant salvinia**	*Salvinia molesta*
Bladderwort	*Utricularia spp*	**Hydrilla**	*Hydrilla verticillata*
Brazilian elodea	*Egeria densa*	**Illinois Pondweed**	*Potamogeton illinoensis*
Bur Marigold	*Bidens spp.*	**Lotus**	*Nelumbo lutea*
Spatterdock	*Nuphar luteum macrophyllum*	**Musk-grass**	*Chara spp*
Cattails	*Typha spp.*	**Pondweed**	*Potamogeton spp.*
Coontail	*Ceratophyllum demersum*	**Slender naiad**	*Najas minor*
Common reed	*Phragmites australis*	**Smartweed**	*Polygonum densiflorum*
Creeping rush	*Juncus repens*	**Southern naiad**	*Najas guadalupensis*
Crested Floating-heart	*Nymphoides cristata*	**Spikerush**	*Eleocharis spp.*
Curly-leaf pondweed	*Potamogeton crispus*	**Stonewort**	*Nitella*
Duckweed	*Lemna spp.*	**Variable-leaf pondweed**	*Potamogeton diversifolius*
Eurasian watermilfoil	*Myriophyllum spicatum*	**Waterlily**	*Nymphaea odorata*
Fanwort	*Cabomba caroliniana*	**Water hyacinth**	*Eichhornia crassipes*
Filamentous algae	*Pithophora, Lyngbya, Hydrodictyon*	**Water lettuce**	*Pistia stratiotes*
Floating bladderwort	*Utricularia inflata*	**Watermilfoil**	*Myriophyllum spp.*
Floating heart	*Nymphoides spp.*	**Water pennywort**	*Hydrocotyle ranunculoides*
Frog's bit	*Limnobium spongia*	**Water primrose**	*Ludwigia hexapetala*
Giant cutgrass	*Zizaniopsis miliacea*	**Watershield**	*Brasenia schreberi*

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 (SCDNR) 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 2018. Some water bodies are not active every year but remain in the plan because of previous major problems. 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 budget constraints and 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.

Water body	Location	Surface acres	Aquatic plants	Coverage acres	Impaired activities
Ashepoo River	Colleton County	Unknown	Water hyacinth	200	Boating, hunting, fishing, public access
Back River Reservoir	Berkeley County	850	Hydrilla, Water hyacinth, Water primrose, Fanwort	360	Boating, fishing, hunting, swimming, industrial water supply, municipal water supply, electric power generation, public access
Baruch Institute	Georgetown County	Unknown, adjacent to Winyah Bay	Phragmites	50	Boating, hunting, fishing, public access
Black Mingo Creek	Georgetown County	Unknown	Alligatorweed, Parrot feather, Water hyacinth	5	Boating, hunting, fishing, public access
Black River	Georgetown County	Unknown	Alligatorweed, Water hyacinth	40	Boating, hunting, fishing, public access
Bonneau Ferry	Berkeley County	Unknown Multiple Reserves and impoundments	Water hyacinth, Water primrose, Frog's bit, Lotus, Cattails, Cutgrass, Pennywort, Parrotfeather, Fanwort, Coontail	40	Boating, hunting, fishing, public access
Charleston County Parks	Charleston County (CawCaw and Laurel Hill)	unknown	Hydrilla, Water primrose, Water hyacinth, Phragmites, Tallow	10	Recreational and public access
Combahee River (Borrow pit)	Colleton County	approx. 5	Hydrilla, Water primrose, Water hyacinth	4	Boating, hunting, fishing, public access
Cooper River (and adjacent ricefields)	Berkeley County	Unknown	Hydrilla, Water primrose, Water hyacinth	approx. 2,800	Boating, hunting, fishing, public access
Donnelley Bear Island WMA	Colleton County	Multiple impoundments and rivers	Cutgrass, Frog's bit, Cattails, Phragmites	80	Hunting, public access
Dungannon Plantation Heritage Preserve	Charleston County	Unknown	Cutgrass, Frog's bit, Cattails, Water primrose, Swamp loosestrife	14	Wood stork nesting site, public access
Goose Creek Reservoir	Berkeley County	600	Water hyacinth, Water lettuce, Water primrose, Hydrilla, Salvinia(*Salvinia minima*)	180	Boating, public access, industrial water supply, floodway

Water body	Location	Surface acres	Aquatic plants	Coverage acres	Impaired activities
Lake Bowen & Reservoir #1	Spartanburg County	1534 & 1483	Muskgrass(Chara), Bladderwort	150	Boating, fishing, hunting, swimming, industrial water supply, municipal water supply, public access
Lake Cunningham	Greenville County	160	Brazilian elodea, Water primrose, Waterlily spatterdock	10	Boating, hunting, fishing, public access
Lake Greenwood	Laurens and Greenwood Counties	11,400	Hydrilla, Slender naiad, Vallisneria	<100	potential impacts to electric power generation, boating, swimming, vector control, public access
Lake Keowee	Pickens and Oconee Counties	18,300	Hydrilla	10	Potential impacts to electric power generation, municipal water supply, boating, swimming, vector control, public access
Lake Monticello(Recreation Lake)	Fairfield County	6,700 (400)	Hydrilla	<1 (Recreation Lake)	Boating, swimming, fishing, vector control, public access
Lake Murray	Lexington and Richland Counties	50,000	Hydrilla, Illinois pondweed, Water primrose, Southern naiad, Alligatorweed	50	Boating, swimming, domestic and municipal water intakes, public access
Lake Wateree	Kershaw County	13,710	Hydrilla, cutgrass	<5	Potential impacts to boating, swimming, vector control, public access
Little Pee Dee River	Marion and Horry Counties	Unknown	Alligatorweed	30	Boating, hunting, fishing, public access
Lumber River	Marion and Horry Counties	Unknown	Alligatorweed	5	Boating, hunting, fishing, public access
Pee Dee River	Georgetown County	Unknown	Water hyacinth, Phragmites	40	Boating, hunting
Prestwood Lake	Darlington County	300	Milfoil, Watershield, Filamentous algae, Water hyacinth	75	Boating, fishing, recreation
Samworth WMA	Georgetown County	Unknown	Phragmites, Water hyacinth	50	Hunting, public access
Santee Coastal Reserve	Georgetown County	Unknown	Phragmites	1500	Hunting, public access

Water body	Location	Surface acres	Aquatic plants	Coverage acres	Impaired activities
Santee Delta WMA	Georgetown County	Unknown	Phragmites	50	Hunting, public access
Waccamaw River	Georgetown and Horry Counties	Unknown	Water hyacinth, Phragmites	50	Boating, hunting, fishing, public access
Yawkey Wildlife Center	Georgetown County	Unknown	Phragmites	25	Hunting, public access
Santee Cooper Lakes					
Lake Marion	Sumter, Clarendon, Calhoun, Berkeley, and Orangeburg Counties.	110,000	Alligatorweed, Brazilian elodea, Hydrilla, Water primrose, Slender naiad, Coontail, Water hyacinth, Filamentous algae, Fanwort, Cutgrass, Crested floating heart, Giant salvinia	TBD	Boating, swimming, public access, potential electric power generation, potential irrigation water withdrawals
Lake Moultrie	Berkeley County	60,400	Alligatorweed, Water primrose, Brazilian elodea, Hydrilla, Slender naiad, Water hyacinth, Watermilfoil, Fanwort, Cutgrass, Crested floating heart	TBD	Potential electric power generation, boating, swimming, public access, potential domestic and irrigation water withdrawals
Santee Cooper Area WMA'S					
Hatchery WMA	Berkeley County	Unknown	Crested Floating Heart, Cattails, Hydrilla, Water Primrose	25	Boating, hunting, fishing, public access
Hickory Top WMA	Clarendon County	Unknown	Cutgrass, Cattails, Misc. Woody Species	15	Boating, hunting, fishing, public access
Potato Creek WMA	Clarendon County	Unknown	Hydrilla, Water Hyacinth, Water Primrose, Bladderwort, Cutgrass, Lotus	140	Boating, hunting, fishing, public access
Sandy Beach WMA	Berkeley County	Unknown	Crested Floating Heart, Cattails, Cutgrass, Lotus, Water Primrose, Misc. Woody Species	30	Boating, hunting, fishing, public access
Santee Cooper WMA	Orangeburg County	Unknown	Crested Floating Heart, Cattails, Cutgrass, Lotus, Water Primrose, Misc. Woody Species	100 (multiple waterbodies)	Boating, hunting, fishing, public access
SC Parks, Recreation and Tourism State Park Lakes					
Aiken State Park	Aiken County	16	Floating heart	10	Fishing, swimming, aesthetics

Water body	Location	Surface acres	Aquatic plants	Coverage acres	Impaired activities
Barnwell State Park	Barnwell County	12	Waterlily, Cattails	9	Fishing, swimming, aesthetics
Charles Towne Landing State Park	Charleston County	5	Duckweed, Alligatorweed, Pennywort, Cyanobacteria, Algae	4	Fishing, tourism, aesthetics
Cheraw State Park	Chesterfield County	280	Floating heart, Waterlily, Spatterdock, Watermilfoil	20	Fishing, swimming, aesthetics
Croft State Park	Spartanburg County	145	Hydrilla	50	Fishing, swimming, aesthetics
H. Cooper Black Recreation Area	Chesterfield County	2	Spatterdock	1	Recreational activities
Hunting Island State Park	Beaufort County	1	Duckweed	1	Fishing, swimming, aesthetics
Huntington Beach SP	Horry County	15	Cutgrass, Phragmites, Cattails	15	Recreational activities
Kings Mountain State Park Crawford Lake	York County	9	Slender naiad	4	Swimming, boating
Lee State Park	Lee County	1.75	Watermilfoil	2	Fishing, swimming, aesthetics
Little Pee Dee State Park	Dillon County	75	Spikerush, Spatterdock	15	Fishing, boating
N.R. Goodale State Park	Kershaw County	160	Waterlily, Watershield	60	Swimming, recreational activities
Paris Mountain State Park	Greenville County	9.5	Slender naiad, Watershield	6	Fishing, swimming, aesthetics
Poinsett State Park	Sumter County	9	Spatterdock, Cattails	5	Fishing, swimming, aesthetics
Sesquicentennial State Park	Richland County	25	Waterlily, Watershield	12	Swimming, fishing
SCDNR State Lakes					
Lake Cherokee	Cherokee County	50	Water primrose	5	Boating, fishing
Lake Edwin Johnson	Spartanburg County	40	Water primrose, Hydrilla, Pondweed	10	Boating, fishing

Water body	Location	Surface acres	Aquatic plants	Coverage acres	Impaired activities
Jonesville Reservoir	Union County	25	Water primrose, Pondweed	10	Boating, fishing
Mountain Lakes	Chester County	70	Water primrose, Alligatorweed, Parrotfeather	5	Boating, fishing
Lancaster Reservoir	Lancaster County	61	Water primrose, Alligatorweed	8	Boating, fishing, hunting
Sunrise Lake	Lancaster County	25	Pondweed	15	Boating, fishing
Lake Ashwood	Lee County	75	Waterlily	spotty	Boating, fishing
Lake Edgar Brown	Barnwell County	100	Water primrose, Coontail	60	Boating, fishing
Lake George Warren	Hampton County	400	Cattails, Water primrose, Coontail	20	Boating, fishing
Lake Thicketty	Cherokee County	100	Hydrilla	5	Boating, fishing
Dargan's Pond	Darlington County	50	Pondweed	15	Boating, fishing
South Carolina Border Lakes					
Lake Wylie	York County, SC; Gaston and Mecklenburg County, NC	13,443	Hydrilla	<100 (all in NC waters)	Potential impacts include electric power generation, boating, swimming, public access, domestic and irrigation water withdrawals
Lake Thurmond	South Carolina, Georgia Border	71,100	Hydrilla	> 7000	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. Problematic species may change based on environmental conditions. Therefore, this plan is fluid and will utilize an adaptive management approach. 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 SCDNR in cooperation with the local sponsor. A summary of proposed expenditures for 2019 and a location map of problem water bodies are located at the end of this section.

SPECIAL NOTE: Due to budget constraints (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. Ashepoo River (Colleton County)

Problem plant species

Water hyacinth

Management objectives

Reduce water hyacinth populations to enhance public access, navigation, and water flow.

Selected control method

Problem Species	Control Agent
Water hyacinth	Triclopyr, Diquat, Imazamox, Imazapyr, Glyphosate, ProcellaCOR-SC

Area to which control is to be applied

Through river system upstream and downstream of US 17 bridge.

Rate of control agents to be applied

Triclopyr - 0.500 - 0.750 gallons per acre.

Diquat - 0.500 gallons per acre.

Imazamox - 0.250 - 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Imazapyr – 0.250 - 0.750 gallons per acre.

ProcellaCOR-SC - 1-5 PDU's per acre foot

Method of application of control agents

Triclopyr, Diquat, Imazapyr, Imazamox, ProcellaCOR-SC, and Glyphosate - spray on surface of foliage with appropriate surfactant.

Timing and sequence of control application

Apply herbicide periodically to water hyacinth from May through October as needed.

Other control application specifications

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

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. Label rate of herbicide will be stringently adhered to.

Entity to apply control agents

Commercial applicator

Estimated cost of control operations

$25,000

Potential sources of funding

Water hyacinths -

Colleton County 50%

SCDNR 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.

2. 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 Dominion Energy 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	Triclopyr, Diquat, Imazamox, Penoxsulam, Imazapyr, Glyphosate, ProcellaCOR-SC
Water primrose, Cutgrass	Triclopyr, Diquat, Imazapyr, Imazamox, Glyphosate
Hydrilla	Copper*, Copper*/Diquat, ProcellaCOR-SC

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

Triclopyr, Diquat, Imazapyr, Imazamox, Glyphosate, ProcellaCOR-SC and Penoxsulam - 300 acres of water hyacinth, water primrose and cutgrass throughout the lake.

Copper*/Diquat, Penoxsulam, ProcellaCOR-SC - 154 acres of hydrilla; 2 treatments of 62.50-acre area near Dominion Energy 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

Triclopyr - 0.500 - 0.750 gallons per acre.

Diquat - 0.500 gallons per acre.

Imazamox - 0.250 - 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

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

Copper*/Diquat - 4 gallons/2 gallons per acre

Imazapyr – 0.250 - 0.750 gallons per acre.

Penoxsulam - 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.

ProcellaCOR-SC - 1-5 PDU's per acre foot

Method of application of control agents

Triclopyr, Diquat, Imazapyr, Imazamox, Glyphosate, ProcellaCOR-SC, and Penoxsulam - spray on surface of foliage with appropriate surfactant.

Copper, Copper*/Diquat, ProcellaCOR-SC - subsurface injection from airboat.

Timing and sequence of control application

Three hundred (300) acres of water hyacinths, water primrose and cutgrass treated with Triclopyr, Imazamox, Imazapyr, Glyphosate, Penoxsulam, ProcellaCOR-SC (May-October), Diquat (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 Endothall, ProcellaCOR-SC.

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

Hydrilla located near the Dominion Energy water intake to be treated periodically during the year with Copper, Copper*/diquat, ProcellaCOR-SC (up to three times in the same 62.50-acre area), treatment area may be expanded as control is realized in target area.

Other control application specifications

Herbicide used only upon approval by the SCDHEC.

All herbicide treatments conducted within 1600 feet of the Charleston Commissioners of Public Works (CPW) water intake will use Triclopyr at a rate of 0.5 gallons per acre or less or Penoxsulam at a rate of 2 to 6 oz/acre. Diquat treatments will be conducted at least 1600 feet from the intake. Following any application of Diquat within 1600 feet of the CPW water intake, herbicide residue concentrations may be monitored according to a plan agreed to by the SCDNR, CPW, and the SCDHEC.

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. Label rate of herbicide will be stringently adhered to.

Entity to apply control agents

Commercial applicator

Estimated cost of control operations

$45,000

Potential sources of funding

Water primrose and water hyacinths -

CPW 30%

Dominion Energy. 20%

SCDNR 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 Dominion Energy intake) -

Dominion Energy. 50%

SCDNR 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) -

CPW 30%

Dominion Energy. 20%

SCDNR 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.

3. 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	Imazapyr, Glyphosate, Imazamox

Area to which control is to be applied

50 acres of phragmites throughout area

Rate of control agent to be applied

Imazapyr - 0.250 - 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Imazamox - up to 5 % solution for spot spray.

Method of application of control agent

Helicopter - 50 acres of Imazapyr, Glyphosate, Imazamox 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

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$5,000

Potential sources of funding

Baruch Institute 50%

SCDNR 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.

4. Black Mingo Creek (Georgetown County)

Problem plant species

Alligatorweed, Parrot feather, Frog's bit, Pennywort, Water hyacinth

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	Triclopyr, Imazapyr, Imazamox, Glyphosate
Frog's bit, Parrot feather	Diquat, Penoxsulam, ProcellaCOR-SC
Water Hyacinth	Diquat, Triclopyr, ProcellaCOR-SC

Area to which control is to be applied

5 acres of problematic plants throughout river

Rate of control agent to be applied

Diquat - 0.500 gallon per acre.

Triclopyr - 0.500 to 0.750 gallons per acre.

Imazapyr - 0.250 - 0.750 gallons per acre.

Imazamox - 1 to 4 pints per acre.

Glyphosate - up to 0.937 gallons per acre.

ProcellaCOR-SC - 1-5 PDU's per acre foot

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

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$1000

Potential sources of funding

Georgetown County 50%

SCDNR 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.

5. Black River (Georgetown County)

Problem plant species

Alligatorweed, Parrot feather, Frog's bit, Pennywort, Phragmites, Water hyacinth

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	Triclopyr, Imazapyr, Imazamox, Glyphosate
Frog's bit, Parrot feather	Diquat, Penoxsulam, ProcellaCOR-SC
Phragmites	Imazapyr, Imazamox
Water hyacinth	Triclopyr, Diquat, Imazapyr, ProcellaCOR-SC

Area to which control is to be applied

40 acres of problematic plants throughout river

Rate of control agent to be applied

Diquat - 0.500 gallon per acre.

Triclopyr - 0.500 to 0.750 gallons per acre.

Imazapyr - 0.250 - 0.750 gallons per acre.

Imazamox - 1 to 4 pints per acre.

Glyphosate - up to 0.937 gallons per acre.

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

ProcellaCOR-SC - 1-5 PDU's per acre foot

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

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$3,250

Potential sources of funding

Nature Conservancy 50%

SCDNR 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.

6. Bonneau Ferry (Berkeley County)

Problem plant species

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

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	Triclopyr, Imazapyr, Imazamox, Glyphosate
Cattails, Cutgrass, Parrotfeather	Imazapyr, Imazamox, Glyphosate, ProcellaCOR-SC
Water hyacinth, Frog's bit	Triclopyr, Diquat, Imazamox, ProcellaCOR-SC, and Penoxsulam
Duckweed	Flumioxazin

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

Diquat - 0.500 gallon per acre.

Triclopyr - 0.500 to 0.750 gallons per acre.

Imazapyr - 0.250 - 0.750 gallons per acre.

Imazamox - up to a 5% solution for spot spray.

Flumioxazin – 5 to 12 oz/ac as a foliar application, submersed application 1 lb/ac foot.

Glyphosate - up to 0.937 gallons per acre.

Penoxsulam - Floating species – 2 to 6 fl oz/acre as foliar application, submersed approximately 0.174 gallons/acre foot.

ProcellaCOR-SC - 1-5 PDU's per acre foot

Method of application of control agent

Helicopter - 20 acres of Imazapyr, Glyphosate, Imazamox 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

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$5,750

Potential sources of funding

SCDNR 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.

7. 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	2,4-D, Triclopyr/2,4-D, Imazamox
Waterlily,	2,4-D, Imazapyr, Glyphosate, Imazamox
Phragmites	Imazapyr, Glyphosate, Imazamox,

Area to which control is to be applied

5 acres

Rate of control agent to be applied

Imazapyr - 2 to 3 pints per acre.
Triclopyr/2,4-D – 200 lbs per acre.
Imazamox - up to 5% solution for spot spray.
Glyphosate - up to 0.937 gallons per acre. 2,4-D - 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.

Other control application specifications

Label rate of herbicide will be stringently adhered to.

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%

SCDNR 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.

8. Combahee River (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	Triclopyr, Imazapyr, Imazamox, Glyphosate
Frog's bit, Parrot feather	Diquat, Penoxsulam, ProcellaCOR-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

Diquat - 0.500 gallon per acre.

Triclopyr - 0.500 to 0.750 gallons per acre.

Imazapyr - 2 to 3 pints per acre.

Imazamox - 1 to 4 pints per acre.

Glyphosate - up to 6 pints per acre.

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

ProcellaCOR-SC - 1-5 PDU's per acre foot

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

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$700

Potential sources of funding

Colleton County 50%

SCDNR 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.

9. 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	Triclopyr, Diquat, Imazamox, Glyphosate, Penoxsulam, ProcellaCOR-SC
Water primrose	Triclopyr, Diquat, Imazapyr, Imazamox, Glyphosate
Hydrilla	Copper*, ProcellaCOR-SC

* 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

Triclopyr, Diquat, Imazapyr, Imazamox, Glyphosate, Penoxsulam - 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.

Copper, ProcellaCOR-SC - 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

Imazapyr - 2 to 4 pints per acre.

Diquat - 2 quarts per acre.

Triclopyr - up to 4 quarts per acre

Imazamox - 1 to 4 pints per acre.

Glyphosate - up to 0.937 gallons per acre.

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

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

ProcellaCOR-SC - 1-5 PDU's per acre foot

Method of application of control agent

Triclopyr, Diquat, Imazapyr, Penoxsulam, ProcellaCOR-SC - spray on surface of foliage with appropriate surfactant.

Copper, ProcellaCOR-SC - subsurface injection from airboat.

Timing and sequence of control application

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

Other control application specifications

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$34,000

Potential sources of funding

Berkeley County 50%

SCDNR 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.

10. 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	Triclopyr, Penoxsulam, ProcellaCOR-SC
Phragmites, Cattails	Imazapyr, Imazamox, Glyphosate
Cutgrass, Swamp loosestrife	Imazapyr, Imazamox, Glyphosate

Area to which control is to be applied

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

Rate of control agent to be applied

Triclopyr - 0.500 to 0.750 gallons per acre

Imazapyr - 2 to 3 pints per acre.

Imazamox - 1 to 4 pints per acre.

Glyphosate - up to 0.937 gallons per acre.

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

ProcellaCOR-SC - 1-5 PDU's per acre foot

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. Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$10,000

Potential sources of funding

Donnelley WMA/USF&W/Nature Conservancy 50%

SCDNR 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.

11. 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	Triclopyr, Imazapyr, Imazamox, Glyphosate, Penoxsulam, ProcellaCOR-SC
Cattails	Imazapyr, Imazamox, Glyphosate
Cutgrass, Swamp loosestrife	Imazapyr, Imazamox, 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

Triclopyr - 0.500 to 0.750 gallons per acre.
Imazapyr - 2 to 3 pints per acre.
Imazamox - 1 to 4 pints per acre.
Glyphosate - up to 6 pints per acre.
Penoxsulam - Floating species – 2 to 12 fl oz/acre.
ProcellaCOR-SC - 1-5 PDU's per acre foot

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. Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$2,000

Potential sources of funding

Dungannon WMA 50%

SCDNR 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.

12. Goose Creek Reservoir (Berkeley County)

Problem plant species

Hygrophila, Water hyacinth, Water primrose, Water lettuce, Hydrilla, Watermilfoil, Fanwort, Common salvinia, 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 common salvinia and 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	Triclopyr, MaxG, Imazapyr, Imazamox, Glyphosate
Water hyacinth, Water lettuce	Triclopyr, Diquat, Penoxsulam, Flumioxazin, ProcellaCOR-SC
Watermilfoil, fanwort	Diquat, 2,4-D, Imazamox
Hydrilla, Hygrophila	Endothall, Copper, triploid grass carp, ProcellaCOR-SC
Common salvinia, Duckweed	Fluridone, Diquat, Penoxsulam, Flumioxazin
Filamentous Algae	Copper

Area to which control is to be applied

Triclopyr, Imazapyr, Imazamox, Glyphosate- 100 acres water primrose in upper reservoir and boat ramp.

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

Triclopyr, Diquat, Penoxsulam, ProcellaCOR-SC - 100 acres of water hyacinth and water lettuce throughout the reservoir.

Diquat, 2,4-D, Penoxsulam, ProcellaCOR-SC - 20 acres of submersed growth throughout the reservoir.

Triclopyr, Imazapyr, Imazamox, Glyphosate, Endothall – 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.

Fluridone, Diquat, Penoxsulam, Flumioxazin – 50 acres of duckweed near populated areas of the reservoir.

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

Rate of control agents to be applied

Diquat - 0.500 gallon per acre.
Triclopyr - 0.500 to 0.750 gallons per acre.
Imazapyr - up to 4 pints per acre.
Imazamox - 1 to 4 pints per acre.
Glyphosate - up to 6 pints per acre.
2,4-D - up to 5 gallons per acre.
Flumioxazin – up to 0.09375 gallons per acre
Penoxsulam - 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.
ProcellaCOR-SC - 1-5 PDU's per acre foot

*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

Triclopyr, Imazapyr, Glyphosate, Diquat, Flumioxazin, Penoxsulam, ProcellaCOR-SC - spray on surface of foliage with appropriate surfactant.

Diquat, 2,4-D, Penoxsulam, ProcellaCOR-SC - subsurface injection from airboat.

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

CPW50%

SCDNR 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

13. Lake Bowen, Reservoir #1 (Spartanburg County)

Problem plant species

Chara, Bladderwort

Note Reservoir 1, which is fed by Lake Bowen, is a direct potable water supply lake for Spartanburg Water. Control in either water body of algae/diatoms or bacteria that increases levels of Geosmin or MIB's, which affects potable water supplies will be accomplished for Spartanburg Water by independent contractors. All contractors must be properly certified and licensed. SCDNR will be pre-notified of the details and timing of this control so as not to cause unexpected problems with any control carried out for regular aquatic plant management activities by either SCDNR or Spartanburg Water's contractors. For information concerning taste and odor issues for potable water please contact Spartanburg Water directly.

Management objective

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

Selected control method

Chara, Bladderwort **Triploid grass carp, Copper, Fluridone, ProcellaCOR-SC**

Area to which control is to be applied

175 acres in lake.

Rate of control agent to be applied

*** Triploid grass carp –initial stocking to control Bladderwort and then stock to maintain 1 fish**

per 6 surface acre density when population levels dictate.
Lake Bowen – 400 triploid grass carp for maintenance control
Reservoir #1 - 1750triploid grass carp for control of bladderwort

Copper - up to 1 ppm

Fluridone – up to 30 ppb in treatment area

ProcellaCOR-SC - 1-5 PDU's per acre foot

Method of application of control agents

Copper, Fluridone, ProcellaCOR-SC - 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 2019 (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 and Reservoir #1 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. Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$30,000

Potential sources of funding

Spartanburg CPW 50%

SCDNR 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.

14. 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	Copper, triploid grass carp
Water primrose,	Triclopyr, Imazapyr, Imazamox,
Fragrant waterlily, spatterdock	Triclopyr, Imazapyr, Imazamox,

Area to which control is to be applied

8 acres of problematic plants throughout Lake Cunningham.

Rate of control agent to be applied

Triclopyr - 0.500 to 0.750 gallons per acre.
Imazapyr - 2 to 3 pints per acre.
Imazamox - 1 to 4 pints per acre.
Copper – up to 1 ppm.
Triploid grass carp – Stock to maintain 1 fish per 8 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 2019 (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. Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$1,500

Potential sources of funding

Greer CPW 50%

SCDNR 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.

15. Lake Greenwood
(Greenwood and Laurens County)

Problem plant species

Slender naiad, Hydrilla, Water primrose, Vallisneria

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 – stock 300 sterile grass carp yearly to get to and maintain a 1 carp to 6 surface acre ratio. (Additional carp in 2017 brought total in system to 4185. These were stocked in response to 100 acres of hydrilla at a rate of 20 carp per vegetated acre.)

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

Problem Species	Control Agent
Slender naiad, Hydrilla	Endothall, Fluridone, Triploid Grass Carp, Copper*, ProcellaCOR-SC, Diquat
Vallisneria	Endothall, Fluridone, Copper*, Diquat
Water primrose	Triclopyr, Glyphosate, Imazapyr, Imazamox

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

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

Imazapyr – 0.250 – 0.750 gallons per acre

Imazamox - -up to 5% spot spray

Fluridone - 0.075 to 0.250 ppm

Copper- up to 1 ppm

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

ProcellaCOR-SC - 1-5 PDU's per acre foot

Triploid Grass Carp – Stock to maintain 1 to 6 surface acres density when population dictates and to add different age class fish. 265 sterile grass carp to maintain a density of 1 grass carp

per 6 surface acres (1900 fish). The Aquatic Plant Management Council is committed to maintenance stocking of triploid grass carp in Lake Greenwood to provide long-term control of hydrilla. The Aquatic Plant Management Council, with recommendations from DNR and Lake Greenwood staff, agrees that the adaptive stocking plan should be continued, based on current observations of collected data, Herbicide treatments may be utilized to provide temporary control of hydrilla when necessary. Changes to the strategy will be implemented if survey results, regrowth, or habitat loss warrant.

Method of application of control agents

Endothall, Fluridone, Copper* - Subsurface application by airboat with adjuvant.

Triclopyr, Glyphosate, Imazapyr, Imazamox - 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 2019 (March-May).

Other control application specifications

Herbicide used only upon approval by the SCDHEC.

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. Label rate of herbicide will be stringently adhered to.

Hydrilla may require multiple treatments.

Entity to apply control system

Commercial applicator

Estimated cost of control operations

$10,000

Potential sources of funding

Greenwood County 50%

SCDNR 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 Keowee (Pickens and Oconee County)

Problem plant species

Hydrilla, Slender naiad

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

Triploid grass carp – stock 250 sterile grass carp for 10 acres of Hydrilla

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

Problem Species	Control Agent
Slender naiad, Hydrilla	Endothall, Fluridone, Triploid Grass Carp, 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

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

Herbicide - 10 acres

Drawdown - entire lake

Rate of control agent to be applied

250 sterile grass carp for 10 acres of known hydrilla

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

Fluridone - 0.075 to 0.250 ppm

Copper- up to 1 ppm

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

Triploid Grass Carp – Future stocking to attain and maintain 1 to 8 surface acres density when population dictates.

Drawdown - to the greatest extent possible within project limits.

Method of application of control agent

Endothall, Fluridone, 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.

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.

250 Triploid grass carp to be released as soon as possible in the spring of 2019 (March-May).

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 SCDHEC. Treatment of control area will be conducted in a manner that will not significantly degrade water quality. Label rate of herbicide will be stringently adhered to.

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 Energy

Drawdown - Duke Energy

Estimated cost of control operations

Herbicide application - $0

Triploid Grass Carp - $2,000

Drawdown - Undetermined

Potential sources of funding

Duke Energy 50%

SCDNR 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 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	Control Agent
Hydrilla	Endothall, Fluridone, Triploid Grass Carp, Copper*

Area to which control is to be applied

Hydrilla -. Perform maintenance stocking in future years as needed (1 per 6 acres- 30 carp) to provide long term control option.

Rate of control agents to be applied

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

Fluridone - 0.075 to 0.250 ppm

Copper- up to 1 ppm

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

Triploid Grass Carp – Perform maintenance stocking in future years (1 per 6 acres- 30 carp) to provide long term control option.

Method of application of control agents

Endothall, Fluridone, 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 SCDHEC.

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 SCDNR district fisheries biologist. In general, treatment will be limited to developed shoreline areas, public access sites, and areas of high public use. Label rate of herbicide will be stringently adhered to.

Hydrilla may require multiple treatments.

Entity to apply control system

Commercial applicator

Estimated cost of control operations

$250

Potential sources of funding

Triploid grass carp

Dominion Energy, Lexington and Richland Counties 50%, SCDNR 50% (up to $30,000 cost share per waterbody)

Mechanical harvester, Dominion Energy, Commercial marina operators, and residential property owners.

Aquatic herbicides

Dominion Energy, Lexington and Richland Counties 50%, SCDNR 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.

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

Problem plant species

Hydrilla, Water Primrose, Illinois Pond Weed, Southern Naiad

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 1800 triploid grass carp to maintain the population.

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

Problem Species	Control Agents
Hydrilla, Illinois Pondweed	Copper, Endothall, Fluridone, Imazamox, ProcellaCOR-SC
Water primrose	Triclopyr, Imazapyr, Imazamox, Glyphosate
Southern Naiad	Diquat, Endothall, Fluridone, Flumioxazin

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

Triploid Grass Carp: Stock 1800 sterile grass carp to maintain the population. (Continue maintenance stocking in future years with 1800 sterile grass carp per year to maintain a density of 1 grass carp per 6 surface acres (approx. - 8333 fish). Continue maintenance stocking in 2019 based on conditions. Stock to maintain 1 to 6 surface acres density when population dictates and to add different age class fish. The Aquatic Plant Management Council is committed to maintenance stocking of triploid grass carp in Lake Murray to provide long-term control of hydrilla. The Aquatic Plant Management Council, with recommendations from SCDNR and Lake Murray staff, agrees that the adaptive stocking plan should be continued, based on current observations of collected data, Herbicide treatments may be utilized to provide temporary control of hydrilla when necessary. Changes to the strategy will be implemented if survey results, regrowth, or habitat loss warrant.

Water primrose treatment:
Triclopyr - 0.500 to 0.750 gallons per acre.
Imazapyr - 2 to 4 pints per acre.
Imazamox - 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/fall 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 using 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 Dominion Energy. Harvesting precautions as stated in item above must be adhered to.

2) Aquatic herbicides – Dominion Energy 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. Label rate of herbicide will be stringently adhered to.

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 - $28,000

Aquatic herbicides - $0

Potential sources of funding

Triploid grass carp.

Dominion Energy, Lexington and Richland Counties 50%

SCDNR 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

Dominion Energy, Lexington and Richland Counties 50%

SCDNR 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.

19. 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	Control Agent
Hydrilla	Endothall, Fluridone, Triploid Grass Carp, Copper*
Filamentous algae	Copper, peroxide based products

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

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

Fluridone - 0.075 to 0.250 ppm

Copper- up to 1 ppm

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

Drawdown - To the greatest extent possible within project limits.

Method of application of control agent

Endothall, Fluridone, Copper*, peroxide based products - Subsurface application by airboat with adjuvant.

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 SCDHEC. Treatment of control area will be conducted in a manner that will not significantly degrade water quality. Label rate of herbicide will be stringently adhered to.

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 Energy

Drawdown - Duke Energy

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 Energy 50%

SCDNR 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.

20. 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	Triclopyr, Diquat, Imazamox, Glyphosate, Penoxsulam, ProcellaCOR-SC
Alligatorweed	Triclopyr, Diquat, Imazapyr, Imazamox, Glyphosate
Biological Control -	Alligatorweed flea beetles, *Agasicles hygrophila*

Area to which control is to be applied

30 acres of alligatorweed and water hyacinth throughout river

Rate of control agent to be applied

Imazapyr - 0.250 to 0.750 gallons per acre.
Diquat - 0.500 gallons per acre.
Triclopyr - 0.250 to 0.750 gallons per acre.
Imazamox - 0.125 to 0.750 gallons per acre.
Glyphosate - up to 0.937 gallons per acre.
Penoxsulam - 2 to 6 fluid ounces per acre as foliar application.
ProcellaCOR-SC - 1-5 PDU's per acre foot

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

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$1,500

Potential sources of funding

Horry and Marion Counties 50%

SCDNR 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.

21. 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 - Triclopyr, Imazapyr, Imazamox, Glyphosate, Penoxsulam

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

Triclopyr - 0.500 to 0.750 gallons per acre.

Imazapyr - 0.250 to 0.750 gallons per acre.

Imazamox - 0.250 to 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.

Penoxsulam - 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

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$500

Potential sources of funding

Horry and Marion Counties 50%

SCDNR 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.

22. 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	Diquat, Triclopyr, Imazamox, Imazapyr, Penoxsulam, ProcellaCOR-SC
Phragmites	Imazapyr, Glyphosate, Imazamox

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

Diquat - 0.500 gallons per acre.
Glyphosate – up to 0.937 gallons per acre
Triclopyr - 0.500 to 0.750 gallons per acre.
Imazapyr - 0.250 to 0.750 gallons per acre.
Imazamox - 0.250 to 0.750 gallons per acre.
Penoxsulam - 2 to 6 fluid ounces per acre as foliar application.
ProcellaCOR-SC - 1-5 PDU's per acre foot

Method of application of control agent

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

Timing and sequence of control application

Diquat, Triclopyr, Imazamox, Imazapyr, Glyphosate, Penoxsulam, ProcellaCOR-SC - to be applied periodically to water hyacinth from May through October.

Imazapyr, Imazamox, Glyphosate - Apply when plants are actively growing.

Other control application specifications

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$3,500

Potential sources of funding

Georgetown County 50%

SCDNR 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. 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	Copper
Water milfoil	Imazamox, Flumioxazin, 2,4-D, Triclopyr OTF Triclopyr/2,4-D, Diquat, Triploid Grass Carp, ProcellaCOR-SC
Water hyacinth	Imazamox, Triclopyr, Triclopyr/2,4-D, Diquat, ProcellaCOR-SC
Watershield	2,4-D, Triclopyr OTF, Triclopyr/2,4-D, ProcellaCOR-SC

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

Copper – up to 1 ppm.

Imazamox – up to 0.500 gallons per acre.

Flumioxazin – 200 to 400 ppb

2,4-D - up to 5 gallons per acre.

Triclopyr – up to 1 gallon per acre

Triclopyr/2,4-D - up to 200 pounds per acre.

Triclopyr OTF – 40 pounds per acre

Diquat - 2 gallons per acre.

ProcellaCOR-SC - 1-5 PDU's per acre foot

*Triploid Grass Carp – 100 fish

Method of application of control agent

Copper, Imazamox, 2,4-D, Diquat, ProcellaCOR-SC - application by airboat with adjuvant.

Copper - subsurface application with appropriate surfactant.

Triclopyr/2,4-D, Triclopyr 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 SCDHEC as needed. Treatment of control area will be conducted in a manner that will not significantly degrade water quality. Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Herbicide application - Commercial applicator

Estimated cost of control operations

$4,000

Herbicide application - $2,000

Triploid Grass Carp – $2,000

Potential sources of funding

City of Hartsville 50%

SCDNR 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. Samworth WMA (Georgetown County)

Problem plant species

Water hyacinth, Phragmites, Zizaniopsis

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	Diquat, Triclopyr, Imazamox, Imazapyr, Penoxsulam, ProcellaCOR-SC
Phragmites, Zizaniopsis	Imazapyr, Imazamox, Glyphosate

Area to which control is to be applied

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

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

Rate of control agent to be applied

Diquat - 0.500 gallons per acre.
Triclopyr - 0.500 to 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Imazapyr - 0.250 to 0.750 gallons per acre.
Imazamox - 0.250 to 0.750 gallons per acre.
Penoxsulam - 2 to 6 fluid ounces per acre as foliar application.
ProcellaCOR-SC - 1-5 PDU's per acre foot

Method of application of control agent

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

Timing and sequence of control application

Diquat, Triclopyr, Imazamox, Imazapyr, Glyphosate, Penoxsulam, ProcellaCOR-SC - to be applied periodically to water hyacinth from May through October.

Imazapyr, Imazamox, Glyphosate - Apply when plants are actively growing.

Other control application specifications

Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$5,000

Potential sources of funding

Samworth WMA 50%

SCDNR 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.

25. 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

Imazapyr, Imazamox, Glyphosate

Area to which control is to be applied

TBD acres of phragmites throughout the ricefields.

Rate of control agent to be applied

Imazapyr - 0.500 to 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Imazamox - 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. Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$TBD

Potential sources of funding

Santee Coastal Reserve 50%

SCDNR 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.

26. 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

Imazapyr, Imazamox, Glyphosate

Area to which control is to be applied

10 acres of Phragmites throughout the ricefields.

Rate of control agent to be applied

Imazapyr - 0.500 to 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre
Imazamox - 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. Label rate of herbicide will be stringently adhered to.

Entity to apply control agent

Commercial applicator

Estimated cost of control operations

$1,500

Potential sources of funding

Santee Coastal Reserve 50%

SCDNR 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.

27. 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	Diquat, Triclopyr, Imazamox, Penoxsulam, ProcellaCOR-SC
Phragmites	Imazapyr, Imazamox

Area to which control is to be applied

100 acres throughout river system where needed.

Rate of control agent to be applied

Diquat - 0.500 gallons per acre.
Triclopyr - 0.500 to 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Imazapyr - 0.500 to 0.750 gallons per acre.
Imazamox - 0.500 to 0.750 gallons per acre.
Penoxsulam - 2 to 6 fluid ounces per acre as foliar application.
ProcellaCOR-SC - 1-5 PDU's per acre foot

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 SCDHEC. 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 50%

SCDNR 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.

28. 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

Imazapyr, Imazamox, 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

Imazapyr - 0.500 to 0.750 gallons pints per acre.
Imazamox - 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%

SCDNR 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 Cooper Lakes

29. Lake Marion
(Calhoun, Clarendon, Orangeburg, Berkeley, and Sumter Counties)

30. 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, Giant salvinia

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.

Control hydrilla growth throughout the main lakes and sub impoundments to minimize its spread within the lakes, help prevent its spread to adjacent public waters, and minimize adverse impacts to native plant populations, electric power generation, agricultural irrigation withdrawals, and public use and access.

Control water hyacinth populations throughout the lakes to enhance boating, fishing, hunting, public access and prevent spread to other areas of the lake to minimize adverse impacts to native plant populations, agricultural irrigation withdrawals, and public use and access.

Control Crested floating heart populations throughout the lakes to enhance boating, fishing, hunting, public access and prevent spread to other areas of the lake to minimize adverse impacts to native plant populations, agricultural irrigation withdrawals, and public use and access.

Control and eradicate Giant salvinia populations throughout the lakes to enhance boating, fishing, hunting, public access and prevent spread to other areas of the lake to minimize adverse impacts to native plant populations, agricultural irrigation withdrawals, and public use and access.

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 sub impoundments.

Selected control method

Problem Species	Control Agents
Hydrilla	Endothall, Fluridone, Copper*, Komeen Crystal, ProcellaCOR-SC, Triploid grass carp

Lyngbya	Copper*, peroxygen compounds
Water hyacinth	Diquat, Triclopyr, Imazamox, 2,4-d, ProcellaCOR-SC
Giant Salvinia	Diquat, Triclopyr, Imazamox, 2,4-d Flumioxazin, Fluridone, ProcellaCOR-SC
Fanwort	Flumioxazin, Fluridone
Coontail, slender naiad, slender pondweed	Endothall, Fluridone, Diquat
Water primrose, alligatorweed, giant cutgrass	Glyphosate, Imazapyr, Triclopyr, Imazamox
Crested floating heart	Endothall, Hydrothol 191, Imazamox / Glyphosate, Triclopyr/2,4-D, Fluridone, ProcellaCOR-SC

* 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 500 acres throughout the system but mostly in the upper lake area above I-95 Bridge.

Hydrilla - 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 2,000 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 500 acres along shoreline areas throughout lake system, as well as within State and Federal wildlife management areas.

Other target species - Approximately 600+ 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, 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

Endothall - 3.0-4.0 ppm (full water column treatment)
Tribune - 0.500 gallons per acre for floating plants; 2 gallons per acre for submersed plants.
Triclopyr - 0.375 to 0.750 gallons per acre for emergent species, per label for submersed plants.
Imazapyr - 0.250 to 0.750 gallons per acre.
Fluridone AS - 10 to 30 ppb.

Copper- up to 1 ppm.
Glyphosate - up to 1.25 gallons per acre.
Fluridone Q, Fluridone PR, Fluridone One - up to 40 ppb (approx 10 pounds/acre).
Imazamox - 0.250 to 1.00 gallons per acre.
Triclopyr/2,4-D – up to 320 pounds per acre.
Komeen Crystal - 0.5-1.0 ppm
ProcellaCOR-SC - 1-5 PDU's per acre foot

Triploid grass carp – The Aquatic Plant Management Council is committed to maintenance stocking of triploid grass carp in the Santee Cooper Lakes to provide long-term control of hydrilla. Although aerial surveying was not possible in 2018, boat surveys indicated hydrilla acreage and distribution similar to 2017. The Aquatic Plant Management Council, with recommendations from SCDNR and Santee Cooper staff, agrees that the adaptive stocking plan should be continued, based on current observations of collected survey data, historical relevant data sets, and triploid grass carp surveys conducted jointly by SCDNR and Santee Cooper staff. The estimated grass carp population in 2019 is 36,217. Recent data supports maintaining a more consistent level of fish by continued stocking of 10,000 sterile grass carp in the Spring of 2019 and to provide baseline stocking at that level for the next 5 years to offset the mortality rate expected during the year and gradually decrease stocked levels to a 1:5 ratio (32,000). Annual data should include estimates of hydrilla acreage, estimates of native vegetation acreage, and fall – based triploid grass carp surveys. Grass carp surveys should function to further assess the relative condition of the population and aid in yearly stocking decisions. All efforts will be made to determine an appropriate balance in the Santee Cooper system by maintaining control of hydrilla while promoting beneficial native vegetation. Herbicide treatments may be utilized to provide temporary control of hydrilla when necessary. Changes to the strategy will be implemented if survey results, regrowth, or habitat loss warrant.

Method of application of control agents

Endothall, Copper, Fluridone, ProcellaCOR-SC , Komeen Crystal – Granular application, subsurface application by airboat or surface application by helicopter.

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

Triclopyr, Glyphosate, Imazapyr, Imazamox, ProcellaCOR-SC - spray on surface of foliage with appropriate surfactant.

Triclopyr/2,4-D – 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 – 10,000, to be released as soon as possible in 2019.

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 10-12 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

$900,000

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 2019 and available funds provided by South Carolina Public Service Authority.

Potential sources of funding

S.C. Public Service Authority 100%

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.

Santee Cooper Area WMA's

31. Hatchery WMA

(Includes Pond1 adjacent to old ramp)

(Berkeley County)

Problem plant species

Crested Floating Heart, Cattails, Hydrilla, Water Primrose

Management objective

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

Selected control method

Crested Floating Heart – Triclopyr, Imazamox, Flumioxazin, ProcellaCOR-SC

Cattails – Imazapyr, Glyphosate, Imazamox

Hydrilla – Fluridone, ProcellaCOR-SC, Triploid Grass Carp (Pond 1)

Water Primrose - Imazapyr, Glyphosate, Triclopyr, Imazamox, ProcellaCOR-SC

Area to which control is to be applied

25 acres (Lake Moultrie), 3 acres (Pond 1)

Rate of control agent to be applied

Triclopyr/2,4-D – 200 lbs per acre.
Imazapyr – 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Imazamox – up to 1 gallon per acre.
Flumioxazin – up to 1 lb per acre foot.
Fluridone – up to 45 ppb
Triploid Grass Carp – up to 15 fish per acre (only in Pond 1)

Method of application of control agent

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

Timing and sequence of control application

Apply when plants are actively growing.

Triploid grass carp, if needed, to be released as soon as possible in 2019 (March-October). RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

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

Other control application specifications

Monitor plant growth prior to treatment.

Entity to apply control agent

Herbicides - Commercial applicator contracted and monitored by SCDNR.

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

Estimated cost of control operations

$3,000

Potential sources of funding

Hatchery WMA 50%

SCDNR 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.

32. Hickory Top WMA (and Greentree Reservoir) (Clarendon County)

Problem plant species

Cutgrass, Cattails, Misc. Woody Species

Management objective

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

Selected control method

Cutgrass, Cattails, Misc. Woody Species – Imazapyr, Glyphosate, Imazamox

Area to which control is to be applied

30 acres

Rate of control agent to be applied

Imazapyr – 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Imazamox – up to 1.000 gallon per acre.

Method of application of control agent

Foliar application using appropriate surfactant from airboat, ATV, or helicopter.

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 SCDNR.

Estimated cost of control operations

$4,000

Potential sources of funding

Hickory Top WMA 50%

SCDNR 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. Potato Creek WMA (Clarendon County)

Problem plant species

Hydrilla, Water Hyacinth, Water Primrose, Bladderwort, Cutgrass, Lotus

Management objective

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

Selected control method

Hydrilla, Bladderwort, Lotus – Fluridone

Water Hyacinth – Triclopyr

Water Primrose, Lotus – Triclopyr, Imazapyr, Glyphosate, Imazamox

Cattails – Imazapyr, Glyphosate, Imazamox

Hydrilla – Triploid Grass Carp

Area to which control is to be applied

140 acres

Rate of control agent to be applied

Fluridone – up to 45 ppb.
Triclopyr - 0.500 – 0.750 gallons per acre.
Imazapyr – 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Imazamox – up to 1.000 gallon per acre.
Triploid Grass Carp – (1428 yearly maintenance stocking to maintain current number)

Method of application of control agent

Foliar application using appropriate surfactant from airboat. Subsurface application 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.

Triploid grass carp, if needed, to be released as soon as possible in 2019 (March-October). RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

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

Entity to apply control agent

Commercial applicator contracted and monitored by SCDNR.

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

Estimated cost of control operations

$15,000

Potential sources of funding

Potato Creek WMA 50%

SCDNR 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

34. Sandy Beach WMA (Berkeley County)

Problem plant species

Crested Floating Heart, Cattails, Cutgrass, Lotus, Water Primrose, Misc. Woody Species, Hydrilla

Management objective

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

Selected control method

Crested Floating Heart – Imazamox, Flumioxazin

Cattails, Cutgrass, Misc. Woody Species – Imazapyr, Glyphosate, Imazamox

Lotus, Water Primrose – Triclopyr, 2,4-d

Hydrilla – Fluridone(ditches within WMA)

Area to which control is to be applied

40 acres

Rate of control agent to be applied

Triclopyr – 0.500 – 0.750 gallons per acre.
Imazapyr – 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Imazamox – up to 1.000 gallon per acre.
Flumioxazin – up to 0.750 lbs per acre.
2,4-d – up to 1.000 gallon per acre.
Fluridone – up to 45 ppb.

Method of application of control agent

Foliar application using appropriate surfactant 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 SCDNR.

Estimated cost of control operations

$6,000

Potential sources of funding

Sandy Beach WMA 50%

SCDNR 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

35. Santee Cooper WMA (Orangeburg County)

Problem plant species

Crested Floating Heart, Cattails, Cutgrass, Lotus, Water Primrose, Misc. Woody Species, Water lily

Management objective

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

Selected control method

Crested Floating Heart, Water lily – Imazamox, Flumioxazin

Cattails, Cutgrass, Misc. Woody Species, Water lily – Imazapyr, Glyphosate, Imazamox

Lotus, Water Primrose – Triclopyr, 2,4-d

Area to which control is to be applied

100 acres on multiple waterbodies based on priority.

Rate of control agent to be applied

Triclopyr – 0.500 – 0.750 gallons per acre.
Imazapyr – 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
Imazamox – up to 1.000 gallon per acre.
Flumioxazin – up to 0.750 lbs per acre.
2,4-d – up to 1.000 gallon per acre.

Method of application of control agent

Foliar application using appropriate surfactant from airboat or helicopter

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 SCDNR.

Estimated cost of control operations

$25,000

Potential sources of funding

Santee Cooper WMA 50%

SCDNR 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.

South Carolina Department of Parks, Recreation and Tourism
State Park Lakes (SCPRT)

36. 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 – triclopyr/2,4-D, ProcellaCOR-SC

Cattails – Imazapyr, Glyphosate

Area to which control is to be applied

10 acres in three lakes

Rate of control agent to be applied

Triclopyr/2,4-D – 200 lbs per acre.
Imazapyr – 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
ProcellaCOR-SC - 1-5 PDU's per acre foot

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

SCPRT 50%

SCDNR 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. 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 – Imazapyr, 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

Triclopyr/2,4-D – 200 lbs per acre.
Imazapyr – 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
ProcellaCOR-SC - 1-5 PDU's per acre foot.

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

SCPRT 50%

SCDNR 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.

38. 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, Flumioxazin, Penoxsulam
Alligatorweed	Triclopyr, Imazapyr, Imazamox, Glyphosate
Pennywort	Triclopyr, Imazapyr, Imazamox, Glyphosate

Area to which control is to be applied

Fluridone, Penoxsulam - 3 acres

Triclopyr, Imazapyr, Imazamox, Glyphosate - 4 acres

Rate of control agents to be applied

Fluridone - 0.125 gallons per acre.
Imazapyr – 0.250 – 0.750 gallons per acre.
Imazamox – 0.500 – 0.750 gallons per acre.
Glyphosate - up to 0.937 gallons per acre.
Renovate - 0.500 to 0.750 gallons per acre.
Flumioxazin – up to 0.09375 gallons per acre
Penoxsulam - 2 to 12 fl oz per acre.

Method of application of control agents

Fluridone, Penoxsulam - Apply subsurface throughout lake

Glyphosate, Flumioxazin, 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

$4,000

Potential sources of funding

SCPRT 50%

SCDNR 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. 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, ProcellaCOR-SC

Floating heart, Spatterdock – Imazapyr, Glyphosate

Area to which control is to be applied

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

Rate of control agent to be applied

Triclopyr/2,4-D – 200 lbs per acre.
Imazapyr – 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
ProcellaCOR-SC - 1-5 PDU's per acre foot

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

SCPRT 50%

SCDNR 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.

40. 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 – 250 fish

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 2019 (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

$4,000

Potential sources of funding

SCPRT 50%

SCDNR 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.

41. 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

2,4-D, Imazapyr, Imazamox, Glyphosate

Area to which control is to be applied

2 acres in lake.

Rate of control agent to be applied

Imazapyr – 0.250 – 0.750 gallons per acre.
Imazamox – 0.500 – 0.750 gallons per acre.

Glyphosate - up to 0.937 gallons per acre.
2,4-D – 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

SCPRT 50%

SCDNR 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.

42. 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, Flumioxazin, Penoxsulam

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.
Flumioxazin – up to 0.09375 gallons per acre
Penoxsulam - 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

SCPRT 50%

SCDNR 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.

43. 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

Imazapyr, Imazamox, Glyphosate

Area to which control is to be applied

10 acres in 3 different lakes.

Rate of control agent to be applied

Imazapyr - 0.500 – 0.750 gallons per acre.

Imazamox - 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

SCPRT 50%

SCDNR 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.

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

Problem plant species

Slender naiad, Misc. species

Management objective

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

Selected control method

Endothall
Triploid Grass Carp

Area to which control is to be applied

4 acres in swimming and paddle boat area, Crawford Lake
Entirety of Lake York

Rate of control agent to be applied

Endothall - Four (4) gallons per acre.
Triploid Carp – 15 fish per vegetated acre.

Method of application of control agent

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

Timing and sequence of control application

Apply in May or June when naiad growth is initiated.
Triploid grass carp to be released as soon as possible in the spring of 2019 (March-May). RESULTS FROM GRASS CARP MAY NOT BE EVIDENT FOR TWO OR MORE YEARS.

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

$2,000

Potential sources of funding

SCPRT 50%

SCDNR 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.

45. 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

Triclopyr/2,4-D, ProcellaCOR-SC

Area to which control is to be applied

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

Rate of control agent to be applied

Triclopyr/2,4-D - 200 lbs per acre.
ProcellaCOR-SC - 1-5 PDU's per acre foot

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

SCPRT 50%

SCDNR 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. 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, Imazamox, Glyphosate, Imazapyr, ProcellaCOR-SC

Area to which control is to be applied

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

Rate of control agent to be applied

Triclopyr/2,4-D - 200 lbs per acre.
Imazamox – 0.500 – 0.750 gallons per acre.
Imazapyr - 0.500 – 0.750 gallons per acre.
Glyphosate – up to 0.937 gallons per acre.
ProcellaCOR-SC - 1-5 PDU's per acre foot

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

SCPRT 50%

SCDNR 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. 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

2,4-D, Renovate Max G, ProcellaCOR-SC

Area to which control is to be applied

5 acres in lake.

Rate of control agent to be applied

2,4-D - Up to 5 gallons per acre.
Triclopyr/2,4-D – 200 lbs per acre.
ProcellaCOR-SC - 1-5 PDU's per acre foot

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

SCPRT 50%

SCDNR 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.

48. 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, Imazamox, Glyphosate, Imazapyr

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

Triclopyr/2,4-D - 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 2019 (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

SCPRT 50%

SCDNR 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.

49. 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

Imazapyr, Glyphosate, Imazamox, 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

Imazamox - Up to 1 gallon per acre.
Imazapyr - Up to 0.750 gallons per acre.

Glyphosate - Up to 0.750 gallons per acre.
Triclopyr/2,4-D – 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

SCPRT 50%

SCDNR 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.

50. Sesquicentennial State Park (Richland County)

Problem plant species

Waterlily, Watershield, Fanwort

Management objective

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

Selected control method

2,4-D, 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

2,4-D - Up to 5 gallons per acre.
Triclopyr/2,4-D – 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

SCPRT 50%

SCDNR 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.

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.

51. 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

Triclopyr

Area to which control is to be applied

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

Rate of control agent to be applied

Triclopyr - 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

SCDNR (WFF division) 100%

SCDNR 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. 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	Triclopyr
Pondweed	Komeen/Diquat
Hydrilla	Triploid Grass Carp, Komeen/Diquat

Rate of control agent to be applied

Triclopyr - 0.500 - 0 gallons per acre.

Komeen/Diquat - 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

SCDNR (WFF division) 100%

SCDNR 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. 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

Triclopyr, Glyphosate

Area to which control is to be applied

10 acres in lake.

Rate of control agent to be applied

Triclopyr - 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

SCDNR (WFF division) 100%

SCDNR 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. 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

Triclopyr, Glyphosate

Area to which control is to be applied

5 acres in lake.

Rate of control agent to be applied

Triclopyr - 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

SCDNR (WFF division) 100%

SCDNR 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. 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

Triclopyr, Glyphosate

Area to which control is to be applied

8 acres in lake.

Rate of control agent to be applied

Triclopyr - 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

SCDNR (WFF division) 100%

SCDNR 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. 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

SCDNR (WFF division) 100%

SCDNR 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 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

SCDNR (WFF division) 100%

SCDNR 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. 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

Imazapyr, Glyphosate

Area to which control is to be applied

60 acres in lake.

Rate of control agent to be applied

Imazapyr - 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

SCDNR (WFF division) 100%

SCDNR 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.

59. 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, Imazapyr, 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.

Imazapyr - 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

SCDNR (WFF division) 100%

SCDNR 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.

60. 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, 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.

Copper - up to 1 ppm Glyphosate- up to 1 gallon per acre.

Method of application of control agents

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

SCDNR (WFF division) 100%

SCDNR 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.

61. 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

SCDNR (WFF division) 100%

SCDNR 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.

62. 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 2019. 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 2019. 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 2019 (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 Energy

Drawdown Duke Energy

Potential sources of funding

Duke Energy 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.

63. 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 affect 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.

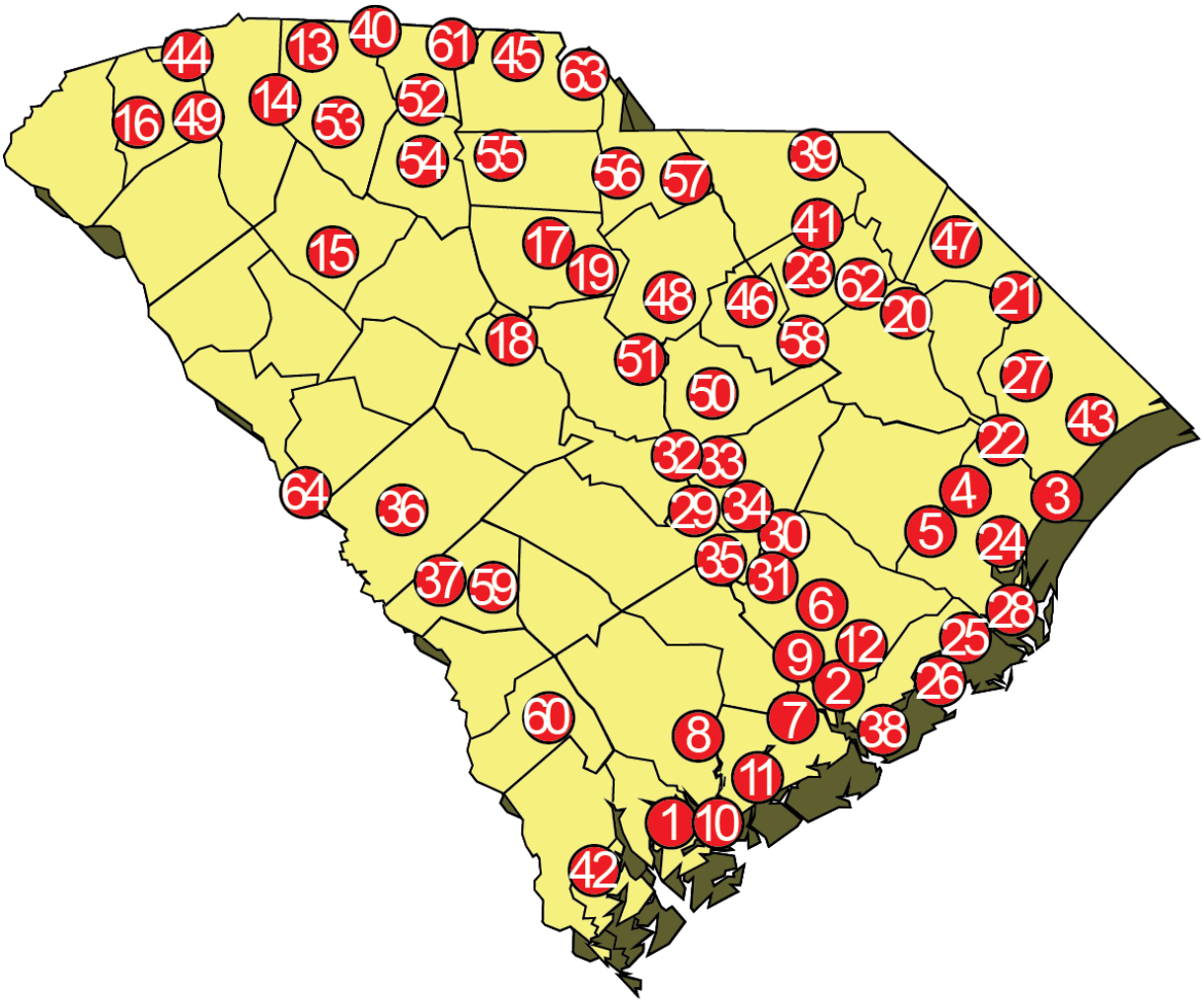
Summary of Proposed Management Operation Expenditures for 2019-2020

	Water Body Name	Total Cost	Local	State	Federal	Local Sponsor
1	Ashepoo	$25,000	$12,500	$12,500	$0	Colleton County
2	Back River Reservoir	$45,000	$22,500	$22,500	$0	Dominion Energy, CPW
3	Baruch	$5,000	$2,500	$2,500	$0	Baruch
4	Black Mingo Creek	$1,000	$500	$500	$0	Nature Conservancy
5	Black River	$3,250	$1,625	$1,625	$0	Nature Conservancy
6	Bonneau Ferry WMA	$5,750	$2,875	$2,875	$0	SCDNR
7	Charleston Co. Parks	$1,000	$500	$500	$0	Charleston Parks
8	Combahee River	$700	$350	$350	$0	Colleton Co.
9	Cooper River	$34,000	$17,000	$17,000	$0	Berkeley Co.
10	Donnelley/ACE Basin	$10,000	$2,500	$5,000	$2,500	SCDNR, USF&W
11	Dungannon WMA	$2,000	$1,000	$1,000	$0	SCDNR, USF&W
12	Goose Creek Reservoir	$34,500	$17,250	$17,250	$0	CPW
13	Lake Bowen	$30,000	$15,000	$15,000	$0	Spartanburg CPW
14	Lake Cunningham	$1,500	$750	$750	$0	Greer CPW
15	Lake Greenwood	$10,000	$5,000	$5,000	$0	Greenwood Co.
16	Lake Keowee	$3,600	$1,800	$1,800	$0	Duke Energy
17	Lake Monticello(Rec. Lake)	$250	$250	$0	$0	Dominion Energy
18	Lake Murray	$28,000	$14,000	$14,000	$0	SCE&G, Lex. Co.
19	Lake Wateree	$0	$0	$0	$0	Duke Energy
20	Little Pee Dee River	$1,500	$750	$750	$0	Horry Co.
21	Lumber River	$500	$250	$250	$0	Horry Co.
22	Pee Dee River	$3,500	$1,750	$1,750	$0	Georgetown Co.
23	Prestwood Lake	$4,000	$2,000	$2,000	$0	City of Hartsville
24	Samworth WMA	$5,000	$2,500	$2,500	$0	SCDNR
25	Santee Coastal Reserve	TBD	TBD	TBD	$0	SCDNR
26	Santee Delta WMA	$1,500	$750	$750	$0	SCDNR
27	Waccamaw River	$4,000	$2,000	$2,000	$0	USF&W/Horry Co.
28	Yawkey Wildlife Center	$3,850	$1,925	$1,925	$0	SCDNR
	Santee Cooper Lakes					
29	Lake Marion	$600,000	$600,000	$0	$0	Santee Cooper
30	Lake Moultrie	$300,000	$300,000	$0	$0	Santee Cooper
	Santee Cooper Area WMA's					
31	Hatchery WMA	$3,000	$1,500	$1,500	$0	SCDNR
32	Hickory Top WMA	$4,000	$2,000	$2,000	$0	SCDNR
33	Potato Creek WMA	$15,000	$7,500	$7,500	$0	SCDNR
34	Sandy Beach WMA	$6,000	$3,000	$3,000	$0	SCDNR
35	Santee Cooper WMA	$25,000	$12,500	$12,500	$0	SCDNR
	State Parks					

36	Aiken State Park	$6,000	$3,000	$3,000	$0	SCPRT
37	Barnwell SP	$6,000	$3,000	$3,000	$0	SCPRT
38	Charlestown Landing SP	$4,000	$2,000	$2,000	$0	SCPRT
39	Cheraw SP	$6,000	$3,000	$3,000	$0	SCPRT
40	Croft SP	$4,000	$2,000	$2,000	$0	SCPRT
41	H Cooper Black SP	$375	$188	$188	$0	SCPRT
42	Hunting Island SP	$1,200	$600	$600	$0	SCPRT
43	Huntington Beach SP	$1,100	$550	$550	$0	SCPRT
44	Kings Mountain SP	$1,050	$525	$525	$0	SCPRT
45	Lee SP	$1,810	$905	$905	$0	SCPRT
46	Little Pee Dee SP	$3,000	$1,500	$1,500	$0	SCPRT
47	NR Goodale	$3,000	$1,500	$1,500	$0	SCPRT
48	Paris Mountain SP	$1,500	$750	$750	$0	SCPRT
49	Poinsett SP	$1,500	$750	$750	$0	SCPRT
50	Sesquicentennial SP	$3,000	$1,500	$1,500	$0	SCPRT
*	51-60 done entirely by SCDNR State Lakes Program, budget not provided					
	61-62 are border lakes with either Federal or other State jurisdictions, budget not provided					
	SCDNR Total	$264,400	$129,825	$132,075	$2,500	
	State Park Lake Total	$43,775	$21,888	$21,888	$0	
	Santee Cooper Total	$900,000	$900,000	$0	$0	
	SCDNR/State Parks Total	**$308,175**	**$151,713**	**$153,963**	**$2,500**	
	Grand Total	**$1,208,175**	**$1,051,713**	**$153,963**	**$2,500**	

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 2018 (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.

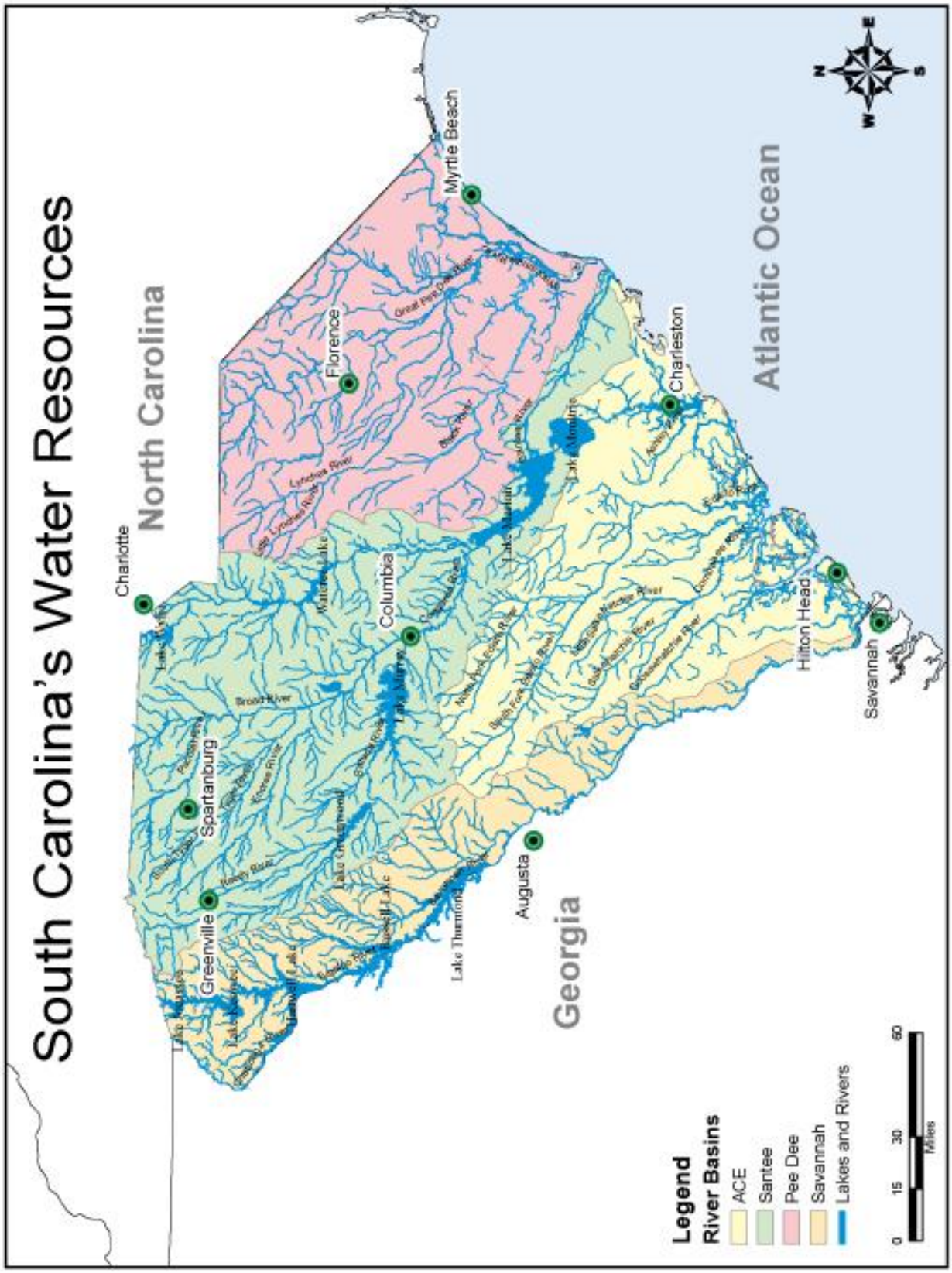
Location of 2019 Management Sites



Appendices

APPENDIX A

Major River Basins in South Carolina


South Carolina's Water Resources
North Carolina
Georgia
Atlantic Ocean
Charlotte
Spartanburg
Greenville
Columbia
Florence
Myrtle Beach
Charleston
Augusta
Savannah
Hilton Head
Lake Wateree
Lake Marion
Lake Moultrie
Lake Thurmond
Lake Murray
Lake Greenwood
Lake Keowee
Lake Hartwell
Lake Russell
Brood River
Lynches River
Great Pee Dee River
Black River
Santee River
Edisto River
Combahee River
Ashepoo River
Saluda River
Broad River
Catawba River
Congaree River
Wateree River
Lake Marion
Lake Moultrie
Lake Thurmond
Legend
River Basins
ACE
Santee
Pee Dee
Savannah
Lakes and Rivers
0
15
30
60
Miles

APPENDIX B

Additional Documentation for NPDES General Permit

NPDES Required Information Details

Aquatic Nuisance Species Program Emergency Numbers

SCDNR Main Street Office 803-734-4036	Chemical Spill/Fish Kill Emergency Number (SCDHEC) 888-481-0125	Clemson Department of Pesticide Regulation 864-646-2150
SCDNR Emergency Number 800-922-5431	SCDHEC Statewide Fish Kill Coordinator - Jim Rice 803-896-4114(O) 803-960-0539(C)	Poison Control Hotline 800-222-1222
Radio Room – Law Enforcement 803-955-4000		National Response Center 800-424-8802
Chris Page SCDNR Program Manager ANS Program 2730 Fish Hatchery Road West Columbia, SC 29172 803-755-2836 Voice 803-600-7541 Cell	Julie Holling SCDNR Field Supervisor ANS Program 2730 Fish Hatchery Road West Columbia, SC 29172 803-755-2872 Voice 803-528-4720 Cell	John Crabb President Estate Management Services 305 Indigo Drive Brunswick, GA 31525 Toll-Free: 888-307-6637 Phone: 912-466-9800

DNR Region	Counties	Freshwater Fisheries Fish Kills	Wildlife Problems	Law Enforcement	Marine Resources
Region I (Clemson) 311 Natural Resources Drive Clemson, SC 29631 (864) 654-1671	Oconee, Pickens, Greenville, Spartanburg, Anderson, Laurens, Abbeville, Greenwood, Union, Cherokee, McCormick, and Edgefield	Dan Rankin 864-654-1671 Ext. 12 864-982-2175 (Cell)	Pat Cloninger 864-986-6248 864-506-5402 (Cell)	CPT Mike Isaacs 864-654-8266 Ext 18 864-982-1702 (Cell)	Saltwater Fish Kills Only
Region II (Florence) 295 S. Evander Drive Florence, SC 29506 (843) 661-4766	York, Chester, Fairfield, Lancaster, Kershaw, Lee, Chesterfield, Marlboro, Darlington, Dillon, Florence, Marion, Williamsburg	Robert Stroud 843-661-4767 803-609-7018 (Cell)	Sam Stokes 843-661-4768 843-870-3771 (Cell)	CPT Matt McCaskill 864-661-4766 843-616-3777 (Cell)	Saltwater Fish Kills Only
Region III (Columbia) PO Box 167 1000 Assembly St. Columbia, SC 29202 (803) 734-4303	Newberry, Saluda, Aiken, Lexington, Richland, Calhoun, Orangeburg, Barnwell, Allendale, Bamberg, Sumter, Clarendon	Jason Bettinger 803-955-0462 803-904-6710 (Cell)	Willie Simmons 803-734-3898 803-609-7010 (Cell)	CPT Ken Simmons 803-755-1825 803-609-6924 (Cell)	Saltwater Fish Kills Only
Region IV (Charleston) PO Box 12559 217 Ft. Johnson Rd. Charleston, SC 29412 (843) 953-9307	Horry, Hampton, Georgetown, Berkeley, Charleston, Dorchester, Colleton, Jasper, Beaufort	Chad Holbrook 843-749-1359 843-870-5807 (Cell)	Alicia Farrell 843-953-5291 843-729-1955 (Cell)	CPT Henry Stackhouse 843-953-9307 843-870-5629 (Cell)	Mike Denson 843-953-9819 843-214-8178 (Cell)

1) Pest Management Area Description

(See AQUATIC PLANT MANAGEMENT STRATEGY section for Specific Water body.)

Control Measure Description

(See AQUATIC PLANT MANAGEMENT STRATEGY section for Specific Water body.)

Schedules and Procedures

(See AQUATIC PLANT MANAGEMENT STRATEGY section for Specific Water body.)

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.

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.

The following information will be provided following the discovery and initial telephonic reporting of the spill:	
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: _____ _____ _____
12.	_____ ***Please provide lat/long and attach detailed map of spill area if possible**.

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

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.

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.

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.

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 Arc Info 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.

Qualifications

a. The Contractor must have a minimum of five years of professional experience around 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 erythrophtalmu*-Linneaus); 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 permitee'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 non-sterile 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.

South Carolina Code of Regulations
Chapter 27 Clemson University (Statutory Authority: 1976 Code §§ 46–9–40; 46–13–30; 46–13–55)
ARTICLE 10
DESIGNATION OF PLANT PESTS
27–135. Designation of Plant Pests.

1. The Commission hereby delegates to the Director the authority to determine and implement appropriate measures to eradicate, control, or slow the spread of plant pests in South Carolina. This authority extends to a decision that a plant pest has become so widespread that the initiation or continuation of control measures would be ineffective.

2. An advisory committee made up of at least 5 members will meet at least annually to review and make recommendations on the official listing of plant pests in SC. The committee members will be: The State Plant Regulatory Official for South Carolina (or designee), the USDA State Plant Health Director for South Carolina (or designee), a Clemson University Cooperative Extension Service Representative, and at least 2 at large representatives from other stakeholder agencies, such as the SC Department of Natural Resources, the SC Forestry Commission, or the SC Department of Agriculture. At large members shall be nominated and voted on by the advisory committee at its annual meeting. Additional at large members may be nominated and voted in at the annual advisory committee meeting. At large members from stakeholder agencies shall each serve a three-year term.

3. The official listing of plant pests in SC shall be maintained and made publicly available on Clemson's website located at: www.clemson.edu/invasives .

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 - (AquaStrike, Aquathol, Aquathol K, Aquathol Super K granular, Hydrothol 191granular 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 7gallons 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.

Aquastrike

Aquastrike costs approximately $73 per gallon.

Use Considerations - AquaStrike is a convenient combination of Aquathol K and Diquat. AquaStrike is designed and formulated for fast and effective control of many submersed nuisance and exotic aquatic plants, especially spike rush when used with a Flumioxazin product.

Water Use Restrictions – Do not use water treated with Aquastrike for irrigation to food crops or ornamentals for 7 days. Do not treat within 600 feet of a potable water intake. There are no fishing or swimming restrictions.

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, Schooner)

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 H*erbicide 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

L. Florpyrauxifen-benzyl (ProcellaCOR-SC)

Target Plants

Submersed/emergent species – Hydrilla, Egeria, Watermilfoil, Eurasian watermilfoil, Lotus, Alligatorweed, Water primrose, Watershield, Crested floating heart, Parrotfeather, Water pennywort

Floating species – Floating species – Water hyacinth, Frog's bit, Mosquito fern

Submerged species - 1-5 PDU's per acre foot to achieve effective control based on density and species.

Floating species – 1-2 PDU's per acre as foliar application.

Cost –ProcellaCOR-SC costs approximately$3800 per gallon. The application rate is conveniently provided in PDU's directly from a built-in measurement device. 1 PDU equals approximately 1.35 ounces of product. Application rates for foliar are 1-2 PDU's per acre and for submersed from 1-5 PDU's per average acre foot. Assuming an application rate of 4 PDU per acre foot at a dept of 4 feet (4 PDU X 4 ac/ft=16 PDU's) and an application cost of $41 per acre, total cost would be $681 per acre for submersed plants. Assuming an application rate of 1 PDU acre, and an application cost of $41 per acre, total cost would be $81 per acre for emergent plants.

Use considerations – ProcellaCOR-SC has no potable water restrictions or irrigation restrictions except for irrigation of food crops and some landscape plants.

Water Use Restrictions - Food crop irrigation waters cannot be used if ProcellaCOR-SC concentrations are above 1 ppb

NOTE: This unique formula requires 40x-100x less active ingredient and achieves significantly longer control. With a *Reduced Risk* classification from the EPA, it is designed to reduce risk *To Our Health, Nontarget Plants, And Our Water Supply*

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 SCDNR 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 SCDNR.

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 SCDHEC, and through the wastewater discharge permitting program (NPDES) also administered by the SCDHEC.

APPENDIX F

SCDNR 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/water-fowl 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. Singletary, III

Date: 2/3/2010

SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES

By: John E. Frampton

Date: 2-22-10

- NOTE: The agreement is currently being reviewed by SCDNR and Santee Cooper for revision based on a 5-year cycle.

APPENDIX G

Summary of SCDNR ANS-Program Aquatic Plant Control Expenditures –

SUMMARY OF AQUATIC PLANT CONTROL – (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 are 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 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 2012 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.

2014 had new water hyacinth problems on the Black River. Grass carp seem to be holding hydrilla on the Santee Cooper system to low numbers and maintenance on the Lake Murray system appears to be right on target. Crested Floating Heart continues to expand on the Santee Cooper Lakes.

The year of 2015 will be remembered as the year of the “1000 year” flood as much of South Carolina was covered with flood water for an extended period in the last 2months of the year. The impact of the flooding on aquatic invasive species management is yet to be determined as the water, although not extreme flooding, has remained high throughout the colder months. A big push was again started by SCDNR and the USF&W to control Phragmites in coastal reserves with treatment of over 1800 acres with a cost of close to $250,000.00. SCDNR application totals the year: 3845 acres at a cost of $643,023.00.

2016 was very similar to 2015 with tremendous amounts of water flushing through the South Carolina’s rivers. Another factor involved was the climate. Little or no “cold” weather was present to slow the growth of the states nuisance plant populations and treatment was continued into the winter months. 2016 saw 3656 acres of treatment at a total cost of $619,583.06.

Hydrilla control on the Santee Cooper Lakes seemed to stay at a balancing point in 2017. The Council committed to a maintenance stocking plan of 10,000 triploid grass carp with yearly monitoring for carp health. This is the first year of a five-year plan which may prevent large scale (100,000 plus) stocking of carp in the future. In all, SCDNR treated 4446 acres at a cost of $599,117.

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 2018 South Carolina Aquatic Plant Management Plan

Comments and Revisions:

I live on the Lake and I agree with the plan.
Thanks,
Key Thrasher
1037 Coffey Street
Manning, SC 29102
ktinc1@earthlink.net

I am in full support of the 2018 DRAFT S.C. Aquatic Plant Management Plan and request that the plan be implemented as outlined in the DRAFT proposal. I am a resident of Clarendon County residing on Lake Marion. I have seen the problems caused in the past by invasive weed,s in particular hydrilla.

Respectfully,
Eddie V. Gleaton, Jr.
1043 Autumn Lane
Summerton, SC 29148
egleaton@yahoo.com

I live on the shore line of Lake Marion and I support the 2018 plan...
Sherry Newsome
ssleepytimegal@gmail.com

I live on the shoreline of Lake Marion. I attended the Council meeting at Santee State Park and heard all the discussion. I do wish to express my support for the 2018 plan. I think control of Hydrillia, CFH and our newest invasive specie, Giant Salvinia is critical to the health and enjoyment of Lake Marion.
Debra Gleaton
Goat Island Boat Club
debgleaton@gmail.com

I am writing in support for the 2018-2019 Aquatic Plant Management Plan for the Santee Cooper Lake system. Thank you for all you do to protect our property and waterways.
Best Wishes,
Jerry Hatcher
Lake Marion resident & Goat Island Boat Club member.
jhatch8@sc.rr.com

Sirs:
I read with great hope the draft plan for the Santee Cooper Lakes. I have noticed an increase in floating crested heart in my area and am in favor of increased treatment in the area. I think the continued introduction of sterile grass carp will also go a long way to try and alleviate the hydrilla problem. Please continue your attempts to rid the lakes of these noxious weeds.
Sincerely,
A Mark Knechtel
amknechtel1@hotmail.com

I can't say how important it is to control the invasive weeds in our lakes.... they choke the Marine life out.. I. Live on Lake Marion and I enjoy boating , the invasive weeds can make it difficult to do that.The invasive weeds can choke out the good weeds...So please do what you can to eliminate these awful plants.
Thank you, Betty Cozart
bettylou247@gmail.com

Hello Chris,
Is DNR concerned about the water hyacinth on the Ashepoo ? If so what is the management plan ?
Thanks
Joe
gojoewthomas@gmail.com

Good Day Chris,
If possible can more be accomplished on the state level concerning Ballast Water release.
Perhaps an education outreach in Conjunction with the US Coast Guard, or an article or two in the SCDNR Wildlife Magazine.
If I can assist in any way please contact me.
Thank You
Glenn Stafford
15 Tippecanoe Street
Simpsonville SC 29680
864-320-6100
sloopchannel@gmail.com

Response:

The plan has few changes from 2017. The plan for the Santee Cooper Lakes provide continuity to an overall adaptive maintenance plan with a consistent stocking of triploid carp to provide diversity in the age class of the fish as well as getting to a targeted range of triploid carp in the system. Annual data should include estimates of hydrilla acreage, estimates of native vegetation acreage, and fall – based triploid grass carp surveys. Grass carp surveys should function to further assess the relative condition of the population and aid in yearly stocking decisions which can change based on information noted above. While we are committed to providing distinct age class fish through stocking for upcoming years, all efforts will be made to determine an appropriate balance in the Santee Cooper system by maintaining control of hydrilla while promoting beneficial native vegetation.

Plan Modifications:

No modifications

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Office of Human Resources,

P.O. Box 167, Columbia, SC 2920

Revised: 2/27/2019