

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



**OFFICE OF FISHERIES
INLAND FISHERIES SECTION**

2021 AQUATIC VEGETATION CONTROL PLAN

**CLEAR-SMITHPORT LAKE
DESOTO PARISH**

Waterbody Information

1. Waterbody type – Impounded swamp created by inundation of two natural lakes, Clear Lake and Smithport Lake.
2. Age and condition of control structure– Smithport Lake Dam was constructed by the Louisiana Department of Wildlife & Fisheries (LDWF) in January of 1948 at elevation 128 MSL. Louisiana Department of Transportation and Development (LDOTD) archives show that several repairs and modifications have been made to the structure since that time.
 - a. In May of 1953, a 100-foot “notch” in the original spillway was closed, raising the pool level from 128.6 MSL to 131.6 MSL.
 - b. January, 1954-unspecified repairs to dam, \$594.
 - c. December, 1956- unspecified repairs to dam, \$500.
 - d. August, 1959-unspecified repairs to dam, \$11,833.
 - e. July, 1968-original timber stop logs were replaced by shop fabricated steel sluice gates.
 - f. May, 1974-Repairs and improvements to dam and spillway including clearing and grubbing, clearing and chemical treatment, seeding and fertilizing, vegetative mulch, fencing w/ gate and gravel surfacing of road, \$13,000.
 - g. October, 1976-Improved outfall channel of Smithport Lake to Bayou Pierre. This improvement allowed for the discharge of water equivalent to the drawdown rate of 4 inches per day as recommended by Louisiana Wildlife and Fisheries Commission, \$120,000.

The condition of Smithport Lake Dam and the spillway is poor. Trees and other vegetation were present on the earthen dam in early 2012, but have since been cleared. The sluice gates are inoperable. The structure offers no drawdown capability at this time. Sluice gates are currently leaking. Logjams and debris are present on both the upstream and downstream sides of the structure.

In July 2014, some minor repairs to the sluice gates by LDOTD and LDWF personnel allowed the gates to operate. The east gate required no repair. The two middle gates were reconnected to the lift stems. The west gate has a gear problem in the west side paired gearbox. In March 2016, historic area-wide flooding created a backflow of water upstream from Bayou Pierre and over the Clear-Smithport Lake Dam. Following the first of a series of three yearly drawdowns in 2016 for vegetation management, severe erosion was found along both the upstream and downstream sides of the spillway. A photograph of the spillway during the drawdown and after the March 2016 floods appears in Figure 1. During the summer of 2016, LDOTD cleared all woody debris and vegetation along the earthen embankment and road leading to the structure, and then placed a gate at its entrance. As of December 26, 2018, only the eastern gearbox and lift is able to lift or close the eastern most

sluice gate. At that time, sluice gate #3 was still open and unable to close as LDOTD worked to have it repaired and closed following the scheduled December 3, 2018 closure date.

Sluice gate #3 remained open through August 2019 and was eventually closed that month following debris removal by LDOTD and LDWF crews. Sluice gate #4 was re-opened to keep lake level to a minimum until the DPPJ completed an extension and dredge work to the Hwy 509 public ramp. Additional clearing, grubbing and temporary spillway repairs were made by LDOTD in December 2019. Sluice gate #4 was then closed on December 13, 2019.



Figure 1. Clear-Smithport Lake Spillway showing severe erosion along face of the spillway following the 2016 floods.

3. Type of control structure –Smithport Lake Dam is an 1,800-foot earthen embankment with a 28-foot wide crown. The dam includes a 600-foot wide spillway made of wooden sheet piles with horizontal wooden crest boards. A photograph of the Smithport Lake Dam control structure appears in Figure 2.



Figure 2 Smithport Lake Dam control structure

4. Water level range - At pool stage -131.6 MSL; High-142 MSL; Low-127.6 MSL.
5. Surface area range – Pool- 3,028 acres.
6. Average depth at pool stage is 4.0 feet.
7. Watershed ratio – 43:1.
8. Drawdown potential of structure – four feet maximum potential at a rate of four inches per day.

On July 1, 2014, a drawdown was initiated with an opening of the east sluice gate. The other three sluice gates were opened on July 9th. Both LDOTD and LDWF were present during the second opening, which required re-connecting the lift stems to both middle gates and using a chain hoist to help the west gate. The west gate is in need of repair to the gears in the gearbox. The primary goal of the drawdown was aquatic vegetation control. A secondary goal was inspection of the spillway and sluice gates by LDOTD for future repair. The gates were closed on November 25, 2014. The Bayou Pierre Game and Fish Commission requested this drawdown. The most recent drawdown was conducted with the use of only two sluice gates from July 21, 2017 to December 4, 2017 for vegetation management. Both of the gears and gearboxes on the west side of the structure were unable to lift the attached sluice gates. The target drawdown level of 127.6 MSL was reached within four weeks, but not as quickly as it could have been with only two of the four sluice gates being operational. This limited the ability to quickly strand vegetation along the shorelines.

The most recent drawdown was initiated by both the BPG&F Commission and LDWF on July 1, 2020 with a closure date of December 1, 2020. This drawdown was conducted with

the use of only the eastern most sluice gate. All other gearboxes, stems and gate slides were inoperable. Desired lake level was achieved, although within a much smaller window and timeframe. Water level fluctuation during this drawdown also increased with only one gate open, therefore reducing the effectiveness of receding water levels to strand floating vegetation. With one gate open, results were considered moderate, and much of Clear Lake remained open throughout the drawdown. Smithport Lake was inaccessible by spray vessel during the drawdown, and giant salvinia (*Salvinia molesta*) did increase in this portion of the lake between August and November. Much of that material was flushed from the lake following the drawdown closure in December 2020.

9. Waterbody Board or Lake Commission – Clear-Smithport Lake was originally governed by the Bayou Pierre State Game and Fish Commission created by Act 139 of 1934. Section 610 of the Louisiana Revised Statutes Title 36 (R.S. 36:610) abolished the Bayou Pierre State Game and Fish Commission and transferred their powers, duties, functions and responsibilities to the secretary of the Department of Wildlife and Fisheries. R.S. 36:610 also provides that any parish or parishes by formal resolution of the governing authority of each parish affected, pursuant to R.S. 56:721 may appoint a game and fish commission which may exercise those powers, duties and functions provided in R.S. 56:721 in relation to the game and fish preserves for which commissions are abolished by R.S. 36:610.

DeSoto Parish Police Jury meeting minutes show that recent members of the Bayou Pierre Game and Fish Commission (BPGFC) were appointed on August 10, 2009. Members of BPGFC are appointed by the DeSoto Parish Police Jury and serve until they resign or are removed. Current members of BPGFC are given as President James Lindsey, Vice President Bubba Woods, , Jacque Dodd, Johnny Pearce and Ricky Weeks.

- a. Primary contact information – The Bayou Pierre Game & Fish Commission can be contacted through the DeSoto Parish Police Jury, P.O. Box 898, Mansfield, LA 71052, (318)-872-0738.
- b. Procedure for spillway openings – The board considers drawdown recommendations from the Louisiana Department of Wildlife and Fisheries or other entities. The board presents a resolution in favor of a drawdown to the Secretary of LDWF. Upon approval by the Secretary, the request is forwarded to LADOTD with specifics of gate operation, including dates for gate opening and closing and the target drawdown level.

What significant stakeholders use the lake?

User groups include shoreline property owners, boaters, anglers, waterfowl hunters, the Bayou Pierre Game and Fish Preserve Commission, natural gas companies in the Haynesville Shale area and the DeSoto Parish Police Jury.

What are their needs and concerns?

The shoreline property owners, boaters, anglers and the lake commission are concerned with maintaining low vegetative coverage. Waterfowl hunters are concerned with adequate water levels to allow successful hunting. The police jury is concerned with adequate water levels to allow water sales.

What is the history of aquatic vegetation complaints?

Vegetation complaints at Clear-Smithport Lake have been chronic in nature for over 40 years. In years past, most complaints were related to water hyacinth (*Pontederia crassipes*), duckweed (*Lemna sp.*), American lotus (*Nelumbo lutea*), water pennywort (*Hydrocotyle spp.*), and a variety of submersed aquatic vegetation including hydrilla (*Hydrilla verticillata*), fanwort (*Cabomba caroliniana*), coontail (*Ceratophyllum demersum*) and bladderwort (*Utricularia spp.*). More recently, giant salvinia has generated the majority of vegetation complaints at Clear-Smithport Lake. In the last several years, severe infestations of Cuban bulrush (*Oxycaryum cubense*) growing on top of giant salvinia have restricted boat traffic. Floating mats of decaying detritus can be found throughout the year and are particularly problematic in May and June.

Have there been any controversial issues on the lake?

Some unauthorized gate closures have occurred during past drawdowns. The closures involved unknown persons. DOTD reopened the gates after clearing debris from the structure. An unauthorized gate closure negatively impacted the 2001 drawdown by reducing the exposure time required for reduction of bottom sediments and vegetative coverage. DOTD installed a gate with a lock on the west end of the spillway in 2017 to decrease damage, trash dumping, and unauthorized gate closure or opening.

On several occasions, questions have arisen regarding ownership of the lake bottom. Past recommendations by LDWF have included clearing timber from the lake. These recommendations have not been implemented. Private individuals own much of the lake bottom and the associated timber.

Ownership of the water within Clear-Smithport Lake has become relevant in recent years due to interest in water sales marketed to natural gas drilling companies. Local residents and local governing bodies have interest in such sales. The water within the lake is state property.

Some controversy has always existed regarding funding for maintenance of this lake and its control structure. Clear-Smithport Lake would benefit greatly from renovation of the lakebed and repair of the control structure. The Bayou Pierre Game and Fish Commission along with the DeSoto Parish Police Jury, shoreline property owners, anglers and hunters have been involved with this issue for many years. To date, no resolution to the problem has been found.

Aquatic Vegetation Status:

Large expanses of giant salvinia limited access almost completely throughout much of 2017 until the drawdown in July restricted the plant growth to only open areas away from the shoreline. The non-forested area along the 509 bridge continued to hold 75-90% coverage through December 4, 2017. A series of colder than average temperatures began impacting salvinia coverage late in 2017, and coverage began to decrease 40-50% throughout Clear-Smithport Lake.

Well below average temperatures continued in January 2018, which decreased vegetation

coverage throughout the spring and early summer. Giant salvinia, water hyacinth and water pennywort coverage rates increased through the summer until an annual drawdown slowed growth along Clear-Smithport shorelines. Vegetation growth did continue in the open and deeper areas of Clear Lake as vessel access and treatments ceased.

With gate #3 remaining open through most of 2019, water fluctuations varied from normal pool levels to slightly below pool until July as precipitation decreased. Open areas of both Clear Lake and Smithport Lake retained only moderate coverage with good access until late July. Access remained poor most of the year above the 509 Bridge and south of the Evans Loop area where giant salvinia, water hyacinth and floating detritus remained intact within shallower areas with dense cypress trees and other woody growth.

On September 17, 2020, the total infestation of the major problem plant species at Clear-Smithport Lake was estimated to be as listed below:

Giant salvinia – 400 acres

Cuban bulrush – 300 acres

Water hyacinth – 50 acres

Water pennywort – 50 acres

Total vegetation coverage = 800 acres or 26.4%

At the time of survey, the lake level was 4.0 feet below pool.

Limitations:

- Watershed ratio of 43:1 limits the use of whole-waterbody herbicide treatments
- Dense coverage of bald cypress (*Taxodium distichum*) and water tupelo trees (*Nyssa aquatica*) (>75%) restricts boat-based foliar applications.
- Shallow water requires the use of surface drive boats to gain access to problem areas.
- Limited regulatory factors exist which would limit LDWF's vegetation control efforts at Clear-Smithport Lake. The BPGFPC and shoreline property owners are cooperative with LDWF in its efforts on this waterbody. However, DeSoto Parish is located within the Louisiana Department of Agriculture and Forestry's (LDAF) 2,4-D waiver area. A waiver is needed to apply 2,4-D between March 15 and September 15 of each year.
- Shoreline development is present in the form of residences and camps on less than 10% of the lake shoreline.
- The water control structure is severely eroded and gates are in need of repair, limiting a rapid drawdown needed to strand vegetation efficiently.

Past Control Measures

Chemical Control:

Details regarding herbicide treatments are provided in Table 2.

Table 2. Herbicide applications at Clear Smithport Lake, LA 2006 – 2020

Year	Acres Treated	Vegetation
2006	179	Alligator weed (<i>Alternanthera philoxeroides</i>) , Water primrose (<i>Ludwigia spp.</i>), Water hyacinth, Giant salvinia
2007	0	
2008	483	Alligator weed, Giant salvinia, Water pennywort, Water hyacinth
2009	1,974	Alligator weed, Giant salvinia, Water pennywort, Water hyacinth
2010	2,300	Alligator weed, Duckweed, Water pennywort, Water primrose, Giant salvinia, Water hyacinth
2011	522	Alligator weed, Water pennywort, Giant salvinia, Smartweed (<i>Polygonum spp.</i>)
2012	904	Giant salvinia, Sedge (<i>Carex spp.</i>), Alligator weed, Water pennywort
2013	151	Giant salvinia
2014	127	Giant salvinia
2015	53	Giant salvinia and Water hyacinth
2016	0	
2017	17	Giant salvinia
2018	139	Giant salvinia and black willow (<i>Salix nigra</i>)
2019	97	Giant salvinia, water pennywort and water hyacinth
2020	63	Giant salvinia

Historically, chemical treatments of water hyacinth, along with associated alligator weed and water pennywort, have consisted of foliar applications of 2,4-D at a rate of 0.5 gallons per acre. Small areas of black willow have recently been treated with triclopyr at a rate of 0.75 gallons per acre. Alligator weed and water pennywort found independent of other vegetation have been treated with foliar applications of glyphosate at a rate of 0.75 gal/acre or imazapyr at a rate of 0.5 gal/acre. Giant salvinia has primarily been treated with foliar applications of diquat at a rate of 0.75 gallons per acre from November 1-March 31. Outside of that period, salvinia is treated with a mixture of diquat (0.25 gal/acre), glyphosate (0.75 gal/acre), and a methylated seed oil surfactant (0.25 gal/acre). All foliar applications have included a non-ionic surfactant at 0.25 gallons per acre. In 2012, a district spray crew was detailed to Clear-Smithport, Wallace Lake, and Grand Bayou Reservoir. Treatment for each species and time of year may be found within the recommendations.

Biological Control:

Giant salvinia weevils (*Cyrtobagous salviniae*) have been introduced at Clear-Smithport Lake to provide a biological control agent for giant salvinia. Dates of weevil releases appear in Table 3.

Table 3. Salvinia weevil releases at Clear-Smithport Lake, LA.

Year	Weevil Species	Amount Released
2008	Giant salvinia weevils	9,700 individuals
2009	Giant salvinia weevils	34 ft. ³ of host plant
2011	Giant salvinia weevils	4,800 individuals
2012	Giant salvinia weevils	32,700 individuals
2013	Giant salvinia weevils	24,062 individuals
2016	Giant salvinia weevils	8,325 individuals
2017	Giant salvinia weevils	18,256 individuals

Physical Control:

Physical control measures utilized at Clear-Smithport have consisted of lake drawdowns that provided generally favorable results.

Table 1. Drawdown history of Clear Smithport Lake, LA.

DRAWDOWN HISTORY				
Date Opened	Date Closed	Purpose	Results	Issues
06/15/1959	Unknown	Weed Control	Unknown	
1964	Unknown	Weed Control	Unknown	None
June 1972	January 1974	Weed Control	Unknown	Recommended. No record of occurrence.
1973	Unknown	Weed Control	Good	None
1974	03/13/1975	Weed Control	Good	None
1978	Unknown	Weed Control	Good	None
09/08/1998	02/25/1999	Weed Control	Good	Gates clogged during drawdown resulting in higher than planned water levels. One gate was damaged and could not be closed on time.
08/01/2001	02/28/2002	Weed Control	Poor	Unauthorized gate closure was noted on 12/20/01.
07/15/2002	Unknown	Weed Control	Unknown	None
07/05/2007	01/31/2008	Weed Control	Good	None
06/16/2008	Scheduled for 01/29/2009 Gates were closed in November.	Weed Control	Good	Gates closed to allow water sales.
7/01/2014	11/25/2014	Weed Control	Good	Minor repairs to middle gates allowed operation. West gate needs gear work, but was opened using a chain fall to help pick up one side of gate.

10/12/2015	01/29/2016	Weed Control	Moderate	Gates were opened much later in the year and did not allow for sufficient drying period during summer. West Gate is still in need of repair.
08-18-2016	12-01-2016	Weed Control	Good	West Gate is still in need of repair and whole structure severely eroded following flooding in March 2016.
07-21-2017	12-04-2017	Weed Control	Moderate Due to gates 1 and 2 broke and slower initial drawdown	Gates 1 and 2 on the West side are broken and gears will not move gates along slides. Structure is severely degraded due to flooding in 2016.
07-2-18	Scheduled for closure on 12-03-18, all closed 12-13-19 See issues	Weed Control	Moderate Due to gates 1 and 2 broke and slower initial drawdown	Gates 1 and 2 broken. Gate 3 was unable to close December 3, 2018 due to gears and still open December 26, 2018. All gates closed December 13, 2019.
07-01-20	12-01-20	Weed Control	Moderate due to gates 2,3 and 4 remaining closed with slow initial drawdown and water release	Gates 2, 3 and 4 are inoperable.

During the 2014 drawdown, LDWF biologists assessed the lake bottom and the effectiveness of the drawdown itself. The two lakes (Clear and Smithport) separate at low water levels and inhibit the complete dewatering of the lake. The remaining water forms two pools. One is located adjacent to the LA 509 boat ramp and is the largest and deepest, averaging 2 to 3 feet and close to 100 acres. The smaller is just above the spillway, is approximately 20 acres, and averages less than 1 foot. In August of 2014, there was an effort by LDWF staff to move some of the logs and debris by hand and boat along the narrow channel connecting both lakes. The purpose of this effort was to maximize drawdown potential in the upper lake at the maximum drawdown level of 4 feet without disturbing the lake bottom or dredging. The results were satisfactory at the time, with expectations of sedimentation and more woody debris build up over time.

Three consecutive drawdowns were initiated from 2016 through 2018. Drawdown dates were from July 1 through the end of November. This series of drawdowns was intended to constantly move vegetation and organic matter for longer windows of time. Coverage did decrease following closure dates on each of these drawdowns and increased access well into the spring following these physical control measures. Opening and closure dates did vary slightly due to access limitations to the control structure for LDOTD as water crested the spillway. The opening in July 2018 did not completely close until December 13, 2019 due to gate, gear and debris issues.

Minor repairs were made to the sluice gates to facilitate the drawdown during 2014. After the lake was completely lowered, the control structure and dam were inspected by DOTD for future repairs.

During 2012 and 2013, LDWF staff cleaned debris, logs and plant growth from the spillway crest at Clear-Smithport Lake. This effort allowed for increased water flow and provided temporary open water areas. Following the drawdown in 2014, there was a large amount of *Sesbania spp.* that had grown along the face of the dam. It was then removed by hand in January 2015 to allow salvinia to flow over the structure during high water events. The results were excellent, and allowed the open area in front of the dam to remain navigable for most of the year. Periodic log and debris removal continued through 2016 until erosion was noticed along the spillway. Funding to improve boat access at the 509 Bridge boat ramp during low water intervals was approved by the DeSoto Parish Police Jury meeting on November 28, 2018. In December 2019, debris and trees were removed by LDOTD and LDWF along the spillway. Areas of erosion along the west end of the spillway were also temporarily filled by LDOTD. Debris was once again removed along the spillway in November and December 2020 to allow giant salvinia to flush out of the lake.

Recommendations:

Chemical Control:

Continued foliar herbicide applications are recommended for Clear-Smithport Lake in accordance with the approved LDWF Aquatic Herbicide Application Procedures:

Plant Species	Herbicide	Surfactant
<i>Salvinia</i> spp. Alternative 1 Common/Giant Salvinia (April 1 to October 31)	Glyphosate (0.75 gal/acre) Diquat (0.25 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
<i>Salvinia</i> spp. Alternative 2 Common/Giant Salvinia (April 1 to October 31)	Glyphosate (0.75 gal/acre) Flumioxazin (2 oz./acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
<i>Salvinia</i> spp. Alternative 3 Common/Giant Salvinia (April 1 to October 31)	MSM (1 oz./acre) Flumioxazin (1 oz./acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
<i>Salvinia</i> spp. Alternative 4 Common/Giant Salvinia (November 1 to March 31)	Diquat (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
<i>Salvinia</i> spp. Alternative 5 Common/Giant Salvinia (November 1 to March 31)	Flumioxazin (12 oz./acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Water Hyacinth	2, 4-D (0.5 gal/acre)	Nonionic surfactant (1 pint/acre)
Water Hyacinth in waiver areas (March 15 to September 15)	Glyphosate (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Alligatorweed/Giant Cut Grass (undeveloped areas)	Imazapyr (0.5 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Alligatorweed/Giant Cut Grass (developed areas)	Imazamox (0.5 gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
American Lotus	2, 4-D (0.5 gal/acre)	Nonionic surfactant (1 pint/acre)
American Lotus in waiver areas (March 15 to September 15)	Glyphosate (0.5 gal/acre)	Nonionic surfactant (0.25 gal/acre)
American Lotus in waiver areas with potable water intakes (March 15 to September 15)	Triclopyr (0.5gal/acre)	Turbulence (or approved equivalent, 0.25 gal/acre)
Duckweed	Diquat (1.0 gal/acre) or Flumioxazin (8 oz./acre)	Nonionic surfactant (0.25 gal/acre) or Turbulence (or approved equivalent, 0.25 gal/acre)
Cuban Bulrush (sedge)	2, 4-D (0.5 gal/acre)	Nonionic surfactant (1 pint/acre)
Cuban Bulrush (sedge) in waiver areas (March 15 to September 15)	Glyphosate (0.75 gal/acre)	Nonionic surfactant (0.25 gal/acre)
Water Lettuce	Diquat (1.0 gal/acre) or Flumioxazin (6 oz./acre)	Nonionic surfactant (0.25 gal/acre) or Turbulence (or approved equivalent, 0.25 gal/acre)

These applications will be principally directed toward control of giant salvinia, water hyacinth and water pennywort, but will also include control of any floating or emergent vegetation as needed to provide boating access.

During the period from dam closure through the winter and into the spring, a more intensive herbicide effort should be made. This more intensive effort should begin before the peak growing season and before drawdown of both lakes where navigation and treatments are more difficult.

Biological Control:

Releases of giant salvinia weevils will continue when available. Weevil releases will focus

on areas with limited access by spray vessels.

Physical Control:

Vegetation assessments will be used to determine coverage prior to scheduled drawdowns. Post-drawdown type mapping will be used to assess drawdown efficacy (Figures 3, 4 and 5).

Repairs should be made to the existing structure to facilitate dewatering of the lake. Discussions should continue between LDWF, BPGFPC, the DeSoto Parish Police Jury and LDOTD to accomplish repair and/or renovation of the existing control structure, as well as renovation of the lakebed to allow for more effective management of this waterbody.

A drawdown in 2021 will be considered following a vegetation assessment in late winter or spring of 2021. If recommended, the drawdown will likely include opening of the only operable gate for that desired drawdown period of July through November. Quarterly meetings between the BPG&F Commission, LDOTD, DPPJ and LDWF to discuss drawdown action is recommended.

Future repairs to the dam or spillway should include renovation or removal of debris from the outfall channel. The debris inhibited water flow and shortened the amount of drying time for bottom sediments.

Debris within the channel separating the two lakes will likely need to be removed once again to facilitate the flushing of giant salvinia over the spillway during high water periods.

As far back as 1971, LDWF biologists have recommended reducing the cypress tree forest found in Clear-Smithport Lake. Conditions that apply to feasibility of timber harvest are outlined in Appendix I.

Typemap:

Figure 3. Aquatic Plant Coverage on Clear-Smithport Lake as of January 2017.

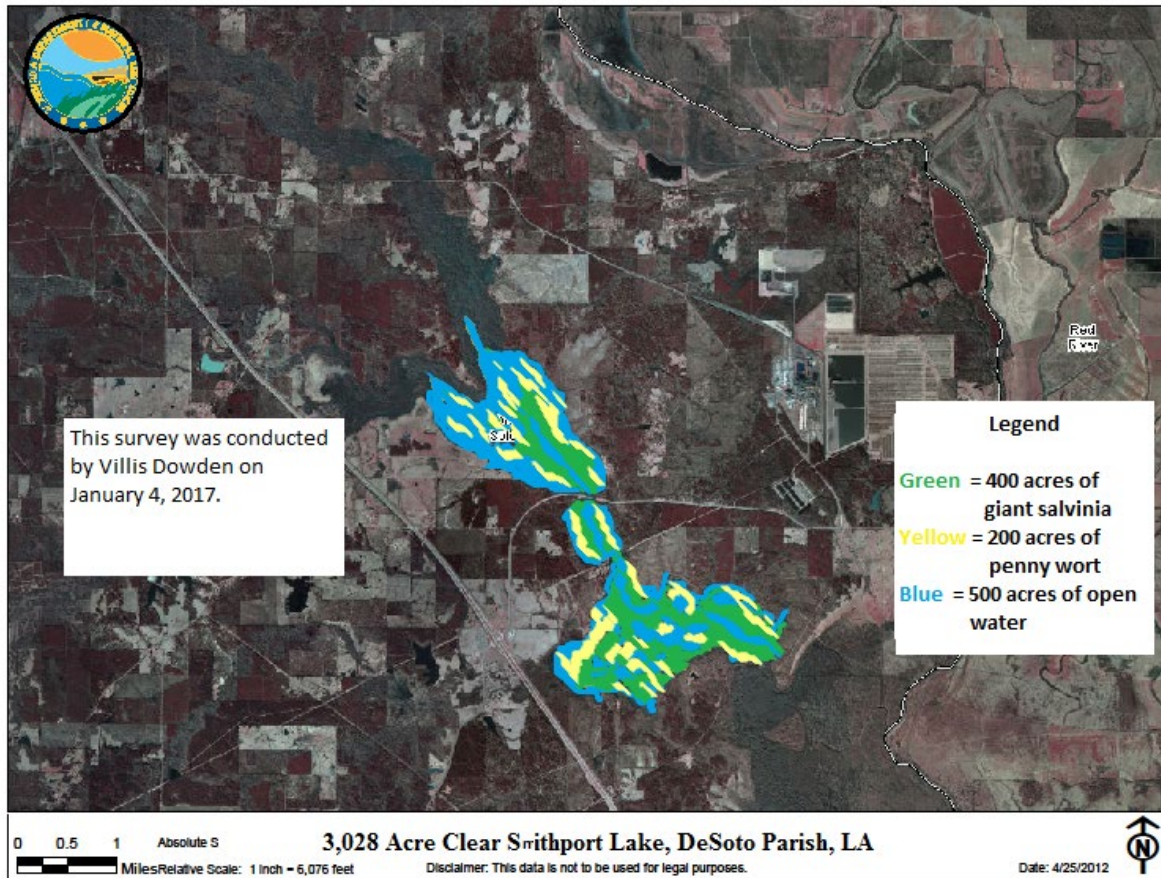


Figure 4. Aquatic Plant Coverage on Clear-Smithport Lake as of February 2015.

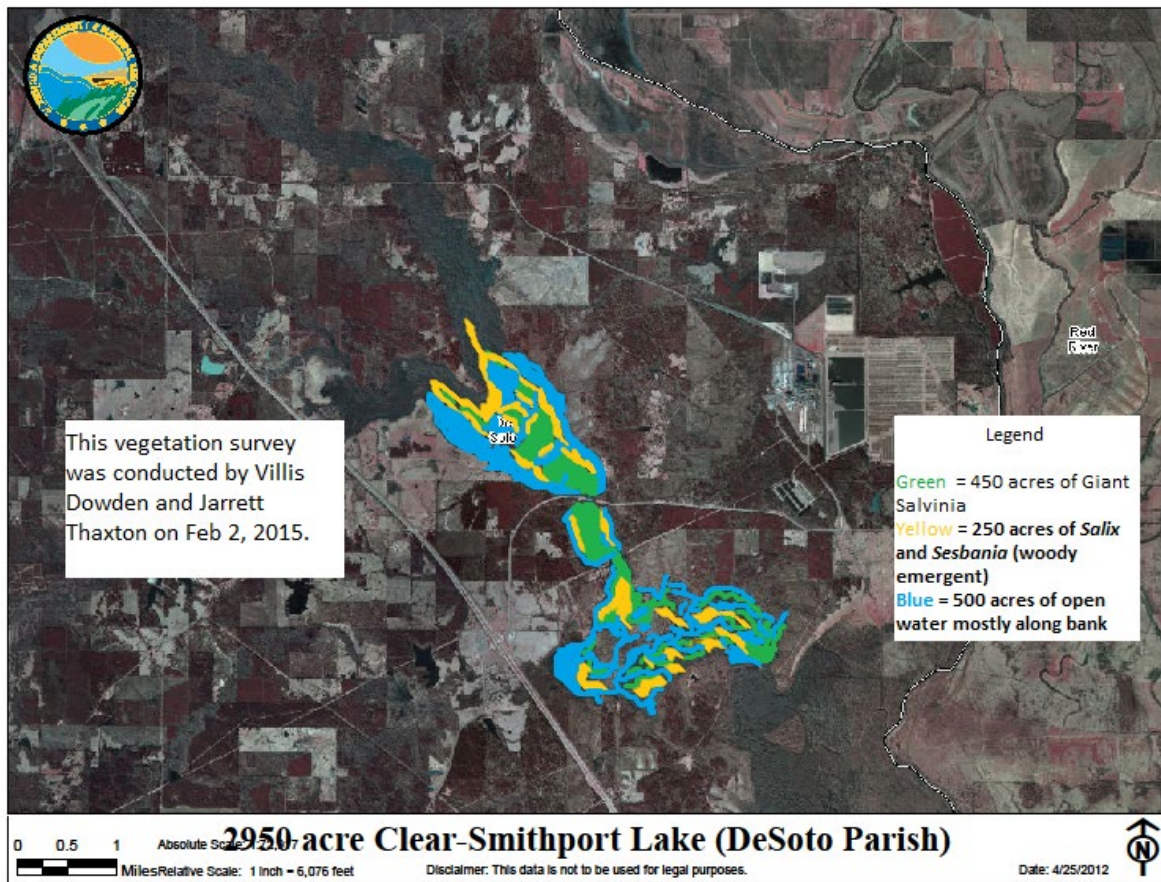
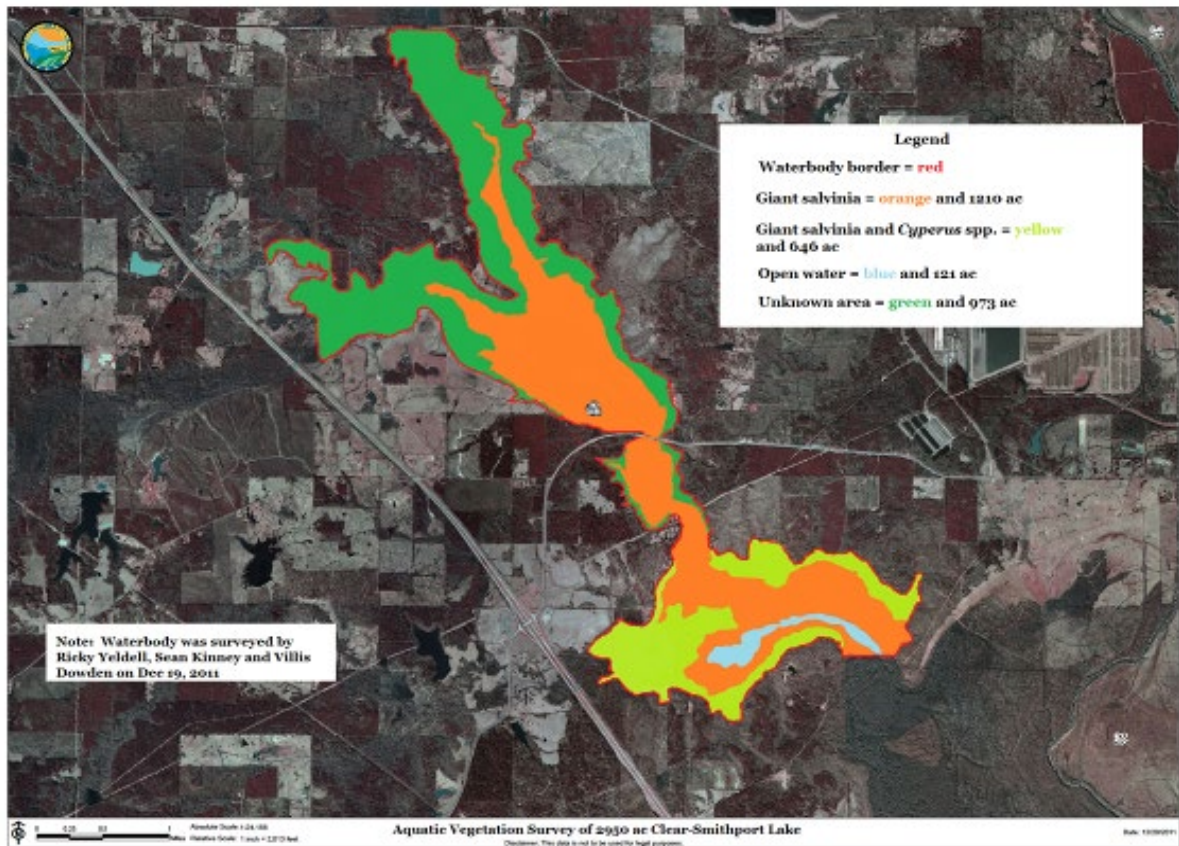


Figure 5. Aquatic Plant coverage on Clear-Smithport Lake as of December 2011.



Type mapping has been conducted at Clear-Smithport Lake in years 1993 and 2000. Vegetation surveys were conducted in years 1982, 1990, 1992, 1993, 1994, 1995, 1998, 1999, 2000, 2001, 2011, 2012, 2015 and 2017.

Appendix I

Analysis of Proposed Habitat Modifications for Management Of Invasive Aquatic Plants in Clear-Smithport Lake

*By
Inland Fisheries Staff*

Introduction

Despite extensive control efforts, aquatic vegetation continues to be a serious problem in Clear-Smithport Lake. Louisiana Department of Wildlife and Fisheries (LDWF) staff biologists addressed two proposed control concepts: replacement and/or modification of the water control structure, and timber removal. Related considerations and conclusions are outlined below.

Background

Clear-Smithport Lake is one of several waterbodies in the Red River corridor formed by the “Great Red River Raft”. The raft was a series of blockages comprised of woody debris, sand and mud that effectively blocked flow of the Red River from Natchitoches to the Arkansas boundary. Over a period of several centuries, backwater areas were enlarged and scoured by the diverted water flow. When the raft was finally removed in 1873, the Red River channel reclaimed the flow, leaving a series of channel scars. Over time, those scars became typical Louisiana swamp habitat, complete with cypress forests.

Water fluctuation in Clear-Smithport Lake was stabilized in 1948 with construction of a dam. From that point forward, the natural water fluctuation cycle was altered and the related benefits were compromised. Organic material from annual leaf fall no longer decomposed as it would with periods of exposure to air. A layer of organic material began to accumulate. Water quality became degraded and the spawning of nesting sport fish was inhibited. Thick standing timber became an effective barrier to wind flow and wave action. As a result, floating vegetation became particularly problematic. Duckweed and water hyacinth were most prominent for many years. In 2006, the threat was magnified with the introduction of giant salvinia. The tremendous reproductive capacity of this invasive species makes it one of the worst invasive species in the world. Managing such a plant in ideal habitat is a formidable challenge. An integrated management plan that combines the benefits of multiple control measures has been adopted by LDWF. Those control measures include water fluctuation, biological controls, and herbicide use.

The existing Clear-Smithport Lake control structure maintains a pool of 3,028 acres at 131.6 feet NGVD. Four 3’ high x 7’ wide steel sluice gates in the face of the spillway wall near the western end of the spillway function as an outlet works. All gates are inoperable. If functional, these gates would allow for water level reduction of 4’ below pool stage or to 127.6’ GVD. An accurate estimate of the remaining lake surface at 127.6’ NGVD is unavailable at this time.

Current Control Actions

With the exception of cold weather, lake drawdowns are the most efficient vegetation control option available for Clear-Smithport Lake. Drawdowns are cost effective, but they are not without cost. A loss would occur with each drawdown in the form of impaired access, reduced recreational opportunity, and reduced aesthetic value. As a result, drawdowns may be unpopular with a significant percentage of Clear-Smithport Lake users.

The 2013 Clear-Smithport Aquatic Vegetation Control Plan recommendations included repairs to the existing structure and renovation of the lakebed. The action would facilitate dewatering of the lake and allow for more effective management. At the time of this writing, deficiencies remain in the spillway, the control structure, and the spillway outfall channel.

Current concerns include:

1. The drawdown gates are inoperable and in need of repair.
2. The wooden sheet pile wall in the spillway and the concrete-filled riprap buttress are deteriorated and should be replaced.
3. The stilling basin is clogged with driftwood and vegetation.
4. There is no proper discharge channel below the control structure. The area downstream of the structure is simply a wet area.
5. A cypress forest currently exists in the lakebed. These trees are of sufficient density to hamper aquatic vegetation control efforts.
6. A land ridge exists upstream of the control structure. This ridge impounds water during drawdowns.
7. The existing control structure offers only three feet of drawdown capability. This limited capability does not provide for a complete drawdown of the lake (i.e. dewatering to the original channel).

Addressing the concerns listed above is primary to achieving complete drawdown capability. Complete drawdown capability could provide dewatering to levels comparable to the pre-impoundment period. Processes that controlled organic accretion and aquatic vegetation could be re-established. Annual reductions of aquatic vegetation through water fluctuation and herbicide applications could reduce the coverage for the successive year.

Expectations of Control

Unfortunately, eradication of invasive aquatic plants in Clear-Smithport Lake is not an outcome that can be reasonably expected to occur. Complete removal of the plants is unlikely, even with water removal to the existing channel. Residual plants will survive in refuges that could include inundated ponds, stump holes, and even wet organic material. Subsequent reintroduction through unintentional transport by man or by wildlife is likely as well.

Proposed Solutions and Logistics

The thick standing timber in Clear-Smithport Lake blocks the wind and wave action necessary to aid in the control of floating vegetation. Many Louisiana waterbodies have floating aquatic vegetation. However, those with sufficient wind and wave action seldom have significant problems with floating aquatic vegetation. Wind driven waves eject floating vegetation to the shoreline. Caddo Lake provides a good example. The majority of the Louisiana side of Caddo

Lake is open water habitat that remains relatively clear of giant salvinia. The Texas side, with its dense cypress forest, suffers a chronic giant salvinia problem. Similar examples are available throughout the 40 Louisiana waterbodies that now have giant salvinia. Clear-Smithport Lake and the other heavily timbered impounded swamps in the Red River corridor all are particularly susceptible to giant salvinia because their dense stands of timber restrict wind and wave action.

Timber removal for vegetation control requires consideration of a complex series of questions, including the following:

1. How much timber must be removed to provide for adequate wind and wave action?
2. Can a sufficient volume of trees physically be removed?
3. Is there a sufficient financial incentive for harvest of the trees?
4. Would public opinion be favorable, or at least tolerant of the removal of a sufficient volume of trees to provide for adequate wind and wave action?

The question of how many trees to be removed has not been answered to date. Sufficient space must be provided between the vegetated crowns of the trees to provide the necessary wind and wave action. Habitat modeling would be necessary for such a determination, but a distance of at least 40-50 feet is estimated. Sufficient tree separation must be provided throughout the impoundment for beneficial effects to be realized. Areas that do not have sufficient tree separation will serve as windbreaks and undermine beneficial effects.

Economics and Feasibility

Cypress trees are well suited to the natural water fluctuation typically associated with swamp habitat. However, prolonged flooding is a stressor to cypress. Stress symptoms include reduced growth and the characteristic “needle-point” tree tops that many Clear-Smithport Lake cypress trees display. Very few trees in Clear-Smithport Lake are large enough to be marketable for logs. The commercial market for Clear-Smithport Lake trees is currently limited to pulp and mulch.

Timber harvest in Clear-Smithport Lake includes challenges that determine economic feasibility. Currently, harvest with water borne equipment is considered impractical. One complicating aspect is that trees would need to be cut underwater to prevent the remaining stump from being a boating hazard. Harvest with heavy land based equipment also includes significant challenges. Access would be directly related to lake bottom firmness. Lake bottom firmness is directly related to dryness.

Tree coverage in Clear-Smithport Lake is not complete throughout the impoundment. Cypress trees cannot germinate in standing water. Open water areas that currently exist in Clear-Smithport Lake are the pre-impoundment areas that held water year round. Complete drawdown capability would be necessary to allow access to standing timber throughout Clear-Smithport Lake.

A significant portion of Clear-Smithport Lake is privately owned. Arrangements to allow for timber harvest throughout the impoundment would have to be made before timber harvest is initiated.

Other Factors

Access to the lake bottom with timber harvesting equipment would be difficult due to instability

of the highly organic substrate. A substantial reduction of organic material would be necessary. Repetitive dry periods would be required to allow the process to occur. Temporal periods that could allow drying of the Clear-Smithport Lake substrate are limited to summer and early fall. Extended dry periods are not possible because of the extensive watershed. The lower elevations of the lake bottom have an even greater layer of organic material because they have not been exposed to air since impoundment. They are also more subject to re-flooding. Consequently, more dry periods will be required for removal of organic substrate. Depending on weather conditions, an estimated 3 to 5 consecutive mid-summer complete drawdowns would be required to stabilize the lake bottom to allow for access with land based timber-harvesting equipment.

Fisheries Impacts

Drawdowns to 4 feet below pool stage were conducted four times from 1998 to 2008. Fish kills have not typically been associated with Clear-Smithport Lake drawdowns, but extensive drawdowns during hot weather periods typically include increased potential for fish kills. Drawdowns of Clear-Smithport Lake to the pre-impoundment channel would be unavoidably associated with fish kills. Multiple drawdowns will be necessary before property below 127.6' NGVD will be accessible to land-based timber harvest equipment. A complete loss of the existing sportfish population would be anticipated. Recovery of the fish population should not be expected until at least 4 years after the final dewatering.

Summary

1. Clear-Smithport Lake is one of a series of waterbodies created by diversion of water flow from the Great Red River Raft.
2. When the raft was removed, the Red River channel reclaimed water flow, leaving scoured, low-lying areas to become swamp habitat.
3. The timing between complete removal of the raft in 1873 and impoundment of Clear-Smithport Lake (1948) was sufficient for growth of a thick cypress forest.
4. Impoundment of the cypress swamp impaired a natural process that provided efficient decomposition of organic material. The newly created habitat was well suited for overabundant aquatic vegetation.
5. Due to inadequate wind and wave action, floating aquatic vegetation has been a chronic problem. Water hyacinth replaced the native duckweed as a significant problem. Giant salvinia has recently become the most significant problem.
6. Currently available control methods are unpopular to some users and have not yielded satisfactory results
7. Other options, including modification to the existing control structure and timber thinning have been proposed to create conditions less favorable for overabundant aquatic vegetation.
8. At least 40 Louisiana waterbodies currently have become infested with giant salvinia, but the invasive species is only a significant problem in waters with limited airflow and wave action.
9. Significant timber thinning would be required throughout the lake bottom to convert the existing cypress forest to habitat less favorable to floating vegetation.

10. Modification of the existing water control structure and dewatering of Clear-Smithport Lake to the pre-impoundment channel will be necessary for sufficient timber thinning.
11. A series of 3-5 consecutive drawdowns to the pre-impoundment channel would be required to stabilize the lake bottom substrate below 127.6' NGVD.
12. Stem density with at least 40-50 feet of separation throughout Clear-Smithport Lake is an estimated requirement for success. Any remaining areas with greater stem density will compromise wind flow and wave action for the remainder of Clear-Smithport Lake.
13. Preliminary requirements include:
 - a. Public outreach to explain all aspects of the endeavor, including the expected multi-year time frame
 - b. Solicitation of public opinion and resolution of opposition to necessary action
 - i. Opposition to cypress harvest is anticipated
 - ii. Opposition to potential loss of sport fish population is anticipated
 - iii. Opposition to associated local economic loss is anticipated
 - c. Determination of lake bottom ownership
 - d. Approval for timber removal by all applicable property owners
 - e. Procurement of funding necessary for control structure modification
 - f. Confirmation that a commercial market exists for Clear-Smithport Lake cypress trees
 - g. Commitment for harvest during designated drawdown periods

Conclusion

The current habitat impairment in Clear-Smithport Lake is the product of unique circumstances that combined to create a heavily forested impoundment. In contrast to Louisiana waterbodies with more open habitat, Clear-Smithport Lake has insufficient wind flow and wave action to control the floating aquatic vegetation. Invasive aquatic vegetation has become an established component of the Clear-Smithport Lake ecosystem and will remain so into the near future. Through modification of the existing control structure and timber harvest, the Clear-Smithport Lake habitat can be modified to be less favorable to aquatic vegetation. Successful completion of habitat modification would allow increased natural control of vegetation and would provide significant relief from giant salvinia. An extended period would be required for successful completion of the project. The effort would likely include an associated loss of recreational fishing opportunities for at least 10 years.

Habitat modification through repairs and/or changes to the control structure that would provide the capability to completely dewater the lake and harvest timber should only be implemented after successful resolution of concerns related to economic feasibility and public opinion. Initiation of control structure modification and/or timber harvest without resolution of those concerns is strongly discouraged.