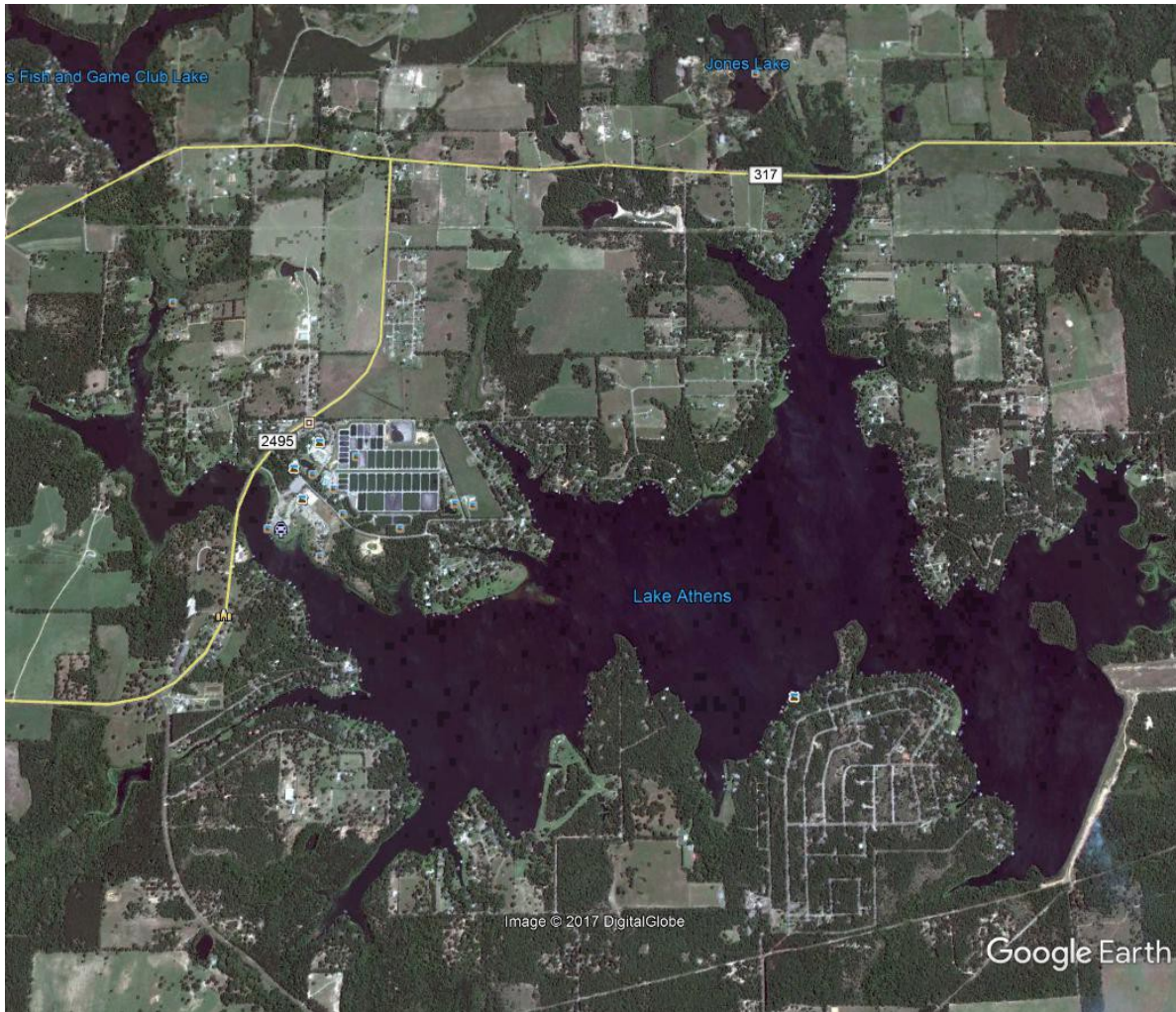


Aquatic Vegetation Management Plan Lake Athens, 2021



Marcos DeJesus, TPWD IF Region 2 Program Director
Jake Norman, TPWD IF District Supervisor, Tyler
Ed Gatlin, AMWA Director
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February 2021

Introduction

Lake Description

Lake Athens is a 1,799-acre reservoir constructed in 1962 on Flat Creek, a tributary of the Neches River, Texas, to supply water and recreation. The controlling authority is the Athens Municipal Water Authority (AMWA). Lake Athens is a public water body in Henderson County and home to the Texas Freshwater Fisheries Center (TFFC), a Texas Parks and Wildlife Department (TPWD) hatchery and education center. Conservation pool level (full pool) at Lake Athens is 440 feet above mean sea level (MSL). Public boat access is limited to two boat ramps at one access area (no fee required), and public bank angling access is restricted to the marina area and bridge crossings. No handicap-specific facilities currently exist, but the convenience pier at the marina allows wheelchair use.

Aquatic Vegetation History

Exotic aquatic vegetation has been present in Lake Athens since 1995. Hydrilla was first discovered in 1995, and coverage has been less than 125 acres since 2011. In spring 2012 an advisory group of property owners, anglers, AMWA, and TPWD met to create a Hydrilla management plan. Under this plan only Hydrilla would be treated and conditions, timing, spatial distribution, approved chemicals, and financial responsibility for treatment were all defined. Water Hyacinth was discovered in 2005 and removed by TPWD. Water Hyacinth is currently absent at Lake Athens.

Alligatorweed is present and coverage has remained low and scattered. Alligatorweed flea beetles were released by TPWD in 2014 for Alligatorweed control (Figure 2).

Maximum coverage of all vegetation types (746 acres; including 123 acres of Hydrilla) occurred in summer 2011 (Figure 1) following three years of stable water (Figure 2). Prolonged drought from 2011 through 2013 caused water level to drop (Figure 3), exposing over 500 acres of reservoir bottom (Figure 4). Desiccation reduced coverage of all aquatic plant species (including Hydrilla) to only 215 acres (15% of lake's surface area) in summer 2013; few, if any, treatments were conducted under the Hydrilla management plan at that time. From 2014 through July 2018 water level stabilized near the 440 ft. elevation (full pool), and the plant community recolonized previously exposed areas. A diverse native emergent and submersed aquatic plant community forms a beneficial fringe for fish and wildlife around the reservoir. In summer 2020 the total aquatic plant coverage was 261 acres (15% of the lake's surface area) and was slightly down from surveys conducted in 2017 and 2018. Typically, 20-40% total vegetative coverage is considered optimum for fish production. When coverage exceeds 40%, the foraging efficiency of fish is reduced, typically resulting in slower growth rates and skinnier fish. Based on the current diversity and abundance of aquatic vegetation, no system-wide vegetation control actions were identified as priorities using TPWD resources. However, allowing property owners the flexibility to address their private access issues related to nuisance vegetation should have minimal negative impact on the existing aquatic vegetation community. See Figures 5 - 8 for detailed maps of vegetation in 2013, 2017, 2018 and 2020. Historical vegetative coverage for all species surveyed can be found in Appendix A.

In February 2017 TPWD and AMWA representatives met with members of the Lake Athens Property Owners Association (LAPOA) to discuss how property owners (or their agents) could file Aquatic Vegetation Treatment Proposals (AVTP's) for shorefront vegetation control. By the end of the initial chemical treatment period in late May, individual chemical treatments for approximately 150 shore-front properties had been conducted removing approximately 65 acres of primarily native aquatic vegetation. Treatments for the remainder of the season were limited to mechanical treatment only at a maximum footprint of 5,625 square feet (75 ft. x 75 ft.).

In November 2017 a stakeholder group was assembled composed of property owners, anglers, AMWA, and TPWD to develop this vegetation management plan. Meetings in December and January were conducted to develop and discuss a plan acceptable to all stakeholders. A final document was completed in January 2018.

In November 2018 the stakeholder group was re-assembled to review the 2018 plan and propose revisions for 2019. Notable changes include: (1) opportunity for earlier treatment in the spring, (2) addition of a fourth treatment window in early fall (3) requirement that only herbicides that will be used (**not just might be used**) are listed on treatment proposals; any deviation from the listed herbicides will require an amended treatment proposal from the herbicide applicator (4) a separate AMWA permit will be required for chemical and mechanical treatment if both are conducted; all permits must be signed by the contractor or person(s) actually conducting the treatment.. *This document represents the updated plan for 2021.*

Roles and Responsibilities

AMWA

The land at the bottom of Lake Athens and the shoreline around the lake to the 448 ft. MSL elevation is owned by AMWA. Raw water is sold by AMWA to the city of Athens for municipal water supply and provided to TFFC to support hatchery fish production. A \$38 permit is required by AMWA for any work done on AMWA property (i.e. piers & boathouses, dredging & excavation, retaining walls, aquatic vegetation management, etc.); *a separate AMWA permit will be required for chemical and mechanical treatment if both are conducted and all permits must be signed by the contractor or person(s) conducting the treatment.* The aquatic vegetation control application process is administered by AMWA in conjunction with TPWD's application process.

TPWD

TPWD is the State agency authorized by the Legislature to protect and conserve fish and fish and wildlife habitat in Texas' public waters. TPWD manages and conserves the natural and cultural resources of Texas to provide hunting, fishing, and outdoor recreation opportunities for the use and enjoyment of present and future generations. TPWD surveys aquatic resources and advises controlling authorities on aquatic vegetation management and recreational access. The TPWD Tyler South Fish Management team is responsible for the management and conservation of freshwater natural resources (13 major reservoirs, including Lake Athens) and to provide fishing opportunities and boating/fishing access for present and future generations in a nine-county area near Tyler. TPWD's Inland Fisheries Division is funded with Federal Sport Fish Restoration dollars (via a tax on fishing equipment, boats, motors, and fuel) through the Fish and Wildlife Service and with state dollars derived through the sale of fishing licenses.

TPWD has two biologist teams that serve Lake Athens. The Inland Fisheries-Tyler District, led by biologist Jake Norman, is responsible for the health of the fishery, including the vegetation management program outlined in this document.

The Brookeland Aquatic Habitat Enhancement team, led by biologist John Findeison, is responsible for the rapid response and treatment of exotic of vegetation deemed to be exotic/harmful, such as Giant Salvinia.

Property Owners and Anglers

It is recognized that reservoir-based businesses and waterfront homeowners have been impacted by aquatic vegetation at Lake Athens. It is also recognized that the diverse native aquatic plant community in Lake Athens contributes to clear water, shoreline protection, and excellent Largemouth Bass, sunfish, and crappie fisheries, attracting water recreation users from all over the state and beyond. Collaboration among AMWA, property owners, anglers, and TPWD will be required if the aquatic habitat and fish populations are to be properly managed for sustainable access and multi-recreational use and enjoyment of the lake by all stakeholders. Input generated from property owners and anglers on the advisory committee was used to assist in development of an aquatic vegetation management plan that is fair, equitable, maintains good fish habitat and water quality, and allows flexibility for property owners to address vegetation issues related to their recreational access. Members of the advisory committee are responsible for relaying information about the Lake Athens Aquatic Vegetation Management Plan to the stakeholders they represent. This management plan will be in effect until December 31st, 2021.

Aquatic Vegetation Control Application Process

At the direction of the Texas Legislature, the Texas Commission on Environmental Quality (TCEQ), the Texas Department of Agriculture (TDA), and TPWD developed a Statewide Aquatic Vegetation Management Plan (State Plan) to guide decision making regarding nuisance aquatic vegetation in public water. The TDA regulates pesticide use in the State of Texas, and TCEQ regulates water for human consumption, and (as stated above) TPWD manages fish and wildlife habitat. The list of herbicides provided in the Statewide Aquatic Vegetation Management Plan is the result of collaboration between TPWD, TDA, and TCEQ. Per state law TPWD is the State agency responsible for the implementation of the Statewide Aquatic Vegetation Management Plan.

Per the State Plan, an AVTP is required to legally remove aquatic vegetation in a public water body. A blank AVTP form and example plan are provided in Appendix B. *A link to a fillable AVTP can be found here:* https://tpwd.texas.gov/publications/pwdforms/media/pwd_1029_t3200_exotic_species_app_aquatic_vegetation_removal.pdf Proposed AVTP's are reviewed by AMWA and TPWD to ensure that legal, best practices are followed, and treatment actions do not damage our natural resources or endanger resource users. For details of the State Plan, see Aquatic Vegetation Management in Texas: A Guidance Document http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_pl_t3200_1066.pdf. In addition to the AVTP, an Exotic Species Permit for Aquatic Vegetation Removal (AVR) may be required to possess any prohibited species prior to

mechanical removal. A complete list of prohibited species is available here: <https://tpwd.texas.gov/huntwild/wild/species/exotic/undefined#plant>. A link to a fillable AVR can be found here: https://tpwd.texas.gov/publications/pwdforms/media/pwd_1029_t3200_exotic_species_app_aquatic_vegetation_removal.pdf

An Exotic Species Permit for Aquatic Vegetation Removal, is required if you cannot securely contain the exotic vegetation in black plastic bags or dry or compost it completely before transport or disposal. An Exotic Species Permit for Aquatic Vegetation Removal is required for all mechanical treatment permits, where an exotic species will be removed, if the homeowner applying for the permit is not performing the removal themselves.

"How to Apply for Aquatic Vegetation Treatment at Lake Athens" (Appendix C) provides a simple flow diagram of the application process for the AVTP and the AVR. For any AVTP to be accepted, both AMWA and TPWD must agree. AVTPs will be accepted for review only during the period March 1st to May 31st annually with **NO EXCEPTIONS**. An AMWA permit or permits, AVTP, and AVR (if necessary) is required for each individual property. Contractors or individuals applying the treatment (mechanical or chemical) are responsible for the accuracy of the information provided on the AVTP and AVR.

Aquatic Vegetation Treatment Process

Herbicide Treatments

To be effective, herbicide treatments should begin after water temperature reaches 65° F. Herbicide treatments by licensed applicators, per approved AVTP, can occur throughout the growing season during defined time periods listed below. Time periods were selected to correspond with major holidays (Memorial Day, Independence Day, Labor Day) to allow for aquatic vegetation control prior to the holiday, and the end of the season. **Note: Treatment outside the designated time periods may be approved by AMWA and TPWD if extenuating circumstances (i.e. weather, natural disaster) prevented treatment during a designated time period.**

Mechanical Treatments

Mechanical treatments can be conducted at any time until December 31st in the same calendar following approval of an AVTP. As noted above if prohibited species are to be removed (i.e. Alligatorweed, Hydrilla, Water Hyacinth) an AVR permit is required in addition to the approved AVTP. (See Appendix C for details).

Treatment Footprint (any method)

TPWD and AMWA will generally approve treatment of aquatic vegetation from the 440 ft. MSL contour (elevation along the bank at full pool) to the 434 ft. MSL contour (six feet deep at full pool) or up to 75 feet from the 440 ft. MSL contour (75 feet from full-pool shoreline). In most cases this will provide recreational and boating access while maintaining fish and wildlife habitat. **In special cases such as in the backs of coves or on long, shallow flats where access to open water is prevented by nuisance vegetation, AVTPs proposing treatment beyond the 434 ft. elevation or 75 ft. distance will be evaluated by AMWA and TPWD on a case-by-case basis.**

Aquatic Vegetation Management Schedule

February 1 – May 31, 2021

- Property owners may solicit bids and hire contractors to conduct herbicide treatment, mechanical treatment, or both.
- TPWD will provide results of the vegetation survey conducted in summer 2018 for use in preparing AVTPs; included in this document and posted on AMWA's web site.
- Contractors should conduct pre-treatment vegetation evaluations in areas to be treated.
- Contractors can prepare AVTPs and AVRs (if necessary) defining footprint, chemicals to be used or mechanical treatment techniques. **NOTE: Use example AVTP in Appendix B as the template.**

March 1 – May 31, 2021

- Submit completed AMWA permit application, AVTP, and AVR (if applicable) applications and supporting materials to AMWA for review and approval no later than May 31. Upon approval, AMWA will submit to TPWD for review and approval. **NOTE: See Appendix C for detailed application process flow chart.**
- Mechanical treatment may be conducted between April 15 and December 31 of the year an AVTP and, if necessary, an AVR permit was approved.
- First herbicide treatment time period is May 3 – May 14, 2021. **NOTE: In order to qualify for herbicide treatment during the first time period, the AVTP must be approved by April 15 to allow sufficient time for review of AVTPs, to notify persons on the Statewide notification list https://tpwd.texas.gov/landwater/water/envirnoncerns/nuisance_plants/notification_list.phtml, and to notify water users (if needed; dependent on chemical).**

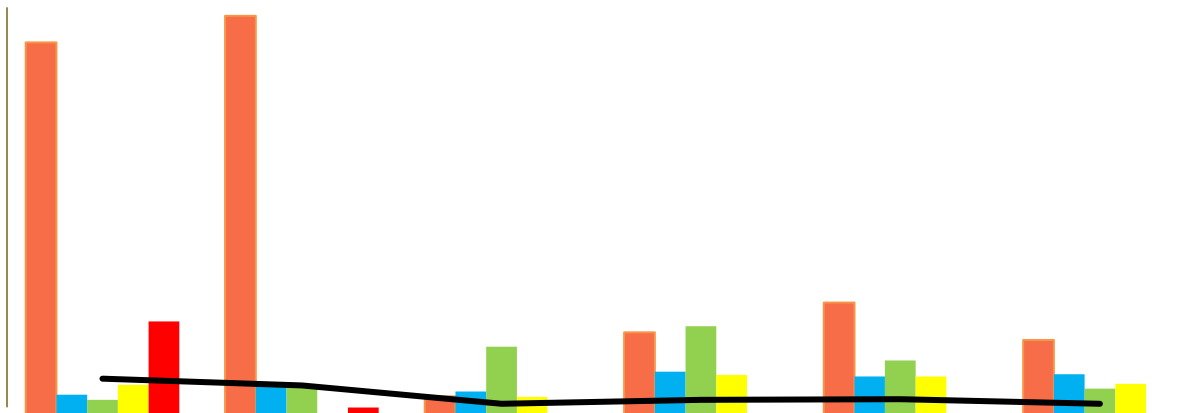
June 1 – October 31st, 2021

- Second herbicide treatment time period is June 7 - June 18, 2021. (If you missed the first treatment, your AVTP must be approved by May 21 to allow sufficient time for review of AVTPs, to notify persons on the Statewide notification list.)
- Third herbicide treatment time period is August 9– August 20, 2021.
- Last herbicide treatment time period is September 20 – October 1, 2021

Primary Vegetation

Surface Acres

600
500
400
300
200
100
0



	2011	2012	2013	2017	2018	2020
Coontail	490	525	25	109	148	99
Pondweed	27	38	31	57	51	54
Lotus	20	39	90	117	72	35
Eelgrass	40	1	24	53	51	41
Hydrilla	123	10	1	1	1	1
Total(%)	48	39	15	20	21	15

Figure 1. Total annual coverage (acres) for dominant species of aquatic vegetation present during summer vegetation surveys, Lake Athens, 2011-2020. Individual species (bars) are displayed as the total area measured in surface acres, for that species, while total % (black line) represents the total percentage of the reservoir occupied by all vegetation that year.



Figure 2. Release sites of Alligatorweed flea beetles at Lake Athens, 2014.

USGS 08031290 Lk Athens nr Athens, TX

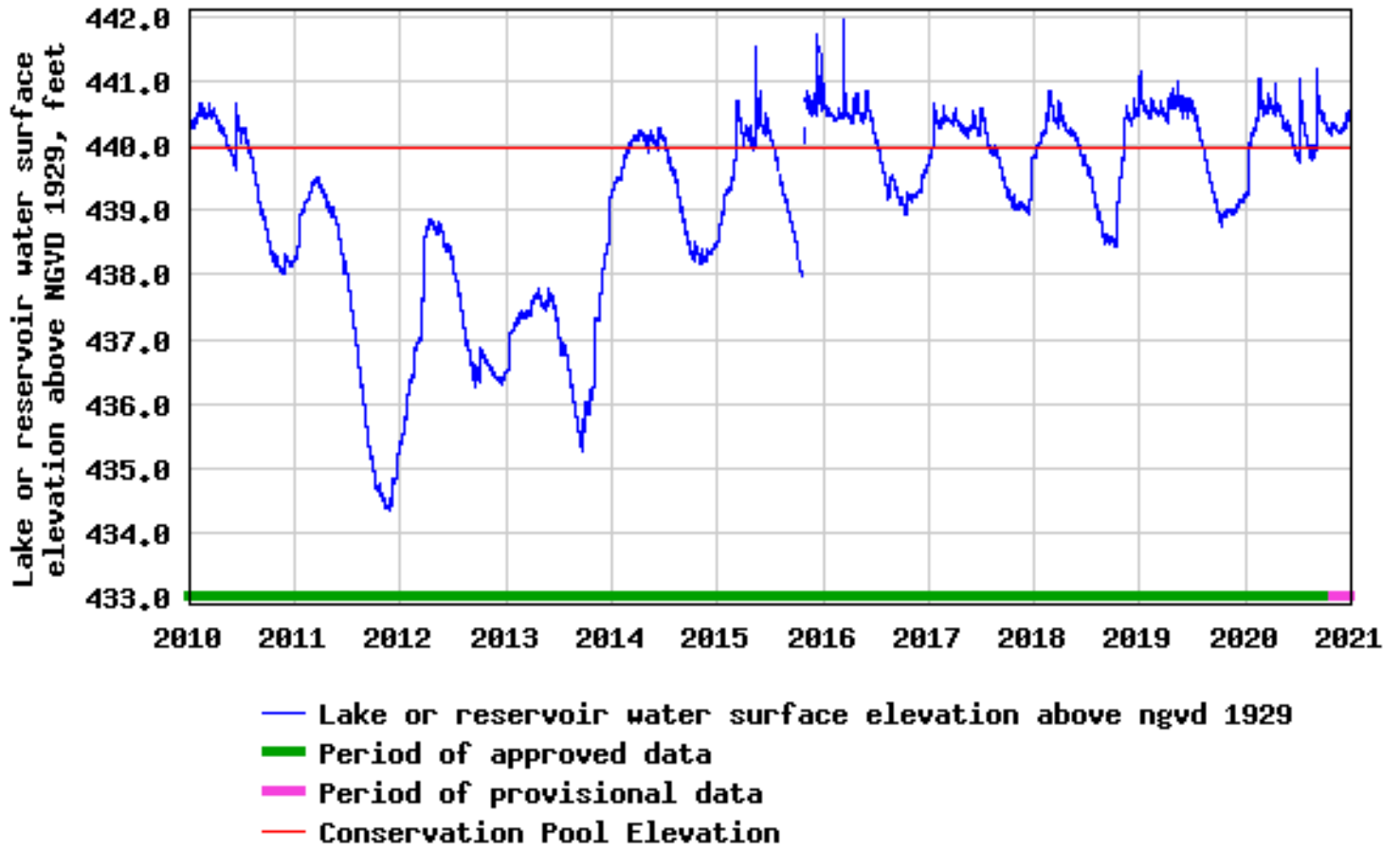


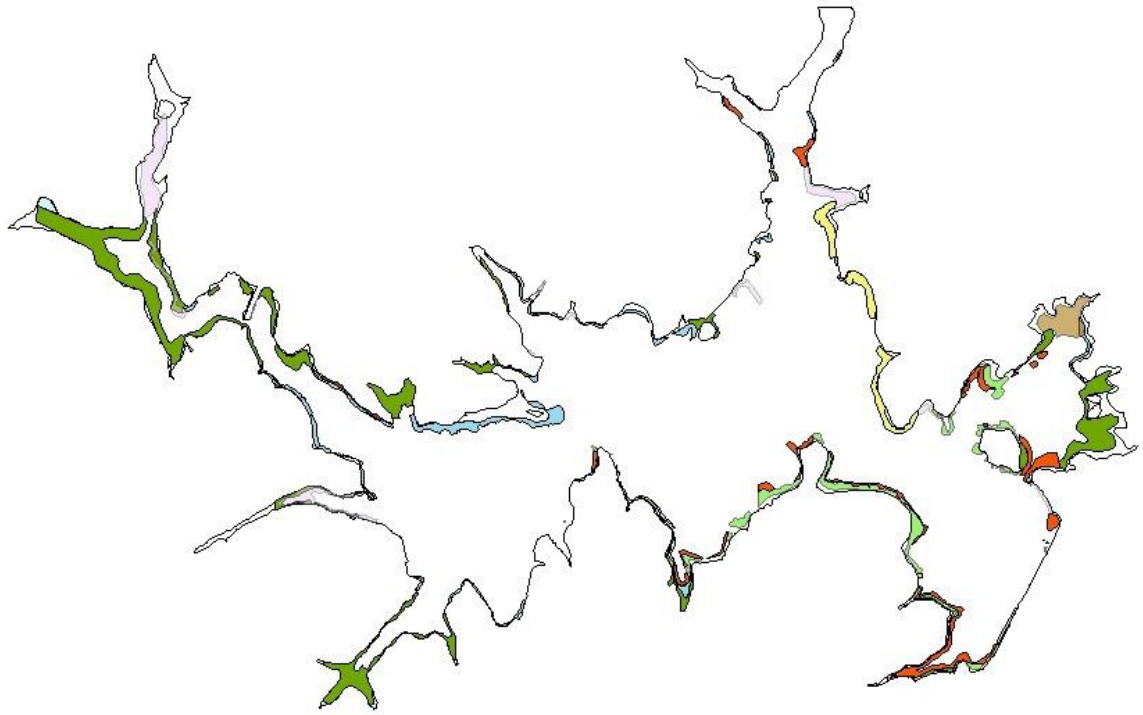
Figure 3. Water level for Lake Athens (2010-2020). Red line represents conservation pool level (440 ft. MSL).



Figure 4. Google Earth image from October 17, 2012 showing extensive reservoir bottom exposure due to low water from the extended drought.

Lake Athens Vegetation Survey 08/05/2013

Current Surface Acreage ~ 1392 Acres



Inland Fisheries Division
Texas Parks and Wildlife Department

Prepared by: Jacob Korman & Richard O'H
Texas Parks and Wildlife - Inland Fisheries Division
Projection: NAD 83 UTM Zone 15N
This Map is for Reference Only
The user must be aware of data conditions
and of the ability to bear responsibility for the appropriate
use of the information with respect to possible errors,
original map scale, collection methodology, currency
of data, and other conditions specific to certain data.

Species ~ Acreage

Total Coverage ~ 214.8 Acres; 15% Lake Coverage

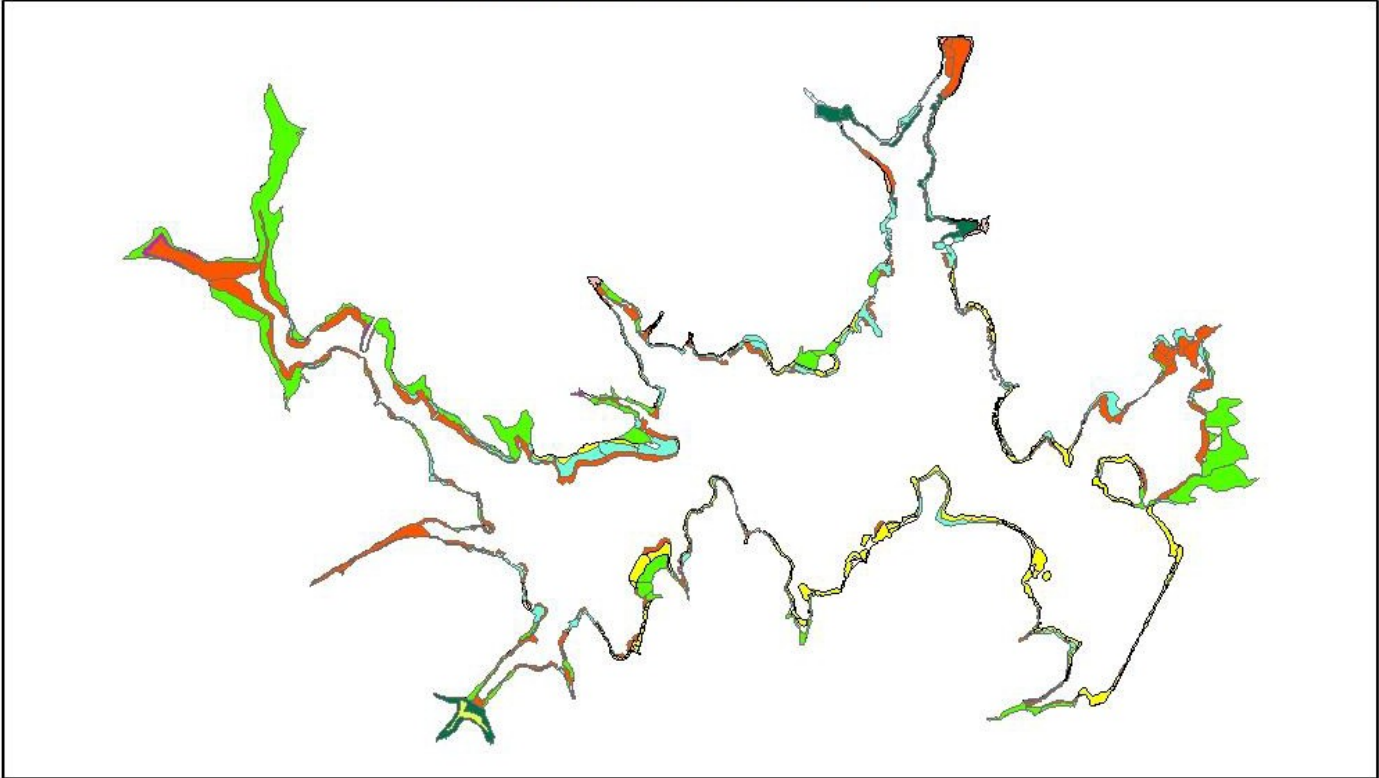
Lotus ~ 89.7	Coontail/Hydrilla Mix ~ 1.4	Nitella ~ 8.7
Pondweed ~ 31.3	Cattail ~ 1	Water Willow < 1
Coontail ~ 24.6	Chara ~ 25.3	White Water Lily ~ 1.8
Wild Celery ~ 24.0	Coontail/Chara Mix ~ 12.8	Primrose < 1
Hydrilla < 1	Lyngbia ~ 1.2	

550
Meters



Figure 5. Comprehensive aquatic vegetation survey at Lake Athens (2013).

Lake Athens Vegetation Survey 07/11/2017
Current Surface Acreage ~ 1,799



Texas Parks and Wildlife Department
 Inland Fisheries Division

Prepared by: Jacob Norman & Richard Ott
 Texas Parks and Wildlife: Inland Fisheries Division
 Projection: NAD 83 UTM Zone 15N

This Map is for Reference Only
 The requestor must be aware of data conditions
 and ultimately bear responsibility for the appropriate
 use of the information with respect to possible errors,
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Species ~ Acreage
 Total Coverage ~ 370.4 Acres: 20.6% Lake Coverage

Lotus ~ 117.2	Alligatorweed ~ 4.7	Panicum ~ 1.0
Coontail ~ 108.8	White Water Lilly ~ 3.1	Waterwillow ~ 1.0
Pondweed ~ 56.7	Bladderwort ~ 2.3	
Wild Celery ~ 53.2	Cuttgrass/Panicum ~ 2.0	
Chara ~ 19.2	Coontail/Hydrilla ~ 1.2	

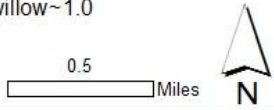
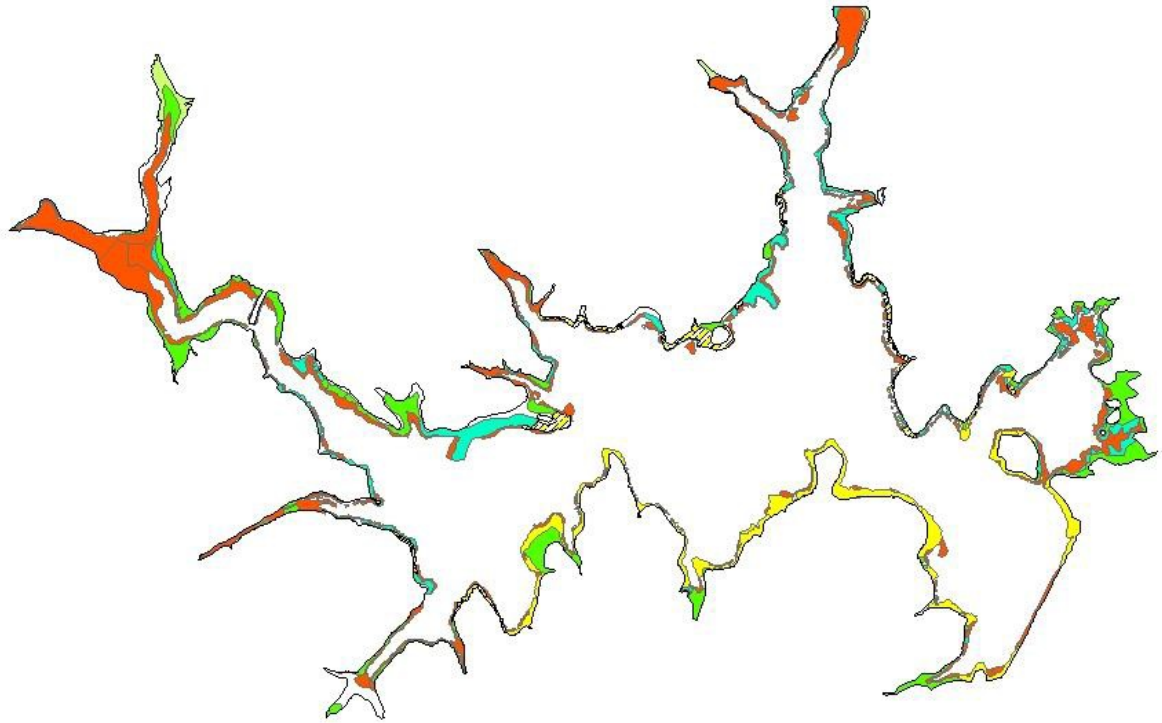


Figure 6. Comprehensive aquatic vegetation survey at Lake Athens (2017).

Lake Athens Vegetation Survey 08/16/2018
Current Surface Acreage ~ 1,701



Texas Parks and Wildlife Department
 Inland Fisheries Division

Prepared by: Jacob Norman & Richard Ott
 Texas Parks and Wildlife, Inland Fisheries Division
 Projection: NAD 83 UTM Zone 15N

This Map is for Reference Only
 The requestor must be aware of data conditions
 and ultimately bear responsibility for the appropriate
 use of the information with respect to possible errors,
 original map scale, collection methodology, currency
 of data, and other conditions specific to certain data.

Species ~ Acreage
Total Coverage ~360 Acres: 21% Lake Coverage

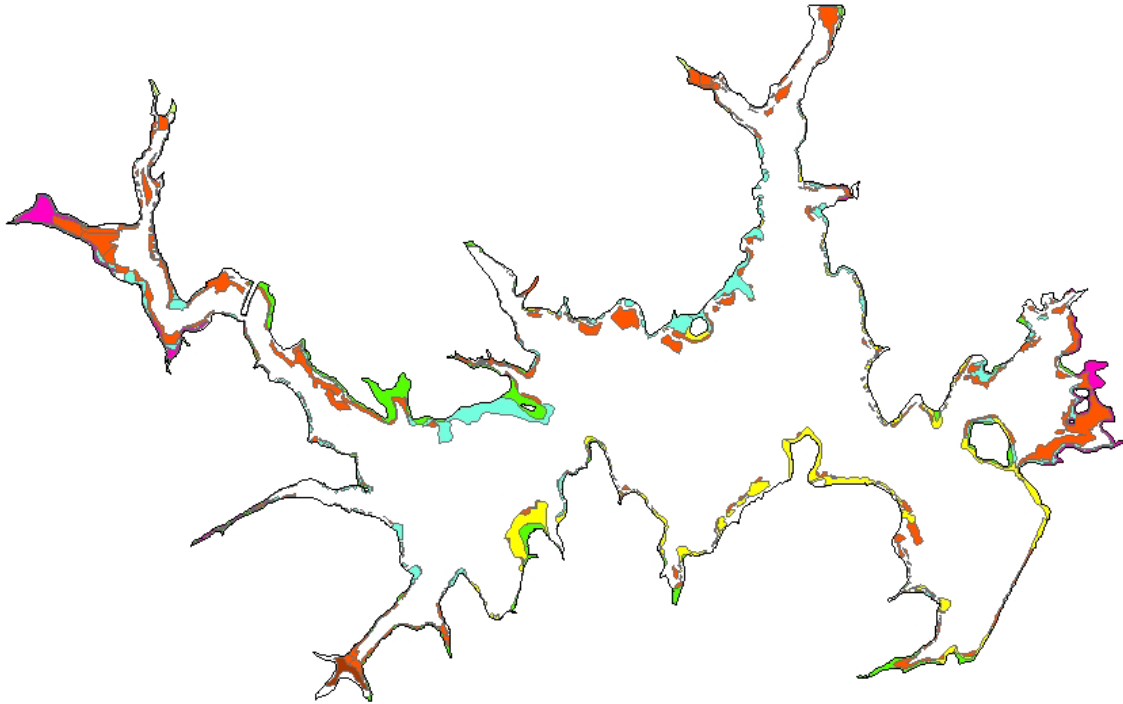
■ Coontail~149	■ Cutgrass~9	■ Aligatorweed<1
■ Lotus~72	■ Watersheild<1	■ Waterwillow~1
■ Pondweed~60	■ Spatterdock<1	
■ Wild Celery~51	■ White Water Lilly<1	
 Wild Celery/Pondweed Mix~19		

0.5
 Miles



Figure 7. Comprehensive aquatic vegetation survey at Lake Athens (2018).

Lake Athens Vegetation Survey 08/2/2020
Current Surface Acreage ~ 1,799



Texas Parks and Wildlife Department
Inland Fisheries Division

Prepared by: Jacob Norman & Bill Hughes
Texas Parks and Wildlife: Inland Fisheries Division
Projection: NAD 83 UTM Zone 15N

This Map is for Reference Only
The requestor must be aware of data conditions
and ultimately bear responsibility for the appropriate
use of the information with respect to possible errors,
original map scale, collection methodology, currency
of data, and other conditions specific to certain data.

Species ~ Acreage
Total Coverage ~ 261 Acres: 15% Lake Coverage

Coontail ~ 99	White Water Lilly ~ 21
Pondweed ~ 54	Cutgrass ~ 7
Eelgrass ~ 41	Bushy Pondweed ~ 3
Lotus ~ 35	Water Primrose ~ 1

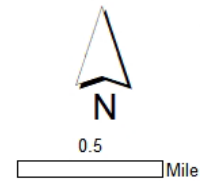


Figure 8. Comprehensive aquatic vegetation survey at Lake Athens (2020).

Appendix A

Year	2011	2012	2013	2017	2018	2020
Reservoir area during survey	1,539	1,658	1,392	1,790	1,701	1,799
Native submersed						
Coontail	490 (31.8)	525 (32.6)	25 (1.8)	109 (6.1)	149 (8.7)	99 (5.5)
Pondweed	27 (1.7)	38 (2.0)	31 (2.2)	57 (3.2)	60 (3.5)	54 (3.0)
Eelgrass	40 (2.6)	1 (<0.1)	24 (1.7)	53 (3.0)	51 (3.0)	41 (2.2)
Eelgrass+Pondweed					19 (1.1)	
Chara (alga)	39 (2.5)		25 (1.8)	19 (1.1)		
Lyngbya (alga)			1 (<0.1)			
Bushy pondweed						3 (0.1)
Native floating-leaved						
American Lotus	20 (1.3)	39 (2.4)	90 (6.4)	117 (6.5)	72 (4.2)	35 (1.9)
White water-lily	7 (0.5)	6 (<0.1)	2 (<0.1)	3 (0.2)	<1 (0.1)	21 (1.2)
Spatterdock					<1 (0.1)	
Water shield					<1 (0.1)	trace
Native Emergent						
Cattail			<1 (<0.1)			trace
Giant cutgrass				2 (0.1)	9 (0.5)	7 (0.3)
Water primrose			<1 (<0.1)			1 (<0.1)
Panic grasses				1 (<0.1)		trace
Water willow			<1 (<0.1)	1 (<0.1)	1 (0.1)	trace
Non-native						
Alligator weed (Tier II)*	<1.0 (<0.1)	28 (1.7)		5 (0.3)	<1 (0.1)	trace
Hydrilla (Tier III)*	123 (8.0)	10 (0.6)	<1 (<0.1)	1 (<0.1)	trace	trace
Giant salvinia (Tier I)*					trace	
Total (% coverage)	746 (48)	647 (39)	215 (15)	368 (20)	365 (21)	261 (15)

Surveys of aquatic vegetation, Lake Athens, 2011 – 2020. Surface area (acres) is listed by plant species with percent of total reservoir surface area occupied in parentheses.

*Tier I is immediate Response, Tier II is management status, Tier III is Watch Status

Appendix B



Aquatic Vegetation Management in Texas: A Guidance Document

Appendix C. Aquatic Vegetation Treatment Proposal Form

Form Instructions: Please fill in all of the following information completely and write legibly. A map of the waterbody with marked or delineated proposed treatment sites must be attached to the treatment proposal or processing may be delayed. An exotic species permit application must also be submitted if prohibited exotic vegetation ([see list here](#)) will be mechanically removed. Contact IFpermits@tpwd.texas.gov for more information.

Water Body Name: _____ Water Body Type(s): Lake/Reservoir River/Creek

Submitted By: _____ Submission Date: _____

Property Owner: _____ Contact Person: _____

Contact Phone: _____ Contact Email: _____

Treatment Site Physical Address ([attach map](#)): _____

Date Surveyed: _____ Proposed Treatment Start & End Dates:* _____ TO _____

Aquatic Vegetation Type(s) - Please Check ALL That Apply: Floating Emergent Submerged

Concern Tier – Please Check ONE: Immediate Response (Tier I) Maintenance (Tier II) Watch Status (Tier III)

Estimated Vegetation Coverage (Acres OR Shoreline Distance) To Be Treated: _____ Average Water Depth: _____ ft.

Proposed Treatment Type(s) - Please check ALL that apply: Mechanical Biological Chemical

Herbicide Applicator Name: _____ Applicator License Number: _____

Enter Each Target Aquatic Vegetation Species Name On A Separate Row In Table Below. ** Also Enter All Surfactants In Table.

Aquatic Vegetation Species <small>Enter one species per row.</small>	Chemical Treatment Brand Name(s) / Active Ingredient(s) <small>Enter one per row; use separate row for each surfactant.</small>	Method/ Form of Treatment <small>Chemical spray, granular chemical, mechanical/cutting, biological control, etc.</small>	Treatment Site Description <small>Shoreline, cove, river/creek, etc.</small>	Treatment Area <small>Enter as acres, acre-feet, or shoreline distance for river/creek; give unit of measure.</small>	Percent Coverage <small>Enter as percent of treatment area.***</small>	Chemical Treatment Rate <small>Rate per acre or acre-foot (or per gallon***); give unit of measure</small>	Total Treatment Used <small>Multiply rate X area***</small>
					%		
					%		
					%		
					%		
					%		
					%		
					%		

Comments: _____

*Approved proposals authorize treatments (up to the maximum acreage proposed) until December 31st of the year the proposal was approved, provided compliance with requirements for notices of intent to apply aquatic herbicide and all applicable local or other regulations/requirements.

**Use Additional Copies Of This Form If Needed.

***Chemical Treatment Of Individual Patches of Riparian Nuisance Vegetation Intermittently Distributed Along a River or Creek Enter "Spot Treatment."

Appendix C

How to Apply for Aquatic Vegetation Treatment

AMWA will only accept treatment proposals from March 1 to May 31 annually³.

