

FINAL PERFORMANCE REPORT



Federal Aid Grant No. F15AF01321 (T-89-1)

**Geographic Distribution and Ecological Impact of
Aquatic Invasive Plants in Oklahoma**

Oklahoma Department of Wildlife Conservation

April 1, 2016 through June 30, 2021

FINAL PERFORMANCE REPORT

State: Oklahoma

Grant Number: F15AF01321 (T-89-1)

Grant Program: State Wildlife Grants

Grant Title: Geographic Distribution and Ecological Impact of Aquatic Invasive Plants in Oklahoma

Report Period: April 1, 2020 – March 31, 2021

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Principal Investigator: Dr. Priscilla Crawford

Objectives:

Objective 1: To develop a statewide map of the current distribution of several aquatic invasive plants through a survey the public lakes of Oklahoma, investigating plant collection records, and contacting natural resource personnel.

Objective 2: To assess the ecological impact of the target invasive species within Oklahoma, including potential further invasion, effect on Species of Greatest Conservation Need, and ecosystem function.

Objective 3: To set up a reporting system for natural resource personnel and citizen scientists to report locations of invasive species within the state.

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1. Lake Surveys Summary

Over the course of the four survey years (2016-2018, and 2020), I surveyed 516 public access points at 147 Oklahoma lakes (Tables 1-2). Due to record setting statewide precipitation in the spring of 2019, lake levels across Oklahoma were several feet above normal pool levels. With lake elevations significantly higher, surveys for aquatic invasive plants on or near shore would not detect the presence of deeply submerged vegetation. Many public access points were underwater, inaccessible, and closed for safety during 2019. The fourth year of data collection was postponed until 2020.

All lakes listed in the Lakes of Oklahoma (Oklahoma Water Resources Board, 2021, <https://www.owrb.ok.gov/news/publications/lok/lok.php>) were surveyed with the exception of Rocky and Mountain, both of which were closed to the public the two times I attempted surveys. Several lakes also had locked gates or were signed private at one or more access points, but at least one access point was surveyed for all listed lakes. Access points included fishing piers, boat ramps and docks, marinas, and swim beaches. Survey protocol was modified from the original design because it was not productive and extremely time consuming. We made visual surveys and sampled by boat and rake when we observed any emergent or submerged aquatic vegetation within 50 m of each side of the sample area. This method was less frustrating and did not compromise data collection. Voucher specimens of invasive species were collected and will be deposited at the Bebb Herbarium, University of Oklahoma. Positive occurrences were also reported to EDDMapS and iNaturalist.

We found aquatic invasive species at 45 access points at 25 lakes. The most commonly found invasive species was Eurasian Milfoil (*Myriophyllum spicatum*) at 14 lakes across the state. Additionally, significant infestations of Alligator Weed (*Alternanthera philoxeroides*) were found on Kerr Lake and Webbers Falls Lake, both on the McClellan-Kerr Navigation channel. I provide details of each species in section 3 of this report.

2. Blue River Surveys

Surveys for the Blue River were targeted for Yellow Flag Iris (*Iris pseudacorus*) because of the known iris infestation on private property upstream of Connerville, Johnston Co. A 2009 kayak survey along the Blue River from the site of infestation down to the Hwy 377/99 Bridge at Connerville revealed several clumps of iris on the banks of the river.

In April of 2016, I surveyed all Blue River bridge crossings for Yellow Flag Iris from The Nature Conservancy's Oka'Yanahli Preserve to the Red River. Of the 18 bridges or low water crossings surveyed, Yellow Flag Iris was only found at the two sites closest to the original infestation and on The Nature Conservancy's Oka'Yanahli Preserve. The preserve staff has treated these patches and is managing the infestations on their property. Surveys at all other bridges downstream were negative for Yellow Flag Iris.

Continued management by The Nature Conservancy and regular surveys of the Blue River is important to keep this invasive species from spreading along this important water way that is home to numerous Species of Greatest Conservation Need and State Rare Species as ranked by the Oklahoma Natural Heritage Inventory.

3. Species History, Impact, and Future Threat in Oklahoma

3.1 Alligator Weed (*Alternanthera philoxeroides*) <https://www.okinvasives.org/alligatorweed>

First Recorded in Oklahoma: 1996

Lakes with Positive Occurrence During This Survey (Abundance):

Pine Creek (MODERATE)

Robert S. Kerr (HIGH)

Webbers Falls (HIGH)

Other Significant Infestations: Likely entire McClellan-Kerr Arkansas River Navigation System

Potential for Further Invasion: HIGH

Alligator Weed was found as a small infestation at the boat dock at Pine Creek Lake in McCurtain Co. and as large and significant infestations at Robert S. Kerr and Webbers Falls Lakes. Large monocultures were found at several locations and Alligator Weed was common at all access points of these two lakes. As these lakes are part of the McClellan-Kerr Arkansas River Navigation System, we must assume that the entire navigation system, including the Arkansas River, has been impacted. Originally introduced in ballast water, it is no surprise that a commercial navigation channel has been invaded.

Alligator Weed was first recorded in Oklahoma in 1996 in Wagoner Co. at the Choteau area of the McClellan-Kerr WMA. The rapid increase of this invasive species is exactly the type of behavior we expect from an extremely troublesome invasive species.

3.2 Hydrilla (*Hydrilla verticillata*) <https://www.okinvasives.org/hydrilla>

First Recorded in Oklahoma: 2006

Lakes with Positive Occurrence During This Survey (Abundance):

Nanah Waiya (LOW)

Murray (HIGH)

Ardmore City (HIGH)

Other Significant Infestations: unknown

Potential for Further Invasion: HIGH

During my surveys, I verified the well-known infestation of Hydrilla at Lake Murray and newly documented the infestation at Ardmore City Lake. Both lakes had thick mats of Hydrilla

vegetation at boat ramps and docks. A couple stems of Hydrilla were also found at Nanih Waiya Lake in Pushmataha Co. Hydrilla had also been reported in the Lake of the Arbuckles, but none were found at the four public access points surveyed. The first record of Hydrilla in Oklahoma was in 2006. The extent of the invasion of Murray and Ardmore City Lakes in the past 15 years indicates that Hydrilla is likely to rapidly spread to other lakes in the near future. This spread will be facilitated by recreational boats that are used in multiple lakes.

3.3 Yellow Flag Iris (*Iris pseudacorus*) <https://www.okinvasives.org/yellowiris>

First Recorded in Oklahoma: 2002

Lakes with Positive Occurrence During This Survey (Abundance):
none

Other significant Infestations: Blue River

Potential for Further Invasion: HIGH

Yellow Flag Iris was not found at any of the lakes surveyed. However, it has invaded the Blue River system in Johnston Co. (see section 2 of this report). This infestation originated on private property on the banks of a spring fed pond on a tributary of the Blue River. The first report of this species in a natural area in Oklahoma was in 2002. iNaturalist observations from the past couple years show that it is popular in gardens and parks in eastern Oklahoma. The continued legal sale of this showy ornamental flower in Oklahoma means we will need to be looking out for its escape into native habitats.

Regular surveys of the Blue River are necessary for rapid response to any further escape of invasive species in this important water way, which is home to numerous Species of Greatest Conservation Need and State Rare Species as ranked by the Oklahoma Natural Heritage Inventory.

3.4 Purple Loosestrife (*Lythrum salicaria*) <https://www.okinvasives.org/purpleloosestrife>

First Recorded in Oklahoma: 1999

Lakes with Positive Occurrence During This Survey (Abundance):
Guthrie (LOW)

Other significant Infestations: unknown

Potential for Further Invasion: LOW

Purple Loosestrife was only found at Guthrie Lake during my survey period. It was originally recorded at Guthrie Lake in 1999. The population at the lake does not seem to be spreading and the species is only found scattered along the lakeshore, mixed in with native vegetation. Purple Loosestrife has been documented in herbaria and reported through iNaturalist in a few roadside locations in central Oklahoma. Although this species is highly invasive in wetlands of the upper Midwest and Northeastern U.S., there is little indication that it will become a significant problem in Oklahoma.

3.5 Parrot Feather (*Myriophyllum aquaticum*) <https://www.okinvasives.org/parrotfeather>

First Recorded in Oklahoma: 1952

Lakes with Positive Occurrence During This Survey (Abundance):
Carlton (MODERATE)

Clayton (MODERATE)
Sportsman (MODERATE to HIGH)
Other significant Infestations: Illinois River
Potential for Further Invasion: MODERATE

Parrot Feather was found at three lakes in Oklahoma during my surveys. Only at Sportsman had it created a monoculture of vegetation forming a dense mat. At Clayton and Carlton, Parrot Feather intermingled with a variety of native vegetation. In combination with these native species, the aquatic vegetation formed large mats of vegetation near shore and floating in the lake. While this provides good habitat for aquatic fauna, it can cause problems for people recreating at the lake and park staff were investigating management options.

Parrot Feather was first recorded in Oklahoma in 1952 at the Tahlequah Fish Hatchery and was the likely source of further infestations in other lakes that were stocked with fish, from this facility. According to herbarium records, Parrot Feather has also been found in Spavinaw (1956), Raymond Gary (1980), Fuqua (1988), and Schooler (1995) Lakes. My surveys were negative for these lakes. Additionally, it was first found at both Carlton and Clayton over 40 years ago. The lack of spread at previously known locations indicates that it has not been as invasive in Oklahoma as other locations in the southeast U.S. However, with changing climate and weather patterns, conditions may shift to promote the growth of this invasive species within Oklahoma.

3.6 Eurasian Milfoil (*Myriophyllum spicatum*) <https://www.okinvasives.org/eurasianmilfoil>

First Recorded in Oklahoma: 1959
Lakes with Positive Occurrence During This Survey (Abundance):
See Table Below
Other significant Infestations: most waterways and waterbodies of the
Wichita Mountains National Wildlife Refuge
Potential for Further Invasion: MODERATE to HIGH

Eurasian Milfoil is the most common and widespread aquatic invasive plant in Oklahoma. I found it in 14 of the 147 lakes surveyed (nearly 10%). These lakes were scattered across the state, in several watersheds, and in several different ecoregions. The first record of Eurasian Milfoil in the state was from Quanah Parker Lake in 1959 and since that time it has been documented in 24 lakes. However, I found no evidence of Eurasian Milfoil at 10 of these lakes (Table 1), indicating that this species is not quickly invading and creating a significant infestation at these lakes. The species may be present at these lakes, but my surveys were limited to the public access points. Unfortunately, in several of the lakes that I did survey, the infestation was remarkably severe. Lakes of the Wichita Mountains National Wildlife Refuge (NWR) with low turbidity were the most heavily infested lakes that I surveyed.

Lake	Year of First Record	Found 2016-2021	Abundance
Quanah Parker	1959	✓	High
Carl Etling	1964		
Comanche	1966	✓	High
Humphries	1970		
Fuqua	1975		
Robert S. Kerr	1975		
Stanley Draper	1979		
Fort Cobb	1979		
Lawtonka	1980	✓	Moderate
Elmer Thomas	1980	✓	High
Chandler	1980		
Purcell	1980		
Clear Creek	1982		
Sooner	1998	✓	High
Shawnee	1980		
Dead Warrior	1999	✓	Moderate
Longmire	2001		
Prague	2016	✓	High
Spavinaw	2016	✓	High
Pauls Valley	2016	✓	Moderate
Cleveland	2017	✓	Low
Jap Beaver	2018	✓	Low
Dalgren	2020	✓	Moderate
Elk City	2020	✓	High

3.7 Brittle Naiad (*Najas minor*) <https://www.okinvasives.org/brittlenaiad>

First Recorded in Oklahoma: 1979

Lakes with Positive Occurrence During This Survey (Abundance):

Robert S. Kerr (LOW)

Other significant Infestations: none

Potential for Further Invasion: LOW to MODERATE

Brittle Naiad was first documented in Oklahoma over 40 years ago in Lake of the Arbuckles. However, I did not find evidence of this species at the public access points. Therefore, in the 40 years since it was first observed, it has not become a problem species at this lake or within the state. I found small patches of Brittle Naiad at three public access points on the southern shore of Robert S. Kerr Lake. Brittle Naiad is a problem in northern states. In future climate scenarios, Oklahoma's waters may not be suitable habitat for Brittle Naiad. However, its presence in the McClellan-Kerr Arkansas River Navigation System is cause for

concern because of the potential to spread easily in this waterway and the potential for disrupting commercial shipping.

3.8 Water Lettuce (*Pistia stratiotes*) <https://www.okinvasives.org/waterlettuce>

First Recorded in Oklahoma: 2020

Lakes with Positive Occurrence During This Survey (Abundance):

 Pretty Water Lake (Sahoma Lake)

Other significant Infestations: none

Potential for Further Invasion: MODERATE

Water Lettuce has become a notable problem in the states of the Gulf Coast, invading lakes, ponds, and slow moving streams. Water Lettuce is sold in Oklahoma and is a popular plant for water gardens, but does not appear to overwinter or produce viable seeds in Oklahoma. I found three individual plants of Water Lettuce at Pretty Water Lake, a small lake next to Sahoma Lake in Sapulpa, OK. All individuals were collected. There are no other reports of Water Lettuce from natural areas in Oklahoma in the iNaturalist or EDDMapS databases.

The degree of infestation along the Gulf Coast, its popularity in water gardens, and continued warming of the climate indicates that Water Lettuce is likely to become a problem in the future. We should continue to look for and eradicate any Water Lettuce that appears to escape from garden habitats into natural areas.

3.9 Other Aquatic Invasive Plants of Concern

ODWC has in the past listed additional aquatic invasive species of concern, both in the Aquatic Nuisance Species Management Plan and in the Request for Proposals for the State Wildlife Grant. Species that are problems in neighboring states within habitats found in Oklahoma should also be evaluated. The following species were not found during my surveys of Oklahoma lakes, but I will discuss their history, current distribution, and potential for invasion.

3.9.1. Wild Taro (*Colocasia esculenta*) <https://www.okinvasives.org/wildtaro>

First Recorded in Oklahoma: never

Potential for Future Invasion: LOW to MODERATE

Grown originally as a substitute crop for potatoes in wet areas, Wild Taro is a common ornamental plant in home landscapes. This species has reported as naturalized and invasive in central Texas and may escape cultivation in Oklahoma in the future.

3.9.2. Brazilian Waterweed (*Egeria densa*) <https://www.okinvasives.org/brazilianwaterweed>

First Recorded in Oklahoma: 1947

Potential for Further Invasion: MODERATE

Brazilian Waterweed had been recorded from numerous locations in the state including lakes in the Wichita Mountains NWR, Holdenville Lake, Lake Murray, and Schooler Lake. The earliest recording of this species in the state was in 1947. I did not find this species at any public

access points, which indicates that it has not spread widely in the state nor has become a problem in the lakes in which it had been previously found.

3.9.3. Water Hyacinth (*Eichhornia crassipes*) <https://www.okinvasives.org/waterhyacinth>

First Recorded in Oklahoma: never

Potential for Future Invasion: LOW to MODERATE

Like Water Lettuce, Water Hyacinth is a significant problem in the states of the Gulf Coast where it is a popular plant for water gardens. Similar to Water Lettuce, the degree of infestation along the Gulf Coast, its popularity in water gardens, and continued warming of the climate indicates that Water Hyacinth may become a problem in the future. We should continue to look for and eradicate any Water Hyacinth that appears to escape from garden habitats into natural areas.

3.9.4. Water Clovers (*Marsilea mutica* & *M. quadrifolia*) <https://www.okinvasives.org/waterclover>

First Recorded in Oklahoma: never

Potential for Future Invasion: LOW

These two species of Water Clovers are not widespread in North America, with the majority of observations occurring in the northeast US and neighboring Kansas and Missouri. Based on its current distribution in the U.S., it is unlikely to become a problem in Oklahoma's waters. However, we should continue to look for these species and eradicate when found.

3.9.5. Crested Floating Heart (*Nymphoides cristata*) <https://www.okinvasives.org/crestedfloatingheart>

First Recorded in Oklahoma: never

Potential for Future Invasion: LOW to MODERATE

Crested Floating Heart is not yet widespread in North America, but it has been reported in natural areas of Texas, Louisiana, and other states of the southeastern U.S. It has been used in water gardens and appears to have escaped and become invasive in the 1990s in Florida. Although this species is currently found in low densities in the Southeast U.S., there is significant concern because herbicides used to treat other similar species have had little effect on this plant.

3.9.6. Yellow Floating Heart (*Nymphoides peltata*) <https://www.okinvasives.org/yellowfloatingheart>

First Recorded in Oklahoma: 1947

Potential for Future Invasion: HIGH

According to herbarium records, Yellow Floating Heart has been in the state at least since the 1940s. It was recorded at Broken Bow Lake in the 1950s and 60s and at Lake Texoma as recently as the 1980s. An infestation was recently found at Lake Carl Blackwell and teams from OSU and ODWC treated this population in 2019. This lake will be closely monitored by lake managers and researchers for repopulation. Given its continued sale as a water garden plant and

knowing its success in Lake Carl Blackwell, I would suspect that it likely to continue to be a problem species in the state.

3.9.7. Giant Salvinia (*Salvinia molesta*) <https://www.okinvasives.org/giantsalvinia>

First Recorded in Oklahoma: never
Potential for Future Invasion: HIGH

Giant Salvinia has not been reported in Oklahoma. There are no herbarium or citizen science records for the state, but there are records in Texas, Louisiana, and Arkansas, including counties adjacent to Oklahoma. The ease of transportation of vegetative reproductive material on boats and other equipment and its tendency to grow rapidly make it a species that could quickly become a problem within the state once established. The current distribution of this invasive just to our south also indicates that our waterbodies will be suitable for the continued spread of Giant Salvinia.

4. eDNA Research

In spring of 2017, Jessa Watters (Siler Lab, Sam Noble Museum) and I discussed the possibility of using eDNA to detect invasive plants in waterbodies. At the time little research had been done testing eDNA techniques with plants. Using eDNA detection to survey lakes could be a way to detect the presence of an invasive species somewhere within the body of water, but not visually detectable.

With assistance from the Siler Lab, I developed methodology to collect eDNA samples. I planned for 10 m transects within the waterbody, starting within the infestation and collecting out into the open water. Jessa Watters and Tamaki Yuri (Genomics Core Facility, Sam Noble Museum) developed the primer-probes for our target species, *Myriophyllum aquaticum*, and congeneric native species. Using techniques developed by the Siler Lab, we filtered and stored the samples in a freezer until they could be processed by the Genomics Core Facility. In the late growing season of 2017, I collected water samples to be tested for eDNA at Sportsman, Carlton, and Clayton Lakes.

Due to the backlog of work at the Genomics Core Facility, my samples were not processed until late 2018. Unfortunately, the initial results from the eDNA analysis of all the lake samples did not indicate the presence of the invasive species, even though several of the samples were taken within the infestation. Therefore, we were definitely getting false negative results, which according to our literature research is not uncommon with eDNA samples. We speculated that the samples were not processed correctly. This was the first time that the Genomic Core Facility at the Sam Noble Museum had worked with plants. The DNA extraction procedures needed to be adjusted for plant material, rather than animal material. During March of 2019, the lab processed the sample material again using methods developed specifically for plants. They tried two different procedures and unfortunately, the results still came back negative. This may be why the literature is scarce regarding eDNA projects focusing on plants.

5. Educational Website

<https://www.okinvasives.org/aquatic-invasives>

The website provides information on all the aquatic invasive species that were found during this survey and other species that are potentially of concern for Oklahoma's waterways. Each species has a short description and links to databases on the spatial distribution and the herbarium records. Rather than provide a static map of the data collected during this survey, we instead link to the iNaturalist and EDDMapS databases that includes not only our data but also data from global databases of records from other professionals and citizen scientists. These databases are updated continuously and will give the best possible information for invasive species distributions in Oklahoma.

6. Reporting system

The original scope of work of this grant was to develop an invasive species reporting system for citizen scientists for invasive species of Oklahoma. A preliminary program was developed and presented to Oklahoma State Park managers and naturalists and to environmental organizations active in the state. However, reporting from these groups was extremely low, with less than 10 reports coming in during a 2-year period. At the writing of the grant proposal, several states had developed individual statewide programs and online reporting systems, including smart phone apps for state or regional reporting. We had modeled our potential program after these. However, these decentralized and individualized databases have been subsequently incorporated into national and global biodiversity databases of professional and citizen science observations. Professional biologists and knowledgeable amateurs now use the Early Detection and Distribution Mapping System (EDDMapS, <https://www.eddmaps.org>) for documenting invasive species and pests. EDDMapS was developed by the Center for Invasive Species and Ecosystem Health at the University of Georgia and has over 5 million records for the U.S. and Canada. Amateur citizen scientists use iNaturalist (<https://www.inaturalist.org>) to document any type of biodiversity, but their observations are becoming an important source of early detections of invasive species. The iNaturalist user interface is simple and easy to use and thousands of Oklahomans regularly upload observations to the database. In the past year, two exotic species were reported by citizen scientists for the first time in Oklahoma using iNaturalist. Many hundreds of other invasive species observations have been made within the state, expanding our knowledge about their current distributions.

Both of these databases are well supported by agencies and institutions, have long standing reputations, and will certainly continue to be the best option for reporting invasive species for Oklahoma, nationally, and globally. Therefore, I, along with the Oklahoma Invasive Plant Council, encourage invasive species observations to be reported through one of these programs.

7. Invasive Species Patterns

A few patterns emerged from the data collected at 147 lakes and 516 public access points.

- **Lakes with highly fluctuating lake levels are much less likely to have aquatic vegetation near the shore that is rooted in the lake bottom.** Lakes such as Eufaula, Broken Bow, Texoma, Keystone, Canton, and Fort Gibson have highly fluctuating water

levels – sometimes rising and falling several meters within a few weeks. This limits the ability of vegetation to survive while rooted in the substrate near shore because it may become totally dry or submerged several meters below the water surface.

- **Lakes with highly turbid water are unlikely to support submerged aquatic vegetation.** Plants below the surface of the water will be unable to photosynthesize because the particles in the water block the sunlight. Lakes with clearer water provide suitable habitat for submerged vegetation.
- **Lakes in close proximity to other lakes with invasive species problems are likely to become infested.** Introductions to new locations are usually caused by transportation on boats and equipment from lake to lake. People who move their boats from lake to lake before the plants dry out or fall off are likely moving invasive plants from lake to lake. We see this with Hydrilla at both Murray and Ardmore City Lakes and Eurasian Milfoil at all the water bodies of the Wichita Mountains NWR.

8. Recommendations

Based on the positive occurrences of invasive species during this survey period, current distribution of aquatic invasive species North America, ecological requirements of aquatic invasive species, and the impact of these species, I make the following recommendations for the Oklahoma Department of Wildlife Conservation and entities that manage public lakes around the state. My work will also inform the Oklahoma Invasive Plant Council as they develop strategies for tackling aquatic invasive species in the state.

- **Update the plant section of Aquatic Nuisance Species plan** based on the new information from these surveys and current information in the EDDMapS and iNaturalist databases https://www.wildlifedepartment.com/fishing-old/ans/ANS_plan.pdf
- **Campaign to get the following species listed as state “Noxious” and develop legal restrictions for the sale, transport, and growth of these species:**
 - Alligator Weed (*Alternanthera philoxeroides*)
 - Brazilian Waterweed (*Egeria densa*)
 - Water Hyacinth (*Eichhornia crassipes*)
 - Hydrilla (*Hydrilla verticillata*)
 - Yellow Flag Iris (*Iris pseudacorus*)
 - Parrot Feather (*Myriophyllum aquaticum*)
 - Eurasian Milfoil (*Myriophyllum spicatum*)
 - Brittle Naiad (*Najas minor*)
 - Yellow Floating Heart (*Nymphoides peltata*)
 - Water Lettuce (*Pistia stratiotes*)
 - Giant Salvinia (*Salvinia molesta*)
- **Equipment used at lakes should be thoroughly cleaned before transportation to another lake.** This not only applies to recreational and commercial boats and trailers, but also to construction equipment and fishing and hunting gear, including such things as traps, waders, and bait buckets.
- **Monitoring of Blue River for Yellow Flag Iris.** Resource managers at the Blue River WMA should regularly survey the river for further spread of this invasive iris.
- **Post information and signage at all infested lakes.** The national “Stop Aquatic Hitchhikers” and “Play Clean Go” campaigns have well developed education materials and outreach toolkits that can easily be implemented throughout the state with a

consistent look and message to help everyone understand the problem of all ANS species.

9. Data Sources

Herbarium Records

The Texas Oklahoma Regional Consortium of Herbaria Data Portal

<https://portal.torchherbaria.org/>

Citizen Science Observations

iNaturalist – online social network of biodiversity observations

<https://www.inaturalist.org>

Professional Invasive Species Reports

Early Detection and Distribution Mapping System (EDDMapS)

<https://www.eddmaps.org/>

Species Information

Texas Invasives Database

https://texasinvasives.org/plant_database/

EDDMapS Species Information

<https://www.eddmaps.org/species/>

State Rare Species and Species of Greatest Conservation Need

Oklahoma Comprehensive Wildlife Conservation Strategy

https://www.wildlifedepartment.com/sites/default/files/Oklahoma%20Comprehensive%20Wildlife%20Conservation%20Strategy_0.pdf

Oklahoma Natural Heritage Inventory

<http://oknaturalheritage.ou.edu/>

Outreach and Education

Play Clean Go – campaign stop the negative impact of invasive species in North America

<https://playcleango.org>

Stop Aquatic Hitchhikers – campaign to stop the spread of aquatic invasive species

<https://stopaquatichitchhikers.org>

Significant Deviations: None.

Equipment Purchase During Grant (Cumulative): None.

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APPENDIX I. ANNUAL REPORTS

A. April 2016-March 2017

Before the field season, I purchased a variety of supplies for the late summer invasive plant aquatic surveys, including plant identification tools, plant press, collecting bags, tape measure, PFDs, kayak paddles, and rubber boots.

During June, I developed a field guide to our target invasive species for use by field assistants working with me.

With the assistance of graduate student Kayleigh Anaya, I began lake surveys for aquatic invasive plants in July. We focused on lakes conveniently located near our office in case resampling was necessary after an adjustment to survey protocol.

For our first 7 lakes we did 50 m transects to the right and left of each survey point (sampling underwater with a rake at 10 m intervals). These were time consuming and unproductive. We changed the protocol to a visual survey with sampling by boat and rake when we observed any emergent or submerged aquatic vegetation within 50 m of each side of the sample area. This method was less frustrating and did not compromise data collection.

We found *Myriophyllum spicatum* in 2 of the 15 lakes surveyed in July. No other target species were found. We made note of some other invasive species of interest at a few of the lakes - *Tamarix* spp. and *Phragmites australis*.

During August, I surveyed 10 lakes at 29 public access points. I found *Myriophyllum spicatum* in 2 lakes surveyed in August. I found *Tamarix* sp. at most of the western lakes that were sampled. I also found large patches of *Arundo donax* at 2 lakes.

During September, I surveyed 7 lakes at 17 public access points. I found no populations of the target aquatic invasive species in these lakes. I found a low abundance of *Tamarix* sp. at 2 lakes. I also found large patches of *Arundo donax* and *Phragmites australis* at 2 lakes.

During October, I surveyed 16 lakes at 50 public access points.

I found large patches of *Arundo donax* at Overholser.

On Nov. 2, I surveyed 6 access points at 1 last lake for the season, Stanley Draper. I found large patches of *Arundo donax*, *Sagittaria arifolia*, and *Phragmites australis* at Lake Stanley Draper.

I exceeded my goal of surveying 40 lakes this year, by surveying a total of 48, including several large lakes with multiple access points. I took advantage of the good weather conditions to continue the survey period into October and first week of November. In the coming years, I will know that surveys for aquatic vegetation can be conducted throughout October if there has been no freeze in the area and water temperatures stay above 65.

I presented these early results at the Oklahoma Natural Resources Conference, Invasive Species Symposium, February 2017.

B. April 2017-March 2018

During April, I had planned to travel by kayak down the Blue River from just west of Connerville to the low water crossing on County Road E 1790 to survey for *Iris psuedacorus* spread down river. Unfortunately, the water levels throughout the spring did not allow for safe or effective float conditions. However, Mark Howery told me of his surveys of the Blue River for seaside alder populations on the Blue River WMA. He reported that he found no *Iris psuedacorus* during his surveys.

During the early summer, I purchased misc. supplies for the upcoming field work.

Beginning in July, I conducted surveys at Fort Gibson and Greenleaf lakes. I sampled at 30 public access points. I found no targeted aquatic invasive species. I also found no populations of the other species that I have added to my survey protocol.

I found one infestation of Kudzu (*Pueraria montana* var. *lobata*) along Hwy 10 near Fort Gibson Lake.

During September, I completed surveys at 16 lakes and did partial surveys of 2 large lakes (Eufaula and Oolagah). I made observations at 40 access points.

During October, I surveyed Lake Murray at 10 public access points. I found Hydrilla at 5 of the access points. At only 2, was the invasive highly abundant. This population of Hydrilla is well known and I was not surprised to find it.

Also during October, I collected water samples for the eDNA project. The project is to test if eDNA water sampling will be a useful survey method for aquatic invasive plants that you may not be able to see at public access points. I collected water and plant samples from Carlton Lake and Clayton Lake. I had collected samples from Sportsman Lake in mid-September. The target species that we are testing is *Myriophyllum aquaticum*. The Genomics Lab at the Sam Noble Museum is developing the primer-probe for this species. I also collected a different species of *Myriophyllum* from Prague City Lake to compare the primer-probe and verify that the primer is specific to *M. aquaticum*. As of the writing of this report, we do not have results from this trial.

I have surveyed approximately half of the lakes for the project and feel confident that I am on track to complete the surveys in the 4 years of the grant. This season concluded a little earlier than last year, as the water temperatures were dropping quickly this fall.

I presented my findings to date at a regional meeting of the Society for Ecological Restoration in November and at the invasive species symposium at the OKNRC in February 2018 (link to PowerPoint Presentation: <https://priscillacrawford.files.wordpress.com/2018/02/crawford-oknrc-2018.pptx>)

C. April 2018-March 2019

Lake temperatures were warm enough in southwest Oklahoma to promote aquatic growth and therefore I initiated this year's surveys in mid-June for that region. I also had travel funds remaining from the 2017-18 grant year to cover the cost of these trips.

I surveyed the following lakes during June: Waurika, Jap Beaver, Dave Boyer, Frederick, Ellsworth, Lawtonka, Tom Steed, Lugert-Altus, Altus City, Hall, Vanderwork, and Ft Cobb.

I attempted to survey Rocky, but there was a locked gate to the boat ramp/dock area. I will follow up when a future trip takes me in the vicinity.

Arundo donax, *Phragmites australis*, and *Tamarix* spp. are common near and around most of these western lakes.

During July and August, I surveyed 20 public access points at Lake Texoma, on the Oklahoma side. I found none of the target species in the lake or near shore. I did find scattered patches of *Arundo donax* around the lake, particularly in areas that had lake communities where people had planted in yards as a screen plant. Interestingly, I did not see any mature zebra mussels at any of the sites on Lake Texoma.

In August, I also surveyed Pawnee Lake. I found no aquatic invasive plants, but did find mature zebra mussels on the old concrete boat docks on the east side of the lake near the dam.

In September I observed the invasive, exotic plant Water Lettuce (*Pistia stratiotes*) along the north shore of the Pretty Water Lake in the vicinity of both fishing piers. I observed only 3 plants, which I collected as a record. This was not one of the species that was originally on the grant, but one that I added to the list to be on the lookout for.

The month of October was surprisingly rainy and caused many lake levels to rise. I had trips planned for the first half of the month, but postponed due to rain and flooding. I attempted surveys at Eufaula, Okmulgee, and Dripping Springs on Oct 24-25, but recent rains had raised the water levels over a foot from just a few weeks prior. I felt that any negative observations may simply be due to the plants being several feet below the water. Therefore, no reliable information was gathered during the month of October.

The during the rainy October lake levels rose quickly and I felt that there was a possibility of false negatives with vegetation being submerged under feet of new water. Coupled with the cool temperatures in late October and early November, the survey season was cut shorter than previous years. However, I have surveyed 106 of the approximately 140 lakes, visiting nearly 400 public access points. The majority of the lakes remaining to be surveyed in 2019 are in western Oklahoma. Given the setbacks I had this fall, I plan to survey as much as possible early in the season to complete the project in case of future weather difficulties.

The eDNA project is has hit several snags. I presented the work in February at OKNRC (link to PowerPoint Presentation: <https://priscillaacrawford.com/field-projects/aquatic-invasive-plant-surveys/>). Unfortunately the initial results from the eDNA analysis of all the lake samples did not indicate the presence of the invasive species, even though several of the samples were take within the infestation. Therefore, we were definitely getting false negative results, which according to our literature research is not uncommon with eDNA samples. We speculated that the samples were not processed correctly. This was the first time that the Sam Noble Genomic Lab had worked with plants. We thought maybe the DNA extraction procedures needed to be adjusted for plant material, rather than animal material. During March, the lab processed the sample material again using methods developed specifically for plants. They tried two different

procedures and unfortunately, the results still came back negative. The biologists in the lab are uncertain what the next step should be and we are researching other possible solutions to this problem. This may be why the literature is scarce regarding eDNA projects focusing on plants.

D. Justification for No Cost Extension - 2019

Due to the record setting statewide precipitation this spring, lake levels across Oklahoma are several feet above their normal pool level. With lake elevations significantly higher than recent history, surveys for aquatic invasive plants on/near shore will not detect the presence of deeply submerged vegetation. In fact many public access points are underwater, inaccessible, and closed for safety. I am requesting that the final year of funding (FY20) be postponed with no additional funds to next year (FY21) so that I may complete the surveys during a more typical rainfall year.

E. April 2019-March 2020

Although we postponed our final year of funding, undergraduate assistants helped to develop an informative website, reporting system, and interactive map.

The draft website: <https://biosurvey.ou.edu/developing-the-aquatic-invasive-plants-of-oklahoma/>.

I had informal discussions with ODWC personnel about integrating our draft website into the newly revised ODWC Aquatic Nuisance Species Program website. We do not want to duplicate effort and we would like the citizens of Oklahoma to find information in one centralized website, rather than bits of information in several websites administered by multiple agencies.

Funded previously in the grant, the eDNA pilot project seems to have concluded that this method of aquatic invasive plants in lakes will not be a viable alternative to plant surveys. When I presented the work in February 2019 at Oklahoma Natural Resources Conference, the results from the eDNA analysis of all the lake samples did not indicate the presence of the invasive species, even though several of the samples were taken within the infestation. Therefore, we have false negatives, which according to our literature research is not uncommon with eDNA samples. We speculated that the samples were not processed correctly. This was the first time that the Sam Noble Genomic Lab had worked with plants and possibly the procedures that were used to extract the DNA from the sample needed to be adjusted for plant material, rather than animal material. During March, the lab processed the sample material again using methods developed specifically for plants. They tried two different procedures and unfortunately, the results still came back negative. The biologists in the genetic lab are uncertain what the next step should be. This may be why the literature is scarce regarding eDNA projects focusing on plants.

F. April 2020-March 2021

After a spring of halted field work, the University of Oklahoma began allowing a return to the field with significant COVID precaution protocols. I was not able to travel with anyone in my vehicle during the field season. Field work was less efficient with only one person. However, travel expenses were significantly less for one person and I chose to camp or use Oklahoma State Park facilities rather than stay in commercial hotels.

Surveys resumed in early July and continued through September. In mid October, I rechecked a few lakes based on herbarium records and previously high water. The last lake, Cedar, was surveyed on 15 October.

Lakes at which I have observed target invasive species:

Ardmore City – 1 survey – *Hydrilla verticillata* – high abundance

Elk City – 2 surveys - *Myriophyllum spicatum* – large mats on north side of lake

Foss – 6 surveys – mature zebra mussels

Guthrie – 1 survey – *Lythrum salicaria* – scattered along north shore

Dripping Springs – 2 surveys - *Phragmites australis* – monoculture along most of the entire lakeshore

Dalgren – 1 survey - *Myriophyllum spicatum* – abundant at boat dock and boat ramp

Canton – 10 surveys - *Phragmites australis* – large monoculture patches where not mowed along lakeshore

Webbers Falls – 6 surveys - *Alternanthera philoxeroides* – common at all public access points, intermingled with native aquatic plants

Kerr – 8 surveys - *Alternanthera philoxeroides* – common at aquatic plants;

Myriophyllum spicatum and *Najas minor* at Cowlington Point Boat Ramp

Dead Warrior – 2 surveys - *Myriophyllum spicatum* – abundant

Fort Supply – 7 surveys - *Phragmites australis* – large monoculture patches; *Arundo donax* - large patch on eastern side of lake

Elmer Thomas – 1 survey - *Myriophyllum spicatum* – high abundance

Rush – 1 survey - *Myriophyllum spicatum* – high abundance

Quanah Parker – 2 surveys - *Myriophyllum spicatum* – high abundance

I attempted to survey Rocky and Mountain lakes, but both had locked and gated entries during my visit.

We requested a budget realignment to move the excess money in the travel line to student salaries. Students assisted with data entry, photo archives, and website development.

Table 1. Data from surveys where invasive species were present.

Survey #	Date	Lake	Exact Location	Aquatic Invasive Species Present	Invasive species notes	General Habitat	Lake Level Scale	Water Temp	Signs	Zebra mussels	Transparency (m)	Riparian and other invasive species of concern
20002	07/09/20	Ardmore City	Boat ramp	Hydrilla	very abundant, all over according to ODWC crew that I spoke with	Cross timbers	3	86	Aquatic Hitchhiker, stencil on ramp		1.5	
17063	09/06/17	Carlton	Boat Ramp	Myriophyllum aquaticum	not a monoculture, mixed in with natives; scattered all along shore	oak hickory pine	4	78	Aquatic Hitchhiker			
17054	09/05/17	Clayton	Boat ramp, south	Myriophyllum aquaticum	scattered with natives at arm of lake, not in water, but rooted in mud	shortleaf pine forest	4	82	Aquatic Hitchhiker			
17051	09/04/17	Cleveland	Dam boat ramp	Myriophyllum spicatum	scattered	bottom land, cross timbers	4	84				
16053	08/25/16	Comanche	fishing pier, near dam	Myriophyllum spicatum	abundant		4	82			1	
16054	08/25/16	Comanche	fishing pier, north	Myriophyllum spicatum	abundant		4					Arundo donax
20051	07/30/20	Dalgren	Boat dock	Myriophyllum spicatum	very abundant	Cross Timbers	3	88			1	
20101	09/03/20	Dead Warrior	Dam boat ramp	Myriophyllum spicatum	large patch	Mixed grass	2	79			0.5	Phragmites, a few patches
20102	09/03/20	Dead Warrior	Fishing pier	Myriophyllum spicatum	lower abundance	Bottomland	2	79			0.5	Phragmites, large patches within Typhus
20014	07/15/20	Elk City	North fishing pier	Myriophyllum spicatum	scattered, loose, floating around	Mowed park	2	80			0.5	
20015	07/15/20	Elk City	SW boat dock	Myriophyllum spicatum	giant mat	Mixed grass	2	81			0.5	
20124	09/30/20	Elmer Thomas	Refuge boat ramp	Myriophyllum spicatum	very abundant, significant infestation	Mixed grass and cross timbers	3	68			5	
20031	07/17/20	Guthrie	Boat dock	Lythrum salicaria	scattered along north shore, not a monoculture, doesn't seem to be a big problem	Mowed park	3	85	Zebra Mussel		0.25	
18007	06/18/18	Jap Beaver	boat ramp	Myriophyllum spicatum	scattered	bottomland	4	81			1	
20073	08/19/20	Kerr	Webber Falls Park boat ramp	Alternanthera philoxeroides	common	Disturbed park	3	87				
20074	08/19/20	Kerr	Vian Creek	Alternanthera philoxeroides	abundant	Bottomland	3					

20075	08/19/20	Kerr	Cherokee Park boat ramp	Alternanthera philoxeroides	abundant	Bottomland	4	86			0.5	
20081	08/20/20	Kerr	Applegate Cove boat ramp	Alternanthera philoxeroides	common	Disturbed park	3	86	Zebra Mussel		0.75	
20082	08/20/20	Kerr	Short Mountain Cove	Alternanthera philoxeroides	common	Oak Hickory Forest	3	88	Zebra Mussel			Phragmites australis
20083	08/20/20	Kerr	Cowlington Point boat ramp	Alternanthera philoxeroides, Najas minor, Myriophyllum spicatum	Alligator weed abundant	Bottomland	3	86			1	Phragmites, big patch
20084	08/20/20	Kerr	Keota Landing boat ramp	Alternanthera philoxeroides, Najas minor, Myriophyllum spicatum	scattered	Oak Hickory Forest	3	88				
20085	08/20/20	Kerr	Little San Bois boat ramp	Alternanthera philoxeroides, Najas minor, Myriophyllum spicatum	not abundant	Bottomland	3	88				
18017	06/19/18	Lawtonka	Schoolhouse Slough Marina	Myriophyllum spicatum	scattered	disturbed, marina	3	81			1	
17072	10/20/17	Murray	North boat ramp	Hydrilla		cross timbers	4	70	Aquatic Hitchhiker		0.5	
17073	10/20/17	Murray	Elephant Rock boat ramp	Hydrilla		cross timbers	4	71	Aquatic Hitchhiker		1	
17078	10/20/17	Murray	Buzzard's Roost boat ramp	Hydrilla		disturbed campground	4	71	Aquatic Hitchhiker		1.5	
17079	10/20/17	Murray	Marietta Landing boat ramp	Hydrilla		cross timbers	4	72			1.75	
17080	10/20/17	Murray	Rock Tower boat ramp	Hydrilla		bottomland	4	73	Aquatic Hitchhiker			
17055	09/05/17	Nanah Waiya	Boat ramp	Hydrilla	Only observed one stem	Oak/Hickory, disturbed	4	83	Aquatic Hitchhiker		0.5	
16006	07/07/16	Pauls Valley	fishing pier	Myriophyllum spicatum	scattered		5	82			0.25	
16084	10/07/16	Pine Creek	Little River Park, boat ramp, south	Alternanthera philoxeroides	abundance low		5	79	Aquatic Hitchhiker		0.75	
16022	07/13/16	Prague	boat ramp	Myriophyllum spicatum	abundant - all shores infested		5	87			1	
20126	09/30/20	Quannah Parker	Fishing pier at Education Center	Myriophyllum spicatum	very abundant, significant infestation	Cross Timber Bottomland	4	69			5	
20127	09/30/20	Quannah	Boat ramp near	Myriophyllum	very abundant,	Mixed grass	4	69	Aquatic			

		Parker	damp	spicatum	significant infestation	and cross timbers			Hitchhiker			
20125	09/30/20	Rush	Boat ramp	Myriophyllum spicatum	very abundant, significant infestation	Mixed grass and cross timbers	4	67			2	
18139	09/19/18	Sahoma	fishing pier, E on Pretty Water Lake	Pistia stratiotes	only three individuals, collected for herbarium specimen	bottomland	4	84			0.75	
18140	09/19/18	Sahoma	fishing pier, middle shore of Pretty Water Lake	Pistia stratiotes	only three individuals, collected for herbarium specimen	bottomland	4	84			0.75	
18156	09/27/18	Sooner	boat dock, west	Myriophyllum spicatum	abundant	grassland	4	75		Observed mature	0.5	
16039	08/17/16	Spavinaw	Lake office, fishing pier	Myriophyllum spicatum	abundant		3	84			1	
16040	08/17/16	Spavinaw	Beaty Cove, fishing pier	Myriophyllum spicatum	abundant		3	85			1.25	
16121	10/28/16	Sportsman	Cove 2, bridge	Myriophyllum aquaticum	abundant and has totally infested the small impoundments on the west side of the road.		3					
20069	08/19/20	Webbers Falls	Spaniard Creek Campground boatramp	Alternanthera philoxeroides	common, in little cove of campground	Bottomland	3	86			0.5	
20070	08/19/20	Webbers Falls	Spaniard Creek N boat ramp	Alternanthera philoxeroides	abundant	Bottomland	3	87			0.5	
20071	08/19/20	Webbers Falls	Brewer Bend boat ramp	Alternanthera philoxeroides	common	Bottomland	3	87			0.5	
20072	08/19/20	Webbers Falls	Greenleaf Cove, Hwy 10 Landing, boat ramp	Alternanthera philoxeroides	abundant	Bottomland	5	88	Aquatic Hitchhiker, stencil on ramp		0.5	

Table 2. Data from all surveys.

Survey #	Date	Lake	Exact Location	Aquatic Invasive Species Present	Invasive species notes	General Habitat	Lake Level Scale	Water Temp	Signs	Zebra mussels	Transparency (m)	Riparian and other invasive species of concern
16001	07/06/16	Purcell	north shore boat ramp				5				0.75	Saccarum ravennae
16002	07/06/16	Purcell	south jetty				5				0.75	Saccarum ravennae
16003	07/06/16	Wiley Post	boat ramp				4				0.5	
16004	07/06/16	Dahlgren	Boat ramp				0					
16005	07/07/16	Pauls Valley	swim beach				5	82			0.25	
16006	07/07/16	Pauls Valley	fishing pier	Myriophyllum spicatum	scattered		5	82			0.25	
16007	07/07/16	R.C. Longmire	southside fishing pier				5	84			0.25	Tamarix sp.
16008	07/07/16	R.C. Longmire	northside fishing pier				5	83			0.5	Tamarix sp.
16009	07/07/16	Tecumseh	boat ramp				5	83			0.01	
16010	07/12/16	Thunderbird	south dam fishing pier				3	82			0.75	
16011	07/12/16	Thunderbird	Turkey Point fishing pier				3	82			0.75	
16012	07/12/16	Thunderbird	Clear Bay Marina				3	83			0.75	
16013	07/12/16	Thunderbird	North Sentinal fishing pier				4	83			0.01	
16014	07/12/16	Thunderbird	Little River Marina				5	85			0.75	
16015	07/12/16	Thunderbird	Little Ax swim beach				4	84			0.25	
16016	07/13/16	Shawnee #1	Isacc Walton Park beach				5	81			1	
16017	07/13/16	Shawnee #1	fishing pier				5	83			1	
16018	07/13/16	Shawnee #2	boat ramp				5	83			1	Tamarix sp.
16019	07/13/16	Wes Watkins	south boat ramp				5	85			0.5	
16020	07/13/16	Wes Watkins	north shore boat ramp				5	85			0.5	
16021	07/13/16	Meeker	dock				5	86			0.01	Phragmites australis
16022	07/13/16	Prague	boat ramp	Myriophyllum spicatum	abundant - all shores infested		5	87			1	
16023	07/14/16	Konowa	north boat ramp				3	90			1	Saccarum ravennae

16024	07/14/16	Konowa	southeast boat ramp				3	90			1	
16025	07/14/16	Konowa	southwest boat ramp				4	88			0.75	
16026	07/14/16	Holdenville	fishing pier				3	83			0.5	
16027	07/14/16	Wewoka	boat ramp				4	83			0.5	
16028	08/16/16	Grand	Riverside campground, boat ramp, below dam				3	80			3	
16029	08/16/16	Grand	Lakeside campground, boat ramp				3	84			3	
16030	08/16/16	Grand	Cedar Point Marina				3				2	
16031	08/16/16	Grand	Disney State Park, boat ramp				3	86		Observed mature	2	
16032	08/16/16	Grand	Clearwater Bay Marina				3				1.5	
16033	08/16/16	Grand	Bernice State Park, boat ramp				3	98			1.25	
16034	08/16/16	Grand	Shangri-La Resort Marina				3	87			0.75	
16035	08/17/16	Grand	Twin Bridges State Park, south boat ramp				3	83			0.25	
16036	08/17/16	Grand	Spring Creek Bridge (Hwy 10), picnic area				3				1	
16037	08/17/16	Grand	Honey Creek State Park, fishing pier				3	84			0.75	
16038	08/17/16	Spavinaw	Upper end of lake, low water crossing				3	82			1.5	
16039	08/17/16	Spavinaw	Lake office, fishing pier	Myriophyllum spicatum	abundant		3	84			1	
16040	08/17/16	Spavinaw	Beaty Cove, fishing pier	Myriophyllum spicatum	abundant		3	85			1.25	
16041	08/24/16	Chickasha	South fishing pier				3	80			0.5	Tamarix sp.
16042	08/24/16	Chickasha	North fishing pier				3	81			0.25	Tamarix sp.
16043	08/24/16	Burtschi	southwest fishing pier				5	82			0.75	Tamarix sp.
16044	08/24/16	Burtschi	North fishing				5	82			0.75	Tamarix sp.

			pier, near dam									
16045	08/24/16	Taylor	North fishing pier				4	81			0.25	Tamarix sp.
16046	08/24/16	Taylor	Southside dike				3					
16047	08/25/16	Humphreys	fishing pier on point				5	81			0.5	Tamarix sp.
16048	08/25/16	Humphreys	fishing pier				5	82			0.5	Tamarix sp.
16049	08/25/16	Clear Creek	fishing pier, Marlow Harbor				5	81			0.75	Tamarix sp.
16050	08/25/16	Clear Creek	south of fishing house				5					Tamarix sp.
16051	08/25/16	Clear Creek	southeast swim beach				5					Tamarix sp.
16052	08/25/16	Duncan	fishing pier				5	82			0.25	Tamarix sp.
16053	08/25/16	Comanche	fishing pier, near dam	Myriophyllum spicatum	abundant		4	82			1	
16054	08/25/16	Comanche	fishing pier, north	Myriophyllum spicatum	abundant		4					Arundo donax
16055	08/25/16	Fuqua	fishing pier				5	84			0.5	Tamarix sp.
16056	08/25/16	Fuqua	enclosed fishing pier				5				0.5	Tamarix sp.
16057	09/01/16	Heyburn	Sheppard Point, fishing pier				3	82	Aquatic Hitchhiker		0.5	
16058	09/01/16	Heyburn	Sheppard Point, campground, south point				3					Phragmites, all along shore, thick monoculture
16059	09/01/16	Heyburn	Sunset Bay, swim beach				3					Phragmites, all along shore, thick monoculture
16060	09/01/16	Heyburn	Sunset Bay, fishing pier				3	82			0.5	
16061	09/01/16	Heyburn	Heyburn Park, fishing pier				3	83			0.25	
16062	09/01/16	Stroud	boat ramp, east side				3					
16063	09/01/16	Stroud	fishing pier, southwest				3	84			2.25	
16064	09/01/16	Stroud	boat ramp, north end				3					
16065	09/08/16	Chandler	fishing pier, north dam				3	81			0.5	
16066	09/08/16	Chandler	fishing pier, south				3	81			0.5	
16067	09/08/16	Bell Cow	Area C, fishing pier, west				4	81	Aquatic Hitchhiker		0.5	
16068	09/08/16	Bell Cow	Area D, fishing				4	80			1	Tamarix sp.

			pier										
16069	09/08/16	Bell Cow	Area B, fishing pier, north shore				4	81				0.5	
16070	09/08/16	Cushing	fishing pier				4	80				0.25	
16071	09/08/16	Boomer	boat ramp				3	81				0.25	Phragmites australis, Arundo donax
16072	09/08/16	McMurtry	boat ramp, northeast				5	81	Zebra Mussel			0.75	Tamarix sp.
16073	09/08/16	McMurtry	fishing pier, southwest				5	81	Zebra Mussel			1	
16074	10/07/16	Coalgate	boat ramp, north				4	71					
16075	10/07/16	Coalgate	fishing pier, near dam				4	72				0.25	
16076	10/07/16	Atoka	boat ramp, west side				1	72	Aquatic Hitchhiker			0.01	
16077	10/07/16	Atoka	fishing pier, northeast				1	74				0.25	
16078	10/07/16	Atoka	Fred's Fish Camp Rd, boat ramp				1	70				0.01	
16079	10/07/16	Atoka	boat ramp, near dam				1	72				0.25	
16080	10/07/16	McGee Creek	fishing pier, south				3	75				1.25	
16081	10/07/16	McGee Creek	fishing pier, near dam				3	76				1.25	
16082	10/07/16	Ozzie Cobb	fishing pier				5	77				0.75	
16083	10/07/16	Pine Creek	Turkey Landing, boat ramp				5	80					
16084	10/07/16	Pine Creek	Little River Park, boat ramp, south	Alternanthera philoxeroides	abundance low		5	79	Aquatic Hitchhiker			0.75	
16085	10/07/16	Pine Creek	Little River Park, boat ramp, north				5	79				0.75	
16086	10/07/16	Pine Creek	Lost Rapids Park, fishing pier				5	79				0.75	
16087	10/08/16	Broken Bow	Carson Creek Area, boat ramp, north				1	76				5	
16088	10/08/16	Broken Bow	Carson Creek Area, boat ramp, central				1	76				5	

16089	10/08/16	Broken Bow	Carson Creek Area, boat ramp, south				1	76			5	
16090	10/08/16	Broken Bow	Lake View Lodge, boat ramp				1	77			5	
16091	10/08/16	Broken Bow	Stevens Gap Area, Deer Dr, boat ramp				1	77			5	
16092	10/08/16	Broken Bow	Marina				1	78			5	
16093	10/08/16	Broken Bow	Holly Creek Area, "boat ramp"				1	79				
16094	10/08/16	Broken Bow	Beavers Bend State Park, swim beach				3				5	
16095	10/09/16	Pine Creek	Pine Creek Cove, boat ramp, west				5	78			1.25	
16096	10/09/16	Pine Creek	boat ramp, near dam, east				5	78	Aquatic Hitchhiker		1.5	
16097	10/17/16	Hugo	Frazier Point, boat ramp				1	77				
16098	10/17/16	Hugo	Salt Creek Cove, fishing pier				1	79				
16099	10/17/16	Hugo	Kiamichi Park, fishing pier				1	76	Aquatic Hitchhiker		0.25	
16100	10/17/16	Hugo	Hugo State Park, marina				1	74			0.25	
16101	10/17/16	Hugo	Hugo State Park, east boat ramp				1	75	Aquatic Hitchhiker			
16102	10/17/16	Hugo	Virgil Point, fishing pier				1	76			0.25	
16103	10/17/16	Schooler	north "boat ramp"				4	77	Aquatic Hitchhiker		0.5	
16104	10/17/16	Hugo	Sawyer Bluff, boat ramp				1	75			0.25	
16105	10/17/16	Raymond Gary	fishing pier, near cabin #4				3	77			0.5	
16106	10/18/16	Talawanda #1	boat ramp, north				3	73			2	
16107	10/18/16	Talawanda #2	boat ramp, south side				3				1.25	
16108	10/18/16	McAlester	boat ramp, west side				3	72			0.25	
16109	10/18/16	McAlester	fishing pier,				4	73			0.25	

			northeast										
16110	10/26/16	Hefner	Lighthouse				1						
16111	10/26/16	Hefner	OKC Boat Club				1						
16112	10/26/16	Hefner	Bluff Creek, fishing pier				1	68				0.5	
16113	10/26/16	Hefner	Lake Patrol Office, boat ramp, east				1	68	Zebra Mussel			0.5	
16114	10/26/16	Hefner	fishing pier, enclosed				1	68				0.5	
16115	10/26/16	Hefner	fishing pier, north of dyke				1	68				0.5	
16116	10/26/16	Overholser	boat ramp, south side				1	68				0.25	
16117	10/26/16	Overholser	boat ramp, west side				1	68				0.01	
16118	10/26/16	Overholser	fishing pier, west				1	68				0.25	
16119	10/26/16	Overholser	Lake Harbor NE, inlet side				1	70				0.25	Arundo donax
16120	10/28/16	Sportsman	Cove 2, boat ramp				3	73					
16121	10/28/16	Sportsman	Cove 2, bridge	Myriophyllum aquaticum	abundant and has totally infested the small impoundments on the west side of the road.		3						
16122	10/28/16	Sportsman	Cove 3, fishing pier, north				3	71	Aquatic Hitchhiker			1.25	
16123	10/28/16	Sportsman	Cove 3, fishing pier, middle				3	70				1.25	
16124	10/28/16	Sportsman	Cove 3, fishing pier, south				3	71	Aquatic Hitchhiker			1.25	
16125	11/02/16	Stanley Draper	Marina, fishing pier				3	70				1	Arundo donax
16126	11/02/16	Stanley Draper	fishing pier, northwest				3	70				1	
16127	11/02/16	Stanley Draper	boat ramp, northeast				3	70	Zebra Mussel			0.75	Phragmites australis, Arundo donax
16128	11/02/16	Stanley Draper	fishing pier #19				3	70				1.25	Phragmites australis, Saccarum ravennae

16129	11/02/16	Stanley Draper	fishing pier, off 134th				3	72					Saccarum ravennae
16130	11/02/16	Stanley Draper	boat ramp, southwest				2						
16131	11/02/16	Stanley Draper	fishing pier #4, middle west side				3	70				1.25	
17001	07/14/17	Fort Gibson	boat ramp, dam lake side						crosstimbers	3	84		
17002	07/14/17	Fort Gibson	boat ramp below dam						bottomland forest	3	83		
17003	07/14/17	Fort Gibson	Wildwood boat ramp - old						bottomland	3	87		
17004	07/14/17	Fort Gibson	Wildwood, fishing pier						bare, rocky shoreline	3	87		0.25
17005	07/14/17	Fort Gibson	Sequoyah State Park, Cherokee Area, Fishing pier						bottomland lake shore	3	88		0.75
17006	07/14/17	Fort Gibson	Boat ramp Sequoyah State Park Choctaw Area						rocky, bottomland lake shore	3	89		
17007	07/14/17	Fort Gibson	Sequoyah State Park Creek area boat ramp						rocky lake shore	3	87		
17008	07/14/17	Fort Gibson	Paradise Cove Boat Ramp						bottomland lake shore, rocky	3	86		
17009	07/14/17	Fort Gibson	Paradise Cove Marina						Marina, rocky shore	3	88		0.5
17010	07/15/17	Fort Gibson	Mallard Bay, boat ramp						Bottomland	3	86		
17011	07/15/17	Fort Gibson	Wahoo Bay, fishing pier						Bottomland	3	85		0.5
17012	07/15/17	Fort Gibson	Sequoyah Bay State Park, Boat Ramp, South						Campground, rocky	3	86		
17013	07/15/17	Fort Gibson	Sequoyah Bay Marina						Marina	3	86		0.75
17014	07/15/17	Fort Gibson	Jackson Bay, boat ramp						Bottomland	3	86		
17015	07/15/17	Fort Gibson	Taylor Ferry South						rocky causeway, picnic area	3	87		
17016	07/15/17	Fort Gibson	Taylor Ferry North, Marina						Marina	3	86		0.75
17017	07/15/17	Fort Gibson	Taylor Ferry North, fishing						Crosstimbers	3	86		0.75

			pier									
17018	07/15/17	Fort Gibson	Long Bay Marina			marina	3	86				0.75
17019	07/15/17	Fort Gibson	Wagoner City Park, fishing pier			bottomland	3	88				0.5
17020	07/15/17	Fort Gibson	White Horn Cove Marina			marina	3	87				0.75
17021	07/15/17	Fort Gibson	Snug Harbor, boat docks			marina	3	89				
17022	07/15/17	Fort Gibson	Rocky Point Fishing Pier			campground	3	89				0.5
17023	07/15/17	Fort Gibson	Blue Bill Point, boat dock			campground	3	91				0.5
17024	07/15/17	Fort Gibson	3 Finger Bay, boat ramp			bottomland	3	88				
17025	07/15/17	Fort Gibson	Mission Bend, boat ramp			bottomland	3	90				
17026	07/15/17	Fort Gibson	Maizy Landing			marina, bottomland, crosstimbers	3	87				0.25
17027	07/15/17	Fort Gibson	Chouteau Point			bottomland, impounded river	3	89				
17028	07/16/17	Greenleaf	Marina fishing pier			cross timbers, hickory oak	4	89				1
17029	07/16/17	Greenleaf	Covered/heated fishing pier			crosstimbers	4	89				1
17030	07/16/17	Greenleaf	South fishing pier			cross timbers	5	89				1
17031	09/02/17	Oologah	Lightening Creek, boat ramp			bottomland forest	3	88				
17032	09/02/17	Oologah	Big Creek, boat ramp amp			bottomland forest	2	84				
17033	09/02/17	Oologah	Double Creek Cove, boat ramp			bottomland forest	2	86				
17034	09/02/17	Copan	Copan point boat dock/ramp			crosstimbers/ bottomlands	4	80		Aquatic Hitchhiker		0.5
17035	09/03/17	Copan	Washington Cove, boat dock			crosstimbers	3	82				0.25
17036	09/03/17	Copan	Osage Plains Park, boat ramp			flint hills (disturbed)	4	84				
17037	09/03/17	Hulah	Wah-Sha-She Park East, boat ramp			bottomland cross timbers	3	86				

17038	09/03/17	Hulah	Skull Creek, boat ramp			cross timbers	3	84				
17039	09/03/17	Hulah	Wah-She-She Park West, boat ramp			cross timbers	2	81			0.1	
17040	09/03/17	Hulah	Hulah Cove Boat Ramp			bottom land cross timbers	3	87				
17041	09/03/17	Bluestem	Boat Ramp, East			cross timbers	3	82			1	
17042	09/03/17	Bluestem	Boat Ramp, West			cross timbers	4	84			0.75	
17043	09/03/17	Pawhuska	Boat Ramp			cross timbers/tallgrass	3	84			2.5	Arundo, one patch near gate at stone house
17044	09/03/17	Hudson/Bartlesville	Boat Ramp/Fishing pier			cross timbers	4	84			0.5	
17045	09/04/17	Waxhoma	Boat Ramp			cross timbers	5	82				
17046	09/04/17	Birch	Twin Cove Boat Ramp			cross timbers	4	83			1	
17047	09/04/17	Birch	Birch Cove Boat Ramp			cross timbers	4	82			1	
17048	09/04/17	Birch	Birch Cove Fishing Pier			cross timbers	4	83			1.25	
17049	09/04/17	Hominy	Dock near dam			cross timbers	4	82			1	
17050	09/04/17	Hominy	Boat Ramp, west on Hwy 9			disturbed	4	83			1	
17051	09/04/17	Cleveland	Dam boat ramp	Myriophyllum spicatum	scattered	bottom land, cross timbers	4	84				
17052	09/04/17	Cleveland	Boat ramp, west				4	84				
17053	09/05/17	Clayton	Boat ramp, north/fishing pier			shortleaf pine forest	4	83	Aquatic Hitchhiker		0.75	
17054	09/05/17	Clayton	Boat ramp, south	Myriophyllum aquaticum	scattered with natives at arm of lake, not in water, but rooted in mud	shortleaf pine forest	4	82	Aquatic Hitchhiker			
17055	09/05/17	Nanah Waiya	Boat ramp	Hydrilla	Only observed one stem	Oak/Hickory, disturbed	4	83	Aquatic Hitchhiker		0.5	
17056	09/05/17	Sardis	Narrows Boat Ramp			shortleaf pine	4	84				
17057	09/05/17	Sardis	Sardis Cove Boat Ramp			shortleaf pine	4	82			0.5	
17058	09/05/17	Sardis	Potato Hills South, boat ramp			campground, rock shore	3	82	Aquatic Hitchhiker		1	

17059	09/05/17	Sardis	Sardis Cove fishing pier			bottomland	4	82			0.75	
17060	09/05/17	Sardis	Potato Hills Central fishing pier			bottomland	4	82			0.75	
17061	09/05/17	Sardis	Potato Hills North Fishing pier			bottomland	4					
17062	09/05/17	Lloyd Church	Boat ramp			oak hickory	4	83				
17063	09/06/17	Carlton	Boat Ramp	Myriophyllum aquaticum	not a monoculture, mixed in with natives; scattered all along shore	oak hickory pine	4	78	Aquatic Hitchhiker			
17064	09/06/17	Wayne Wallace	South boat ramp			oak hickory pine	3	80	Aquatic Hitchhiker			
17065	09/06/17	Wayne Wallace	Boat ramp, north end		same vegetation as 17-64, not as abundant	oak hickory pine, disturbed	3	80				
17066	09/06/17	Eufaula	Hwy 9 south boat dock			bottomland	3	80	Aquatic Hitchhiker, Zebra Mussel		1	
17067	09/06/17	Eufaula	Hwy 9 north, boat dock			bottomland, disturbed park	3	80	Zebra Mussel		1.25	
17068	09/06/17	Eufaula	Gaines Creek boat ramp			cross timbers, disturbed	3	80				
17069	09/06/17	Eufaula	Oak Ridge			cross timbers, disturbed park	3	80	Zebra Mussel		0.5	
17070	09/06/17	Weleetka	boat ramp			cross timbers, disturbed park	4	81	Aquatic Hitchhiker			
17071	09/06/17	Wetumka	fishing pier			cross timbers	3	80	Aquatic Hitchhiker		0.75	
17072	10/20/17	Murray	North boat ramp	Hydrilla		cross timbers	4	70	Aquatic Hitchhiker		0.5	
17073	10/20/17	Murray	Elephant Rock boat ramp	Hydrilla		cross timbers	4	71	Aquatic Hitchhiker		1	
17074	10/20/17	Murray	Cisco Road boat ramp, not functional any longer			cross timbers, disturbed campground	4	72				
17075	10/20/17	Murray	Tipps Point boat ramp			cross timbers	4	71	Aquatic Hitchhiker		1	
17076	10/20/17	Murray	Marina, SW side, boat ramp			disturbed marina area	4	72	Aquatic Hitchhiker		1.25	
17077	10/20/17	Murray	Long fishing			cross timbers	4				1	

			pier											
17078	10/20/17	Murray	Buzzard's Roost boat ramp	Hydrilla		disturbed campground	4	71	Aquatic Hitchhiker			1.5		
17079	10/20/17	Murray	Marietta Landing boat ramp	Hydrilla		cross timbers	4	72				1.75		
17080	10/20/17	Murray	Rock Tower boat ramp	Hydrilla		bottomland	4	73	Aquatic Hitchhiker					
17081	10/20/17	Murray	Martin's Landing boat ramp			cross timbers, disturbed campground	4	72	Aquatic Hitchhiker			0.25		
17082	10/20/17	Murray	Group Camp 3 fishing pier			bottomland	4	72				1.25		
18001	06/18/18	Waurika	Boat dock, Chisholm Park			Lake shore, mesquite grassland	4	79				0.5	Tamarix sp., Phragmites australis	
18001	06/18/18	Waurika	boat dock, Chisholm Park			mesquite grassland, disturbed lakeshore	4	79				0.5	Tamarix sp., Phragmites australis, mesquite	
18002	06/18/18	Waurika	swim beach, Chisholm Park			disturbed campground	4	79					Tamarix sp.	
18003	06/18/18	Waurika	boat ramp, Beavers Landing			mixed grass prairie, disturbed	4	79	Aquatic Hitchhiker	Observed mature	1		Phragmites australis	
18004	06/18/18	Waurika	boat dock, Kiowa Park #2			rip rap, disturbed, manicured	4	80	Aquatic Hitchhiker			0.75		
18005	06/18/18	Waurika	boat dock, Kiowa Park #1, north			disturbed, manicured	4	80				0.5	Tamarix sp.	
18006	06/18/18	Waurika	boat dock, Wichita Ridge			rip rap, disturbed, manicured	4	81	Aquatic Hitchhiker			0.5	Phragmites australis	
18007	06/18/18	Jap Beaver	boat ramp	Myriophyllum spicatum	scattered	bottomland	4	81				1		
18008	06/18/18	Dave Boyer	no access points to water			golf course	4						Mesquite	
18009	06/18/18	Frederick	boat ramp, east (not in use)			mixed grass, disturbed	4	80				0.25	Mesquite	
18010	06/18/18	Frederick	boat ramp, west			mixed grass, disturbed	4	80				0.25	Mesquite	
18011	06/19/18	Ellsworth	boat dock, Bonnifield Rd.			rip rap, disturbed	3	79				0.5		
18012	06/19/18	Ellsworth	boat ramp, Edgewater Blvd.			bottomland, disturbed	3	80				0.5		
18013	06/19/18	Ellsworth	boat ramp,			bottomland	4	81						

			north, East Cache Creek inflow										
18014	06/19/18	Ellsworth	boat ramp, northeast, Cove Acres			disturbed campground	3	80				0.25	
18015	06/19/18	Ellsworth	boat ramp, SE, Fisherman's Cove			disturbed	3	80	Aquatic Hitchhiker			0.25	Arundo donax
18016	06/19/18	Lawtonka	boat dock, north marina			disturbed	3	81				0.5	
18017	06/19/18	Lawtonka	Schoolhouse Slough Marina	Myriophyllum spicatum	scattered	disturbed, marina	3	81				1	
18018	06/19/18	Tom Steed	boat ramp, Great Plains State Park			disturbed, rip rap, manicured	2	79				0.5	
18019	06/19/18	Tom Steed	pond, near campground			bottomland, manicured campground	3						
18020	06/19/18	Tom Steed	boat ramp, Glen Creek			bottomland	4	81					
18021	06/19/18	Lugert-Altus	boat ramp, north (no longer in use)			bottomland	2	80	Aquatic Hitchhiker			0.5	Tamarix sp.
18022	06/19/18	Lugert-Altus	boat ramp, Hicks Mtn			rip rap	2	79	Aquatic Hitchhiker			0.5	Tamarix sp.
18023	06/19/18	Lugert-Altus	fishing pier, Quartz Mountain Nature Park			rocky scrubland	2	79	Aquatic Hitchhiker			0.5	
18024	06/20/18	Altus City	fishing pier, east			disturbed, manicured park	3	79				1.5	Tamarix sp., Arundo donax
18025	06/20/18	Altus City	fishing pier, west			disturbed, manicured park	3	79				0.25	
18026	06/20/18	Hall	fishing pier			shinnery oak mixgrass prairie	3	80				0.5	Tamarix sp., Arundo donax
18027	06/20/18	Vanderwork	fishing pier			bottomland	4	80	Golden Algae			0.5	Tamarix sp.
18028	06/20/18	Fort Cobb	boat ramp, NW on rd #E1240			bottomland	4	81					Tamarix sp.
18029	06/20/18	Fort Cobb	fishing pier, Coalson's landing			bottomland	4	81				0.5	Arundo donax
18030	06/20/18	Fort Cobb	boat dock, NW at State Park			bottomland	4	80				0.75	Tamarix sp.
18031	06/20/18	Fort Cobb	Boat ramp, St Park Southwest			Disturbed bottomland	3	80				1	

18032	06/20/18	Fort Cobb	Fishing Pier, Sunset Cove			Disturbed Marina	4	80			0.75	
18033	06/20/18	Fort Cobb	Boat Ramp, Northeast Rd #1250			Disturbed	4	81			0.75	
18034	06/20/18	Fort Cobb	Boat Dock, WMA Northeast			Bottomland	4	82			0.5	
18035	07/11/18	Texoma	Boat ramp, Northern most, east side			Bottomland Forest	4	90				
18036	07/11/18	Texoma	Nowberry Creek			Marina	4	90	Zebra Mussel		1.5	
18037	07/14/18	Texoma	Boat dock, Buncombe Creek			Rip Rap, disturbed	3	90	Zebra Mussel		0.75	
18038	07/14/18	Texoma	Catfish Bay Marina			Marina disturbed	3	90			0.5	
18039	07/14/18	Texoma	Boat Dock, Johnson Creek			Disturbed, manicured	3	89	Aquatic Hitchhiker, Custom, stencil on ramp		0.75	
18040	07/14/18	Texoma	Marina, Willow Springs			Disturbed Marina	3	89			1	
18041	07/14/18	Texoma	Lakeside USACE			Rip Rap, manicured	3	90	Zebra Mussel		1	
18042	07/14/18	Texoma	Boat dock marina, Alberta Creek			Disturbed campground	3	89			0.75	
18043	07/14/18	Texoma	Boat ramp, McLaughlin Creek, Road's End Park			Bottomland Forest	3	90			0.5	
18044	07/14/18	Texoma	Marina, East side, covey Creek, Park Ave			Disturbed Marina	3	90			1	
18045	07/14/18	Texoma	Marina, western side of Carney Creek area			Disturbed marina	3	90			1	
18046	07/15/18	Texoma	Boat Dock, Eastern Burns Run			Botomland	3	88	Zebra Mussel		1	
18047	07/15/18	Texoma	Boat Ramp, western burns run			Disturbed	3		Zebra Mussel			

18048	07/15/18	Texoma	Boat ramp, William Woods			Disturbed rip rap	3					
18049	07/15/18	Texoma	Platter Flats			Crosstimbers, disturbed, manicured	3	88	Zebra Mussel		0.5	
18049	08/10/18	Texoma	Boat ramp, Tishmingo-no longer in use			Bottomland disturbed	3					
18050	08/10/18	Texoma	Boat dock-Cumberland			Disturbed campground	3	86			0.25	
18051	08/10/18	Texoma	Marina-Bridgeview			Disturbed Marina	3	87			0.5	
18052	08/10/18	Texoma	Marina-Little Glanes			Disturbed marina	3	86	Aquatic Hitchhiker		0.75	
18053	08/10/18	Texoma	Marina-Buncomba (left side)			Disturbed marina	3	86	Aquatic Hitchhiker		0.5	
18054	08/27/18	Keystone	Boat ramp-Walnut Creek			Disturbed campground, crosstimbers	2	85				Kudzu, at entrance to park
18055	08/27/18	Keystone	Boat ramp to west of walnut creek (1575) - not in regular use			Crosstimbers	2	85				
18056	08/27/18	Keystone	Fishing Pier - Prue			Crosstimbers	2	86			0.5	
18057	08/28/18	Keystone	Boat Ramp-south, Keystone State Park			Crosstimbers, Disturbed	2	82				
18058	08/28/18	Keystone	Piers-Keyston SP marina			Marina	2	82			0.5	
18059	08/28/18	Keystone	Boat Ramp-North Keystone SP			Crosstimbers, Disturbed	2	83				
18060	08/28/18	Keystone	Boat Dock-Keystone ramp			Crosstimbers, Disturbed	2	82			0.75	
18061	08/28/18	Keystone	Marina, south Salt Creek Core			Disturbed Marine, rip rap	2	83			0.5	
18062	08/28/18	Keystone	Boat Dock, New Mannford			Crosstimbers, Disturbed	2	83			0.5	
18063	08/28/18	Keystone	Boat Dock-south Washington Irving Core			Disturbed, rip rap, sandy	2	82			0.5	
18064	08/28/18	Keystone	Boat dock-			Disturbed,	2	84			0.25	

			Appalachia Bay			Crosstimbers						
18065	08/28/18	Keystone	Boat Dock, Cowshin south			Crosstimbers, disturbed	2	83	Aquatic Hitchhiker		0.25	
18066	08/28/18	Keystone	Boat ramp-north Cowshin Bay			Disturbed, Crosstimbers	2	84				
18067	08/28/18	Keystone	Boat ramp-Feyodi Creek (no longer usable)			Bottomland	2	84			0.1	
18068	08/28/18	Keystone	Boat ramp-Cedar Creek Park			Bottomland	3	86			0.1	
18069	08/28/18	Keystone	Boat ramp-Osage			Bottomland, disturbed	3	86			0.1	
18070	08/28/18	Pawnee	boat dock, SW by dam			crosstimbers	4	82		Observed mature	0.25	
18071	08/28/18	Pawnee	boat dock, SE by dam			crosstimbers	4	84		Observed mature	0.25	
18072	09/03/18	Tenkiller	Boat dock-Snake Creek Core			Bottomland, Disturbed	3	83			1.25	
18073	09/03/18	Tenkiller	Boat dock-South Chicken Creek			Bottomland, Disturbed	3	84			1.25	
18074	09/03/18	Tenkiller	Boat Ramp-north Chicken Creek			Bottomland, Disturbed	2	84				
18075	09/03/18	Tenkiller	Marina-Six Shooter			Marina, rip rap	3	84			1.5	
18076	09/03/18	Tenkiller	Marina-Coohsen Band			Marina	3	84			1	
18077	09/03/18	Tenkiller	Boat Dock-Cooshen Bend (little core)			Disturbed campground	2	85			1	
18078	09/03/18	Tenkiller	Boat Ramp-Coohsen Bend (across from big cliffs)			Disturbed campground	2	84				
18079	09/03/18	Tenkiller	Boat ramp-Carlisle Cove			Disturbed, Oak Hickory, Bottomland	2	86				
18080	09/03/18	Tenkiller	Boat ramp-Standing rock			Bottomland, Oak Hickory	2	86				
18081	09/03/18	Tenkiller	Marina-Elk Creek			Marina	2	85			0.5	
18082	09/03/18	Tenkiller	Boat dock- Elk Creek VSACE			Disturbed, rip rap	2	84			0.75	

18083	09/03/18	Tenkiller	Boat ramp- Camey Ridge			Bottomland, Oak Hickory	2	86				
18084	09/03/18	Tenkiller	Boat ramp-Etta Bend			Bottomland	2	88				
18085	09/04/18	Tenkiller	Marina-Burnt Cabin			Marina, Rip rap, Oak Hickory	2	84			1.5	
18086	09/04/18	Tenkiller	Marina- Barnacle Bill's			Marina, Oak Hickory	2	84			1.25	
18087	09/04/18	Tenkiller	Boat dock- Sizemore Core			Disturbed, Oak Hickory	2	84			1	
18088	09/04/18	Tenkiller	Boat dock- Sizemore landing, north			Oak Hickory	2	84			0.75	
18089	09/04/18	Tenkiller	Boat ramp- Sizemore landing, south			Bottomland	2	84				
18090	09/04/18	Tenkiller	Boat dock- Petite Bay, south			Oak Hickory	2	84			0.75	
18091	09/04/18	Tenkiller	Boat dock- Petite Bay, north			Disturbed campground	2	84			0.75	
18092	09/04/18	Tenkiller	Boat ramp- Cherokee landing SP			Disturbed campground	2	84			0.5	
18093	09/04/18	Tenkiller	Carters Landing			Bottomland, Disturbed	2	85				
18094	09/04/18	Tenkiller	Boat ramp- Horseshoe Bend			Bottomland	2	83				
18095	09/11/18	Eucha	Boat ramp- southwest, near office			Short leaf pine	1	80			0.25	
18096	09/11/18	Eucha	Boat dock- southeast, campground			Disturbed campground	1	79			0.5	
18097	09/11/18	Eucha	Fishing Pier- northeast			Bottomland	1	78			0.5	
18098	09/11/18	Eucha	Fishing pier- northeast of bridge			Bottomland	1	80			0.75	
18099	09/11/18	Eucha	Fishing pier, western			Disturbed campground, bottomland	1	80			1.25	
18100	09/11/18	Hudson	Marina, Indian Springs			Oak Hickory	2	78			0.75	
18101	09/11/18	Hudson	Boat dock Salina			Bottomland	3	79			0.75	
18102	09/11/18	Hudson	Boat ramp,			Disturbed	3	79				

			South Salina			bottomland						
18103	09/11/18	Hudson	Boar ramp, near Hwy 20 South of Salina			Disturbed	2	80				
18104	09/11/18	W.R. Holway	Boat ramp/dock - northwest			Bottomland	4	81			1	
18105	09/11/18	W.R. Holway	Boat ramp- north			Bottomland	4	81				
18106	09/11/18	W.R. Holway	Boat ramp - southeast			Bottomland	4	80				
18107	09/11/18	Hudson	Boat ramp, South, Hwy 82			Bottomland	2	77				
18108	09/11/18	Hudson	Dogwood Marina			Disturbed	2	78				
18109	09/11/18	Hudson	Boat ramp, lake side terrace			Disturbed campground	1	80				
18110	09/11/18	Hudson	Boat dock, Snowdale Park			Disturbed Campground	1	79			0.5	
18111	09/12/18	Claremore	Fishing pier- south, by dam			Disturbed park, crosstimbers	3	76			0.25	
18112	09/12/18	Claremore	Fishing pier/enclosed boat dock			Disturbed park	3	76			0.25	
18113	09/12/18	Claremore	Upper dam on trail			Bottomland	4					
18114	09/12/18	Hudson	Marina West side stranc			Bottomland	4	76			0.75	
18115	09/12/18	Hudson	Boat dock, Ray's Cove			Bottomland	4	78			0.5	
18116	09/12/18	Hudson	Boat ramp, (Ray's landing) Beaver Point			Botomland	4	78	Zebra Mussel			
18117	09/12/18	Oologah	Boat dock- Blue Creek Park			Bottomland	4	79			0.5	
18118	09/12/18	Oologah	Boat ramp- Clermont Park			Bottomland	5	81				
18119	09/12/18	Oologah	Boat ramp- Spincer Creek Core			Crosstimbers	5	78	Aquatic Hitchhiker			
18120	09/12/18	Oologah	Boat ramp- Winganon			Bottomland	5	78	Aquatic Hitchhiker			
18121	09/12/18	Oologah	Boat ramp - East side			Bottomland	5	78				
18122	09/12/18	Oologah	Vada Point			Bottomland, Crosstimbers	5	78				
18123	09/12/18	Oologah	Talala Creek			Bottomland,	5					

			Bridge			riparian						
18124	09/12/18	Oologah	Boat ramp - Sunny Side			Bottomland	5	79				
18125	09/18/18	Skiatook	boat dock, Hominy Landing			crostimbers, disturbed	1	82	Aquatic Hitchhiker	Observed mature	0.5	
18126	09/18/18	Skiatook	boat dock, Bull Creek Peninsula			crostimbers, disturbed	1	83	Aquatic Hitchhiker		1.25	
18127	09/18/18	Skiatook	boat dock, Twin Points			crostimbers, disturbed	1	82	Zebra Mussel	Observed mature	1.25	
18128	09/18/18	Skiatook	boat dock, Black Dog, north			crostimbers, disturbed	1	82			2	
18129	09/18/18	Skiatook	boat dock, Osage Park			crostimbers, disturbed	1	84		Observed mature	2.5	
18130	09/18/18	Skiatook	marina, Crystal Bay, north end			crostimbers, disturbed	1	84		Observed mature	2.25	
18131	09/18/18	Skiatook	boat ramp, Skiatook Point			crostimbers, disturbed	1	83		Observed mature	0.5	
18132	09/18/18	Skiatook	boat dock, Tallchief Cove			crostimbers, disturbed	1	80	Zebra Mussel	Observed mature	1.5	
18133	09/18/18	Shell	Boat ramp			Cross timbers	1	83				
18134	09/18/18	Yahola	Dam- not a fishing pier			Urban park	3					
18135	09/18/18	Oologah	Boat dock- Verdigris River Park			Cross timbers, campground disturbed	3	80	Aquatic Hitchhiker		1	
18136	09/18/18	Oologah	Marina- Redbud			Cross timbers, disturbed	3	80			0.75	
18137	09/19/18	Bixhoma	Fishing pier-northwest			Cross timbers	4	83			3.75	
18138	09/19/18	Bixhoma	Fishing pier-southeast			Crosstimbers	4	83			2.75	
18139	09/19/18	Sahoma	fishing pier, E on Pretty Water Lake	Pistia stratiotes	only three individuals, collected for herbarium specimen	bottomland	4	84			0.75	
18140	09/19/18	Sahoma	fishing pier, middle shore of Pretty Water Lake	Pistia stratiotes	only three individuals, collected for herbarium specimen	bottomland	4	84			0.75	
18141	09/19/18	Sahoma	Fishing Pier-east side of tiny pen			Bottomland, Disturbed park	2	86			0.5	
18142	09/19/18	Sahoma	Fishing Pier-Pretty Water		No water lettuce visible	Bottomland	4	84			0.75	

			lake, south dam end										
18143	09/19/18	Okemah	Boat dock-northwest			Crosstimbers	3	84				1.25	
18144	09/19/18	Okemah	Boat dock-Northeast			Crosstimbers, Disturbed park	3	84	Aquatic Hitchhiker			1.25	
18145	09/19/18	Okemah	Fishing pier-south			Cross timbers	3	84				0.75	
18146	09/27/18	Brushy Creek	Boat dock				3	75					
18147	09/27/18	Stilwell City	Boat dock				3	73					
18148	09/27/18	Carl Blackwell	Fishing Area Pond, SW Arm Trout			Crosstimbers, Park	4	76					
18149	09/27/18	Carl Blackwell	Boat Ramp near trout pond, East side			Crosstimbers, Park	4	76	Aquatic Hitchhiker, Zebra Mussel				
18150	09/27/18	Carl Blackwell	fishing pier			disturbed park	4	75	Aquatic Hitchhiker			0.5	Arundo donax
18151	09/27/18	Carl Blackwell	marina			disturbed marina	4	75				0.5	
18152	09/27/18	Carl Blackwell	fishing pier, western cove			disturbed park	4	78				0.5	Arundo donax
18153	09/27/18	Carl Blackwell	boat dock, south			crosstimbers	5	75				0.75	
18154	09/27/18	Lone Chimney	boat ramp, north			crosstimbers	5	76					
18155	09/27/18	Sooner	boat dock, east			grassland	4	75				0.5	
18156	09/27/18	Sooner	boat dock, west	Myriophyllum spicatum	abundant	grassland	4	75		Observed mature		0.5	
18157	09/27/18	Fairfax City	boat dock			crosstimbers	4	77				0.75	
18158	09/27/18	Kaw	Boat dock, Washunga Bay			Bottomland	1	76	Zebra Mussel			0.25	
18159	09/27/18	Kaw	Boat dock (disrepair), Bear Creek Cove			Bottomland disturbed	1	76					
18160	09/27/18	Kaw	Boat ramp, Trader's Bend			Bottom land, river riparian	1	72					
18161	09/28/18	Ponca	Windmill Cove			Cross timbers	4	74				0.5	
18162	09/28/18	Ponca	Boat dock, west side			Disturbed park	4	74	Zebra Mussel			0.5	
18163	09/28/18	Ponca	Boat ramp-dam Southwest			Disturbed park	4	74					
18164	09/28/18	Ponca	Boat ramp and dock, East lake			Disturbed park	4	73	Zebra Mussel			0.5	
18165	09/28/18	Ponca	Stone fishing			Disturbed park	4	73					

			pier, near lake patrol office										
18166	09/28/18	Ponca	Boat ramp, south end of swim beach, ski docks North end			Disturbed Park	4	44				0.75	
18167	09/28/18	Kaw	Boat dock, Coon Creek Cove			Disturbed	1	70	Zebra Mussel			0.1	
18168	09/28/18	Kaw	Boat dock-Pioneer park			Disturbed, bottomland	1	74				0.1	
18169	09/28/18	Kaw	Boat ramp-Sarge Creek Core			Disturbed, Bottomland	1	74	Zebra Mussel			0.1	
18170	09/29/18	Kaw	Burbank Landing-mostly abandoned			Bottomland	1	74					
18171	09/29/18	Kaw	Boat dock-Osage Core			Cross timbers, disturbed	1	74	Zebra Mussel			0.25	
18172	09/29/18	Kaw	Boat dock-McFadden Cove			Disturbed, bottomland	1	75	Aquatic Hitchhiker			0.25	
18173	09/29/18	Kaw	Boat ramp-Sandy Park, no longer open to boats			Riparian	1	75					
20001	07/09/20	Carter	Dock and boat ramp			Cross timbers	3	84	Aquatic Hitchhiker			1.5	
20002	07/09/20	Ardmore City	Boat ramp	Hydrilla	very abundant, all over according to ODWC crew that I spoke with	Cross timbers	3	86	Aquatic Hitchhiker, stencil on ramp			1.5	
20003	07/09/20	Scott King	Boat ramp			Cross timbers	3	86	Aquatic Hitchhiker			0.75	
20004	07/09/20	Jean Neustadt	North and south boat docks			Cross timbers	4	86	Stencil on ramp			0.5	Mesquite
20005	07/09/20	Healdton	North boat ramp			Mowed park	3						
20006	07/09/20	Healdton	North dock			Mowed park	3	87				0.25	
20007	07/09/20	Healdton	South boat ramp			Mowed park	3	87				0.25	
20008	07/09/20	Arbuckle	North boat ramp			Cross timbers	3	88				0.5	
20009	07/09/20	Arbuckle	Boat dock and			Cross timbers	3	88	Aquatic			1	

			fishing pier, Buckhorn							Hitchhiker, stencil on ramp			
20010	07/09/20	Arbuckle	Buckhorn, fishing pier and boat dock north			Cross timbers	3	87		Aquatic Hitchhiker		0.75	
20011	07/09/20	Veterans	Boat ramp and fishing pier			Cross timbers	3	87				1.75	
20012	07/09/20	Arbuckle	Point, boat dock and fishing pier			Cross timbers	3	88				1	
20013	07/15/20	Crowder	Boat ramp and fishing pier			Mixed grass with cedar	3	81				0.5	
20014	07/15/20	Elk City	North fishing pier	Myriophyllum spicatum	scattered, loose, floating around	Mowed park	2	80				0.5	
20015	07/15/20	Elk City	SW boat dock	Myriophyllum spicatum	giant mat	Mixed grass	2	81				0.5	
20016	07/15/20	Clinton	Boat dock			Mixed grass	2	82				0.25	
20017	07/15/20	Foss	Panther Creek boat ramp			Mixed grass	2	82					
20018	07/15/20	Foss	Mouse Creek boat dock			Mixed grass	2	80		Observed mature	1		Scattered Tamarix, patch of Phragmites
20019	07/15/20	Foss	Sandy Beach boat dock			Mixed grass	2	81		Observed mature	2		Tamarix, a few
20020	07/15/20	Foss	Cedar Point			Mixed grass	2	80		Observed mature	1.75		Tamarix
20021	07/15/20	Foss	Cuthbert			Mixed grass and mowed park	2	82		Observed mature	1.25		Scattered Tamarix along shore, many dead in water
20022	07/15/20	Foss	Buffalo Bend			Bottomland	2	83		Observed mature	1.25		Scattered Tamarix along shore, many dead in water
20023	07/15/20	American Horse	Boat ramp			Mixed grass with cedar and oak	3	84					
20024	07/17/20	Arcadia	Central State Park boat dock			Cross timbers	3	84				0.5	
20025	07/17/20	Arcadia	Central State Park swim beach			Cross timbers	3						
20026	07/17/20	Arcadia	Edmond Park			Cross timbers	3	84				0.5	

			boat dock										
20027	07/17/20	Arcadia	Edmond Park swim beach			Cross timbers							
20028	07/17/20	Arcadia	Spring Creek boat ramp and dock			Cross timbers	3	86				0.5	
20029	07/17/20	Arcadia	Spring Creek swim beach			Cross timbers	3						
20030	07/17/20	Langston	Boat Ramp			Cross timbers	3	84	Zebra Mussel			0.75	
20031	07/17/20	Guthrie	Boat dock	Lythrum salicaria	scattered along north shore, not a monoculture, doesn't seem to be a big problem	Mowed park	3	85	Zebra Mussel			0.25	
20032	07/17/20	Liberty	Boat dock			Cross Timbers	3	86	Zebra Mussel			1.75	
20033	07/17/20	Elmer	Boat dock			Mowed park	3	86				0.25	
20034	07/17/20	El Reno	NW boat ramp			Disturbed park	3	86					
20035	07/22/20	Dripping Springs	Calf Creek Land boat dock			Cross Timbers	4	86	Aquatic Hitchhiker			1	Phragmites, all along shore, huge infestation
20036	07/22/20	Dripping Springs	Clovis Point Fishing Pier			Cross Timbers	4	86				1	Phragmites, all along shore, huge infestation
20037	07/22/20	Okmulgee	Hickory Point boat dock			Cross Timbers	4	86				1	
20038	07/22/20	Okmulgee	Red Oak boat ramp			Cross Timbers	4	86				1.25	
20039	07/22/20	Okmulgee	Black Jack boat ramp			Cross Timbers	4	87				1	
20040	07/22/20	Okmulgee	Pin Oak Landing boat ramp			Cross Timbers, mowed park	4	87	Aquatic Hitchhiker			1.25	
20041	07/22/20	Jim Hall	North boat ramp			Mowed park	5	87				0.25	
20042	07/22/20	Jim Hall	South boat ramp			Cross Timbers	5	87				0.25	
20043	07/22/20	Eufaula	Gentry Cove boat ramp (2)			Cross Timbers	3	90					
20044	07/22/20	Eufaula	Deep Fork WMA, Hwy 266 boat ramp			Bottomland	3	87				0.25	
20045	07/22/20	Eufaula	East of Checotah, boat			Bottomland	3	90				0.25	

			ramp										
20046	07/22/20	Eufaula	S of 40 on E side, boat ramp			Bottomland	3	90					
20047	07/22/20	Eufaula	Leisure Land boat ramp			Cross timbers	3	90				0.5	
20048	07/22/20	Eufaula	Indian Springs boat ramp			Bottomland	3	91				0.75	
20049	07/22/20	Eufaula	Belle Star boat ramp			Cross Timbers	3	88				0.75	
20050	07/22/20	Eufaula	Mill Creek boat ramp			Bottomland	3	90	Aquatic Hitchhiker			0.5	
20051	07/30/20	Dalgren	Boat dock	Myriophyllum spicatum	very abundant	Cross Timbers	3	88				1	
20052	08/13/20	El Reno	Swim Beach boat ramp			Mowed park	5	80				0.5	
20053	08/13/20	El Reno	Big fishing pier			Mowed park	3	80				0.5	
20054	08/13/20	Watonga	Canyon Vista Campground boat ramp			Mowed park	2	81					
20055	08/13/20	Canton	Big Bend Park north boat ramp			Mowed park, bottomland	3	80	Zebra Mussel			0.5	Phragmites, abundant where not mowed
20056	08/13/20	Canton	Big Bend Park middle boat ramp			Mowed park	3	81	Zebra Mussel				Phragmites, abundant where not mowed
20057	08/13/20	Canton	Big Bend Park south boat ramp			Mowed park	3	81	Zebra Mussel			0.5	
20058	08/13/20	Canton	Cheyenne Arapaho Park boat ramp			Bottomland	3	82					
20059	08/13/20	Canton	Canadian Park north boat ramp			Mowed park	3	80	Zebra Mussel	Observed mature		0.5	Phragmites, abundant where not mowed
20060	08/13/20	Canton	Canadian Park south boat ramp			Mowed park	3	80	Zebra Mussel			0.5	Phragmites, abundant where not mowed
20061	08/13/20	Canton	Sandy Cove swim beach			Beach	2	80					
20062	08/13/20	Canton	Longdale Park boat ramp			Bottomland	2	81	Zebra Mussel				Phragmites australis
20063	08/13/20	Canton	Boat ramp west of Fairview Golf			Bottomland	2	80					Phragmites, high abundance

			Course									
20064	08/13/20	Canton	Boat ramp west of WMA HQ			Bottomland	3	88				Phragmites, high abundance
20065	08/14/20	Great Salt Lake	South Rec Area Boat Ramp			Modified dam area	1	80				Tamarix
20066	08/14/20	Great Salt Lake	Sandy Beach boat ramp			Mowed park	1	80				Tamarix, high abundance
20067	08/19/20	Webbers Falls	Three Forks boat ramp			Bottomland	3	83			0.5	
20068	08/19/20	Webbers Falls	Hopewell Park			Bottomland	3	83				
20069	08/19/20	Webbers Falls	Spaniard Creek Campground boatramp	Alternanthera philoxeroides	common, in little cove of campground	Bottomland	3	86			0.5	
20070	08/19/20	Webbers Falls	Spaniard Creek N boat ramp	Alternanthera philoxeroides	abundant	Bottomland	3	87			0.5	
20071	08/19/20	Webbers Falls	Brewer Bend boat ramp	Alternanthera philoxeroides	common	Bottomland	3	87			0.5	
20072	08/19/20	Webbers Falls	Greenleaf Cove, Hwy 10 Landing, boat ramp	Alternanthera philoxeroides	abundant	Bottomland	5	88			0.5	
20073	08/19/20	Kerr	Webber Falls Park boat ramp	Alternanthera philoxeroides	common	Disturbed park	3	87				
20074	08/19/20	Kerr	Vian Creek	Alternanthera philoxeroides	abundant	Bottomland	3					
20075	08/19/20	Kerr	Cherokee Park boat ramp	Alternanthera philoxeroides	abundant	Bottomland	4	86			0.5	
20076	08/20/20	Wister	Quarry Peninsula boat ramp			Mowed park	4	82	Aquatic Hitchhiker		0.5	
20077	08/20/20	Wister	Wister Ridge boat ramp			Bottomland	4	83			0.5	
20078	08/20/20	Wister	Victor Campground boat ramp			Disturbed campground	4	84				
20079	08/20/20	Wister	Potts Creek boat ramp			Bottomland	4	83				
20080	08/20/20	Wister	SE boat ramp			Bottomland	4	82				
20081	08/20/20	Kerr	Applegate Cove boat ramp	Alternanthera philoxeroides	common	Disturbed park	3	86	Zebra Mussel		0.75	
20082	08/20/20	Kerr	Short Mountain Cove	Alternanthera philoxeroides	common	Oak Hickory Forest	3	88	Zebra Mussel			Phragmites australis
20083	08/20/20	Kerr	Cowlington Point boat	Alternanthera philoxeroides,	Alligator weed	Bottomland	3	86			1	Phragmites, big patch

			ramp	Najas minor, Myriophyllum spicatum	abundant							
20084	08/20/20	Kerr	Keota Landing boat ramp	Alternanthera philoxeroides, Najas minor, Myriophyllum spicatum	scattered	Oak Hickory Forest	3	88				
20085	08/20/20	Kerr	Little San Bois boat ramp	Alternanthera philoxeroides, Najas minor, Myriophyllum spicatum	not abundant	Bottomland	3	88				
20086	08/28/20	Eufaula	West boat ramp off I-40			Cross Timbers	2	80				
20087	08/28/20	Eufaula	Holiday Cove			Cross Timbers	2	81				
20088	08/28/20	Eufaula	Jack Frisbie boat ramp, Eufaula State Park			Cross Timbers	2	80				
20089	08/28/20	Eufaula	Marina, Eufaula State Park			Disturbed park	2	81			0.5	
20090	08/28/20	Eufaula	Boat ramp, W of S Hwy 150			Bottomland	2	82			0.5	
20091	08/28/20	Eufaula	Eufaula Cove Marina			Disturbed park, in town	2	82			0.5	
20092	08/28/20	Eufaula	South Point boat dock			Disturbed park, in town	2	82			0.5	
20093	08/28/20	Eufaula	Porum Landing boat ramp			Disturbed park	2	82			0.75	
20094	08/28/20	Eufaula	Dam Site Campground boat ramp			Cross Timbers	2	82			1	
20095	08/28/20	Eufaula	Brooken Cove boat ramp			Cross Timbers, mowed park	2	84			0.75	
20096	08/28/20	Eufaula	S of Brooken Cove boat ramp			Bottomland	2	84				
20097	08/28/20	Eufaula	Arrowhead State Park boat ramp			Cross Timbers	2	84				
20098	08/28/20	Eufaula	Town of Crowder boat ramp			Cross Timbers	2	85			0.5	
20099	08/28/20	Eufaula	Crowder Point Campground boat ramp			Disturbed park	2	85			0.5	
20100	08/28/20	Eufaula	Cardinal Point			Disturbed park	2	86				

			boat ramp										
20101	09/03/20	Dead Warrior	Dam boat ramp	Myriophyllum spicatum	large patch	Mixed grass	2	79			0.5	Phragmites, a few patches	
20102	09/03/20	Dead Warrior	Fishing pier	Myriophyllum spicatum	lower abundance	Bottomland	2	79			0.5	Phragmites, large patches within Typhus	
20103	09/03/20	Vincent	Boat ramp			Mixed grass	3	75					
20104	09/04/20	Fort Supply	South boat ramp			Disturbed park	3	75				Tamarix, a few; Phragmites, large patches	
20105	09/04/20	Fort Supply	Boat ramp on berm			Bottomland	3	72			0.25	Tamarix, a few; Phragmites, large patches	
20106	09/04/20	Fort Supply	Boat ramp at tent site			Mowed park	3	73			0.25	Tamarix, scattered individuals	
20107	09/04/20	Fort Supply	Boat ramp near gate			Mowed park	3	73			0.25	Tamarix, scattered individuals	
20108	09/04/20	Fort Supply	Boat ramp near dam			Mowed park	3	72			0.25	Phragmites patches	
20109	09/04/20	Fort Supply	East side south boat ramp			Disturbed park	3	73			0.25	Tamarix, a few; Phragmites, large patches; Arundo large patches	
20110	09/04/20	Fort Supply	Beaver Point Campground boat ramp			Disturbed park	3	73			0.25	Tamarix, scattered individuals	
20111	09/13/20	Eufaula	Juniper Point SE boat ramp			Bottomland	4	78					
20112	09/13/20	Eufaula	Juniper Point N boat ramp			Disturbed park	4	78					
20113	09/13/20	Eufaula	Hwy 31 Landing			Bottomland	4	78					
20114	09/13/20	Eufaula	Elm Point boat dock			Mowed park	4	78			0.25		
20115	09/13/20	Eufaula	Hickory Point boat ramp			Cross Timbers	4	78					

20116	09/13/20	Eufaula	Bud's Point boat ramp			Bottomland	4	79				
20117	09/13/20	John Wells	Fishing pier			Mowed park	3	79			1.5	
20118	09/13/20	New Spiro	Boat ramp			Oak Hickory Bottomland	4	80				
20119	09/14/20	Carl Albert	Boat ramp			Oak Hickory Bottomland	5	77				
20120	09/23/20	Evan Chambers	Boat ramp			Sagebrush grassland	3	69				Tamarix common; Phragmites all around lake, had to mow for fishing spots!
20121	09/23/20	Optima										
20122	09/23/20	Carl Etling	Boat ramp near dam			Shortgrass	1	78				Tamarix common
20123	09/23/20	Carl Etling	Boat ramp SE side			Bottomland	1	78				Tamarix common
20124	09/30/20	Elmer Thomas	Refuge boat ramp	Myriophyllum spicatum	very abundant, significant infestation	Mixed grass and cross timbers	3	68			5	
20125	09/30/20	Rush	Boat ramp	Myriophyllum spicatum	very abundant, significant infestation	Mixed grass and cross timbers	4	67			2	
20126	09/30/20	Quanah Parker	Fishing pier at Education Center	Myriophyllum spicatum	very abundant, significant infestation	Cross Timber Bottomland	4	69			5	
20127	09/30/20	Quanah Parker	Boat ramp near damp	Myriophyllum spicatum	very abundant, significant infestation	Mixed grass and cross timbers	4	69	Aquatic Hitchhiker			
20128	10/15/20	Cedar	Boat ramp at dam			Short leaf pine	4	68			1	