

Final Report

Texas Emerald Ash Borer Survey – 2010

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Summary:

As part of the national USDA-APHIS Emerald Ash Borer Survey Cooperative Agreement Award (No. 10-8412-1145-CA), the Texas AgriLife Extension Service conducted a biological survey in 2010 to determine if Emerald Ash Borer, an exotic and invasive species, was present in northeast and east-central Texas. A total of 201 traps were monitored at 57 locations, including 46 US Army Corp of Engineer campgrounds, 9 state parks, and 2 other sites in northeast and east-central Texas during March-August, 2010. As this pest is believed to be moved in firewood, camp grounds were selected based on the number of overnight reservations made by campers from the upper Midwestern U.S. where the emerald ash borer is established. To help increase public awareness of the pest, identification cards and other printed information material was distributed to campground attendants and site managers at each trapping location. No Emerald Ash borer adults were collected in this survey. The 2010 survey was a follow-up to similar surveys in 2008 and 2009, and provides base-line data and a trapping network for future surveys.

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In addition to the biological survey, a new training program for citizen science volunteers was developed with the cooperation of the Texas Invasive Plant and Pest Council. This training module and online reporting tool will be used to expand the network of biological field trapping to include trained human observers capable of reporting suspicious cases of ash death and borer signs throughout the state.

Objectives:

1. Determine if Emerald Ash Borer (*Agrilus planipennis* Fairmaire) is present but undetected in ash (*Fraxinus* sp.) and related tree species in Texas.
2. Develop benchmark data for future surveys to determine possible expansion of this pest in Texas.
3. Increase awareness by campers, campground attendants, and others of the risk of transporting firewood and other articles infested with ash borers into uninfested areas.
4. Provide information to the public to ensure proper identification of Emerald Ash Borers and damage caused by feeding larvae.

Background:

The Emerald Ash Borer (*Agrilus planipennis* Fairmaire), a native to Asia, is an exotic pest of mature ash (*Fraxinus* sp.) in the U.S., and is apparently expanding its range in the U.S. At this time, it has been detected in 12 Midwestern states and in 2 Canadian provinces. It has been estimated to be responsible for the death and decline of at least 70 million trees across the U.S. and Canada. This pest most likely entered the U.S. from its natural range in eastern Russia, northern China, Japan and Korea in ash wood used to stabilize cargo in ships or for packing or crating heavy consumer products in the late 1990's and was first detected in 2002.

Adult beetles are dark metallic green in color, 1/2 inch long and 1/8 inch wide. Adults can fly at least 1/2 mile from an infested tree when they emerge. Many infestations may have been started when people moved infested ash nursery trees, logs, or firewood into uninfested areas. The larvae are approximately 1 mm in diameter and 15 mm (0.6 in) long, and are creamy white.

The average emerging season for adults is early spring to late summer with a one year life cycle in southern Michigan, although in colder regions the life cycle may be up to 2 years. Adults lay eggs in crevasses in the bark. Larvae burrow into the bark after hatching and feed on the cambium and phloem and effectively girdle the tree, causing death of the tree within two years. The canopy of an infected tree begins to thin above infected portions of the trunk and major branches. Heavily-infested trees exhibit canopy die-back usually starting at the top of the tree with one-third to one-half of the branches dying in 1 to 2 years.

Biological Survey Procedures:

As part of the national USDA-APHIS Emerald Ash Borer Survey, insect monitoring traps were placed at various campgrounds, state parks, and national forests in 25 counties in north, east, and central Texas. A total of 201 traps were monitored at 57 different locations in east and east-central Texas beginning in late March (Table 1). Campground locations were selected based on the number of overnight reservations made by residents from the

upper Midwestern U.S. Since this pest is believed to be spread in infested ash logs, firewood, or nursery trees, sites which allow outdoor campfires were targeted. Additional traps were placed in nine Texas state parks, Sam Houston National Forest near Conroe, TX, and Knob Hills Trails Wildlife Management Area near Flower Mound TX.

Purple triangular traps used in this survey were approximately 24" x 14", coated with non-toxic glue, and baited with a Manuka oil lure to attract adult beetles. Traps were identified with a "Do Not Disturb" label along with contact information and were placed in or near ash trees at least 5 ft. above the ground, with no more than 4 traps at any one location. The location for each trap was also documented using a hand-held GPS unit (Garmin eTrex Legend). Traps were placed in ash trees when possible and in other trees if no ash trees were present. If the ash trees were too small to position the trap out of reach of people, traps was placed in non-ash tree but usually within 20 ft of small ash trees. The most common *Fraxinus* species included in the survey were Texas Ash (*Fraxinus texensis*), White Ash (*Fraxinus americana*), and Green Ash (*Fraxinus pennsylvanica*).

A map showing trap locations as plotted using GPS technology is given in Figure 1. As can be seen, traps were limited to the northeast and eastern areas of the state, where the majority of ash (*Fraxinus* sp.) are present.

Traps were monitored at 45–50 days after installation in late March – early April and again when the traps were removed in early August. Insects which were suspected as being emerald ash borers were removed from the traps and collected in small vials containing 70% ethyl alcohol and taken back to the laboratory for positive identification. Trap location, GPS coordinates and other survey details were entered into the on-line Integrated Survey Information System 'ISIS' maintained by USDA-APHIS.

Citizen Science Initiative

In addition to the biological survey with field traps, this year we initiated a subcontract / cooperative agreement with the Texas Invasive Plant and Pest Council to add a new training module to their *Invaders of Texas* citizen science monitoring program. The *Invaders* program is an innovative campaign whereby volunteer "citizen scientists" are trained to detect and report the arrival and dispersal of invasive species in their area (<http://texasinvasives.org/invaders/become.php>). The idea behind the program is simple. The more trained eyes looking for invasive species, the better the chances for early detection. Early detection can mean reduction or delay of economic and ecological damage caused by invasive species.

The *Invaders* program is a collaborative project managed by the Lady Bird Johnson Wildflower Center in Austin, TX with support from the U.S. Forest Service Forest Health Protection, U.S. Forest Service National Forests and Grasslands in Texas, Texas Forest Service, Texas Parks and Wildlife and Texas Master Naturalists. Since its inception in 2005 through 2009, the *Invaders* program has hosted 31 workshops and trained over 700 citizen scientists. These citizen scientists have logged over 3,300 hours in the field and collected over 8,000 species observations. In the past, this program has focused principally on invasive plants. Under our agreement, the program will develop a new animal and insect pest database, and add emerald ash borer to its curriculum for citizen science training workshops.

Results and Discussion

Biological Survey

No emerald ash borer adults were detected on any of the 201 traps deployed in 2010 (See Appendix 1 for a listing of all trap sites and locations). Various other beetles including click beetles, ground beetles, etc along with other insects (flies, mosquitoes, moths, etc) were trapped and identified.

A total of 43 days were spent installing traps, inspecting traps and replacing lures, and removing traps at the end of the survey (Table 2). A major portion of this time was spent traveling to the various locations in north, east, and southeast Texas. Approximately 10,560 miles were driven in the 43 days needed to conduct the survey, for an average of 245 miles per day.

Several extra trips were needed to return to campgrounds to replace traps which had been blown down by wind storms or which had been vandalized. Some of the potential damage to traps was reduced by securing tree hangers and spreaders using cable ties. This significantly reduced the number of traps which had to be re-hung, except in areas which were affected by severe thunderstorms and gale force winds.

Citizen Science and Public Awareness Activities

An 11-slide introduction was developed in cooperation with Travis Gallo, Program Coordinator for the *Invaders of Texas* citizen science program at The Lady Bird Johnson Wildflower Center. The slides give an overview of emerald ash borer including its history, threat to Texas forestry and how to recognize and report trees suspected of harboring infestations. The slide show and quiz was inaugurated in January 2011 (see <http://texasinvasives.org/training/chapter.php?chapter=9>). All new training workshops conducted in 2011 will include information on emerald ash borer, and previously trained volunteers who wish to maintain their citizen scientist status are required to view the training modules and complete a quiz. We will report on the numbers of trained volunteers following the 2011 season.

In addition, online EAB reporting capabilities are now available online through the Texas Invasives website. Trained volunteers report the latitude and longitude of the suspected sighting along with pertinent comments. To see the report form, go to http://texasinvasives.org/action/report_detail.php?alert_id=5

To help increase awareness of the pest among campers and park visitors, identification cards and other printed information material was distributed to campground attendants and project superintendents at each trapping location. A brief 5 page summary of the survey objectives, background, and survey procedures which included pictures of the pest, pest damage, and survey traps was given to all Corp of Engineer Operations Managers, state park managers, and campground attendants at each location used in this survey.

Recommendations:

Suggestions and/or recommendations for future emerald ash borer surveys include:

- Expanding trap distribution to include campgrounds and RV parks with higher likelihood of being used by interstate travelers, especially in areas of east Texas containing a higher population of ash (*Fraxinus*) trees. Many of these campgrounds do not have as many restrictions on the movement of firewood and could become a source for ash borer infestations
- Reducing the number of traps in, or skipping altogether, parks and campgrounds with low ash tree populations and adding more traps in areas of higher ash tree populations.
- Provide more information and educational materials to park and campground personnel to help in emerald ash borer identification, and better inform them of the damage emerald ash borers could cause if they become established in Texas.
- Establish a network of trained entomologists who are willing to investigate suspected cases of emerald ash borer as reported by citizen scientists. Collect data on numbers and contact information of volunteers trained through the *Texas Invaders* program and follow up with additional training and surveys.

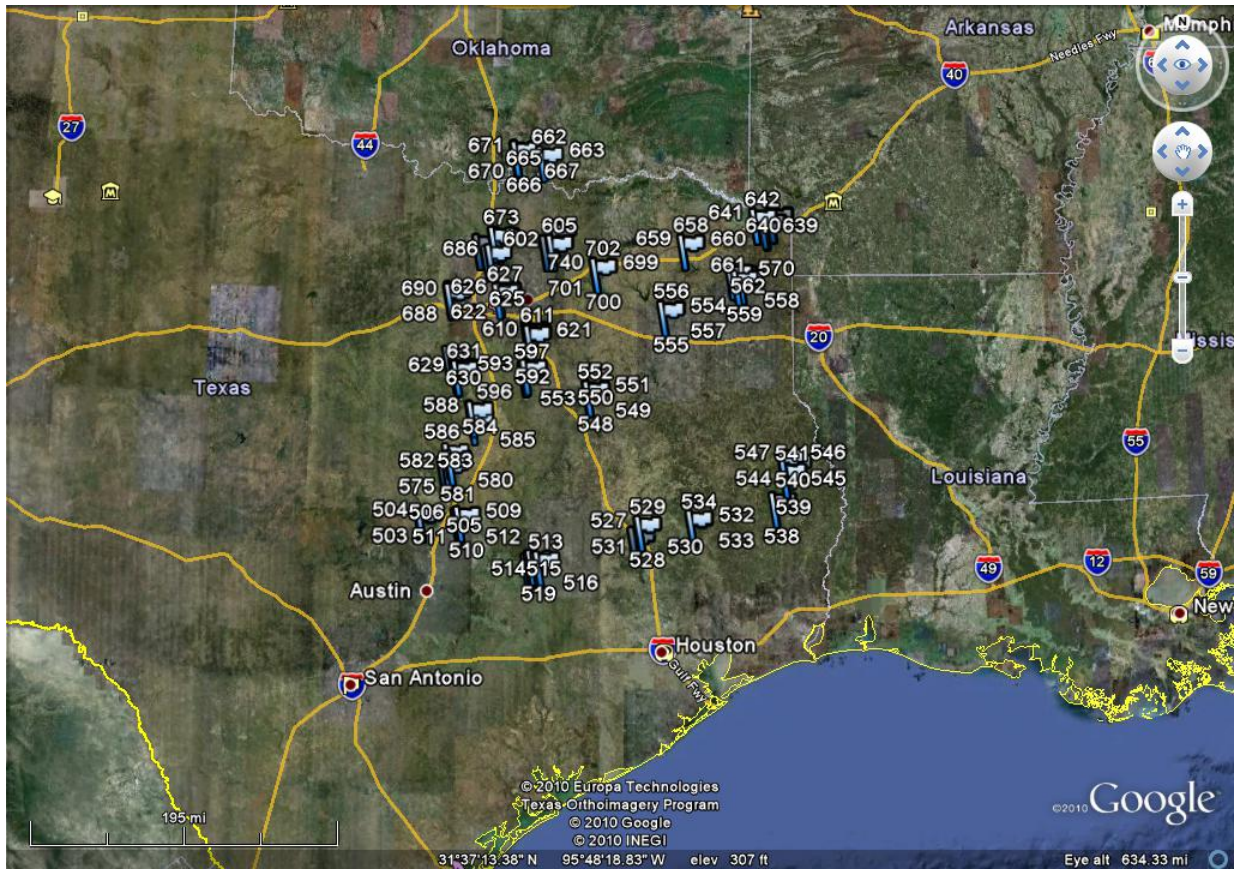


Figure 1. Map of Emerald Ash Borer trap locations listed by GPS waypoint number.

Table 1. 2010 Emerald Ash Borer Survey – Texas Trap Location Data

Location	Lakes	Campgrounds	No. of Traps
US Army Corp of Engineer	17	45	145
Texas State Parks		9	45
National Forest		1	4
City Campgrounds / RV Parks		1	3
Other Sites		1	4
	17	57	201

Table 2. 2010 Emerald Ash Borer Survey – Summary of Activities

Activity	Days	No. Traps	Traps/Day
Locate trees and install traps	16	201	12.6
Inspect traps and replace lure	14	201	14.4
Inspect and remove traps	13	201	15.5
Total Days	43		

APPENDIX 1
Emerald Ash Borer Surveillance Traps in Texas – 2010

Actual Survey Locations

Loc. No.	Trap No.	Location	Park	Tree	County	GPS Coordinates		Inst. Date	Comments/Recommendations
						North	West		
01	001	Lake Georgetown	Cedar Breaks Park	Ash	Williamson	30.67387	097.73944	29-Mar	Continue in 2011
01	002	Lake Georgetown	Cedar Breaks Park	Elm	Williamson	30.67447	097.73750	29-Mar	Continue in 2011
01	003	Lake Georgetown	Cedar Breaks Park	Elm	Williamson	30.67318	097.73683	29-Mar	Continue in 2011
02	004	Lake Georgetown	Jim Hogg Park	Ash	Williamson	30.68215	097.74117	29-Mar	Continue in 2011
02	005	Lake Georgetown	Jim Hogg Park	Ash	Williamson	30.68070	097.74036	29-Mar	Continue in 2011
02	006	Lake Georgetown	Jim Hogg Park	Ash	Williamson	30.68165	097.73865	29-Mar	Continue in 2011
02	007	Lake Georgetown	Jim Hogg Park	Ash	Williamson	30.68506	097.74110	29-Mar	Continue in 2011
02	008	Lake Georgetown	Jim Hogg Park	Ash	Williamson	30.68591	097.73853	29-Mar	Continue in 2011
03	009	Granger Lake	Taylor Park	Ash	Williamson	30.66960	097.37106	29-Mar	Continue in 2011
03	010	Granger Lake	Taylor Park	Ash	Williamson	30.67082	097.37072	29-Mar	Continue in 2011
03	011	Granger Lake	Taylor Park	Ash	Williamson	30.66844	097.37194	29-Mar	Continue in 2011
03	012	Granger Lake	Taylor Park	Ash	Williamson	30.66625	097.37218	29-Mar	Continue in 2011
04	013	Granger Lake	Wilson H. Fox Park	Ash	Williamson	30.68312	097.34988	29-Mar	Continue in 2011
04	014	Granger Lake	Wilson H. Fox Park	Ash	Williamson	30.68391	097.34700	29-Mar	Continue in 2011
04	015	Granger Lake	Wilson H. Fox Park	Ash	Williamson	30.68483	097.34612	29-Mar	Continue in 2011
04	016	Granger Lake	Wilson H. Fox Park	Ash	Williamson	30.68452	097.35106	29-Mar	Continue in 2011
05	017	Lake Somerville	Yegua Creek Park	Oak	Washington	30.30764	096.54320	30-Mar	Discontinue for 2011
05	018	Lake Somerville	Yegua Creek Park	Oak	Washington	30.30736	096.54072	30-Mar	Discontinue for 2011

06	019	Lake Somerville	Rocky Creek Park	Ash	Washington	30.30528	096.56186	30-Mar	Continue in 2011
06	020	Lake Somerville	Rocky Creek Park	Hackberry	Washington	30.29800	096.56463	30-Mar	Continue in 2011
07	021	Lake Somerville State Park	Nails Creek Unit	Oak	Lee	30.28643	096.66238	30-Mar	Discontinue for 2011
07	022	Lake Somerville State Park	Nails Creek Unit	Elm	Lee	30.28974	096.66283	30-Mar	Discontinue for 2011
08	023	Lake Somerville State Park	Birch Creek Unit - Yaupon	Ash	Burleson	30.31772	096.61542	30-Mar	Continue in 2011
08	024	Lake Somerville State Park	Birch Creek Unit - Yaupon	Ash	Burleson	30.31563	096.62106	30-Mar	Continue in 2011
09	025	Lake Somerville State Park	Birch Creek Unit - Old Hickory	Elm	Burleson	30.30423	096.63848	30-Mar	Continue in 2011
09	026	Lake Somerville State Park	Birch Creek Unit - Old Hickory	Elm	Burleson	30.30649	096.63506	30-Mar	Continue in 2011
10	027	Sam Houston National Forest	Cagle - Sweetgum	Ash	Walker	30.52428	095.59016	5-Apr	Discontinue for 2011
10	028	Sam Houston National Forest	Cagle - Sweetgum	Oak	Walker	30.52375	095.58893	5-Apr	Discontinue for 2011
11	029	Sam Houston National Forest	Cagle - Sycamore	Ash	Walker	30.52046	095.59058	5-Apr	Discontinue for 2011
11	030	Sam Houston National Forest	Cagle - Sycamore	Sweetgum	Walker	30.52045	095.58941	5-Apr	Discontinue for 2011
12	031	Huntsville State Park	Coloneh Area	Ash	Walker	30.61748	095.52752	5-Apr	Continue in 2011
12	032	Huntsville State Park	Coloneh Area	Ash	Walker	30.62108	095.52695	5-Apr	Continue in 2011
12	033	Huntsville State Park	Coloneh Area	Ash	Walker	30.61644	095.52448	5-Apr	Continue in 2011
13	034	Huntsville State Park	Prairie Branch	Ash	Walker	30.61792	095.53661	5-Apr	Continue in 2011
14	035	Lake Livingston State Park	Pin Oak	Hickory	Polk	30.66717	095.00632	6-Apr	Continue in 2011
14	036	Lake Livingston State Park	Pin Oak	Ash	Polk	30.66946	097.00919	6-Apr	Continue in 2011
15	037	Lake Livingston State Park	Briar Loop	Ash	Polk	30.66111	097.00737	6-Apr	Continue in 2011
26	038	Lake Livingston State Park	Yaupon Loop	Ash	Polk	30.65387	097.00467	6-Apr	Continue in 2011
17	039	B.A. Steinhagen Reservoir	Sandy Creek	Ash	Jasper	30.82703	094.16006	6-Apr	Continue in 2011
17	040	B.A. Steinhagen Reservoir	Sandy Creek	Ash	Jasper	30.82004	094.16633	6-Apr	Continue in 2011
17	041	B.A. Steinhagen Reservoir	Sandy Creek	Ash	Jasper	30.82014	094.17142	6-Apr	Continue in 2011
18	042	Sam Rayburn Reservoir	Twin Dikes	Hickory	Jasper	31.07126	094.05253	6-Apr	Discontinue for 2011
18	043	Sam Rayburn	Twin Dikes	Hickory	Jasper	31.07298	-	6-Apr	Discontinue for 2011

		Reservoir					094.05835			
18	044	Sam Rayburn Reservoir	Twin Dikes	Ash	Jasper	31.07500	-	094.06262	6-Apr	Discontinue for 2011
19	045	Sam Rayburn Reservoir	Mill Creek	Beech	Jasper	31.15299	-	094.00591	6-Apr	Discontinue for 2011
19	046	Sam Rayburn Reservoir	Mill Creek	Ash	Jasper	31.15101	-	094.00742	6-Apr	Discontinue for 2011
20	047	Sam Rayburn Reservoir	San Augustine	Ash	San Augustine	31.20233	-	094.07461	6-Apr	Continue in 2011
20	048	Sam Rayburn Reservoir	San Augustine	Ash	San Augustine	31.20253	-	094.07626	6-Apr	Continue in 2011
20	049	Sam Rayburn Reservoir	San Augustine	Ash	San Augustine	31.20242	-	094.08104	6-Apr	Continue in 2011
20	050	Sam Rayburn Reservoir	San Augustine	Oak	San Augustine	31.20079	-	094.08163	6-Apr	Continue in 2011
21	051	Fairfield Lake State Park	Post Oak Area	Ash	Freestone	31.79154	-	096.05838	7-Apr	Continue in 2011
21	052	Fairfield Lake State Park	Post Oak Area	Ash	Freestone	31.70049	-	096.05788	7-Apr	Continue in 2011
22	053	Fairfield Lake State Park	Cooks Ferry	Ash	Freestone	31.78923	-	096.05717	7-Apr	Continue in 2011
22	054	Fairfield Lake State Park	Cooks Ferry	Ash	Freestone	31.78617	-	096.05743	7-Apr	Continue in 2011
23	055	Fairfield Lake State Park	Springfield	Ash	Freestone	31.78173	-	096.05548	7-Apr	Continue in 2011
23	056	Fairfield Lake State Park	Springfield	Ash	Freestone	31.78231	-	096.05665	7-Apr	Continue in 2011
24	057	Tyler State Park	Area 5	Ash	Smith	32.47468	-	095.29508	7-Apr	Continue in 2011
24	058	Tyler State Park	Area 9	Ash	Smith	32.47823	-	095.29021	7-Apr	Continue in 2011
24	059	Tyler State Park	Area 10	Ash	Smith	32.47923	-	095.28748	7-Apr	Continue in 2011
24	060	Tyler State Park	Cedar Point	Ash	Smith	32.48082	-	095.29442	7-Apr	Continue in 2011
25	061	Lake O' the Pines	Brushy Creek	Oak	Marion	32.74374	-	094.53786	8-Apr	Discontinue for 2011
25	062	Lake O' the Pines	Brushy Creek	Box elder	Marion	32.74138	-	094.53679	8-Apr	Discontinue for 2011
26	063	Lake O' the Pines	Buckhorn Creek	Hickory	Marion	32.75761	-	094.49127	8-Apr	Discontinue for 2011
26	064	Lake O' the Pines	Buckhorn Creek	Hickory	Marion	32.75883	-	094.49246	8-Apr	Discontinue for 2011
26	065	Lake O' the Pines	Buckhorn Creek	Ash	Marion	32.75610	-	094.49450	8-Apr	Discontinue for 2011
26	066	Lake O' the Pines	Buckhorn Creek	Oak	Marion	32.75591	-	094.49155	8-Apr	Discontinue for 2011
27	067	Lake O' the Pines	Johnson Creek	Ash	Marion	32.78320	-	094.55130	8-Apr	Discontinue for 2011

27	068	Lake O' the Pines	Johnson Creek	Sweetgum	Marion	32.77997	-	094.54687	8-Apr	Discontinue for 2011
27	069	Lake O' the Pines	Johnson Creek	Oak	Marion	32.78606	-	094.54678	8-Apr	Discontinue for 2011
27	070	Lake O' the Pines	Johnson Creek	Oak	Marion	32.78905	-	094.54871	8-Apr	Discontinue for 2011
28	071	Lake O' the Pines	Alley Creek	Ash	Marion	32.79801	-	094.59312	8-Apr	Continue in 2011
28	072	Lake O' the Pines	Alley Creek	Ash	Marion	32.79575	-	094.59501	8-Apr	Continue in 2011
28	073	Lake O' the Pines	Alley Creek	Ash	Marion	32.79527	-	094.59566	8-Apr	Continue in 2011
28	074	Lake O' the Pines	Alley Creek	Elm	Marion	32.79758	-	094.59003	8-Apr	Continue in 2011
29	075	Lake Belton	West Cliff Park	Ash	Bell	31.11510	-	097.51923	12-Apr	Continue in 2011
29	076	Lake Belton	West Cliff Park	Ash	Bell	31.11542	-	097.51866	12-Apr	Continue in 2011
29	077	Lake Belton	West Cliff Park	Ash	Bell	31.11576	-	097.52154	12-Apr	Continue in 2011
30	078	Lake Belton	Live Oak Ridge	Ash	Bell	31.11729	-	097.47465	12-Apr	Continue in 2011
30	079	Lake Belton	Live Oak Ridge	Ash	Bell	31.11714	-	097.47654	12-Apr	Continue in 2011
30	080	Lake Belton	Live Oak Ridge	Hackberry	Bell	31.11573	-	097.47572	12-Apr	Continue in 2011
31	081	Lake Belton	Cedar Ridge	Ash	Bell	31.16820	-	097.45763	12-Apr	Continue in 2011
31	082	Lake Belton	Cedar Ridge	Ash	Bell	31.16961	-	097.45718	12-Apr	Continue in 2011
31	083	Lake Belton	Cedar Ridge	Ash	Bell	31.17077	-	097.44357	12-Apr	Continue in 2011
31	084	Lake Belton	Cedar Ridge	Ash	Bell	31.16958	-	097.44384	12-Apr	Continue in 2011
32	085	Lake Belton	White Flint Park	Oak	Bell	31.22896	-	097.47091	12-Apr	Continue in 2011
32	086	Lake Belton	White Flint Park	Ash	Bell	31.22754	-	097.47227	12-Apr	Continue in 2011
33	087	Lake Waco	Midway Park	Ash	McLennan	31.52333	-	097.22632	13-Apr	Continue in 2011
33	088	Lake Waco	Midway Park	Ash	McLennan	31.52563	-	097.22644	13-Apr	Continue in 2011
34	089	Lake Waco	Airport Park	Ash	McLennan	31.59466	-	097.23315	13-Apr	Continue in 2011
34	090	Lake Waco	Airport Park	Ash	McLennan	31.59904	-	097.24058	13-Apr	Continue in 2011
34	091	Lake Waco	Airport Park	Ash	McLennan	31.59876	-	097.24007	13-Apr	Continue in 2011
34	092	Lake Waco	Airport Park	Ash	McLennan	31.60211	-	-	13-Apr	Continue in 2011

							097.24077			
35	093	Navarro Mills Reservoir	Oak Park	Ash	Navarro	31.96750	-	096.69701	13-Apr	Continue in 2011
35	094	Navarro Mills Reservoir	Oak Park	Ash	Navarro	31.96834	-	096.69574	13-Apr	Continue in 2011
35	095	Navarro Mills Reservoir	Oak Park	Ash	Navarro	31.96438	-	096.69613	13-Apr	Continue in 2011
35	096	Navarro Mills Reservoir	Oak Park	Ash	Navarro	31.96388	-	096.69527	13-Apr	Continue in 2011
36	097	Navarro Mills Reservoir	Liberty Hill Park	Ash	Navarro	31.94689	-	096.71999	13-Apr	Continue in 2011
36	098	Navarro Mills Reservoir	Liberty Hill Park	Ash	Navarro	31.94681	-	096.71422	13-Apr	Continue in 2011
36	099	Navarro Mills Reservoir	Liberty Hill Park	Ash	Navarro	31.94712	-	096.70495	13-Apr	Continue in 2011
36	100	Navarro Mills Reservoir	Liberty Hill Park	Ash	Navarro	31.94884	-	096.70362	13-Apr	Continue in 2011
37	101	Lake Lavon	East Fork Park	Ash	Collin	33.03777	-	096.51349	14-Apr	Continue in 2011
37	102	Lake Lavon	East Fork Park	Ash	Collin	33.03747	-	096.51131	14-Apr	Continue in 2011
37	103	Lake Lavon	East Fork Park	Ash	Collin	33.03868	-	096.51222	14-Apr	Continue in 2011
37	104	Lake Lavon	East Fork Park	Ash	Collin	33.03962	-	096.51315	14-Apr	Continue in 2011
38	105	Lake Lavon	Lavonia Park	Ash	Collin	33.04412	-	096.44409	14-Apr	Continue in 2011
38	106	Lake Lavon	Lavonia Park	Ash	Collin	33.04538	-	096.44470	14-Apr	Continue in 2011
38	107	Lake Lavon	Lavonia Park	Ash	Collin	33.04708	-	096.44312	14-Apr	Continue in 2011
38	108	Lake Lavon	Lavonia Park	Ash	Collin	33.04293	-	096.44505	14-Apr	Continue in 2011
39	109	Lake Lavon	Caddo Park	Ash	Collin	33.16245	-	096.41839	14-Apr	Continue in 2011
39	110	Lake Lavon	Caddo Park	Ash	Collin	33.16255	-	096.41685	14-Apr	Continue in 2011
39	111	Lake Lavon	Caddo Park	Ash	Collin	33.16098	-	096.41168	16-Apr	Continue in 2011
39	112	Lake Lavon	Caddo Park	Ash	Collin	33.16096	-	096.41077	16-Apr	Continue in 2011
40	113	Bardwell Lake	Highview Park	Ash	Ellis	32.26231	-	096.65839	16-Apr	Continue in 2011
40	114	Bardwell Lake	Highview Park	Ash	Ellis	32.26450	-	096.65937	16-Apr	Continue in 2011
40	115	Bardwell Lake	Highview Park	Ash	Ellis	32.26561	-	096.66044	16-Apr	Continue in 2011
40	116	Bardwell Lake	Highview Park	Ash	Ellis	32.26837	-	096.66369	16-Apr	Continue in 2011

41	117	Bardwell Lake	Waxahachie Park	Ash	Ellis	32.28977	-	096.67884	16-Apr	Continue in 2011
41	118	Bardwell Lake	Waxahachie Park	Ash	Ellis	32.29147	-	096.68254	16-Apr	Continue in 2011
41	119	Bardwell Lake	Waxahachie Park	Ash	Ellis	32.29292	-	096.68680	16-Apr	Continue in 2011
41	120	Bardwell Lake	Waxahachie Park	Ash	Ellis	32.29456	-	096.69201	16-Apr	Continue in 2011
42	121	Bardwell Lake	Mott Park	Ash	Ellis	32.26174	-	096.66595	16-Apr	Continue in 2011
42	122	Bardwell Lake	Mott Park	Ash	Ellis	32.26178	-	096.66423	16-Apr	Continue in 2011
42	123	Bardwell Lake	Mott Park	Ash	Ellis	32.26031	-	096.66382	16-Apr	Continue in 2011
42	124	Bardwell Lake	Mott Park	Ash	Ellis	32.25698	-	096.66282	16-Apr	Continue in 2011
43	125	Cedar Hill State Park	Shady Ridge Camping Area	Ash	Dallas	32.63544	-	096.97388	16-Apr	Continue in 2011
43	126	Cedar Hill State Park	Shady Ridge Camping Area	Ash	Dallas	32.63888	-	096.97623	16-Apr	Continue in 2011
43	127	Cedar Hill State Park	Shady Ridge Camping Area	Ash	Dallas	32.63594	-	096.97581	16-Apr	Continue in 2011
43	128	Cedar Hill State Park	Eagle Ford Camping Area	Ash	Dallas	32.63293	-	096.97602	16-Apr	Continue in 2011
43	129	Cedar Hill State Park	Lakeview Camping Area	Ash	Dallas	32.62819	-	096.97878	16-Apr	Continue in 2011
43	130	Cedar Hill State Park	Coyote Crossing Camping Area	Ash	Dallas	32.61628	-	096.99223	16-Apr	Continue in 2011
44	131	Lake Whitney	McCown Valley Park	Ash	Hill	31.94450	-	097.40029	19-Apr	Continue in 2011
44	132	Lake Whitney	McCown Valley Park	Ash	Hill	31.94528	-	097.39767	19-Apr	Continue in 2011
44	133	Lake Whitney	McCown Valley Park	Ash	Hill	31.94438	-	097.40585	19-Apr	Continue in 2011
44	134	Lake Whitney	McCown Valley Park	Elm	Hill	31.94415	-	097.39894	19-Apr	Continue in 2011
45	135	Lake Whitney	Cedron Creek Park	Ash	Bosque	31.96910	-	097.41869	19-Apr	Continue in 2011
45	136	Lake Whitney	Cedron Creek Park	Ash	Bosque	31.96617	-	097.41791	19-Apr	Continue in 2011
45	137	Lake Whitney	Cedron Creek Park	Ash	Bosque	31.96193	-	097.41512	19-Apr	Continue in 2011
45	138	Lake Whitney	Cedron Creek Park	Ash	Bosque	31.96396	-	097.41498	19-Apr	Continue in 2011
46	139	Lake Whitney	Plowman Creek Park	Hackberry	Bosque	32.06897	-	097.49239	19-Apr	Discontinue for 2011
46	140	Lake Whitney	Plowman Creek Park	Elm	Bosque	32.07152	-	097.49093	19-Apr	Discontinue for 2011
47	141	Wright Patman	Malden Lake Park	Ash	Bowie	33.28101	-	-	20-Apr	Continue in 2011

		Reservoir					094.34026		
47	142	Wright Patman Reservoir	Malden Lake Park	Ash	Bowie	33.28209	- 094.33595	20-Apr	Continue in 2011
47	143	Wright Patman Reservoir	Malden Lake Park	Hickory	Bowie	33.28186	- 094.33807	20-Apr	Continue in 2011
47	144	Wright Patman Reservoir	Malden Lake Park	Ash	Bowie	33.27805	- 094.34122	20-Apr	Continue in 2011
48	145	Wright Patman Reservoir	Piney Point Park	Ash	Cass	33.29481	- 094.16903	20-Apr	Continue in 2011
48	146	Wright Patman Reservoir	Piney Point Park	Ash	Cass	33.29454	- 094.16977	20-Apr	Continue in 2011
48	147	Wright Patman Reservoir	Piney Point Park	Hickory	Cass	33.29679	- 094.16889	20-Apr	Continue in 2011
48	148	Wright Patman Reservoir	Piney Point Park	Oak	Cass	33.29547	- 094.16836	20-Apr	Continue in 2011
49	149	Wright Patman Reservoir	Rocky Point Park	Hickory	Cass	33.28842	- 094.17418	20-Apr	Discontinue for 2011
49	150	Wright Patman Reservoir	Rocky Point Park	Hickory	Cass	33.28950	- 094.17249	20-Apr	Discontinue for 2011
49	151	Wright Patman Reservoir	Rocky Point Park	Hickory	Cass	33.28560	- 094.17033	20-Apr	Discontinue for 2011
49	152	Wright Patman Reservoir	Rocky Point Park	Hickory	Cass	33.28559	- 094.16843	20-Apr	Discontinue for 2011
50	153	Atlanta State Park	White Oak Ridge Area	Hickory	Cass	33.28566	- 094.16840	21-Apr	Continue in 2011
50	154	Atlanta State Park	White Oak Ridge Area	Ash	Cass	33.23463	- 094.23506	21-Apr	Continue in 2011
50	155	Atlanta State Park	Wilkins Creek Area	Ash	Cass	33.22932	- 094.23698	21-Apr	Continue in 2011
50	156	Atlanta State Park	Wilkins Creek Area	Hickory	Cass	33.23049	- 094.23592	21-Apr	Continue in 2011
50	157	Atlanta State Park	Wilkins Creek Area	Ash	Cass	33.22871	- 094.23598	21-Apr	Continue in 2011
50	158	Atlanta State Park	Knight's Bluff	Ash	Cass	33.23454	- 094.25556	21-Apr	Continue in 2011
51	159	Lake Bob Sandlin State Park	Cherokee Trace	Ash	Titus	33.05404	- 095.08583	21-Apr	Continue in 2011
51	160	Lake Bob Sandlin State Park	Moccasin Track	Ash	Titus	33.05739	- 095.08379	21-Apr	Continue in 2011
51	161	Lake Bob Sandlin State Park	Fort Sherman Camping Area	Ash	Titus	33.05304	- 095.08845	21-Apr	Continue in 2011
51	162	Lake Bob Sandlin State Park	Fort Sherman Camping Area	Ash	Titus	33.05376	- 095.08870	21-Apr	Continue in 2011
52	163	Lake Texoma	Dam Site	Ash	Grayson	33.81728	- 096.55852	22-Apr	Continue in 2011
52	164	Lake Texoma	Dam Site	Ash	Grayson	33.81816	- 096.55953	22-Apr	Continue in 2011
53	165	Lake Texoma	Juniper Point East	Ash	Grayson	33.86151	- 096.83130	22-Apr	Continue in 2011

53	166	Lake Texoma	Juniper Point East	Ash	Grayson	33.86037	-	096.83144	22-Apr	Continue in 2011
53	167	Lake Texoma	Juniper Point East	Ash	Grayson	33.85926	-	096.83009	22-Apr	Continue in 2011
53	168	Lake Texoma	Juniper Point East	Ash	Grayson	33.86177	-	096.82325	22-Apr	Continue in 2011
53	169	Lake Texoma	Juniper Point East	Ash	Grayson	33.86166	-	096.82803	22-Apr	Continue in 2011
53	170	Lake Texoma	Juniper Point East	Ash	Grayson	33.86007	-	096.82834	22-Apr	Continue in 2011
54	171	Lake Texoma	Juniper Point West	Ash	Grayson	33.85934	-	096.83406	22-Apr	Continue in 2011
54	172	Lake Texoma	Juniper Point West	Ash	Grayson	33.86135	-	096.83478	22-Apr	Continue in 2011
55	173	Lake Lewisville	Hickory Creek Park	Ash	Denton	33.10942	-	097.04588	22-Apr	Continue in 2011
55	174	Lake Lewisville	Hickory Creek Park	Ash	Denton	33.10868	-	097.04694	22-Apr	Continue in 2011
55	175	Lake Lewisville	Hickory Creek Park	Ash	Denton	33.10764	-	097.14739	22-Apr	Continue in 2011
55	176	Lake Lewisville	Hickory Creek Park	Ash	Denton	33.10690	-	097.04427	22-Apr	Continue in 2011
55	177	Lake Lewisville	Hickory Creek Park	Ash	Denton	33.10510	-	097.04249	22-Apr	Continue in 2011
55	178	Lake Lewisville	Hickory Creek Park	Ash	Denton	33.10549	-	097.04127	22-Apr	Continue in 2011
56	179	Lake Lewisville	Westlake Park	Ash	Denton	33.09645	-	097.04127	22-Apr	Continue in 2011
56	180	Lake Lewisville	Westlake Park	Ash	Denton	33.09718	-	097.00281	22-Apr	Continue in 2011
56	181	Lake Lewisville	Westlake Park	Ash	Denton	33.10199	-	096.99704	22-Apr	Continue in 2011
56	182	Lake Lewisville	Westlake Park	Ash	Denton	33.11139	-	097.00259	22-Apr	Continue in 2011
57	183	Lake Grapevine	Vineyards Campground	Ash	Tarrant	32.95537	-	097.07533	26-Apr	Continue in 2011
57	184	Lake Grapevine	Vineyards Campground	Ash	Tarrant	32.95520	-	097.07739	26-Apr	Continue in 2011
57	185	Lake Grapevine	Vineyards Campground	Ash	Tarrant	32.95549	-	097.07480	26-Apr	Continue in 2011
58	186	Benbrook Reservoir	Bear Creek Park	Ash	Tarrant	32.61157	-	097.48692	26-Apr	Continue in 2011
58	187	Benbrook Reservoir	Bear Creek Park	Hackberry	Tarrant	32.60429	-	097.49632	26-Apr	Continue in 2011
58	188	Benbrook Reservoir	Bear Creek Park	Elm	Tarrant	32.60488	-	097.49345	26-Apr	Continue in 2011
58	189	Benbrook Reservoir	Holiday Park	Ash	Tarrant	32.63384	-	097.48677	26-Apr	Continue in 2011
58	190	Benbrook Reservoir	Holiday Park	Ash	Tarrant	32.63221	-	-	26-Apr	Continue in 2011

							097.48365			
59	191	Benbrook Reservoir	Holiday Park	Ash	Tarrant	32.62375	-	097.48280	26-Apr	Continue in 2011
59	192	Benbrook Reservoir	Holiday Park	Ash	Tarrant	32.62249	-	097.48833	26-Apr	Continue in 2011
60	193	Lake Grapevine	Knob Hills Trail Wildlife Mgt.	Ash	Denton	33.04092	-	097.20363	26-Apr	Being deveolped/Discontinue for 2011
60	194	Lake Grapevine	Knob Hills Trail Wildlife Mgt.	Ash	Denton	33.04233	-	097.20329	26-Apr	Being deveolped/Discontinue for 2011
60	195	Lake Grapevine	Knob Hills Trail Wildlife Mgt.	Ash	Denton	33.04280	-	097.20319	26-Apr	Being deveolped/Discontinue for 2011
60	196	Lake Grapevine	Knob Hills Trail Wildlife Mgt.	Ash	Denton	33.04429	-	097.20516	26-Apr	Being deveolped/Discontinue for 2011
61	197	Lake Tawakoni State Park	White Deer Reach	Ash	Hunt	32.84512	-	095.99151	27-Apr	Continue in 2011
61	198	Lake Tawakoni State Park	White Deer Reach	Ash	Hunt	32.84737	-	095.99020	27-Apr	Continue in 2011
61	199	Lake Tawakoni State Park	White Deer Reach	Ash	Hunt	32.84626	-	095.99210	27-Apr	Continue in 2011
61	200	Lake Tawakoni State Park	Spring Point	Ash	Hunt	32.84911	-	095.99171	27-Apr	Continue in 2011
61	201	Lake Tawakoni State Park	White Deer Reach	Ash	Hunt	32.84640	-	095.99099	15-Jun	Continue in 2011