

The 2011 Drought in Texas

Tree Health Issues

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Let's begin by looking at the severity of the 2011 drought

Austin-American Statesman, September 29, 2011:

“Texas could be in the midst of a drought the history books have never seen,” state climatologist John Nielsen-Gammon said. The current drought could last until 2020, because the region's climate is in the middle of a 20- to 40-year dry phase, he said. The drought of record, occurred from about 1950 - 1957. “Sooner or later there will be a drought that's worse,” Nielsen-Gammon said. The 2011 drought was estimated to have caused \$5.2 billion in agricultural losses in Texas through August.

Some bullet points about the 2011 drought in Texas

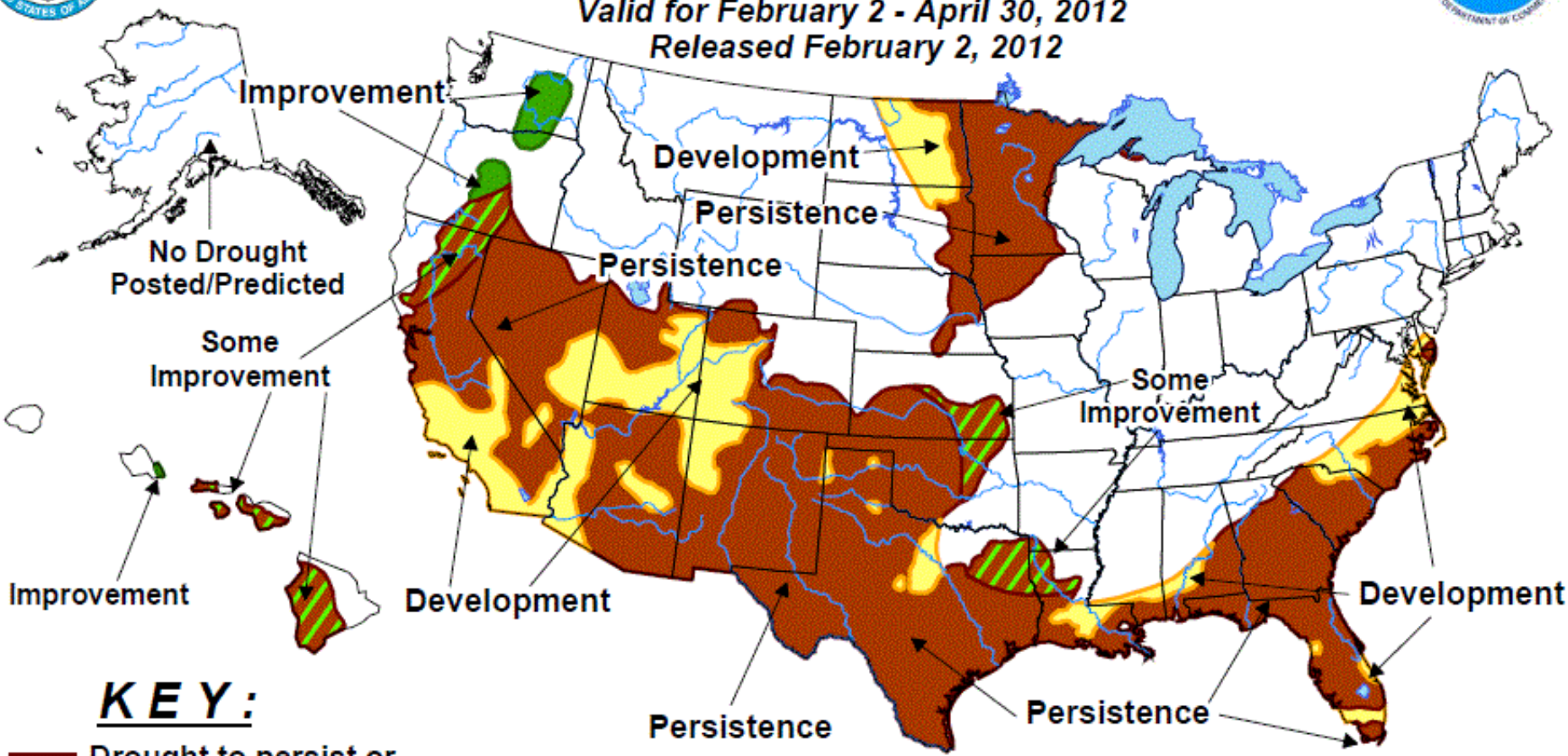
- ✓ Texas has experienced its most severe one-year drought on record. (John Nielsen-Gammon, Texas State Climatologist).
- ✓ The 12 months from October 2010 – September 2011 were the driest on record with [7.18](#)” (statewide average) of rainfall (normal is 14.94”); record low was [7.35](#)” Oct 1901 – Sep 1902).
- ✓ Oppressive summer heat with temperatures over 100° broke records across the state, especially for consecutive days and total number of days with temperatures equal to or greater than 100°.
- ✓ Tree-ring data has been used to calculate the standard Palmer Drought Severity Index (PDSI) dating back over 450 years (to 1550) in Texas. From this study, it was concluded that 1789 was the only year in the last 461 years when Texas had a drought as severe as 2011.
- ✓ In some areas of central and west Texas, the drought may be causing “landscape level” changes in the vegetation with millions of acres being impacted.
- ✓ 100 million to 500 million trees with a diameter of five inches or larger were estimated to have succumbed to the 2011 drought. That is equivalent to 2% to 10% of the state’s 4.9 billion trees. Urban/yard/street trees are not included in the estimate.



U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for February 2 - April 30, 2012
Released February 2, 2012



KEY:

-  Drought to persist or intensify
-  Drought ongoing, some improvement
-  Drought likely to improve, impacts ease
-  Drought development likely

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

The impact of the 2011 drought on some East Texas lake levels (as of November 16, 2011)

- ✓ Sam Rayburn Reservoir – 13.7 feet below normal pool elevation
- ✓ Lake Nacogdoches – 12.34 feet below normal pool elevation
- ✓ Toledo Bend Reservoir – 12.31 feet below normal pool elevation
- ✓ Lake Livingston – 4.04 feet below normal pool elevation
- ✓ Lake Palestine – 6.9 feet below normal pool elevation
- ✓ Lake Conroe – 7.92 feet below normal pool elevation
- ✓ B. A. Steinhagen (Dam B) – 3.78 feet below normal pool elevation
- ✓ Lake Fork – 7.62 feet below normal pool elevation

While talking about the 2011 drought, we must not forget the impact wildfires had on the Texas landscape. Following are a few statistics and photos about the fires.

Wildland Fire Statistics for Texas for 2011 (as of October 5, 2011)

Agency	Fires	Acres	Structures Lost	Structures Saved
State (TFS)	3,163	2,874,780	5,774	28,078
Fire Departments	18,487	893,860	1,224	21,573
Totals	21,650	3,768,640	6,998	49,651

Ten largest Fires 2011

Start Date	Fire Name	Acres	County	Year
09-Apr-11	Rockhouse	314,444	Jeff Davis	2011
25-Apr-11	Deaton Cole	175,000	Val Verde	2011
11-Apr-11	Cooper Mountain Ranch Fire	162,625	Kent	2011
10-Apr-11	Wildcat Fire	158,308	Coke	2011
09-Apr-11	PK Complex	126,734	Palo Pinto	2011
06-Apr-11	Swenson Fire	122,500	Stonewall	2011
06-May-11	Dickens Complex	89,200	Dickens	2011
09-May-11	Iron Mountain Fire	87,401	Brewster	2011
07-May-11	Schwartz Fire	83,995	Brewster	2011
14-Apr-11	Frying Pan Fire	80,907	Andrews	2011

Top 10 Fires – Homes Lost

Start Date	Fire Name	Homes Lost	County	Year
04-Sep-11	Bastrop County Complex	1,649	Bastrop	2011
09-Apr-11	Possum Kingdom Complex	168	Palo Pinto	2011
05-Sep-11	Riley Rd	73	Montgomery	2011
04-Sep-11	Pedernales Bend	67	Travis	2011
04-Sep-11	Bear Creek	66	Cass	2011
09-Apr-11	Rockhouse	41	Jeff Davis	2011
30-Aug-11	101 Ranch	39	Palo Pinto	2011
04-Sep-11	Steiner Ranch	35	Travis	2011
09-Apr-11	Hickman	34	Midland	2011
27-Feb-11	Tanglewood Fire	33	Randall	2011

2,555 houses lost in 2011 as of October 5, 2011

Aviation resources have played a critical role this fire season and have been instrumental in saving hundreds of homes. Since January 1, dozens of air tankers (including a DC-10 and several “scooper “ aircraft from Canada), SEATs (single engine air tankers), helicopters, and fixed-wing air attack aircraft have flown more than 16,000 accident-free hours and have dropped more than 33 million gallons of water and retardant.

(October 5, 2011)

Wildland Fire Statistics for East Texas for 2011

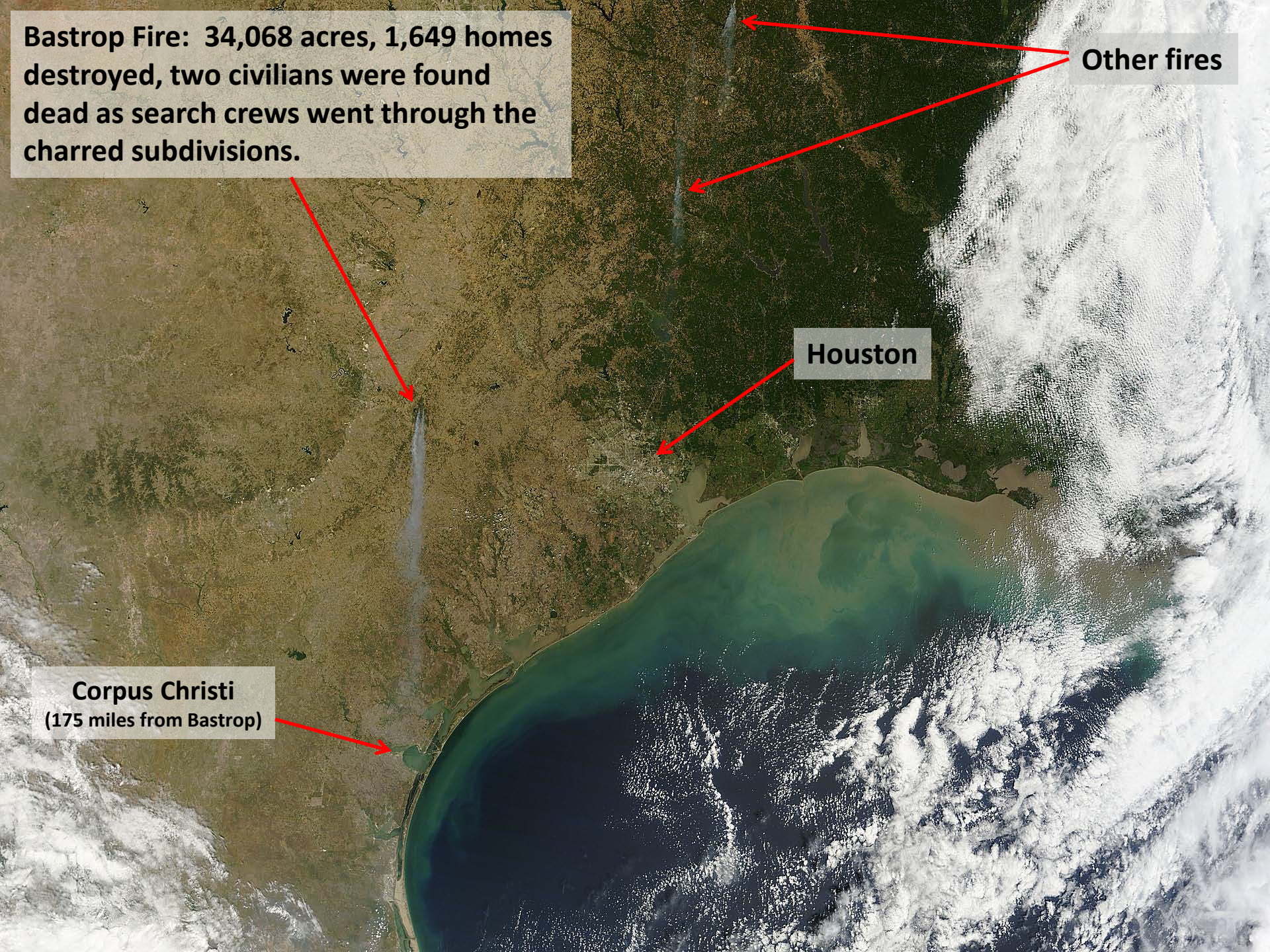
- ✓ More than one-third of the nearly 36 million cubic feet (216 million board feet) of timber killed earlier this year by wildfires in Grimes, Jasper, Trinity and Polk counties has been salvaged.
- ✓ The Dyer Mill Fire ignited June 21 charring 5,280 acres and destroyed 30 homes in Grimes County.
- ✓ The Powerline Fire ignited on June 21 charring 4,197 acres in Jasper County. No homes lost.
- ✓ The Bearing Fire ignited on June 30 charring 22,222 acres in Polk and Trinity counties and destroyed one home.

Bastrop Fire: 34,068 acres, 1,649 homes destroyed, two civilians were found dead as search crews went through the charred subdivisions.

Other fires

Houston

Corpus Christi
(175 miles from Bastrop)





Bastrop Fire



Bastrop Fire



Bastrop Fire

Bastrop Fire as seen from Austin



deannaroy.com



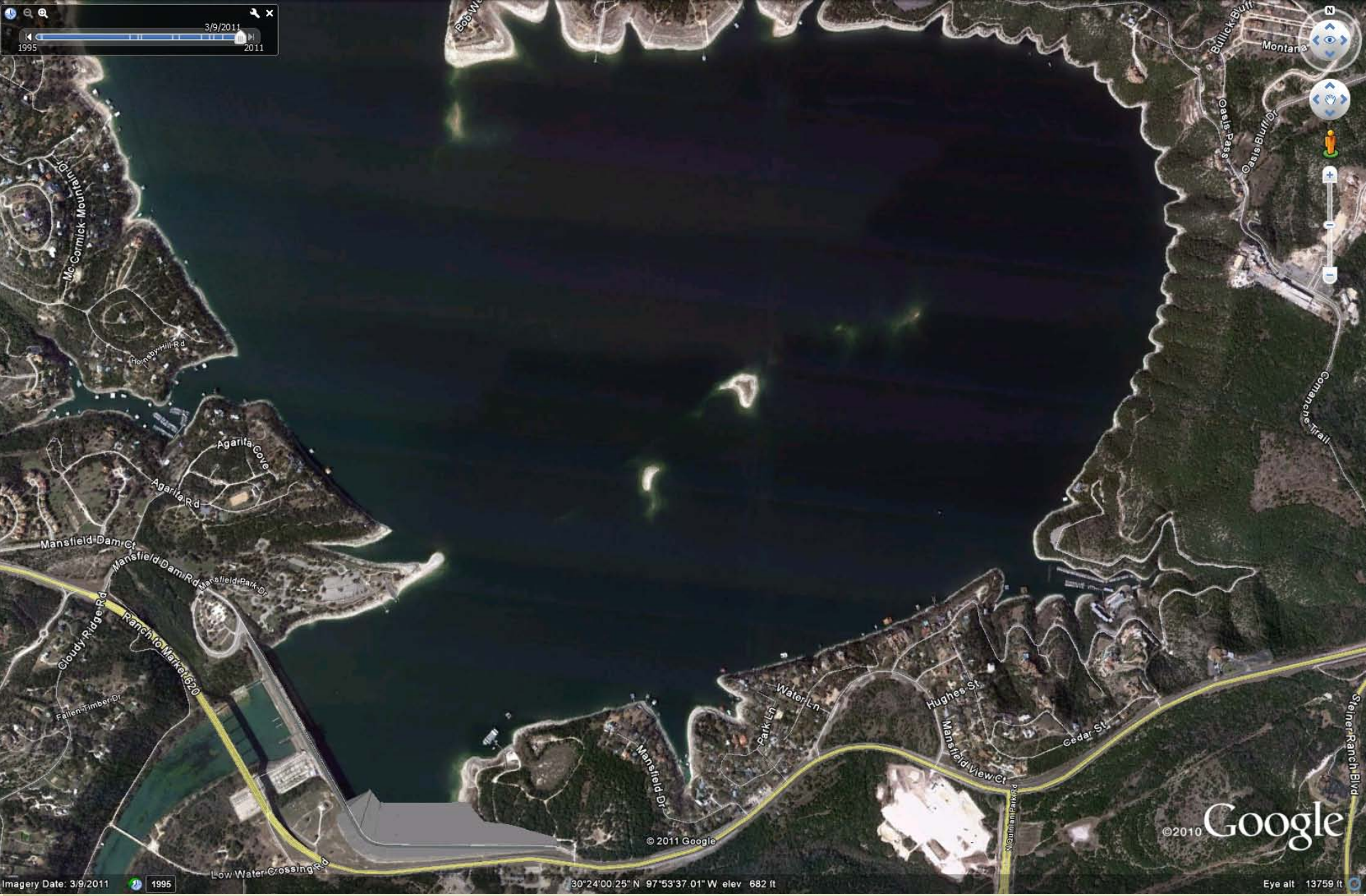
Bastrop Fire yard art

Following is a photographic tour of some of the 2011 drought impact around Texas

September 2011



Lake Travis (near Austin) at 46.52 feet below normal, "Sometime Island"



Lake Travis "Sometime Island" March 9, 2011



Lake Travis "Sometime Island" February 27, 2009



Lake Travis "Sometime Island" February 28, 2008



Hurst Creek on Lake Travis



Cell phones found on the bottom of Lake Travis



Pedernales River at State Highway 71 crossing, NW of Austin

(Halfway between Lubbock and Dallas)



Brazos River runs dry in Knox County, Texas during the summer drought of 2011



Swimming hole between College Station and Austin

Ron Billings, TFS



**Drought impact near Junction, TX
(about 125 miles west of Austin)**

Ron Billings, TFS



**Drought impact near Junction, TX
(about 125 miles west of Austin)**

Ron Billings, TFS



Central Texas drought – dead(?) live oaks

Mark Duff, TFS

Marion Ferry boat ramp Sam Rayburn Reservoir

DANGER
SWIMMING AND
BATHING PROHIBITED
IN APPROACHES TO
OR ON BOAT RAMPS

WARNING
GIANT SALVINIA PRESENT IN RESERVOIR



STATUS: Giant salvinia is a floating aquatic plant prohibited in the United States by Federal Law. Giant salvinia grows rapidly and forms thick mats which crowd out other vegetation, degrade water quality, and impede recreational uses. Giant salvinia poses a serious threat to all water bodies in East Texas.

PREVENTION: Giant salvinia is easily transported to other water bodies by boats, propellers, and trailers. Even small plant fragments can create new infestations.

REMOVE ALL PLANTS FROM BOATS AND TRAILERS BEFORE LEAVING LAUNCH AREAS

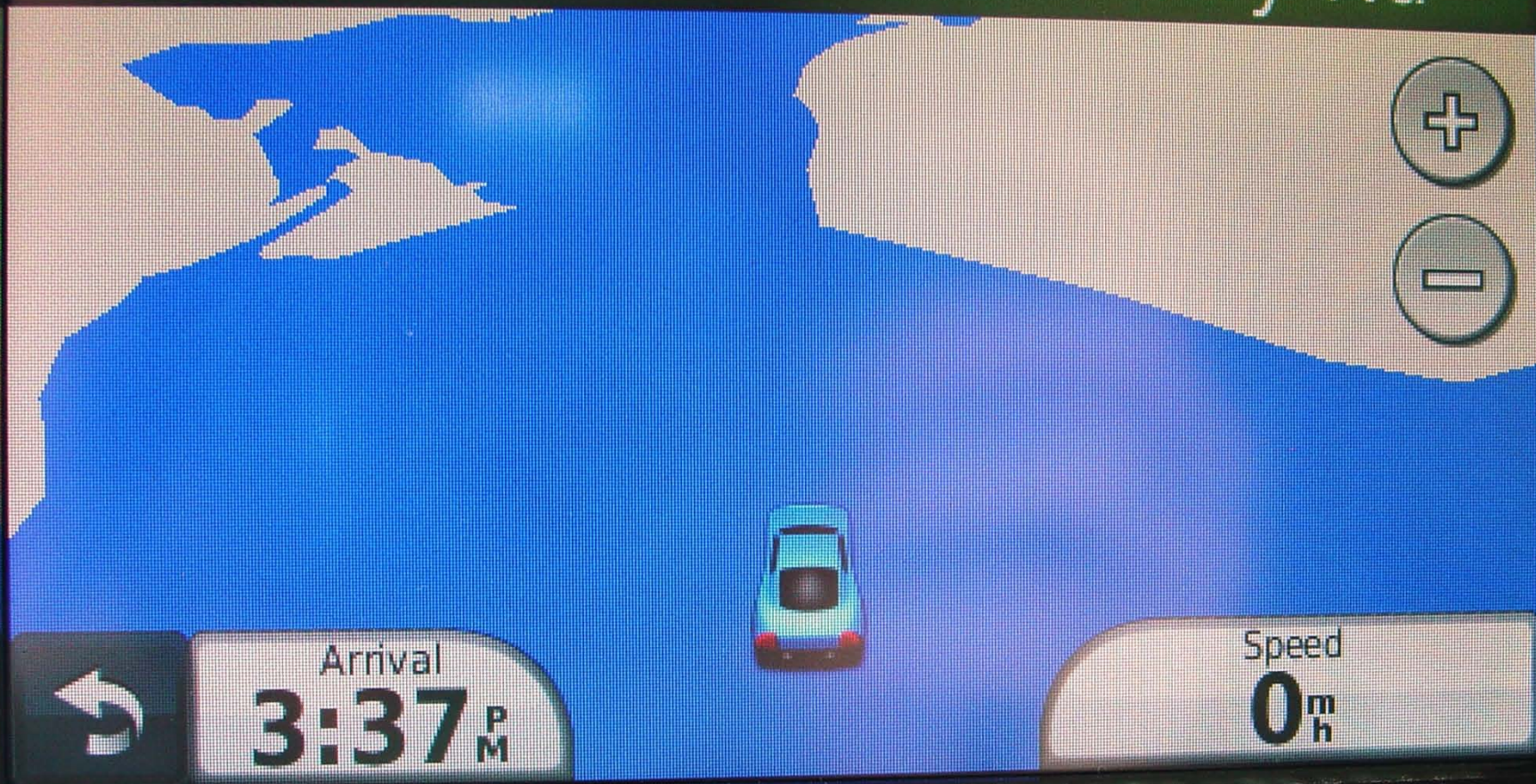
For more information please call 409-344-9965 or

**A FISH CONSUMPTION ADVISORY
EXISTS FOR THIS WATER BODY
OR ADJACENT AREAS**

Please contact the
Department of State Health Services
for more information at:
(512) 864-6787
or see the Web site at
www.dshs.state.tx.us/seafood/



Continue to Marions Ferry Rd



GARMIN nüvi

**My GPS as I drove in the dry lake bed
to find water at Marion Ferry**



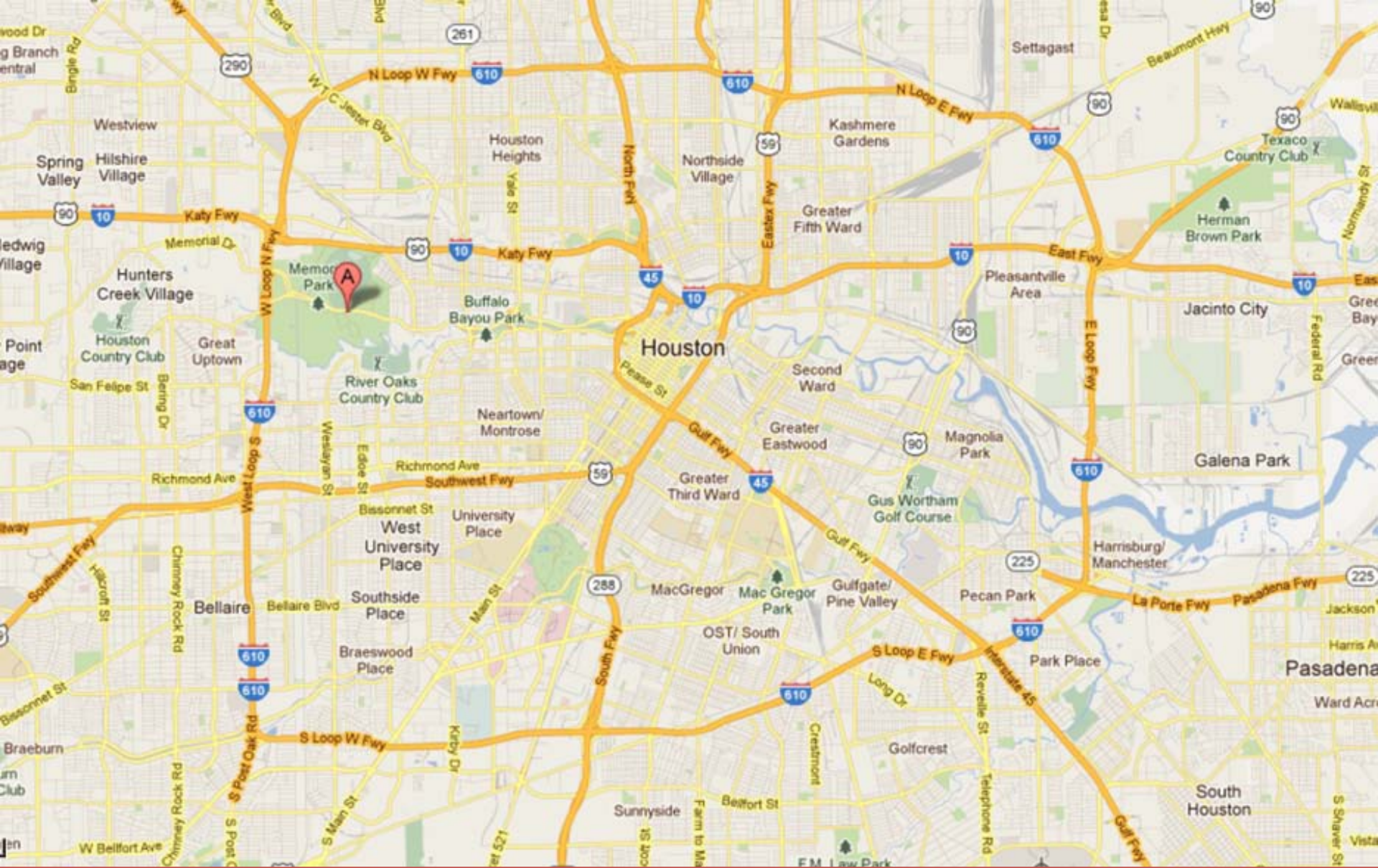
Pine and hardwood trees impacted by drought on the Jones State Forest near Conroe (Montgomery County)



**Pine and hardwood trees
impacted by drought in
The Woodlands**



**Pine and hardwood trees impacted by drought in
The Woodlands (Research Forest area)**



Memorial Park – Houston

Located a few miles west of downtown and inside Loop 610



Memorial Park – Houston
An estimated 80% of the trees have died

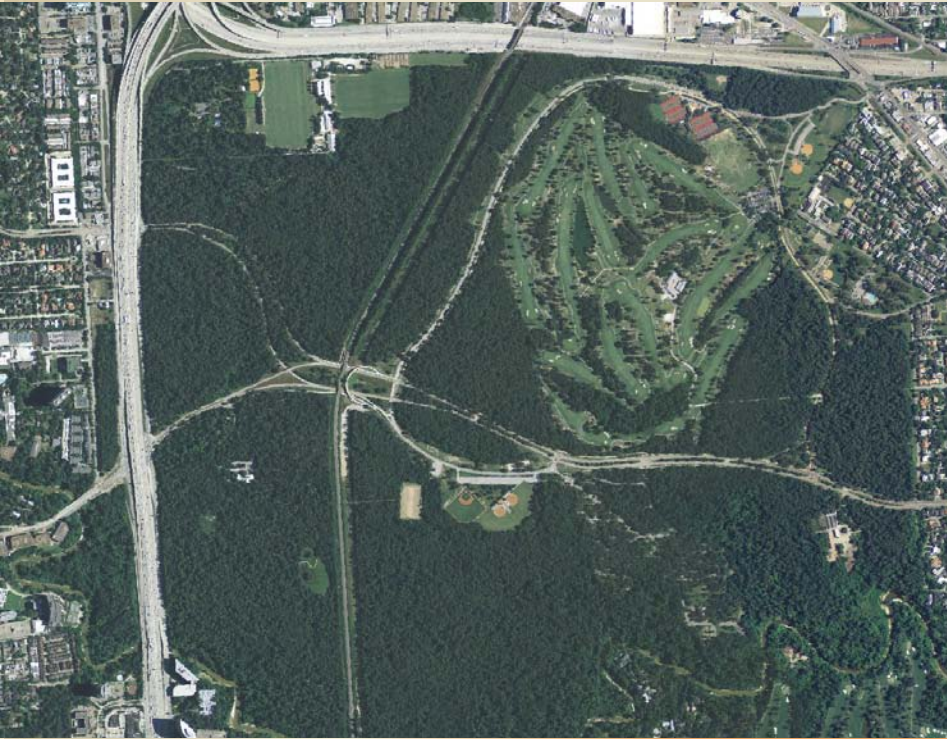
2010 Memorial Park, Houston, Texas



2011 Memorial Park, Houston, Texas



Memorial Park, Houston



2010



2011



Trinity River at Riverside, TX



Lake Nacogdoches



**Pine and hardwood trees impacted by drought
near Gladewater, TX**



**Pine and hardwood trees impacted by drought
near Palestine, TX**

East Texas Pine Plantation Survey

Estimate of Drought Impact

- ✓ Unthinned and thinned pine plantations in East Texas were surveyed by TFS personnel in January 2012.
- ✓ Plantations were 15-20 years old.
- ✓ Thinned plantations were thinned in 2008, 2009 or 2010.
- ✓ Live trees and trees that died in 2011 were counted (dominant and codominant trees).
- ✓ Results were tallied by 4 East Texas regions – NE, Central, SE, and Western fringe.
- ✓ A ½-acre plot was sampled in each plantation.
- ✓ Let's look at the results.

East Texas Pine Plantation Survey

Estimate of Drought Impact

UNTHINNED PLANTATIONS THINNED PLANTATIONS

REGION	NUMBER	% MORTALITY	NUMBER	% MORTALITY
NE	10	4.1%	10	0.5%
Central	8	6.4%	11	0.5%
SE	7	1.4%	8	0.3%
Western Fringe	17	3.9%	21	0.4%
Total or Mean	41	3.9%	50	0.4%

Greatest mortality was in an unthinned plantation in Houston County (24.9%). Unthinned plantations had over 9X more mortality than thinned plantations. Average for all plantations was only 2.2% mortality.

The drought has left many landowners and homeowners wondering if their trees are dead or alive.

- ✓ Many shade trees went into dormancy as early as August, dropping their leaves and branches in a desperate act of self-preservation.
- ✓ Many pine trees are topped with red, dead needles.
- ✓ Assessing trees damaged or killed by drought can be tricky.
- ✓ Not all trees that “appear” dead are actually dead.
- ✓ Winter leaf drop has complicated the diagnosis of hardwood trees
- ✓ Group the trees into three different categories — **definitely dead**, **likely to live**, and **questionable**.
- ✓ Let’s look closer at these three categories.

Definitely Dead

Here are some things to look for



Pine engraver beetles (*Ips* beetles) often attack pine trees weakened from drought or construction damage.

DEFINITELY DEAD PINE TREES

Once the needles on a pine tree have turned red, the tree is dead and will not recover. The same thing is true for cedar trees.





DEFINITELY DEAD PINE TREE

When pine engraver beetles attack pine a tree, the tree often dies from the top down. This tree will not recover.



Look for “pitch tubes” on the trunk of pine trees as an indication of pine engraver beetle attacks.



DEFINITELY DEAD
HARDWOOD TREES

When hypoxylon canker appears on the trunk, the tree is dead and will not recover.



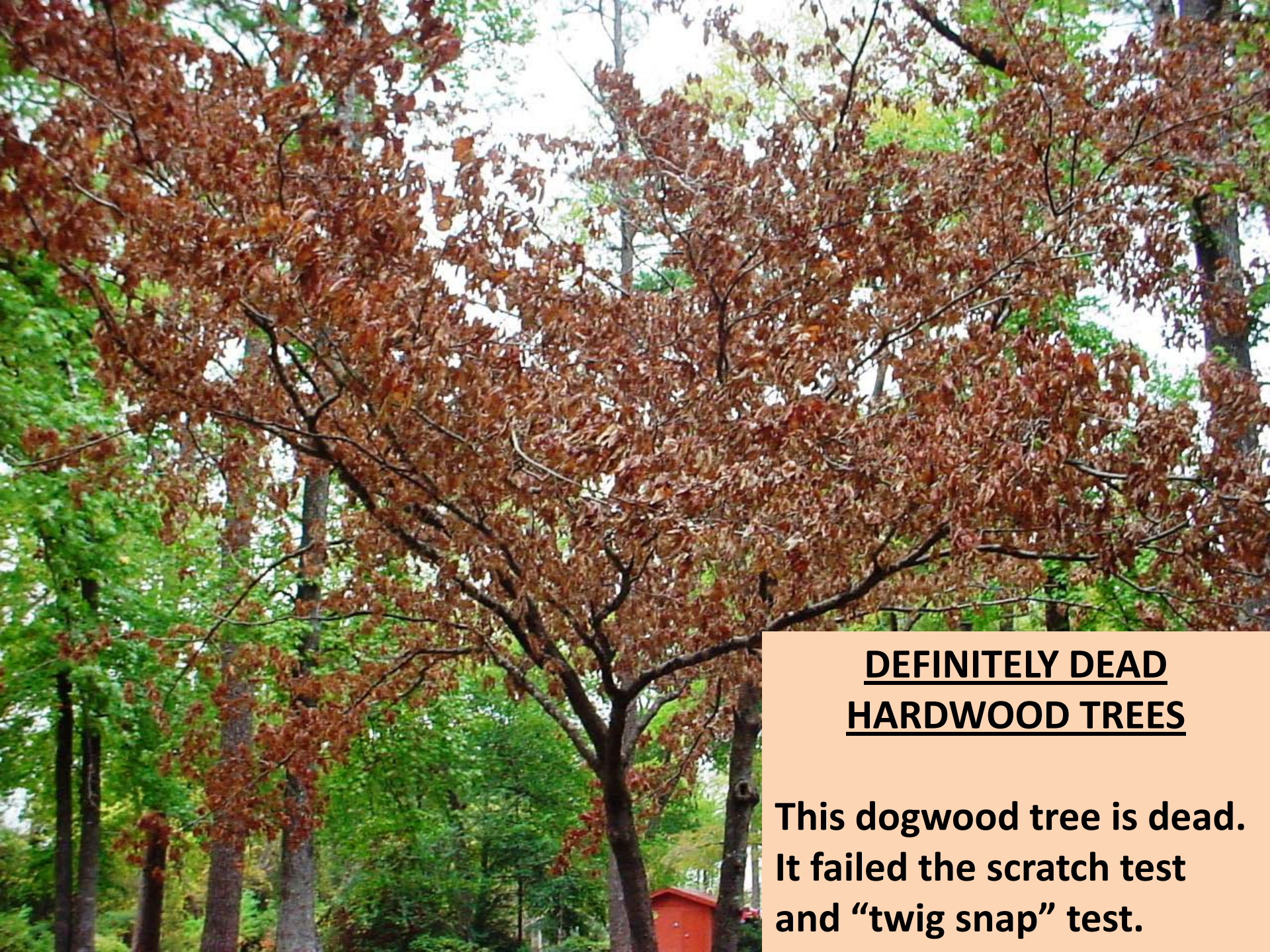
Don't confuse hypoxylon and smooth patch

**This is NOT hypoxylon
canker. This is a fungus
called smooth patch that
forms white/gray sunken
areas on the bark, mostly
on post oak. It does not
harm the tree.**

A close-up photograph of a tree trunk showing significant bark damage. The bark is greyish-brown, heavily cracked, and peeling away in several places, revealing the lighter-colored wood underneath. The texture is rough and uneven. In the background, a blurred green landscape and a red playground slide are visible.

DEFINITELY DEAD
HARDWOOD TREES

When the bark cracks and becomes loose, the tree is dead.



DEFINITELY DEAD
HARDWOOD TREES

**This dogwood tree is dead.
It failed the scratch test
and “twig snap” test.**

DEFINITELY DEAD HARDWOOD TREES

Removing dead trees is of no value in protecting other live trees. Wood from dead hardwood trees is OK to use for firewood.

Likely To Live

Here are some things to look for



Likely To Live

All the leaves on this red oak tree turned brown in August and most of them fell from the tree. This tree should leaf out in the Spring of 2012.



This pine tree is not dying. The older needles are dropping from the tree early due to drought stress. Notice the needles at the tips of the branches are still green.

Likely To Live



Likely To Live

This pine tree is not dying. In the fall and winter, it is common for small, scattered branches in the crown of a pine tree to die. This is natural and not a cause for concern.

Likely To Live

This oak tree is showing signs of drought stress, but is not dying. Notice that there are green leaves scattered throughout the crown.





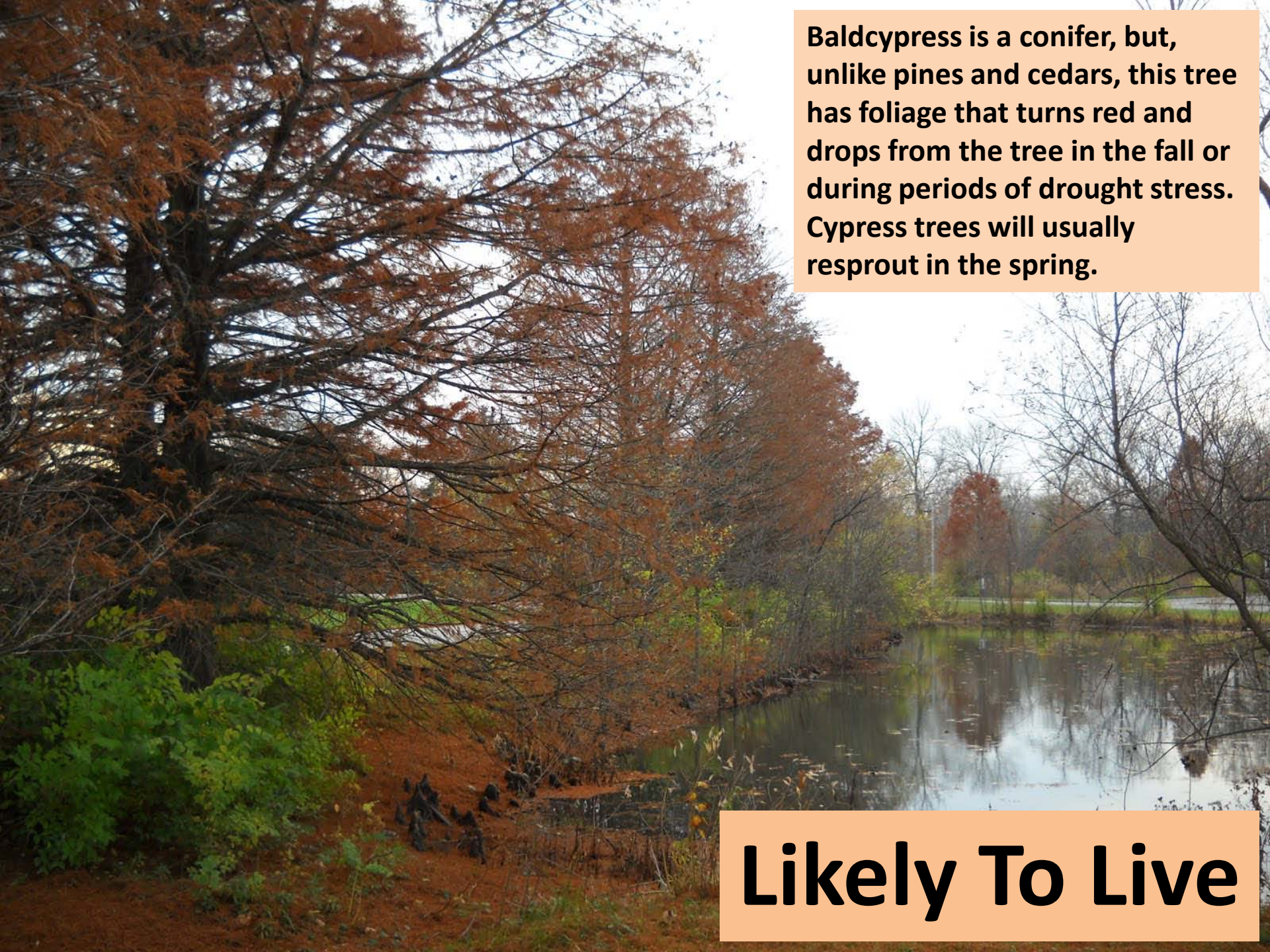
Likely To Live

The scratch test shows the inner bark of this hickory tree to be green and alive even though all the leaves are brown. This tree also passed the “twig snap” test.

Likely To Live

The scratch test shows the inner bark of this blue beech (*Carpinus caroliniana*) tree to be green and alive even though all the leaves are brown. This tree also passed the “twig snap” test.





Baldcypress is a conifer, but, unlike pines and cedars, this tree has foliage that turns red and drops from the tree in the fall or during periods of drought stress. Cypress trees will usually resprout in the spring.

Likely To Live

Questionable

Trees that appear to fit between the
definitely dead and *likely to live*
categories

Here are some things to consider



Questionable

All the leaves on this American elm tree have died and most have fallen from the tree. The fact that most of the mistletoe is also dead indicates this tree may have lost most of its crown and probably won't recover.

Questionable

- ✓ Here is a rule-of-thumb to remember when evaluating whether a tree is dead or alive.
- ✓ If all the leaves turn brown and persist on the tree, it may be dead.
- ✓ If all the leaves turn brown and fall from the tree, it may be alive.
- ✓ Whether a tree retains or drops its leaves is not a guarantee of life or death.
- ✓ Use the “twig snap” and scratch test to help determine the condition of a tree.

Questionable

- ✓ **Deciding whether to remove a questionable tree can be a tough decision for both property owners and professional tree care experts.**
- ✓ **For questionable trees, waiting until spring to see if the tree leafs out may be the best course of action.**
- ✓ **Waiting until spring to decide about removing questionable trees is especially true for trees that are valuable in a home landscape.**
- ✓ **Removal should be considered if a severely drought-stressed tree is close to a house or other structure on which it might fall.**
- ✓ **For more information on keeping trees healthy or assessing drought-stressed trees, check with a certified arborist, forester or other tree care professional.**

The End

