



# Texas Wetland News

and WETLAND CONSERVATION PLAN UPDATE

4200 Smith School Road • Austin, TX 78744  
www.tpwd.state.tx.us/wetlands/publications

TEXAS  
PARKS &  
WILDLIFE

J U L Y 2 0 0 9

## WHAT MAKES A LAKE?

*Ryan McGillicuddy, Texas Parks and Wildlife Department*

With 196 major reservoirs (those containing 5,000+ acre-feet of storage capacity) and numerous smaller impoundments in this state being used for water supply, flood control, hydropower and recreation, Texas could be called a land of lakes. However, very few of these lakes were naturally formed, but were instead created by the intentional damming of creeks and rivers.

It is often said that Caddo Lake is “the only natural lake in Texas.” As a geographer with a sometimes compulsive tendency to classify things, I think there is a lot to this statement that it is worth briefly examining.

First of all, what exactly is a lake and what is the difference between a lake and a pond? While some limnologists (those who study inland bodies of water and their related ecosystems) use physical characteristics such as the degree of wave action and wind induced turbulence to distinguish the two, many others use a size-based definition. However, even amongst those who use size to make their determination, there is a difference of opinion, with some who say that anything over five surface-acres should be classified as a lake and others who claim the threshold to be 99 or more acres.

So, what makes a lake a lake appears to be highly subjective, but lakes are big and ponds are small. Clear?

*(Continued on page 7)*

## TPWD Battles Giant Salvinia on Caddo Lake

### Fate of Unique Wetland Hangs in the Balance

*Photos by Larry D. Hodge, Texas Parks and Wildlife Department*

UNCERTAIN, Texas — Caddo Lake, the only large, naturally formed lake in Texas, has been designated as a wetland of international importance. It supports an ecosystem found nowhere else in Texas.

And we may be losing it.

Not to development or global warming or neglect, but to a floating fern from South America first found in Texas little more than a decade ago: giant salvinia, or *Salvinia molesta*.

Giant salvinia first appeared on Caddo Lake in 2006, and it quickly progressed from invader to near-conqueror. In just two years the plant expanded its coverage of the surface from two acres to more than 1,000.

Texas Parks and Wildlife Department (TPWD), in partnership with the Cypress Valley Navigation District and the Caddo Lake Institute, launched an offensive against giant

*Caddo Lake, designated a wetland of international importance by the RAMSAR convention, is threatened by invasive aquatics like giant salvinia and water hyacinth.*

*(Continued on page 2)*



## Caddo Lake, continued

salvinia on June 1. “We’re here at Caddo Lake to spray giant salvinia with herbicide to try to knock it back to a more manageable level,” said Craig Bonds, TPWD’s regional director for inland fisheries. “We are at a tipping point with giant salvinia coverage. If we don’t get on it heavily, we could lose this battle and experience increased levels of giant salvinia, to the point where we won’t be able to control it. We will never eradicate it. This is going to be an on-going fight.”

TPWD and Cypress Valley Navigation District crews will be on the lake applying Environmental Protection Agency (EPA)-approved herbicides until about June 12. Each of the five spray boats operating can cover about 40 acres per day.

“Hairs on the leaves of giant salvinia make it very resistant to herbicide application,” said Howard Elder, TPWD’s aquatic vegetation biologist. “We have to use very aggressive herbicides and surfactants approved by the EPA to be able to control the plant. We have found herbicide applications to be about 90 percent effective; it takes a week to 10 days to see results.”

The battle against giant salvinia is being fought mainly by the herbicide boats and a mechanical harvester that gobbles up the plant from the surface of the water and carries it to shore for disposal. Salvinia-eating weevils are also in use on several lakes, but results are slow.

“We’re conducting trials to see how the harvester will handle the shallow, stumpy water of Caddo Lake,” explained Jack Canson with the Caddo Lake Institute. “This came about because we have a private landowner at Caddo Lake, Mr. John Sanders, who has a long association with the lake and a background in heavy machinery. He purchased the machine and brought it here. The City of Marshall appropriated \$25,000 so we could test to see how the harvester will actually operate. We don’t think that harvesting can cure the problems at Caddo Lake; we don’t think that herbicides alone can, either. We do think there are places on the lake where a harvester can provide relief-clearing boat roads and areas where there is a lot of public use. We’re very encouraged by the results so far.”



*Giant salvinia (Salvinia molesta) is a floating, rootless fern from Brazil that can take over an entire lake, making it unsuitable for fish and wildlife and unusable by humans.*

While it may seem impossible for a simple plant to defeat all the efforts to get rid of it, such has already happened. “At Toledo Bend Reservoir south of here, the magnitude of the problem is so great that we are relegated to just keeping boat ramps free and clear and improving boat access and navigation where we can,” said TPWD’s Bonds. “Actually controlling giant salvinia is no longer an option on that lake given current resources, and we are trying to keep Caddo from reaching a similar condition.”

The stakes are nothing less than survival-for the lake and for the people around it. “Caddo Lake is a national treasure because of its ecosystem and the diversity of plants and animals it supports,” Bonds said. “Giant salvinia has the capability of wreaking havoc here. It can double its coverage every five to seven days under optimal growing conditions. We have nature tourism here, we have anglers, recreational boaters, waterfowlers-and every single user of this lake is impacted by this plant. If we don’t ramp up our efforts to control this plant now, we may lose control of it. That’s our fear, that this wonderful, wonderful place is at risk.”

The threat does not end with Caddo. Giant salvinia has the capability of riding on boat trailers to other lakes throughout Texas and causing similar problems. And that offers hope—if all boaters and anglers will help.

“The ultimate answer for combating this problem outside the Caddo Lake area is not herbicide control,” Bonds explained. “It’s public awareness and public participation. We need every angler, recreational boater and waterfowler to implement a vital behavior: Clean your boat trailer when you exit a water body that has giant salvinia. Signs at boat ramps at reservoirs where giant salvinia occurs warn anglers to watch out for this plant. It is critical to have 100 percent compliance from boaters to stop the spread of this plant. It only takes one person to spread this problem to other areas.”

Bonds and Elder also urge people using any lake to report any plants they suspect might be invasive species. “Angler reports

*(Continued on page 3)*

*A mechanical harvester that skims vegetation from the surface to be removed from the lake is one tool being used to battle giant salvinia on Caddo Lake.*

# Texas Master Naturalists: Creating Wetland Habitat to Protect Water Quality in Brays Bayou

*Diane Humes, Galveston Bay Area Chapter Texas Master Naturalists*



The Galveston Bay chapter Texas Master Naturalists, in conjunction with Cradle of Texas and Gulf Coast chapters, has been working on wetlands projects in the Galveston-Houston area for five years. Their most ambitious project involved planting a treatment marsh – actually three ponds – to filter bacteria and contaminants from a stormwater drain that empties into Brays Bayou near downtown Houston. The project, at Mason Park, involved engineering and excavation work to create the pond system, for which there were many partners. The

master naturalists prepared and collected the native plants for the site and spent many hours planting and nurturing them, as well as mentoring several local student groups who helped with the plants.

In order to educate the local population about this project, the master naturalists helped host two fairs and a Trash Bash event at the site. In addition, they now have water testing data from three years of water sampling; two years also include *E. coli* testing, performed by master naturalists. The *E. coli* testing clearly demonstrates that the wetland system cleans 99 percent of the bacteria out of the stormwater and returns water to the bayou cleaner than the bayou itself.



After three years and 10,000 plants, the treatment wetland at Mason Park has added habitat for wildlife. The project supports egrets and herons, red-winged blackbirds, turtles, fish, frogs and water snakes. The neighbors enjoy walking through the project site. And, it survived Hurricane Ike very well.

*Top: The treatment wetland at Mason Park.*

*Above: One of the earliest inhabitants of the new wetlands.*

## Caddo Lake, continued

to us have been instrumental in eradicating giant salvinia on several other lakes,” Bonds stated. Suspected infestations can be reported to Elder at (409) 384-9965. The TPWD Web site has information that anglers and boaters can use to learn to identify this and other invasive species.

While the efforts to combat giant salvinia are expensive – \$64,000 for herbicides alone for the current operation-the cost of doing nothing could be even greater. “We cannot even think of not doing what we can to control the giant salvinia on the lake,” said Elder. “If not controlled, giant salvinia can and will take over the entire lake. It will block out all light from the water beneath, displacing native fish and plant species, negatively impacting the water quality and displacing waterfowl and other wildlife. Should

giant salvinia progress to the point where access is affected, all recreation will cease. You won’t be able to launch a boat or move a boat through dense salvinia mats. It will cost local communities and reservoir-based businesses countless revenue.”

Until now, life in Uncertain, Texas, has allowed many people to fulfill the dream of living in a special place where the pace is slow and the world’s problems seem far away.

Thanks to giant salvinia, the town’s name now seems prophecy, not promise.

**On the Net:** [www.caddolakeinstitute.us](http://www.caddolakeinstitute.us)  
[www.uncertain-tx.com](http://www.uncertain-tx.com) [www.texasinvasives.org](http://www.texasinvasives.org)  
[www.tpwd.state.tx.us/huntwild/wild/species/exotic/salvinia.phtml](http://www.tpwd.state.tx.us/huntwild/wild/species/exotic/salvinia.phtml)

# Exploring the World in a Drop of Wetland Water

## An Activity of the Lake Waco Wetland, Supported by Heart of Texas Master Naturalists

*Melissa Mullins, GEAR UP Waco Marsh Madness Coordinator*

What's in the water? This basic question seems to always capture people's imaginations, as if water is magical and mysterious—there's stuff in there, just under the surface, unseen. What's in there? Is it good? Is it bad? Is it alive? Will it hurt me? Is it clean? Is it polluted? Perhaps our fascination with water comes from the fact that we depend on it for many essential life functions so the magnetic pull of a water feature in the landscape is just as irresistible to us as it is to other "wildlife." This spring, eighth- and ninth-grade students from Waco and La Vega ISD figured out what's in the water by exploring water chemistry and microorganisms at the Lake Waco Wetland.

Students worked in small groups at one of two sites in the wetland, rotating through stations and recording data and observations. The first site is at the infall basin where water enters the wetland from the North Bosque River and the second is a site where water has traveled through the wetland for some time. At the water quality station, students measured pH, temperature, D.O., CO<sub>2</sub> and turbidity using LaMotte test kits. Students collected phytoplankton and zooplankton at a second station using plankton tow nets and periphytometers, and prepared slides which they examined at the

water's edge using battery-powered compound microscopes. At the benthic station, students used dredges and sieves to collect bottom-dwelling organisms that they examined using dissecting microscopes. Guides and identification aids were provided at each station.

Following field work, students worked in groups to construct a trophic pyramid using pictures of the types of organisms they saw in the wetland. Students looked at the summarized data from both sites and were asked to draw conclusions and form reasonable explanations for differences they saw, especially focusing on how organisms might affect, or be affected by, environmental conditions at the sites. They presented their results to the rest of the student groups with the opportunity for questions.

Marsh Madness is part of GEAR UP Waco, funded by the U.S. Department of Education, and is a partnership between the City of Waco and Baylor University. Students from Waco ISD and La Vega ISD began participation in Marsh Madness field trips as sixth-graders and



*Millie Lebrmann, Heart of Texas Master Naturalist, assists students in examining microorganisms they collected at the Lake Waco Wetland using plankton nets. Photo courtesy Bryan Stone, Heart of Texas Master Naturalist.*

will continue to have the opportunity to participate through high school graduation. Heart of Texas Master Naturalists volunteer as group leaders for the program and go through training with science teachers every semester to prepare for the field trips. The field trips developed through Marsh Madness can be used by the Lake Waco Wetland and other school districts even after the grant has ended.

The world in a drop of water field trip supports TEKS objectives, focusing on organisms and environments and science procedures. Students get the opportunity to "do science" and best of all, they do it while getting muddy outside in a wetland!

For questions about GEAR UP Waco Marsh Madness, contact [Melissa\\_mullins@baylor.edu](mailto:Melissa_mullins@baylor.edu); for information or questions about the Lake Waco Wetland contact Lake Waco Wetland Coordinator Nora Schell at [noras@ci.waco.tx.us](mailto:noras@ci.waco.tx.us).

*Students measure pH, D.O., turbidity, CO<sub>2</sub>, and temperature at the water quality station to determine how aquatic organisms might respond to, and influence, their environment. Photo courtesy Bryan Stone, Heart of Texas Master Naturalist*



# New Data Available from TNRIS

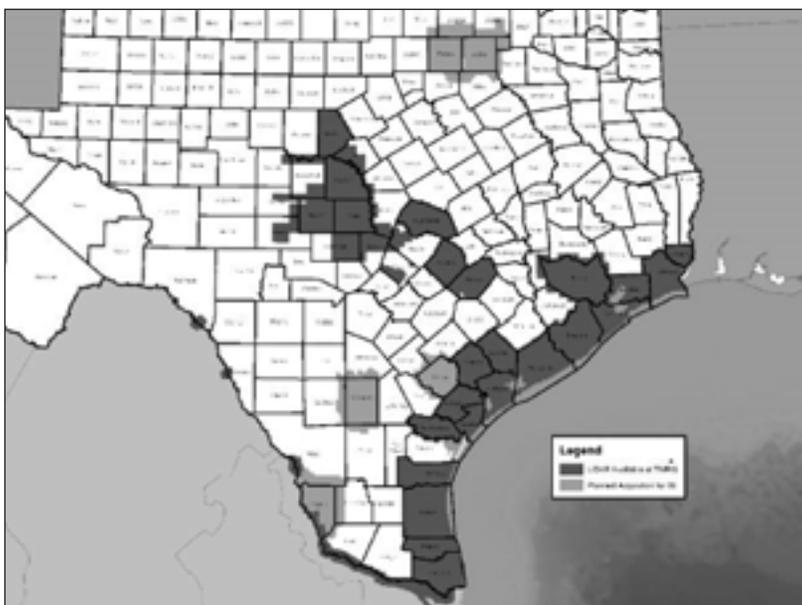
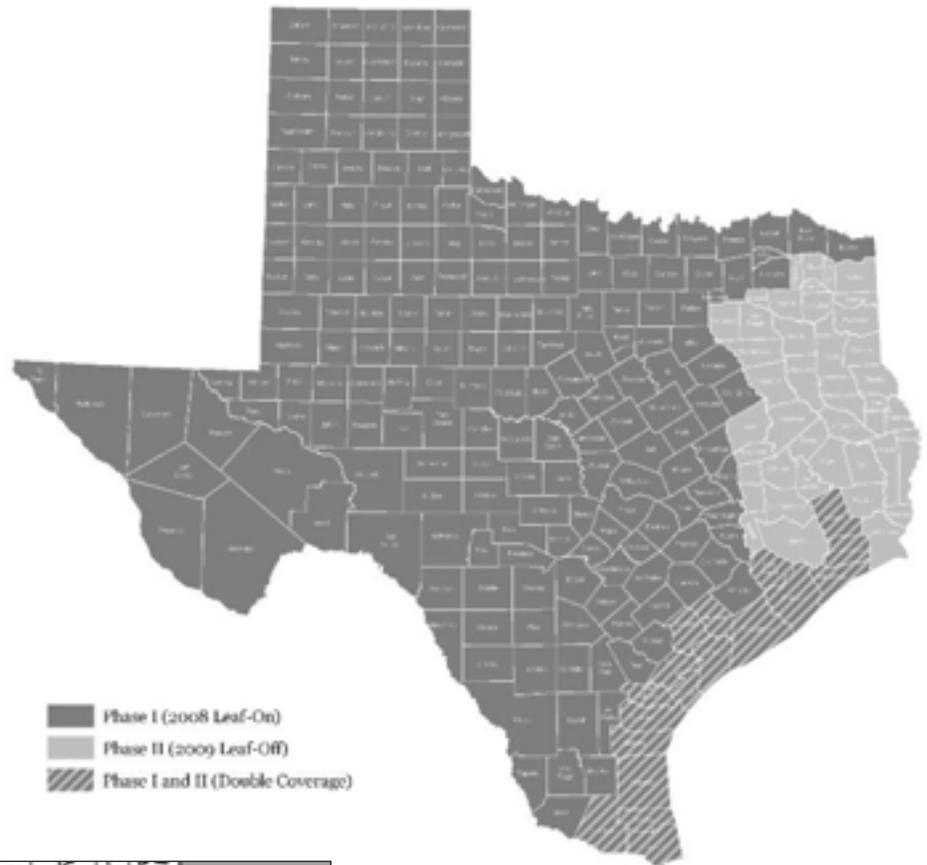
## Aerial Imagery and Elevation Profiles Useful for Watershed Management and Conservation

*Kim Ludeke, Texas Parks and Wildlife Department*

This graphic identifies the 2008-2009 National Aerial Imagery Program coverage for Texas. There is dual coverage along most of the Texas coast, with both leaf-on conditions from the summer of 2008 and leaf-off conditions from January 2009. This is 1 meter imagery in four spectral bands so both natural color and false-color infrared imagery can be produced. The 1 meter 2008 imagery is already available. The 2009 1 meter and 0.5 meter 4 band products are to be delivered to Texas Natural Resources Information System (TNRIS) later this year. Funding for this imagery came primarily from the USDA Farm Service Agency, TNRIS, and the U.S. Geological Survey. Other important contributions came from the USDA Natural Resources Conservation Service, the Texas Commission on Environmental Quality, The Texas General Land Office, and the Texas Commission on State Emergency Communications.

**More information is available  
on the Web at:  
[www.tnr.is.state.tx.us](http://www.tnr.is.state.tx.us)  
[www.apfo.usda.gov](http://www.apfo.usda.gov)**

2008-2009 Texas Orthoimagery Project  
Acquisition Areas



LiDAR is a technology using air-borne lasers to develop a very detailed elevation profile of the land under the plane. The point data is usually within a few centimeters of vertical accuracy so can be processed to produce a high resolution digital elevation model or contour map of the landscape. The darkly shaded areas in this image show where LiDAR has already been flown in Texas. The more lightly shaded areas detail the planned acquisition area for 2009 by TNRIS and others. These data sets get very large and take special software and expertise to process. This data is of special interest in developing digital Flood Insurance Rate Maps (dFIRMS). The Federal Emergency Management Agency, river authorities, TNRIS and the Texas Water Development Board are facilitating the funding and development of this data.

# Master Naturalist Program Seeks Applicants

Twelve chapters of the Texas Master Naturalist program have announced fall training classes for volunteers wanting to help conserve our natural resources.

The Texas Master Naturalist program – with 40 chapters – develops a corps of well-informed citizen volunteers who educate their communities about the management of natural resources. The main qualification needed to become a Certified Texas Master Naturalist is an interest in learning and taking an active role in conservation. Volunteers will receive a minimum of 40 hours of training from educators and specialists representing places such as universities, agencies, nature centers and museums. Training topics include interpretation and management of natural resources, ecological concepts, eco-regions of Texas and natural systems management. Volunteers are expected to give 40 hours of service a year in community education, demonstration and habitat enhancement projects. They are also expected to pursue a minimum of eight hours of advanced training in areas of personal interest.



Texas Master Naturalist chapters announcing volunteer training this fall are listed with contact information. Enrollment is limited in most chapters. If a deadline has passed contact the chapter to see if seating is still available. Other chapters are planning for a fall class. Contact the state office of the Texas Master Naturalist program to seek other training locations.

**ALPINE–Tierra Grande Chapter.** Class begins August 28 at the Nature Conservancy's Davis Mountain Preserve. Registration is due by July 15. Call (432) 837-2882 to see if seating is available. For information, contact: [albertgbork@sbcglobal.net](mailto:albertgbork@sbcglobal.net).

**AUSTIN–Capital Area Chapter.** Training begins November 21 and registration is needed by September 30. Class information is available by phone at (512) 964-7540 or e-mail [ThorneBio@aol.com](mailto:ThorneBio@aol.com).

**BRYAN–Brazos Valley Chapter.** Training begins September 8 with registration due by September 1. Details can be found on the chapter Web site: <http://grovesite.com/tmn/bv> or call (979) 695-0847.

**COMAL COUNTY/NEW BRAUNFELS–Lindheimer Chapter.** Plans are set for a class to begin in October. Details will be posted on the chapter Web site <http://grovesite.com/tamu/lc> or call (830) 620-3440.

**CORPUS CHRISTI–South Texas Chapter.** Training begins on September 12 and applications will be accepted until the class begins that morning. Details and more information can be obtained by e-mail: [mlopez2012@stx.rr.com](mailto:mlopez2012@stx.rr.com)

**DENTON–Elm Fork Chapter.** You are invited to attend the chapter's Roundup Open House on August 20 and class begins September 1. Registration is due by August 21. Contact (940) 349-2883 or [sherrillcampbell@verizon.net](mailto:sherrillcampbell@verizon.net) for more information.

**FORT WORTH–Cross Timbers Chapter.** Class begins on August 25. More information is available at [www.ctmn.org](http://www.ctmn.org) or contact [ginger@ctmn.org](mailto:ginger@ctmn.org).

**HEMPSTEAD–Coastal Prairie Chapter.** Class begins on September 10 and the registration deadline is August 25. Additional information is available at: [www.coastalprairie.org](http://www.coastalprairie.org) or call (281) 239-2424.

**KERRVILLE–Hill Country Chapter.** The first class is August 26 and registration is requested no later than July 17. Details are available at (830) 896-9576 or contact [jbrazaitis@aol.com](mailto:jbrazaitis@aol.com).

**ORANGE–Sabine-Neches Chapter.** Be a charter member of this new chapter that begins its first class on September 8. Registration is due by August 21 and details are available by contacting the Orange County AgriLife Extension office at (409) 882-7010 or e-mail: [rlstanford@ag.tamu.edu](mailto:rlstanford@ag.tamu.edu).

**SAN ANTONIO–Alamo Area Chapter.** The state's founding chapter begins class September 10 and applications are due August 20. Applications can be found at [www.alamomasternaturalist.org](http://www.alamomasternaturalist.org) and should be sent to [pball12@satx.rr.com](mailto:pball12@satx.rr.com). Call (210) 764-1921 for more information.

**SAN BENITO–Rio Grande Valley Chapter.** Training begins January 13, 2010 and registration is due January 6. More information and details can be found at [rgvctmneduchair@gmail.com](mailto:rgvctmneduchair@gmail.com) or call (956) 455-9204.

Texas Parks and Wildlife Department and Texas AgriLife Extension co-sponsor the Texas Master Naturalist program. For more information about existing chapters or forming a new chapter, contact Sonny Arnold, Assistant Program Coordinator, 111 Nagle Hall, 2258, TAMU, College Station, TX 77843-2258. Call (979) 458-1099 or e-mail: [sarnold@ag.tamu.edu](mailto:sarnold@ag.tamu.edu). Complete information about the Texas Master Naturalist program is available at: <http://masternaturalist.tamu.edu>.

## What Makes a Lake, continued

Secondly, what is it that makes a lake *natural*? I would suggest that a natural lake is one that is created by naturally occurring physical processes and is capable of sustaining itself without human maintenance or intervention. Caddo Lake was indeed formed naturally and in a somewhat unique fashion as well.



It is often stated that Caddo was created by the New Madrid earthquake of 1811, but the facts have revealed this to be a myth. Instead, most who have studied the lake agree that it was originally created as a result of the "Great Raft," a massive 100-mile-long log jam that formed sometime around the 12th century. This feature impounded the flows of the Red and Atchafalaya rivers forcing water into the Cypress Creek Basin where Caddo now lies. The accounts of explorers who traversed the area prior to 1811 support this theory.

However, with the help of dynamite, the Great Raft was completely dismantled by 1873, and Caddo Lake is currently sustained by a dam constructed in 1914. While the lake is historically natural, being originally created and sustained by natural processes, it would vanish if the existing dam were removed. Once again, things become somewhat subjective.

So are there other natural lakes in Texas? Absolutely, though not on the scale of Caddo Lake. Although it is currently partially surrounded by a levee, Green Lake is a naturally formed water body that lies just inland from the coast in Calhoun County. It encompasses about 10,000 surface-acres, smaller than Caddo's 26,800 acres but certainly larger than your average pond. Additionally, there are numerous oxbow lakes (or "resacas" as

they are called along the Rio Grande) along the rivers of Texas, formed as rivers meander and water fills the former channel.

Last but not least, let's not forget our friends in the Panhandle where surface water comes primarily in the form of playa lakes. These are naturally formed disc-shaped basins that fill with surface runoff. While most playas are ephemeral (containing water for only part of the year), the average size of these water holes is 17 surface-acres with the largest of the playas reaching over 200 acres. In all, there are about 19,000 playa lakes in the High Plains of Texas, many of which have been altered to hold larger amounts of water for livestock and irrigation.

Without a clear definition of size, it can be difficult to say with certainty what constitutes a lake here in Texas. Moreover, with playa lakes having been altered and historic lakes such as Caddo and Green fortified to maintain their structure, it has become hard to determine what's natural and what isn't. But semantics aside, I think it's safe to say we've got more than a few natural lakes and that there's a whole lot of water and associated wildlife for us hydrophiles in Texas to enjoy.

Pond or lake, natural or unnatural, whatever the case may be, grab a fishing pole, a canoe, a pair of binoculars or a swim suit and get out there.

### WANT TO GET ON THE MAILING LIST?

Send your name and physical mailing address to [beth.bendik@tpwd.state.tx.us](mailto:beth.bendik@tpwd.state.tx.us) to receive the *Texas Wetland News* twice a year free of charge.

Or, to opt out of the paper newsletter and be notified via e-mail when a new edition of *Texas Wetland News* is posted online, complete a request form at [www.tpwd.state.tx.us/enews](http://www.tpwd.state.tx.us/enews).

### HAVE AN ARTICLE YOU'D LIKE TO SUBMIT?

If you would like to submit an article or announcement concerning wetland-related activities, initiatives, or workshops\* for the next *Texas Wetland News*, please e-mail the editor at: [ryan.mcgillicuddy@tpwd.state.tx.us](mailto:ryan.mcgillicuddy@tpwd.state.tx.us)

*\*Please note that the newsletter cannot include announcements of for-fee seminars or workshops for which Texas Parks and Wildlife Department is not a sponsor.*

Texas Parks and Wildlife Department conservation staff is responsible for soliciting and editing articles in this newsletter. Inclusion of an article in this newsletter does not imply TPWD's endorsement of a particular project or individual management method. Wetland management methods used depend upon the specific goals of the project.



# Texas Wetland News

and WETLAND CONSERVATION PLAN UPDATE

Texas Parks and Wildlife Department  
4200 Smith School Road  
Austin, TX 78744

PRSRT STD  
US POSTAGE PAID  
AUSTIN TX  
PERMIT NO. 2270

# J U L Y 2 0 0 9



# Texas Wetland News

and WETLAND CONSERVATION PLAN UPDATE

4200 Smith School Road • Austin, TX 78744  
[www.tpwd.state.tx.us/wetlands/publications](http://www.tpwd.state.tx.us/wetlands/publications)



Executive Director  
**Carter P. Smith**  
  
Editors  
**Beth Bendik**  
**Ryan McGillicuddy**

**COMMISSION**  
**Peter M. Holt, Chairman**  
San Antonio  
**T. Dan Friedkin, Vice-Chairman**  
Houston  
**Mark E. Bivins** Amarillo  
**Ralph H. Duggins** Fort Worth  
**Antonio Falcon, M.D.** Rio Grande City  
**Karen J. Hixon** San Antonio  
**Dan Allen Hughes, Jr.** Beeville  
**Margaret Martin** Boerne  
**S. Reed Morian** Houston  
**Lee M. Bass, Chairman-Emeritus**  
Fort Worth



TEXAS PARKS AND WILDLIFE DEPARTMENT MISSION STATEMENT  
*"To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations."*

You may view this publication through the TPWD Web site. If you wish to have your name and address removed from the printed version mail distribution list, please notify us by completing a request form at [www.tpwd.state.tx.us/enews/](http://www.tpwd.state.tx.us/enews/). Once verified, we will notify you by e-mail when a new version of your selected newsletter is posted at [www.tpwd.state.tx.us/newsletters/](http://www.tpwd.state.tx.us/newsletters/).

### FOR MORE INFORMATION

All inquiries: Texas Parks and Wildlife Department, 4200 Smith School Rd., Austin, TX 78744, telephone (800) 792-1112 toll free, or (512) 389-4800 or visit our Web site for detailed information about TPWD programs:

**[www.tpwd.state.tx.us](http://www.tpwd.state.tx.us)**

©2009 Texas Parks and Wildlife Department PWD BRT3200-003 (7/09)  
In accordance with Texas State Depository Law, this publication is available at the Texas State Publications Clearinghouse and/or Texas Depository Libraries.

Printed on recycled paper.