

Six Days in the Field: Texas Stream Team teaches Water Quality during Wetlands Expedition

By Travis Tidwell

Morning came early on June 17 and the humid coastal air already started to warm up after the cool summer night. Twenty-three science teachers from Texas, Louisiana, and Mexico eagerly boarded the spacious *M/V Fling* the previous day for an overnight jaunt across the Gulf of Mexico. I happily boarded with the others, excited for the journey ahead. We awoke that morning sailing along the Intracoastal Waterway in western Louisiana. Stretching from the Gulf of Mexico all the way up the Atlantic coast, the Intracoastal Waterway is an artificial canal that cuts through richly-diverse wetlands, bays, and estuaries on its roughly 3,000 mile course. For the next five days, the *M/V Fling* floated along the Intracoastal Waterway on a wetland expedition, stopping along the way to learn from the extraordinarily diverse ecological habitats of the Texas-Louisiana Coast.

The Gulf of Mexico Foundation (GMF) is a non-profit organization that is “dedicated to promoting and facilitating conservation of the health and productivity of the Gulf of Mexico and its resources through education, public awareness, research, and leadership programs.” Every year the GMF hosts the Intracoastal Waterway Wetlands Expedition. Science teachers and educators are taken on a six day aquatic science cruise from Louisiana to Texas to learn from each other and from the natural environment. This past June, I was fortunate enough to be invited on the Wetland Expedition. As a Texas Stream Team representative, I was asked to contribute to the water quality component of the program.

Each morning during breakfast we were briefed on the scheduled activities. We would then gather our gear and board kayaks and zodiacs to spend the day paddling around the wetlands. Once we made it to shore at our designated testing sites, teachers thumbed through field guides to identify plants, spied coastal birds through binoculars, waded through muddy water while seining for fish with a net, and collected water samples for water quality data. The Intracoastal Waterway Wetlands Expedition was a great opportunity for talking to teachers about water quality. As we traveled along the coast, we noted how the water quality differed at each site, and I helped to explain how water quality was related to activities within the different watersheds that we traversed. It was an excellent platform for teaching about non-point source pollution and how it moves through a river system.

Salinity values provided the starker difference in water quality that the group observed. The water in the Louisiana wetlands was practically fresh, and as the expedition moved west, the salinity increased. By the time everyone reached Galveston Bay, the salinity was the same as seawater. This was an excellent learning opportunity, during which I was able to demonstrate to the teachers on-board how the Louisiana wetlands were dominated by the Mississippi River watershed, the largest watershed in North America. The outdoor educational experience helped participants conceptualize the ecological importance of the vast amounts of freshwater flowing into the Gulf of Mexico. As the group moved west, the drainage areas of the watersheds decreased in size, so less freshwater was brought into the wetlands. This change in salinity was directly related to the changes in some of the other parameters tested within the wetland ecosystems that the teachers observed. The freshwater wetlands of Louisiana were dominated by bald cypress, and other woody plants, whereas the hardy cordgrass (*Spartina*) was the most common plant in the salt marshes of Galveston Bay. This change in gradient from salt water tolerant species to salt-loving species (halophytes) also helped to visualize the impact of surface water flow onto coastal wetlands and estuaries. The fish that were collected by the seining nets at various testing sites changed from channel catfish and bluegill in the freshwater wetland areas to mullet, spotted sea trout, and red drum in the saltwater areas.

During the expedition, participants also got to see firsthand the economic importance of coastal environments. As the *M/V Fling* steamed along the Intracoastal Waterway, we saw barges carrying tons of freight, local crab fisherman hauling in their daily catch, and oil refineries scattered along the coastline. The expedition even briefly stopped in Galveston for a tour of the Ocean Star Offshore Drilling Rig and Museum to learn about the oil and gas industry.

Each evening, after a hearty dinner prepared by the ship's crew, the group gathered in the galley or on the top deck of the *M/V Fling* to compile all of the data collected that day. On the last day, the teachers put together all of their field observations, water quality data, and photographs into a presentation that could be taken back to the classroom with them, to share the learning opportunity with students. This was a great way to demonstrate applied sciences to teachers, who then took the information they learned back to the classroom-setting. This expedition helps to make aquatic science exciting, hands-on, and practical for teachers and students alike. Texas Stream Team was happy to participate in the expedition, and looks forward to working more with the Gulf of Mexico Foundation in the future.

If you are a teacher that is interested in participating in the next Intracoastal Waterway Wetland Expedition, or you want more information on the Gulf of Mexico Foundation, please visit the Gulf of Mexico Foundation website at <http://www.gulfmex.org/>.



The teachers come ashore to do their sampling in the wetlands with the *M/V Fling* in the background.
Photograph by Travis Tidwell.



The teachers begin to collect plants, seine for fish, and conduct water quality sampling in the wetlands.

Photograph by Travis Tidwell.



A teacher measures water clarity in the wetlands with a Secchi disk. Photograph by Mike Smith.



An alligator swims by to check out the *M/V Fling*. Photograph by Travis Tidwell.



Science teachers test the water for nitrates aboard the *M/V Fling*. Photograph by Travis Tidwell.

Aquatic Plant Series: Giant Salvinia (*Salvinia molesta*)

By Taylor Ream

Habitat and Range: Giant Salvinia is native to South America and was introduced to North America as an invasive species in the 1990s (Texas Parks and Wildlife). Since its introduction, it has spread throughout Texas and the Southern United States (Texas A&M and Texas Parks and Wildlife). It grows in still, undisturbed water and ranges from North Carolina to Texas and is also found in California, Arizona, and Hawaii (United States Department of Agriculture).

Description: *Salvinia molesta* or Giant Salvinia is a small free-floating fern that grows in clusters to form thick mats in still, undisturbed water. It has oblong leaves that range from 0.5 – 1.5 inches long, sometimes folding in half to take on a chain-like appearance. It can grow about 2 inches deep and has stiff leaf hairs on the surface that separates into four segments, which merge together again at the tip to form an egg beater shape (Texas A&M). You can distinguish Giant Salvinia from Common Salvinia (*Salvinia minima*) by Giant Salvinia's larger leaves (approximately the size of a quarter to a half dollar) and segmented leaf hairs (Texas Parks and Wildlife).

Importance: As an invasive species, Giant Salvinia can often outcompete native plants and vegetation, which normally provide habitat and food for local animals and waterfowl. Its overgrowth can also cause fish kills and oxygen depletion in the bodies of water in which it is found. Owing to the thick clusters of growth, Giant Salvinia also blocks sunlight from aquatic plants below, causing these plants to die, which leads to further oxygen depletion in the body of water. Due to its high invasiveness, it is important for individuals to thoroughly clean boats and trailers that are leaving areas infested with Giant Salvinia to

prevent introduction into other non-native ecosystems. Help keep our waters safe by learning to spot Giant Salviania!



<http://plants.ifas.ufl.edu/manage/why-manage-plants/floridas-most-invasive-plants/giant-salvinia>

Image Citation:

"Giant Salvinia." Plant Management in Florida Waters. <http://plants.ifas.ufl.edu/manage/why-manage-plants/floridas-most-invasive-plants/giant-salvinia> (accessed September 24, 2013).

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"Plants Profile for Salvinia Molesta." USDA Natural Resources Conservation Service.

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Partner Spotlight: Texas Stream Team Partners with Texas Conservation Alliance in east Texas

By Will Butler



A new group of Citizen Scientists has been formed in the Neches River Basin! The Texas Conservation Alliance is a dedicated group focused on protecting, improving and maintaining the natural heritage of Texas. The group has wide stakeholder involvement, ranging from fishermen to elected representatives. For the past decade, TCA has “provided vital support for creation of the Neches River National Wildlife Refuge and expansion of the Big Thicket National Preserve,”

Photo courtesy of Texas Conservation Alliance

according to TCA Executive Director Janice Bezanson. She noted that TCA has also formed “two local (Neches River) advocacy groups, promoted books about the Neches, has given programs (about the Neches) to civic organizations, and generated extensive media attention to the river.”

Texas Stream Team and TCA have partnered to form the Neches River Stream Team in Beaumont, Texas. A group of nineteen volunteers, led by Gina Donovan of TCA, were trained to become Texas Stream Team Water Quality Monitors on August 19, 2013. During the five hour training volunteers learned how to measure water conductivity, pH, dissolved oxygen, water depth, air and water temperature, as well as how to conduct accurate field observations. Texas Stream Team’s Travis Tidwell conducted the training and was assisted by TST staff member Will Butler. “Working with the Texas Stream Team brings a new dimension to Neches River protection,” says Ms. Bezanson; “it will help ensure that the quality of this beautiful river and its exceptional riverside habitat is maintained.”

In partnering with Texas Stream Team, TCA plans to conduct monthly monitoring of sites along the Neches and Sabine Rivers and then submit their results to the Texas Stream Team and TCEQ databases. These activities will assist in increasing watershed and water quality awareness in Beaumont and the surrounding region. The TCA’s citizen scientist monitors will also serve as “water ambassadors” to curious pedestrians who may have questions regarding the condition of water in the Neches and Sabine rivers. Along with Texas Stream Team, the city of Beaumont and Neches River Authority will provide monitoring kits to the citizen scientists. According to Bezanson, by helping to engage volunteers in the water quality monitoring process, TCA’s partnership with Texas Stream Team will help to spread the culture of environmental stewardism in East Texas and educate local citizens on the value of protecting water quality.

Texas Stream Team is excited to partner with TCA and their citizen scientist monitors to expand water quality monitoring into two important watersheds in the Neches and Sabine. Special thanks go out to Gina Donovan for helping foster such a tremendous turnout at the training, as well as Karin Warren and the City of Beaumont for allowing Texas Stream Team to use their Water Utilities building for the event. For more information regarding the August 19th training in Beaumont, please visit <http://www.tcatexas.org/tcas-neches-stream-team-under-way-2/>, and for more information about the Texas Conservation Alliance please visit <http://www.tcatexas.org/>.

Texas Stream Team Fun Facts

By Taylor Ream

Since the early 90s, Texas Stream Team has had 206 trainers who have trained 5,413 Citizen Scientist Monitors. Texas Stream Team’s Citizen Scientists actively monitor 402 sites across Texas. Citizen Scientists have contributed 34,022 volunteer hours since 1991. Water quality is monitored in 59 out of 254 counties in Texas. Population within those 59 counties accounts for over 76% of population in Texas. Additionally, Citizen Scientists also monitor water quality at sites that are in the known distribution of 55 Federally Endangered Species. Collectively, Texas Stream Team’s Citizen Scientists monitor 82,973 miles of rivers and creeks out of the total 191,000 miles in Texas. Texas Stream Team and its Citizen Scientists have dedicated, and continue to dedicate, a substantial amount of time and effort to monitoring and protecting water quality in Texas for over three decades!

Volunteer Spotlight: Patricia Wyman and the Creek Freeks!

By Lindsay Sansom

Being a sixth grader is hard enough without being labeled a freak. However, for Mrs. Wyman's class, that is exactly what the sixth grade Gateway Middle schoolers wanted to be called; Creek Freeks! Mrs. Patricia Wyman was chosen for the volunteer spotlight this fall because of her upstanding efforts to educate our young people about the importance of keeping creeks, streams, and rivers clean and protecting the natural heritage of their hometown, Killeen, Texas.

Patricia Wyman became a Texas Stream Team (TST) Citizen Scientist water quality monitor at UT's Environmental Science Institute just about two years ago. A Texas State University Alumni ('94), Patricia has dedicated herself to becoming a strong environmental steward through volunteering and continued education opportunities. In addition to becoming a TST Citizen Scientist, Wyman recently joined the ranks of the Texas Master Naturalists, where she continues her volunteer efforts for such organizations as Shots across Texas and Boy Scouts of America. Mrs. Wyman started the Creek Freeks as a way to engage her students in hands-on, experiential learning in an outdoor setting.

The Creek Freeks had just begun to monitor a nearby tributary of Nolan Creek, when an arsonist set fire to the Gateway Middle School. The school was temporarily moved across town, and while classes are now being held back on the regular campus, there are still renovations occurring. For now, the Creek Freeks will have to do their water quality testing in the classroom. However, renovations should be completed in time for the cooler weather, which will allow more outside sampling. In preparation for this, Mrs. Wyman has gone above and beyond by taking the Advanced TST training so that she may now measure nutrients, including nitrates/nitrites, phosphates, and *E. coli*. By connecting the concepts of water quality with a creek that many of the children play in, Mrs. Wyman hopes to help the children understand how poor water quality can negatively impact aquatic life in the creek.

The efforts of Mrs. Wyman, and other TST Citizen Scientists in the Killeen area, also contribute data collection to the TST DataViewer, which is then used in the

"The most important part of water quality monitoring I try to impart to my students is that water is essential for all life on this planet. We must be stewards of this Earth and understand that all creatures have a right to live and drink clean water. By keeping trash in our cars, and by not pouring dangerous substances down the drain, we can help out. I want them to know that even the smallest efforts will have a major impact on some little creek critter." – Mrs. Patricia Wyman, 6th Grade Teacher, Gateway Middle School, Killeen, Texas

Watershed Protection Plan for Nolan Creek. Since 1996, Segment 1218 of Nolan Creek has been listed as impaired for bacteria on the Texas Commission on Environmental Quality's (TCEQs) 303(d) List; in 2010 concerns over other nutrients were added to the list for this segment. The City of Killeen, in conjunction with local and state project partners and regional stakeholders are currently in the process of developing a Watershed Protection Plan, which will include developing a Total Daily Maximum Load (TMDL) for Nolan Creek.

In the meantime, Mrs. Wyman and the Creek Freeks continue to learn about the vital importance of maintaining a healthy ecosystem, good water quality, and sound environmental stewardship. Texas Stream Team would like to recognize the great work of Mrs. Patricia Wyman; thank you for educating the next generation of water stewards!



One of Patricia Wyman's Creek Freeks takes dissolved oxygen samples at their monitoring site behind their school.

Web o' Water: For the Love of the Lake

By Lindsay Sansom

The beautiful White Rock Lake was built in the early 1900s as a water supply reservoir for a growing population in nearby Dallas, Texas. The reservoir has had a long history as a water supply reservoir, however, now the lake is primarily used for recreation. By the mid-1970s, White Rock Lake was in disrepair and was widely regarded as a place for drunken teenagers to hang out; as a result, it was littered with empty beer bottles and trash. By the late 1980s, the community started to call for a change. The mid-1990s saw the formation of the non-profit group, For the Love of the Lake (FTLOTL). With the primary mission of maintaining the park and protecting the water quality and aquatic habitats, FTLOTL partnered with the Dallas Parks and Recreation Department.

The volunteer group is comprised of a strong community base of active citizens concerned with improving the park and the water quality of the lake. Starting in 1996, FTLOTL began hosting a Second Saturday Shoreline Spruce up. For two hours, every second Saturday of the month, for the past 17 years, FTLOTL volunteers have been cleaning up litter all along the shoreline and participating in lake beautification projects. Talk about dedication to your community!!!

Local businesses, churches, school groups, nonprofit agencies, and any other interested local agencies are invited to take part in the Dallas Parks and Recreation's Adopt -A- Shoreline program, which is administered by FTLOTL. This dedicated group of community volunteers has only increased in number and commitment since the program began, 17 years ago. While they started with just nine community groups, there are now more than 45 local groups that have actively adopted a strip of shoreline to maintain along White Rock Lake. Every year, FTLOTL hosts an Annual Adopt-A-Shoreline Appreciation Picnic. During these communities gatherings two awards are handed out; one for the Group of the Year and one for the New Group of the Year.

In addition to the monthly volunteer clean ups, FTLOTL, in cooperation with the Texas Stream Team and the Aquatic Alliance, actively monitors several sites surrounding White Rock Lake. The Aquatic Alliance is comprised of several local groups (FTLOTL, Master Naturalists, Trinity River Audubon Center, etc...) that have all partnered with TST to help increase the number of trained Citizen Scientists who monitor water quality in Dallas, Collin, and Denton Counties. Currently, there are more than 50 trained Citizen Scientists, who monitor at 40 different locations in the tri-county region, and the group is always looking for new volunteers!

One of the longest standing partners that TST has had, FTLOTL has a dedicated base of volunteer Citizen Scientists that collect data. In fact, the White Rock Lake dataset is one of the most complete data sets in TST's online DataViewer. The most recent TST White Rock Lake Water Quality Data Report is scheduled to be released later this year. For more trends regarding water quality at White Rock Lake please refer to the TST White Rock Lake Water Quality Data Report, or pull raw data strait from the TST [DataViewer](#). In the meantime, keep up the excellent work FTLOTL!

If you are interested in becoming a Citizen Scientist and volunteering with FTLOTL, please contact Richard Grayson at the following email address: rgrayson@rivergeek.com. For more information regarding White Rock Lake and FTLOTL, please visit <http://www.whiterocklake.org/>