



Texas Watersheds

Conservation news from headwaters to coast

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PULL. KILL. PLANT.

It's People Over Arundo in the Nueces Basin

BY KAREN FORD

PHOTOS COURTESY OF NUECES RIVER AUTHORITY

In the Upper Nueces basin, an educated population of landowners, volunteers and a number of supporting organizations spent the blazing hot summer of 2011 engaged in hand-to-hand combat with *Arundo donax*, the big invasive river cane—and for now, the people are winning.

“This is not about a plant. This is about people with a common understanding taking responsibility for what happens on their land,” explains Sky Jones-Lewey, Director of Resource Protection and Education for Nueces River Authority (NRA). “And where we once had a perfect storm of invasives in the upper basin, we now have a perfect storm of people responding.”

It all started back in the spring of 2010 when several landowners on the Nueces and Sabinal rivers rang the alarm about arundo taking over their riparian areas. Other landowners noticed large fluctuations of diurnal (day-night) flows in the river and knew something wasn't right. As part of the NRA's successful Nueces Riparian Landowners Network, these landowners called on the river authority to answer questions and find a way to fix the problem.

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*Landowners inspect herbicide application,
Summer 2011*



EDITOR'S *Perspective*

BY RYAN MCGILLICUDDY,
TPWD CONSERVATION ECOLOGIST AND CO-EDITOR OF TEXAS WATERSHEDS

Watersheds and Partnerships

It is with great excitement that we introduce the inaugural edition of Texas Watersheds, a newsletter dedicated to highlighting efforts to conserve the aquatic resources of Texas, from the headwaters and uplands that feed our wetlands and rivers to the coasts that are nourished by their waters.

Our previous publication, *Texas Wetland News*, focused primarily on wetlands and their associated habitats, and for years we have enjoyed bringing attention to this critical resource. But as the Watershed Policy and Management Program at Texas Parks and Wildlife has evolved in its efforts to conserve and restore aquatic and riparian ecosystems on a watershed-scale, so has the need to highlight a broader spectrum of activities occurring throughout the state.

The importance of using a watershed-scale perspective to conserve our natural resources has become increasingly evident. After all, everyone lives in a watershed and virtually every land use and activity that occurs throughout the landscape (including on uplands seemingly distant from our creeks and rivers) affects our local waterways. Therefore, watershed conservation must include an incredibly broad range of stakeholders and community interests, as well as a number of actions specifically catered to the area. Such efforts must be science-based but also value-driven, incorporating the needs and desires of landowners and the community into the health of the natural resources on which they depend. It is a lofty goal, but it is amazing what can be achieved when people and organizations partner together.

For the first edition of *Texas Watersheds* we felt it important to illustrate the value of such partnerships in conservation, and have brought together a number of articles that share this common theme. Karen Ford's article on the effort to control invasive species in the Nueces River Basin shows what is possible when a community unites in a common vision and responds to a challenge in their watershed. An enormous effort in watershed-scale conservation that is occurring in the Llano River Basin highlights the importance of partnerships, and is documented in three related articles which tie together elements of restoration, recreation and science. Both Arlene Kalmbach and Andi Cooper's articles update us on projects that could not be achieved without valuable partnerships between the public, federal and state agencies, and private contributors. Finally, Megan Bean introduces an upcoming tool that will soon aid Texans statewide in the conservation of aquatic resources.

Staff from the Watershed Policy and Management Program and other programs at TPWD have been fortunate to participate as partners in the development of many of the projects detailed in this publication, and it is our pleasure to bring these and other projects to your attention. We look forward to updating you on the progress being made toward conserving our aquatic resources, and hope you enjoy this and future editions of *Texas Watersheds*.

An Unexpected Discovery

"As we scouted downstream of Vanderpool before beginning the herbicide application in June, we observed colonies of naturally dead arundo and got excited," said Sky Jones-Lewey, PULL KILL PLANT project coordinator.

"We first thought they were victim of the extreme drought and drying out of the riparian area, but then we found dead arundo along the water's edge. Several of these colonies were clustered around and intertwined with dead ash juniper trees along a low terrace that flanks the river. We collected leaf and stalk samples and shipped them to Dr. John Goolsby at the USDA's ARS lab in Weslaco where he found no signs of insect damage," to which their death could be attributed, Jones-Lewey said. In consultation with Texas Agriculture Research Center in Uvalde we then collected root samples and had them analyzed by plant pathologists at Texas A&M.

On one sample they found the consistent presence of a common root fungus, *Fusarium* (possibly *Fusarium poae*) and suspected the fungus as the primary cause for the crown/root/pup deterioration and subsequent symptom development in the plant. In the end, the cause of death of untreated arundo on the Sabinal River could not be unequivocally pegged on any one thing. It is surmised that the soil chemistry that favors *Fusarium* growth perhaps disfavors arundo growth. More research is needed here.

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It's People Over Arundo...

A comprehensive and coordinated effort to control arundo began to form in early 2011. Partnering agencies were called in to assess the extent of the problem and help identify and fund a treatment program. Texas Parks and Wildlife Department (TPWD) came forward with funds and expertise, along with U.S. Fish and Wildlife Service (USFWS), Texas State Soil and Water Conservation Board (TSSWCB) and the Rio Grande-Nueces Resource Conservation and Development Council (RC&D). After both ground and aerial "truthing" of the situation, a treatment area was defined on both the Nueces and Sabinal Rivers, and a concerted landowner outreach effort began.

After substantial research in the county tax appraisal districts, letters were mailed to more than 300 landowners explaining the threats of the arundo problem and identifying the proposed treatment effort. "The response was almost immediate," said Ms. Jones-Lewey. "Everyone was asking, what can WE do to help?"

A three-pronged approach was devised and **PULL KILL PLANT** became the new battle cry of the program. The summer of 2011 will be remembered as an incredible first wave offensive by a cadre of volunteers and landowners, with agencies providing technical and funding support.

Early on, it was observed that arundo was spreading through downed stalks that were sprouting at every node. One 20-foot stalk can have more than 20 nodes, so proliferation of the plant can be extraordinary when stalks are cut. While education to landowners regarding cutting, mowing and other mechanical means of elimination is critical, animals can have the same effect. In this case, it was determined

Pulling young arundo plants from the river bed

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A large stand of arundo is chemically treated as part of the Pull Kill Plant program.

Woody riparian plants were installed by Native American Seed Company in summer, 2011.



that a water-centric rodent, nutria, was the culprit in many places, and nutria-gnawed stalks were responsible for much of the recent arundo explosion on the Nueces and Sabinal rivers. In addition, it is known that arundo is a big carbon-sequesterer; it flourishes in a carbon-rich atmosphere and is believed to cause a corresponding change in pH to the soils and water where it grows.

Hand-pulling new arundo sprouts was an effective, if labor-intensive, strategy on more than 30 miles of the Nueces River. The pulling was accomplished by landowners, volunteers (including three Eagle Scouts and their troops), a team of college students, and a force of farm labor contractors from Uvalde. From June 15 through August 30, four passes were made on the targeted river reach, and more than 850,000 nodes were pulled and removed from the riverbed. Pulling crews worked daily from sun-up to early afternoon and retired for the day when temperatures jumped past 105 degrees.

Arundo was found growing in thick colonies along the riparian zones of the Nueces and Sabinal and was ripe for control through chemical treatment. So far, the only herbicide proven safe in aquatic environments and effective in killing *Arundo donax* in experiments on the Nueces is the systemic herbicide Habitat™ containing the plant amino acid blocker *Imazapyr*.

Prior to beginning the project on private land, another round of landowner education and coordination was essential. One hundred sixty-one (161) landowners chose to participate and authorized the PULL KILL PLANT treatments on their lands. Care was taken to accommodate landowner wishes

and avoid damage to non-target species. The “rope trick” and the “box trick” were devised to pull arundo stalks away from trees and to cover individual protected plants during the herbicide application.

“Many landowners were onsite to observe treatments, assist with logistics and deliver necessities,” according to Ms. Jones-Lewey. “They brought us lunch, gave us their gate combinations, and helped pull us out when the equipment broke down.”

In a project area that included 3,688 acres and 47 miles of river, about 178 acres of arundo were treated with the herbicide on the upper Nueces River in Uvalde and Zavala counties. The Sabinal River project area included 772 acres and 8 miles of river with 15 acres treated with herbicide in Bandera County. While these acreages may sound small, it’s important to remember that the methodology was individual plant treatment. An experienced herbicide applicator with specialized equipment, coupled with a sound ground team communication strategy, was key to the organized treatment. Funding for this part of the program came from TPWD’s Aquatic Invasive Program and Landowner Incentive Program, as well as a TSSWCB invasive control matching grant.

The PLANT component of the program was designed to jump-start the restoration process by engaging and educating the landowners and to help offset the “ugly” factor of slow decaying arundo colonies. About 50 trees were planted within the sediment rich areas of the dead arundo clumps that provide a perfect nursery for young pecan, little walnut, mulberry and willow.

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Guadalupe Bass Restoration Initiative Coordinates Watershed-scale Conservation Projects Underway in the Llano Watershed

BY GARY GARRETT, TPWD FISHERIES BIOLOGIST /
PROGRAM DIRECTOR, WATERSHED POLICY AND MANAGEMENT

The National Fish and Wildlife Foundation has begun an initiative to focus and coordinate actions to conserve rare species of black basses in the United States. Although the initiative plans to address all species of endemic black bass in the southeast, the first project will address the State Fish of Texas, Guadalupe bass. This initiative will be coordinated by the Texas Parks and Wildlife Department and one of the initial focal areas will be the South Llano River.

The Guadalupe bass (*Micropterus treculii*) is a Central Texas endemic, naturally occurring only in streams draining the Edwards Plateau region (San Antonio, Guadalupe, Colorado and Brazos river systems). In 1989, it was designated the State Fish of Texas by the Texas Legislature, in recognition of the unique character of both the Guadalupe bass and its habitat. Guadalupe bass has long provided a popular sport fishery in the Edwards Plateau region of Texas. The angling experience is not about quantity, it's about the quality of a fishing trip for an agile, fast-water fish occurring in an attractive, natural setting.

Guadalupe bass numbers have decreased over recent decades and for that reason the Guadalupe Bass Restoration Initiative was developed to reverse the trend. The decline in abundance is due to a combination of factors, including decreased stream flow, habitat degradation and hybridization with smallmouth bass (*M. dolomieu*). Habitat loss and genetic contamination problems are pervasive throughout the range of Guadalupe bass. Stream flow declines and a decrease in habitat quality are due mainly to human cultural activities and population growth, and thus are likely to continue.

Interspecific hybridization became a threat to Guadalupe bass survival when the non-native smallmouth bass was introduced, beginning in 1974. The Texas Parks and Wildlife Department initiated an intensive smallmouth bass stocking program in the Edwards Plateau region with the objective of increasing angler harvest in Central Texas streams and reservoirs. An unforeseen result of the stocking program was hybridization between these species. A genetic survey of Guadalupe bass in 1989 showed extensive hybridization with smallmouth bass in almost every Guadalupe bass stream system. An assessment of the current status is now underway. Preliminary results show only the Pedernales River with a pure population of Guadalupe bass.

Although TPWD has a policy of no longer stocking smallmouth bass in the Hill Country, the hybrids are still problematic. Since 1992, TPWD has been evaluating a stocking program whereby pure Guadalupe bass are introduced into a genetically contaminated stream system (headwaters of the Guadalupe River) in order to numerically and reproductively overwhelm the hybrid swarm. Although total eradication of the smallmouth bass genome is improbable in some of the more contaminated stream systems, if the smallmouth bass genetic influence could be reduced to low levels (1%), genetic restoration would be considered successful.

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TPWD staff release genetically pure Guadalupe bass fingerlings into the South Llano River.

As part of the TPWD Guadalupe Bass Restoration Initiative, restoration efforts will focus on Guadalupe bass populations in the north and south forks of the Llano River. This project provides the opportunity to use interest in the State Fish of Texas to raise awareness of habitat quality and support restoration and conservation efforts in the region. Specific restoration activities will include assessments of fish community structure and habitat use, removal of non-native smallmouth bass and hybrids, stocking of genetically-pure Guadalupe bass, genetic monitoring of Guadalupe bass populations, instream and riparian habitat assessments, and instream, riparian and upland restoration and conservation.

The intent of the Guadalupe Bass Restoration Initiative is to protect Guadalupe bass populations and their habitat by developing networks of willing landowners interested in

implementing coordinated landscape conservation actions at watershed-scales. Conservation actions implemented by landowner networks will promote functional riparian and stream systems, and emphasize the conservation of native fish communities and supporting habitats. The networks will attempt to reduce or eliminate activities on the landscape that degrade water quality, reduce water quantity, degrade riparian systems, favor non-native species, or fragment stream systems, while encouraging a wide array of sustainable land-use activities that are compatible with aquatic resource conservation.

More information on funding to help landowners protect or improve their part of the watershed is available at: www.tpwd.state.tx.us/landwater/land/private/lip/

COMPONENT 1 – Protect and maintain intact, healthy habitats

Despite recent increases in development activity throughout the native range of Guadalupe bass, many stream segments remain relatively pristine and intact. However, projections of population growth, water demands, and land-use changes indicate that these locations will soon be at risk. The human population on the Edwards Plateau is predicted to increase by approximately 25% by 2020, with some subsets of the region expected to double in population size. The associated demands placed upon these ecosystems will have direct effects on the health of Guadalupe bass populations.

To address projected changes in water demands and land uses, a Watershed Conservation Plan is needed for the headwaters region of the Llano River. The Plan is being developed by the South Llano Watershed Alliance, assisted by a technical team of TPWD biologists and other experts working in collaboration with interested stakeholders (e.g., private landowners, local governments, state and federal agencies, conservation NGOs, local angler organizations, etc.). TPWD will help coordinate the implementation of this Plan with a focus on working through partnerships to protect and maintain aquatic, riparian and upland habitats essential to the long-term health and sustainability of this ecosystem.





Guadalupe bass fingerlings raised in a TPWD hatchery await their release into the South Llano River.

COMPONENT 2 – Restore degraded habitats

Habitats important to the health of Guadalupe bass populations will be restored to a naturally functioning condition. Habitat restoration actions will enhance all life history stages of Guadalupe bass, supporting reproduction, survival and maintenance of populations at carrying capacity. In addition, restoration of habitat will benefit all other native aquatic species.

Working through the TPWD Landowner Incentive Program, habitat restoration can be achieved by networks of willing landowners interested in implementing coordinated landscape conservation actions at watershed-scales. Conservation actions implemented by landowner networks will promote functional riparian and stream systems, and emphasize the conservation of native fish communities and supporting habitats. The networks will attempt to reduce or eliminate activities on the landscape that degrade water quality, reduce water quantity, degrade riparian systems, favor non-native species, or fragment stream systems, while also encouraging a wide array of sustainable land-use activities that are compatible with aquatic resource conservation.

We are currently developing projects with private landowners, South Llano State Park, and the Texas Tech Llano River Field Station. These include stream bank stabilization and reestablishment of native vegetation to support functional riparian zones, removal or redesign of road crossings that serve as barriers to fish passage or that alter natural fluvial processes in the river, instream structural habitat enhancements, including placement of root wads, log and boulder complexes that support sustainable populations of Guadalupe bass and other native fishes, and upland grasslands restoration to support recharge of springs and restored hydrologic flows.

In addition, we are working with the South Llano Watershed Alliance to provide a landowner workshop on fire ecology and restoration in response to the large fires they experienced in 2011. This situation is viewed as somewhat unique in terms of the interaction of 1) extreme drought prior to the fire, 2) intense fire and 3) extreme post-fire drought. Certainly many landowners would like to help their land recover, and a well-designed approach utilizing proper methods can provide benefits throughout the watershed.

COMPONENT 3 – Ameliorate effects of invasive species

During fall 2010 adult male and female Guadalupe bass were collected from locations with minimal hybridization within the Llano River for use as hatchery brood fish. Each fish was evaluated at 22 microsatellite loci to assure genetic purity and was implanted with a PIT tag for unique identification.

In April and May 2011, approximately 170,000 fingerlings derived from these brood fish were stocked in locations throughout the South Llano River. At least two more stockings (2012 and 2013) are planned.

In coordination with the stocking efforts, we will be monitoring the genetic status of the population as well as funding research to better understand important aspects of their ecology, such as movement and habitat utilization.

Coming Soon...

The South Llano River Paddling Trail

BY MELISSA PARKER, TPWD RIPARIAN ECOLOGIST

The restoration projects that are being implemented to improve key habitat features within the South Llano River will go a long way towards long-term conservation of Guadalupe Bass.

Paddlers enjoy the South Llano River where the planned trail will be.

Beyond restoration and habitat enhancement projects, the South Llano Watershed Alliance (SLWA) has also focused on educating river recreationists on the importance of conserving such a special ecological and recreational resource. As a means to provide this education, the SLWA held a series of public meetings to obtain community support for the development of a Texas Paddling Trail (TPT) on the South Llano River. Through their efforts, the creation of a TPT received support from the City of Junction, Texas Tech University, Kimble County, as well as adjacent landowners and local businesses.

A key goal of the SLWA in establishing the South Llano River Paddling Trail is to create structured public access sites that provide parking, trash receptacles, and educational kiosks that explain how to safely navigate the South Llano River, where to put in and take out, how long one can expect the trip to take, what to take with you while on the river (life vest, water, food, etc.), how to behave while on the river, how NOT to trespass on private land (the banks are privately owned, unless they are owned by a public entity), and wildlife, fishing, and conservation information. By providing structured public access and educating recreationists before they get onto the river, visitors can come away with an enjoyable experience that fosters an appreciation for the conservation of waterways, fish and wildlife.

The six-mile South Llano River Paddling Trail is planned for opening in the spring of 2012, and will run from the South Llano River State Park to Junction City Park. Texas Tech will offer an alternate take-out at Flatrock Bridge for a distance of 4.4 miles. The trail hosts a variety of habitat and beautiful scenery. An abundance of wildlife, great birding and fishing opportunities, and beautiful, clear water make for a wonderful trip.



**Look for this trail opening in the spring at
www.tpwd.state.tx.us/paddlingtrails**

Range-wide Survey of Hybridization in the Guadalupe Bass

BY PRESTON BEAN, PH.D. CANDIDATE, TEXAS STATE UNIVERSITY



Guadalupe bass — Micropterus treculii

Beginning in 1974, smallmouth bass were stocked throughout the Texas Hill Country to provide greater sport fishing opportunities for Texans. Unbeknownst to biologists at the time, the smallmouth bass began hybridizing with native Guadalupe bass. Hybridization between the two species poses a threat to the Guadalupe bass as it can lead to extirpation, with pure Guadalupe bass eventually replaced by hybrids. Researchers at Texas State University–San Marcos have recently conducted a range-wide survey of the Guadalupe bass to find out how levels of hybridization with introduced smallmouth bass have changed over the years.

Three rivers, the Guadalupe, Llano and San Saba, have hybrids present in the populations with only the Guadalupe having pure smallmouth bass. The levels of hybridization in the Llano and San Saba are low (less than 5%); however, hybrids were not previously found in these populations in a Texas Parks and Wildlife Department survey in the early 1990s. Hybrids were previously found in the Lampasas and San Gabriel rivers in the Brazos drainage, but have since faded away on their own. Only pure Guadalupe bass were recently found there. However, the outcome

has been different in the Blanco and South Concho rivers where pure Guadalupe bass are no longer found and only hybrids and smallmouth bass occur. Three native populations of Guadalupe bass in which hybrids have never been found still persist in the Medina, Pedernales, and lower Colorado rivers. The results of this most recent survey are being used to guide conservation actions in the Guadalupe Bass Restoration Initiative. For example, stocking of pure Guadalupe bass has begun in the South Llano River in an effort to swamp out the hybrids before their numbers increase in the population.

In addition to the range-wide survey of hybridization, the Texas State University researchers are examining how the geography of Central Texas and man-made barriers, such as dams, affect the population genetic structure of the Guadalupe bass. Also, they are examining how genetic diversity varies among Guadalupe bass populations and affects variation in resource use among these populations. The results of these studies will be available next spring. Questions about these projects can be directed to Preston Bean at preston.bean@txstate.edu.

Watershed BMP Website Coming Soon

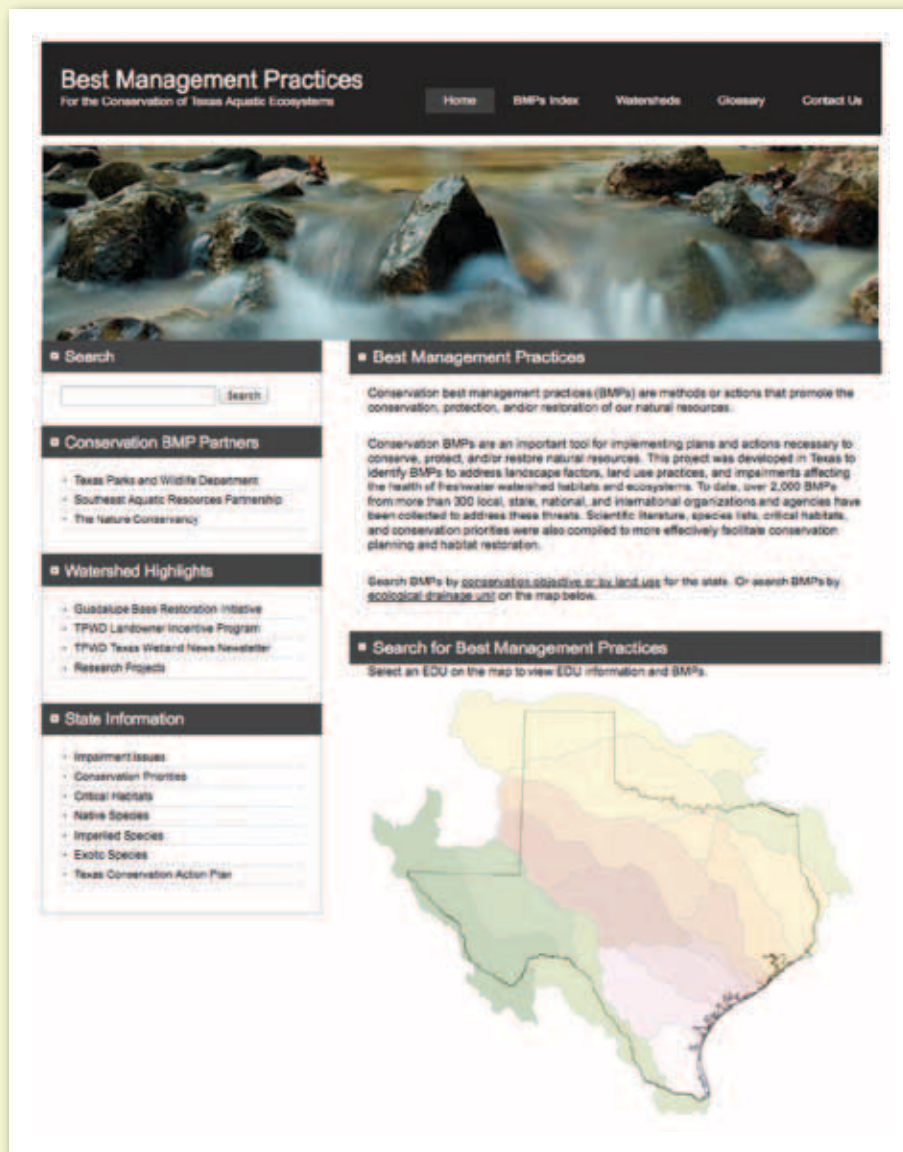
Comprehensive Site Will Provide a Unique Tool for Conservation in Texas

BY MEGAN BEAN, TPWD FISH CONSERVATION ECOLOGIST

Conservation best management practices (BMPs) are an important tool for developing and implementing plans and actions necessary to conserve, protect, or restore natural resources.

The Watershed Policy and Management Program at Texas Parks and Wildlife has developed a website to disseminate conservation BMPs identified to address land use practices and impairments affecting the health of Texas watersheds. Over 2,000 BMPs from more than 300 local, state, national, and international organizations and agencies have been collected to address state and regional threats. BMPs were organized by conservation objective, land use type, and ecological drainage unit. Individual BMP pages include a basic summary and description of the BMP, identified conservation benefits, links to collected BMPs, and a scientific literature bibliography. Species lists, conservation priorities, impairment issues, and watershed information (e.g. land use patterns, conservation initiatives, and current research projects) are also being compiled to more effectively facilitate conservation planning and habitat restoration.

The website will be available for public use by the end of 2011. Be on the lookout for a press release from TPWD announcing its arrival.



If you have any questions, please contact Megan Bean at megan.bean@tpwd.state.tx.us.



Water, Wildlife and Partnership

Watershed Landowner Incentive Program

Implementing Numerous Projects

BY ARLENE KALMBACH, TPWD LANDOWNER INCENTIVE PROGRAM COORDINATOR

Water has always been a precious commodity in Texas, and I don't have to spell out just how acutely aware we are of this fact as we sit in the middle of an epic drought. Wildlife is highly valued by the people of Texas, and for my purposes the term wildlife encompasses both aquatic and terrestrial creatures. If something benefits the watershed, it's likely to benefit wildlife. Riparian corridor restoration and protection, brush control, and native plantings are a few of the project types supported by this program that have a direct benefit to both the watershed and wildlife.

Achieving lasting conservation on any appreciable scale in Texas requires partnerships. So for over a year now, the TPWD Wildlife Division Private Lands Program, through the Landowner Incentive Program, has been working in close partnership with the Inland Fisheries Division Watershed Policy and Management Program to bring watershed-based conservation to the Texas landscape. We know that watershed conservation practices enhance a diversity of natural resources while providing societal benefits such as clean, abundant water, productive habitats and recreational opportunities. TPWD has some key partners that provide the funding to make this work possible. Through grants and cooperative agreements from partners such as the USFWS Partners for Fish and Wildlife Program, the National Fish and Wildlife Foundation, and private entities such as Anheuser-Busch, TPWD is leveraging the dollars needed to make a difference on the landscape.

Biologists and funding are important to this effort, but the most important partners in this work are the private landowners who recognize the enormous value and potential of their land and willingly accept the role of steward. It is their interest in conserving and protecting the state's natural resources, not only for the direct benefits to their families, but for the benefits to all Texans, that makes them critical to conservation efforts. Texas is largely a privately-owned state, so when a landowner chooses to protect and maintain the natural resources on their land they benefit the watersheds and wildlife of Texas for everyone. So thank a conservation-minded rancher or farmer next time you think about it, not necessarily for the food you eat but for the water you drink, the pristine rivers you float, the deer you hunt, or the birds you watch.

One of the recent projects undertaken through this partnership is a large scale effort to remove the exotic, invasive species *Arundo donax* (giant river cane) from the Nueces and Sabinal rivers and return them to a more historically natural state. This exotic species is prolific and aggressive and has a detrimental impact on water flows and the plant communities native to these river basins. This enormous effort was kicked off last year through a partnership in the Montell area of the Nueces River and has expanded to include more of the Nueces and parts of the Sabinal River as well. This work is a huge collaboration of many private landowners and conservation partners led by the Nueces River Authority. (See the front page of this publication for more information on this project.)

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*A helicopter applies herbicide to a large stand of arundo.
Photo courtesy of Sky Jones-Lewey, Nueces River Authority*



Another project recently underway through this partnership involves one large landowner working with multiple natural resource agencies to protect Duff Springs in the Terlingua Creek Watershed, a small oasis in the northern Chihuahuan Desert landscape of the Trans Pecos. Conservation of springs in this arid region benefits much more than the one landowner who stewards the resource. A long history of over grazing, drought, erosion and brush encroachment has negatively impacted this valuable resource. With dedication and assistance, this landowner is working to carefully remove the invading brush and restore the area to a more historically natural riparian setting. To read more on this project go to page 1 of the 2011 Landowner Incentive Program Bulletin: www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_lf_w7000_1405_03_11.pdf

*The protection of springs such as these is critical to desert ecosystems.
Photo courtesy of Catherine Brown, Project Supervisor, O2 Ranch*

*Texas snowbell
(*Styrax plantanifolius* ssp. *texanus*)
Photo courtesy of Bill Carr,
Ladybird Johnson Wildflower Center*

*A net is set up to collect falling
seeds from a Texas Snowbell.
Photo courtesy of The Bamberger Ranch Preserve*



One more project to highlight is the continued efforts of J. David Bamberger in his work to restore endangered Texas Snowbells to the Southern Edwards Plateau area. Through funding from this program he has continued his work to plant, protect and establish this beautiful plant within its native range. To read more on this project go to page 3 of the 2010 Landowner Incentive Program Bulletin: www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_lf_w7000_1405_03_10.pdf



Some exciting upcoming projects include work to maintain and protect the integrity of the headwaters of the Llano River through prescribed burns, construction of structures that slow overland flow, a project to help maintain a native grassland prairie and remove exotic chinaberry from a stretch of the Llano River, work to improve the Texas Tech-owned stretch of the Llano River and provide outdoor educational opportunities, and a project to address erosion problems along the Llano River on a small property within the Junction City limits.

If you think your property or a landowner you work with might be interested in learning more about the opportunities provided by this program, go to www.tpwd.state.tx.us/lip to learn more.

1,500-Acre Marsh Restoration Project at J.D. Murphree WMA

A Public-Private Conservation Effort

BY ANDI COOPER – DUCKS UNLIMITED; MIKE REZSUTEK – TEXAS PARKS AND WILDLIFE DEPARTMENT

Most people would be hard-pressed to find a use for 2 million cubic yards of silt-saturated dredge material. But to wetland managers in the upper coast of Texas, this is a highly valuable resource in their efforts to fight against continuing loss of coastal wetland habitats. By a process known as beneficial use of dredged material, silts that once were destined for upland disposal sites now play a critical role in wetland conservation and restoration.

The Salt Bayou Unit of J.D. Murphree Wildlife Management Area near Port Arthur, Texas, managed by the Texas Parks and Wildlife Department, is the site of an approximately 1,500-acre restoration project. This project happened through the efforts of four major players: National Oceanic and Atmospheric Administration (NOAA) Fisheries, Texas Parks and Wildlife Department (TPWD), Golden Pass Liquefied Natural Gas (GPLNG), and Ducks Unlimited (DU). It is one of the largest beneficial use projects of its kind in Texas, but not the first time beneficial use occurred on the J.D. Murphree WMA. A smaller project as mitigation for wetland impacts completed in 2008 acted as the template for this larger project.

The wildlife management area provides important stopover and staging habitat for many of the waterfowl in the Central Flyway that migrate and winter along the Texas Gulf Coast. The Salt Bayou Unit also provides valuable habitat to mottled ducks, a resident species whose declining population in Texas has caused concerns within the waterfowl conservation community.

Due to saltwater intrusion and subsidence, the Salt Bayou Unit has degraded over the years, reducing the amount of emergent vegetation that provides the foundation for fisheries, birds, amphibians, reptiles and mammals inhabiting



Native wetland vegetation is planted in the dredge material at J.D. Murphree WMA

the marsh. Scouring storm surges and other impacts from hurricanes have further degraded this marsh complex. Once areas lose their vegetation, they also lose many of their benefits to wetland-associated fish and wildlife.

In an attempt to reverse this loss, TPWD worked with GPLNG and DU to place as much as 24 inches of dredge material in subsided marsh to raise elevations to desirable levels. This effort will accommodate the reestablishment and growth of native wetland vegetation while maintaining ponds and other surface water features important in a properly functioning marsh. The dredge material was filling in the GPLNG berth along the Sabine Neches Waterway, and would have been put in upland disposal otherwise. The three partners saw a win-win opportunity for GPLNG to use that material to help restore marsh and provide cost savings to GPLNG at the same time.

The project didn't start out as the large-scale restoration seen today. Originally, a NOAA Fisheries Hurricane Ike Recovery Grant to TPWD proposed to restore 40 acres of emergent marsh habitat damaged by storm impacts. The \$1.5-million grant enabled TPWD to hire DU for planning, engineering, surveys and monitoring of the small project. The grant also covered part of the costs of replanting marsh vegetation on the restoration site.

During the initial planning stages of the project, an opportunity to partner with GPLNG developed. Maintenance dredging of GPLNG's berthing terminal presented the possibility to beneficially use more than 2 million cubic yards of dredge material. TPWD asked DU to survey and develop a design for the project and to oversee the placement of the dredge material during the construction phase. Ultimately, nearly 1,500 acres of coastal marsh was enhanced by this partnership – a substantially greater benefit than the 40 acres originally proposed to NOAA. This project created a partnership that delivered far more wetlands improvement than planned and one that should serve as the standard for future beneficial use projects. Funding from NOAA did not pay for the dredging itself, but will be utilized to plant much more than 40 acres of restored marsh.

"We've worked with DU for many years, and we know their expertise in wetlands restoration," Jim Sutherlin, area manager for J.D. Murphree, said. "This area has long been important for waterfowl and other wildlife, and we want to ensure that it continues to provide quality habitat. We appreciate our relationship with Golden Pass and the special efforts they are making to provide the fill material needed for restoring the marsh."

"We value the opportunity to work with Texas Parks and Wildlife, Ducks Unlimited and Jefferson County in bringing this important restoration project to fruition," Raymond Jones, president of Golden Pass LNG, said. "By revitalizing our existing coastal marshes, we are providing wintering waterfowl and other wildlife with the types of natural habitats that promote long-term viability. We look forward to pursuing additional opportunities in the future."

"Golden Pass LNG could have taken a more traditional and dependable route by placing the dredge material in a containment area. The fact that they not only considered using the material in a positive way, but actually encouraged and paid their dredging contractors to do whatever was necessary to make

What is Beneficial Use of Dredge Material?

Beneficial use of dredged materials is the utilization of dredged sediments as resource materials in productive ways. Several hundred million cubic yards of sediment must be dredged from U.S. ports, harbors and waterways each year to maintain and improve the nation's navigation systems for commercial, national defense and recreational purposes. Traditional dredging methods discharge sediment into confined containment facilities or into the open waters of oceans, rivers, lakes, wetlands, and estuaries. Dredged material containment facilities currently in use in the United States are nearing or are already full to capacity with material. Identifying new containment sites poses difficulties due to conflicting land uses, potential environmental impacts, and the high value of near-water real estate.

Due to growing scientific knowledge and public awareness of using dredged material as a valuable resource for wetland restoration and renourishment, beneficial use of dredged material has become a viable option to traditional "dredge and contain" methods for waterway maintenance projects. Marsh restoration projects that utilize beneficial use of dredge material can mimic natural geomorphic and hydrologic processes that have been altered or completely terminated. For instance, rivers and waterways that have been leveed to provide dependable venues for shipping traffic and

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the project work best for marsh restoration deserves much credit and attention,” said DU regional biologist Greg Green. “At a time when corporations can be considered to have little environmental stewardship, it is encouraging for Golden Pass to participate in the project in this way of their own volition.”

Large-scale restoration of coastal marshes requires significant investment from local, state and federal agencies; non-profit organizations; and private citizens. There are many methods for marsh restoration and habitat conservation, but beneficial use projects are one of the few that can create habitat in a cost-effective way. In some situations, beneficial use projects can cost less than traditional dredge placement projects due to a reduction or elimination of disposal fees imposed by the owner of a contained placement site.

“We need more beneficial use projects along the Gulf Coast,” DU regional biologist Greg Green said. “Large-scale restoration is the only option if we are going to ensure the legacy of this region as important waterfowl wintering habitat.”

“Jefferson County wholeheartedly supports marsh restoration and is actively pursuing opportunities to promote more of these types of projects for our area,” Jefferson County Judge Elect Jeff Branick said. “Coastal marshes protect coastal communities and are vital to preserving the recreational heritage of our area.”



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What is Beneficial Use of Dredge Material?

commerce have been altered in such a way that natural flood events cannot replenish adjacent marshes with nutrient-rich, sediment-laden flood waters. Beneficially using dredge material created from river maintenance projects can provide a means of sustaining marsh values in some areas. Open disposal of dredge material is highly unfavorable within the conservation community, and can be considered a complete waste of a valuable resource.

The placement of dredged material is managed and conducted by federal, state and local governments; private entities; and semi-private entities, such as port authorities. The U.S. Army Corps of Engineers issues permits for the placement of dredged material, while the role of the U.S. Environmental Protection Agency is to provide over-

sight in the permitting process. Beneficial uses of dredged material may make traditional placement of dredged material unnecessary or at least reduce the level of placement. Economic, social and other benefits can result from the productive use of dredged material. However, monitoring of the restoration sites is critical for achieving success.

Wetland restoration using dredged material can be accomplished in several ways, but is dependent upon the characteristics of the material being used. For example, silty, fine dredge material can be applied in thin layers to bring degraded wetlands up to an intertidal elevation, as has been done extensively in south Louisiana. Sandy, heavy, sediment-laden dredge material can be de-watered and used

in wind and wave barriers to allow native vegetation to re-grow and restore the viability of a wetland. Dredged material sediment can be used to stabilize eroding natural wetland shorelines or to nourish subsiding wetlands. De-watered dredged material can also be used to construct erosion barriers and other structures that aid in restoring a degraded or impacted wetland.

Dredged material has been extensively used to restore and establish wetlands. Where proper sites can be located and government and private agency cooperation can be coordinated, wetlands restoration is a relatively well-established and technically feasible use of dredged material.

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It's People Over Arundo...

Time and continued surveillance of the project areas will be the best test of success for PULL KILL PLANT. Partnerships with the U.S. Geological Survey (USGS), USFWS and NRA's Clean Rivers Program are important going forward to study and measure the results over the next several years. From a 2010 demonstration treatment area near Montell, the USGS flow gage may already be telling the story by showing a return to pre-arundo flow patterns with flatter, less dramatic diurnal fluxuations. Through this flow rate data and visible observations, it has been conjectured that arundo could have been responsible for a loss of about 5,000 acre feet of flow in Nueces headwater streams, much of it over the Edwards Recharge Zone, in 2010. It will be important to continue to monitor flow and water quality data in years ahead, especially when drought conditions have passed.

After the first summer of PULL KILL PLANT, it's clear that people are the essential ingredient, and engaging and educating them is critical to long-term success and control of arundo or any other invasive plant. In addition to the agency partnerships, foundations and individuals came through with needed funds for the education and outreach efforts. These include the Tim and Karen Hixon Foundation, Jacob and Terese Hershey Foundation and the Sarah Friend Family.

"Despite the misery from this hottest and driest of summers, the field experience has been enriching for all who participated. The student interns who helped implement the program grew and gained in ways that are hard to quantify," reflects Sky Jones-Lewey. "The landowners were empowered with knowledge and understanding. The farm laborer contractors who helped us pull sprouts set the pace for this tough physical work. We all joined in on their songs. It was a rich experience for all involved – and we made a huge dent in arundo in the Nueces basin. Yes, PULL KILL PLANT is about the people, but it will take continuing funding to ensure successful control and riparian restoration on the Nueces and Sabinal rivers."

For more information, visit www.pullkillplant.com

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