

A CONSERVATION SUCCESS STORY

The Guadalupe Bass Restoration Initiative (GBRI) is a conservation success story that has resulted from nearly three decades of extraordinary efforts by a passionate and committed network of public and private partners. Guadalupe Bass are endemic to the clear, spring-fed rivers of the Texas Hill Country, where populations are threatened by habitat alteration and hybridization with non-native Smallmouth Bass. These threats are enormously challenging to address, but recent conservation successes for Guadalupe Bass in the Blanco, South Llano, and San Antonio rivers demonstrate what can be achieved when partners rally around a shared conservation vision.

The story begins in 1934, the first year that Smallmouth Bass are known to have been brought into Texas. With 30,000 Smallmouth Bass fry (newly hatched fish) provided by the Arkansas Game and Fish Commission, the Texas Game and Fish Commission attempted to establish a Smallmouth Bass production program at the Tyler and Dundee State Fish Hatcheries. Water in the hatchery ponds proved too warm, and the brood stock couldn't survive the Texas summers. That program was abandoned in 1937, and the remaining Smallmouth Bass were stocked in Caddo Lake and Tyler Post Office Lake. Efforts to establish Smallmouth Bass fisheries in Texas laid dormant until summer 1958, when Texas Game and Fish Commission biologists stocked 6,500 two-inch Smallmouth Bass fingerlings in the South Llano River from Telegraph downstream to Junction. Those fish were supplied by the Tishomingo National Fish Hatchery in Oklahoma. The stocking effort was profiled in the July 1958 issue of Texas Game and Fish in an article titled "Smallmouth Bass, Visitors to Texas, Give Spirited Fight on the End of a Line." Authored by two Texas Game and Fish Commission aquatic biologists, the article references historic difficulties establishing Smallmouth Bass fisheries in Texas, but then poses the question, "Now you ask, why try again?" In response, the biologists share that "Smallmouth is a good fishing game fish which will add greatly to the sport of catching fish. Second, there is adequate desirable food in the Llano River to support this additional species. Finally, the Llano River is one of the most suitable, if not the

most suitable stream in Texas for Smallmouth." The article goes on to discuss concerns with high summer water temperatures in the South Llano River but theorizes that deep pools and areas of the river adjacent to springs will offer thermal refuge for Smallmouth Bass.

The experimental introduction of Smallmouth Bass to the South Llano River continued thru 1960 and proved unsuccessful in establishing a Smallmouth Bass fishery. Meanwhile, the stockings resulted in an unforeseen and unintended consequence of creating a hybrid population of Guadalupe Bass and Smallmouth Bass. This hybridization went unnoticed in the South Llano River until similar situations resulted from stocking of Smallmouth Bass in other Hill Country rivers. Between 1974 and 1980, Smallmouth Bass were stocked in the Blanco, Guadalupe, Medina, and San Gabriel rivers, and in Cibolo and Onion creeks.

Once hybridization was detected and threats to Guadalupe Bass were recognized, the Department ceased efforts to establish Smallmouth Bass fisheries in Hill Country rivers and instead began to devise a strategy to prevent the local extirpation and possible extinction of Guadalupe Bass. Initial conservation efforts included establishment of a refuge population of genetically-pure Guadalupe Bass in the Sabinal River in 1988. In 1992, TPWD initiated a Guadalupe Bass hatchery program that has since produced and stocked 2,355,807 Guadalupe Bass in Hill Country rivers. The Department has also partnered with local landowners, non-governmental organizations, fishing clubs, river authorities, and other partners to restore and preserve habitat conditions for Guadalupe Bass in rivers throughout the Hill Country.

In 2010, TPWD focused its attention on the South Llano River and the hybrid population that resulted from those historic Smallmouth Bass stockings that occurred from 1958 to 1960. In partnership with the Llano River Watershed Alliance, the Texas Tech University Llano

River Field Station, areas landowners, and an extensive list of other local project partners, a plan was hatched to restore Guadalupe Bass to the South Llano River. Between spring 2011 and spring 2017, more than 700,000 genetically-pure Guadalupe Bass were stocked in the South Llano River. Today, less than 2% of the Guadalupe Bass population now consists of hybrids. In addition to the South Llano River stocking program, project partners organized river conservation workshops attended by approximately 750 landowners and local community partners in the watershed. Over 78,000 acres of ranchlands implemented stewardship practices to help preserve fish habitats. Restoration projects in the watershed restored 7,754 acres of spring, stream and riparian habitats, directly benefiting water quality and habitat conditions for Guadalupe Bass. These and other conservation efforts in the South Llano River watershed successfully restored Guadalupe Bass populations and helped promote local stewardship practices that will ensure the river is able to sustain Guadalupe Bass populations into the future.

TPWD and partners have since replicated this successful conservation approach in other rivers and watersheds of the Hill Country. TPWD is currently collaborating with an extensive network of conservation partners to preserve intact populations of Guadalupe Bass in Brushy and Gorman creeks and the Pedernales and lower Colorado rivers. Guadalupe Bass were also recently restored to the Blanco River and Mission Reach of the San Antonio River. Efforts to restore Guadalupe Bass to the namesake Guadalupe River are ongoing, along with efforts to assess the status of Guadalupe Bass in the San Gabriel River. Future directions include assessing the status of native Guadalupe Bass populations in Cibolo Creek and the upper San Antonio and Medina rivers and assessing the status of refuge populations of Guadalupe Bass in the Nueces, Frio, and Sabinal rivers.

GBRI CONSERVATION OUTCOMES

In 1991, TPWD assembled *Guidelines for the Management of Guadalupe Bass*, which represented the initial range-wide conservation plan for the species and served to launch the GBRI. An updated, range-wide conservation plan was assembled in 2017. From 1991-2019, an extensive list of conservation outcomes were achieved through the GBRI, including:

- Partnered with the Southeast Aquatic Resources Partnership, National Fish and Wildlife Foundation, other state fish and wildlife agencies, angler organizations, and university researchers to establish the Native Black Bass Initiative, a \$30M conservation campaign (2010-2019) to restore endemic basses, including Guadalupe Bass, in rivers of the southern USA
- With support from the Native Black Bass Initiative, partners implemented watershed-scale conservation to restore and preserve habitats for Guadalupe Bass in the Llano, Pedernales, and Blanco river watersheds
- Repatriated Guadalupe Bass to the upper reaches of the Blanco River following removal of Smallmouth Bass and hybrids
- Repatriated Guadalupe Bass to the Mission Reach of the San Antonio River
- Achieved genetic restoration of the South Llano River Guadalupe Bass population
- Established refuge populations of genetically pure Guadalupe Bass in the Sabinal River and other areas of the Nueces River basin
- Stocked Guadalupe Bass in the namesake Guadalupe River to prevent extirpation due to hybridization with Smallmouth Bass
- Conducted applied research to refine conservation strategies for Guadalupe Bass, including studies that examined the extent of hybridization with Smallmouth Bass throughout the Hill Country; flowrecruitment relationships; landscape-scale habitat associations; movement; population dynamics; population status in priority rivers; and economic value of Guadalupe Bass fisheries



THE PLAN AHEAD

In 2017, TPWD assembled *Guadalupe Bass Conservation Plan: A Ten-Year Plan for Restoring and Preserving the State Fish of Texas (2017-2026)*, which serves as the current,
range-wide conservation plan for the species
and as the strategic plan for the GBRI.
Objectives outlined in the updated plan
consist of the following:

- 1. Maintain seven to 10 self-sustaining Guadalupe Bass populations as defined by the following criteria:
 - A. Hybridization rate between Guadalupe Bass and Smallmouth Bass remains less than 1%
 - B. The proportion of the genome attributable to Smallmouth Bass remains less than 10%
 - C. Pure Smallmouth Bass are absent in the sub-basin or within the stream reach with barriers to movement of Smallmouth Bass into the reach
 - D. Natural recruitment is adequate to maintain a population size that supports recreational fishing opportunities (population-specific as determined by monitoring efforts)
- 2. Restore native Guadalupe Bass populations to the extent that listing as a Species of Greatest Conservation Need is no longer warranted



Furthermore, the updated range-wide conservation plan identifies specific actions to protect non-hybrid populations, restore hybrid populations, and preserve and enhance angling opportunities. The plan also identifies supporting implementation strategies, including partnership development, public outreach, research, invasive species management, habitat restoration and preservation, and landowner technical

guidance on watershed best management practices.

The purpose of this annual report is to share updates on the status of the GBRI and summarize progress and next steps in implementation of strategies and actions identified in the range-wide conservation plan. Accomplishments of the GBRI during state fiscal year (FY) 2019 (September 1, 2018 – August 31, 2019) are summarized herein.



GBRI ACCOMPLISHMENTS IN 2019

Outreach and Education - The GBRI was featured in numerous presentations, podcast interviews, blogs, newsletters, and popular articles, including the following:

- July 2019 Season 1, Episode 7 of the <u>Under the Texas Sky Podcast</u> featured an interview with TPWD biologist Tim Birdsong who profiled efforts by TPWD and partners to conserve Guadalupe Bass
- July 2019 Tim Birdsong gave a presentation titled "Black Bass Diversity in Rivers of the Southern USA: Conservation and Angling Opportunities" at Living Waters Fly Fishing in Round Rock
- July 2019 TPWD distributed a media release titled "<u>Large Numbers</u>
 of <u>Juvenile Bass Indicate Llano River Recovering from Historic Flood</u>
 Event"
 - The media release was adapted into an article published by <u>The</u>
 <u>Daily Trib</u>
- May 2019 Tim Birdsong gave presentations to the New Braunfels Fly Fishers and Sun City Fly Fishers titled "Guadalupe Bass Restoration Initiative"
- April 2019 Episode 33 of The Fisheries Podcast featured an interview with Tim Birdsong and fly fishing guide Chris Johnson on efforts to conserve Guadalupe Bass
- April 2019 Bassmaster Magazine published an article titled "Guadalupe Bass Recovery"
- April 2019 TPWD distributed a media release that discussed <u>post-flood recovery of the Llano River Guadalupe Bass population</u>
 - ► The media release was adapted for articles published by <u>We Are</u>
 <u>Texas Hill Country</u> and the <u>Austin American Statesman</u>
- March 2019 In cooperation with the Texas Council of Fly Fishers
 International, San Gabriel Fly Fishers, Bass Pro Shops, and Living
 Waters Fly Fishing, TPWD launched the GBRI San Gabriel River Prize
 Giveaway

- ▶ TPWD fisheries technician and avid fly angler Austin Orr announced the prize giveaway program and shared angling techniques for Guadalupe Bass through a <u>live video on the TPWD</u> <u>Facebook page</u>
- Related articles were published by <u>Community Impact Newspaper</u>, <u>Wide Open Spaces</u>, and <u>Lone Star Outdoor News</u>
- February 2019 Tim Birdsong gave a presentation to the Central Texas Fly Fishers titled "Progress in Restoration of the State Fish of Texas Throughout its Native Range"
- January 2019 TPWD biologists Marcos De Jesus and Patrick Ireland gave a presentation titled "Guadalupe Bass Restoration on Brushy Creek" at Living Waters Fly Fishing in Round Rock
- January 2019 TPWD distributed a media release that announced new river fishing access opportunities for Guadalupe Bass on the Llano River
- January 2019 TPWD biologists Stephan Magnelia and Ryan McGillicuddy gave a presentation to the Guadalupe County Master Naturalists profiling efforts to repatriate Guadalupe Bass to the Blanco River
- January 2019 Ryan McGillicuddy gave a presentation titled "Restoring the State Fish of Texas, Guadalupe Bass Micropterus treculii" at the Annual Meeting of the Southern Division of the American Fisheries Society
- November 2018 TPWD distributed a media release that addressed angler concerns about the <u>status of Guadalupe Bass following</u> <u>historic flooding of the Llano River</u>
- October 2018 Tim Birdsong profiled conservation milestones achieved through the GBRI at site visits hosted for the staff and board of the <u>National Fish Habitat Partnership</u> and coordinators of the 20 regional Fish Habitat Partnerships
 - ▶ The National Fish Habitat Partnership continues to be a major source of funding for the GBRI, supporting Guadalupe Bass habitat restoration projects on the Blanco, Llano, and Pedernales rivers

Conservation Outcomes - A litany of conservation actions were implemented in 2019 to conserve Guadalupe Bass populations and enhance Guadalupe Bass fisheries, including fish stocking, research, monitoring, habitat restoration, habitat preservation, and angler access improvements. Those efforts are summarized below for each of the rivers identified by TPWD as a priority area for conservation or restoration of Guadalupe Bass.

Llano River

- TPWD biologist John Botros cooperated with the Llano River
 Watershed Alliance to arrange a landowner workshop to promote the
 River Access and Conservation Areas Program, and subsequently
 negotiated the establishment of four new public river access areas on
 the Llano River through access agreements with cooperating private
 riparian landowners
- TPWD biologists John Botros and Ryan McGillicuddy cooperated with the Llano River Watershed Alliance and Texas Council of Fly Fishers International to organize a volunteer work day used to perform recreational access improvements and riparian habitat restoration at a public river access area on the Llano River near Castell
- TPWD biologists Ryan McGillicuddy and John Botros cooperated with the Llano River Watershed Alliance to conduct a post-flood assessment of river conditions along 240 km of the Llano and South Llano rivers
 - Surveys documented bank erosion, damage to riparian habitats, and potential hazards to navigation posed by flood debris, and monitored post-flood recovery of the fish community, including Guadalupe Bass

Pedernales River

• TPWD staff (Karim Aziz, Stephen Curtis, Kristen Eggers, Angela England, Archis Grubh, and Ryan McGillicuddy) continued to collaborate with the Hill Country Alliance and cooperating landowners to restore riparian habitats in the Pedernales River watershed, with an emphasis on control of invasive river cane

Lower Colorado River

- TPWD staff and volunteers (Micah Birdsong, Noah Birdsong, Tim Birdsong, John Botros, Alana Hoffman, Noah Hoffman, Kevin Kolodziejcyk, and Stephan Magnelia) cooperated with All Water Guides to conduct the 2nd Annual LoCo Trash Bash
 - Supported by hundreds of volunteers, the event removed over 8,000 kg of trash and raised public awareness of the ecological and recreational value of the lower Colorado River, which boasts the current state record Guadalupe Bass



Guadalupe River

- TPWD research biologists Paul Fleming and Nate Smith published a study in the American Fisheries Society book, *Managing Centrarchid Fisheries in Rivers and Streams*
 - ▶ Titled "Spatial distribution and hybridization levels in Guadalupe Bass five years after remedial stocking," the study found hybridization levels were reduced in headwaters reaches of the Guadalupe River and tributaries relative to downstream reaches
- Paul Fleming and Nate Smith completed a Guadalupe Bass and Largemouth Bass mark/recapture study in the Guadalupe River headwaters, which examined bass abundance, density, and the effects of instream barriers on Guadalupe Bass movement
 - ➤ Final density estimates of Guadalupe Bass (>100 mm) ranged from 52 to 127 fish per river km among the four major study reaches; Largemouth Bass (>100 mm) densities ranged from 99 to 202 fish per river km
 - Analysis of movement data from recaptured fish indicated limited movement of either species; of 861 fish that were tagged and subsequently recaptured, only about 5.5% crossed an instream barrier moving either upstream or downstream (roughly half in each direction)
 - A pilot project has since been initiated to evaluate targeted stocking of genetically pure advanced fingerling size (>100 mm) Guadalupe Bass in stream reaches with historically high hybridization levels; these advanced fingerlings will be stocked at densities similar to those identified in the study; targeted removal of hybrid fish will occur concurrent with stocking efforts
- TPWD biologist Travis Tidwell continued to collaborate with The Meadows Center for Water and the Environment, Siglo Group, and local stakeholders to assemble a basin-wide assessment of needs and priorities for conserving Species of Greatest Conservation Need
- Jessica Graham and Kat Hoenke (Southeast Aquatic Resources Partnership) and Kimberly Meitzen (Texas State University)

continued to develop an inventory of instream barriers to aquatic organism passage in the upper Guadalupe River basin upstream of Canyon Reservoir; a digital inventory of dams and road crossings has been created for the full study area; field surveys are being conducted to measure potential aquatic organism passage across road-related barriers (e.g., bridges, low-water crossings, culverts) with a focus on the North Fork, South Fork, Johnson Creek, Bear Creek, and Honey Creek

- A total of 39 road crossings have been surveyed, and of these, 10 pose no barrier, 14 are minor, 8 are moderate, 1 is significant, 2 are severe, and 4 represent upstream crossings with no flow in the channel
- This project will provide information on potential barriers to fish movement for TPWD biologists working in the upper tributaries of the mainstem Guadalupe River, and can help prioritize road crossings that could be better designed to benefit aquatic organism passage while also improving the hydrologic functions necessary for supporting resilient aquatic communities and stream ecosystems
- TPWD biologist Angela England and fisheries technician Kristen Eggers continued to collaborate with the Upper Guadalupe River Authority to implement landscape-scale restoration of riparian habitats, with an emphasis on control of invasive river cane

Medina River

 TPWD biologist Angela England and fisheries technician Kristen Eggers continued to collaborate with the Bandera County River Authority and Groundwater District to implement landscape-scale restoration of riparian habitats, with an emphasis on control of invasive river cane

San Antonio River

- TPWD biologist Gordon Linam continued to collaborate with the San Antonio River Authority to monitor the recently reestablished population of Guadalupe Bass in the Mission Reach of the San Antonio River
 - Routine monitoring continued to indicate that Guadalupe Bass have become well-established in the Mission Reach, with possible range extensions detected downstream and into tributaries (awaiting results of genetic analysis)
 - ▶ The Mission Reach is now a popular fishing location, with Guadalupe Bass comprising a regular component of the creel
 - Building upon the successful reintroduction of Guadalupe Bass, the San Antonio River Authority recently requested cooperation

from TPWD in reintroduction of other native fishes to the Mission Reach including Spotted Gar, Gray Redhorse, Blacktail Shiner, and Texas Logperch

Brushy Creek

- TPWD fisheries management biologist Patrick Ireland conducted a roving creel survey that documented high angler utilization of a 160-km reach of Brushy Creek (i.e., 20,958 angler hours during fall 2018 and spring 2019 combined)
- New fisheries management regulations have since been proposed to the TPW Commission that would prohibit cast netting in Brushy Creek, in part to protect forage for Guadalupe Bass and prevent illegal harvest



San Gabriel River

- TPWD partnered with the San Gabriel Fly Fishers, Bass Pro Shops, Living Waters Fly Fishing, and the Texas Council of Fly Fishers International on the <u>GBRI San Gabriel River Prize Giveaway</u>, which celebrated 10-year conservation milestones achieved for Guadalupe Bass through the multi-state Native Black Bass Initiative
- TPWD staff (Alana Hoffman, Kevin Kolodziejcyk, and Stephan Magnelia) completed surveys and genetic assessments to fill data gaps on the status and distribution of Guadalupe Bass in headwaters reaches of the San Gabriel River and tributaries (results are not yet available); results from FY2018 sampling indicated that the downstream reaches of the San Gabriel River represent a natural zone of hybridization between Guadalupe Bass and Spotted Bass (and a transition zone from the range of Spotted Bass in the eastern portion of the state and the range of Guadalupe Bass in the Hill Country)

Blanco River

- Surveys were conducted by TPWD staff (Alana Hoffman, Patrick Ireland, Kevin Kolodziejcyk, Gordon Linam, Stephan Magnelia, Ryan McGillicuddy, and Joedy Yglesias) in the Blanco River and tributaries to monitor the status of the recently-reintroduced Guadalupe Bass population
- TPWD staff (Kristen Eggers, Angela England, and Ryan McGillicuddy)
 continued to cooperate with The Nature Conservancy and cooperators
 landowners to restore riparian habitats throughout the Blanco River
 watershed, with an emphasis on control of invasive river cane
- In cooperation with the Hill Country Alliance, TPWD biologist Ryan McGillicuddy facilitated establishment of the Friends of the Little Blanco, an informal network of landowners interested in conservation and sharing of information related to stream and riparian best management practices
- Stephan Magnelia and co-authors published a manuscript in the American Fisheries Society book, *Managing Centrarchid Fisheries in Rivers and Streams*; the manuscript is titled "Restoration of Guadalupe"

Bass (*Micropterus treculii*) in the Blanco River, Texas: a case study in the opportunistic use of drought as a fisheries management tool"

Gorman Creek

 TPWD biologist Angela England and fisheries technician Kristen Eggers continued to collaborate with the Colorado Bend State Park to restore riparian habitats along Gorman Creek, which hosts a genetically-pure population of Guadalupe Bass



Frio River

- In cooperation with the Texas Water Development Board and Texas A&M Forest Service, TPWD biologists Sarah Robertson, Melissa Parker, and Tom Heger led a biology and geomorphic study and stakeholder process focused on a 26-mile reach of the Frio River from Leakey to Concan
 - Study results identified linkages between localized instream habitat alteration (e.g., dredging), declines in habitat diversity and quality, and loss of aquatic species richness and diversity
 - Study results are now being used to inform TPWD's regulatory permitting of instream habitat disturbances in the Frio River and other rivers throughout the Hill Country

Nueces River

 TPWD biologists Melissa Parker and Tom Heger continued to collaborate with the Nueces River Authority to implement landscapescale restoration of instream and riparian habitats, with an emphasis on control of invasive river cane and promotion of best management practices in design, construction, and maintenance of stream crossings

Upper Colorado River, Sabinal River, and Lampasas River

No activities to report

Range-Wide Habitat Restoration

- The TPWD <u>Landowner Incentive Program</u> continued to prioritize the range of Guadalupe Bass for investments in watershed restoration, with an emphasis on restoration of streams, riparian habitats, and grasslands
 - ▶ Five new habitat restoration projects were supported within the range of Guadalupe Bass in FY2019, with four new projects in the Llano River watershed and one in the Blanco River watershed
- TPWD continued to collaborate with the Hill Country Conservancy,
 Llano River Watershed Alliance, Hill Country Alliance, and numerous other local conservation organizations to implement the Hill Country

Headwaters Conservation Initiative (HCHCI), which is focused on enhancing water and wildlife resources within priority watersheds of the Hill Country, including the Blanco, Llano, and Pedernales rivers and Onion Creek

 During FY2019, the HCHCI supported nine habitat restoration projects expected to restore 10,810 acres within GBRI priority watersheds

Range-Wide Habitat Preservation

- The <u>Texas Farm and Ranch Lands Conservation Program</u> continued to invest significantly in the preservation of fish and wildlife habitats throughout the Texas Hill Country (and statewide)
 - During FY2018-FY2019, the Program awarded grants to cooperating land trusts as cost-share funding to establish conservation easements on 16,009 acres statewide, which included the preservation of 3,254 acres within GBRI priority watersheds
 - In late FY2019, the Program announced eight new projects totaling 3,361 acres would be supported in FY2020-FY2021, which included 2,468 acres to be preserved within GBRI priority watersheds

Technical Guidance on Watershed Best Management Practices

- Led by TPWD biologists Melissa Parker, Ryan McGillicuddy, and John Botros, 16 workshops were organized and instructed by TPWD and partners within the Hill Country to inform landowners and communities of strategies, tools, and resources available to support conservation of Hill Country rivers and associated fish and wildlife habitats
 - These workshops contributed to development of many of the project-based outcomes referenced previously and to the development of other habitat restoration projects currently in the planning stages



THANK YOU TO OUR COOPERATORS

All Water Guides

Bandera County River Authority and Groundwater District

Bass Pro Shops

City of Fredericksburg

Favrot Fund

Hill Country Alliance

Hill Country Conservancy

Living Waters Fly Fishing

Llano River Watershed Alliance

Lower Colorado River Authority

National Fish and Wildlife Foundation

National Fish Habitat Partnership

Nueces River Authority

San Antonio River Authority

San Gabriel Fly Fishers

Siglo Group

Southeast Aquatic Resources Partnership

Texas A&M Forest Service

Texas Council of Fly Fishers International (and member clubs)

Texas Master Naturalists

Texas Parks and Wildlife Foundation

Texas State University

Texas Tech University Llano River Field Station

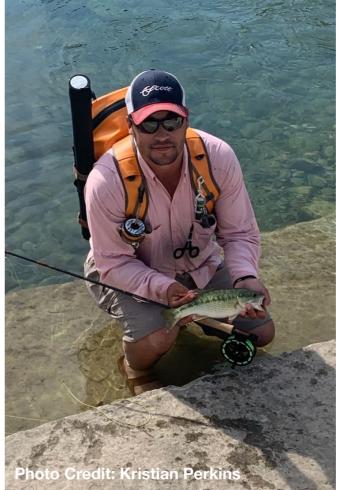
Texas Water Development Board

The Meadows Center for Water and the Environment at Texas State University

The Nature Conservancy

U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program Upper Guadalupe River Authority

And especially the numerous Texas Hill Country landowners and anglers whose support and cooperation makes the GBRI possible!





Guadalupe Bass caught by anglers who participated in the GBRI San Gabriel River Prize Giveaway, supported by Bass Pro Shops, San Gabriel Fly Fishers, Texas Council of Fly Fishers International, and Living Waters Fly Fishing



