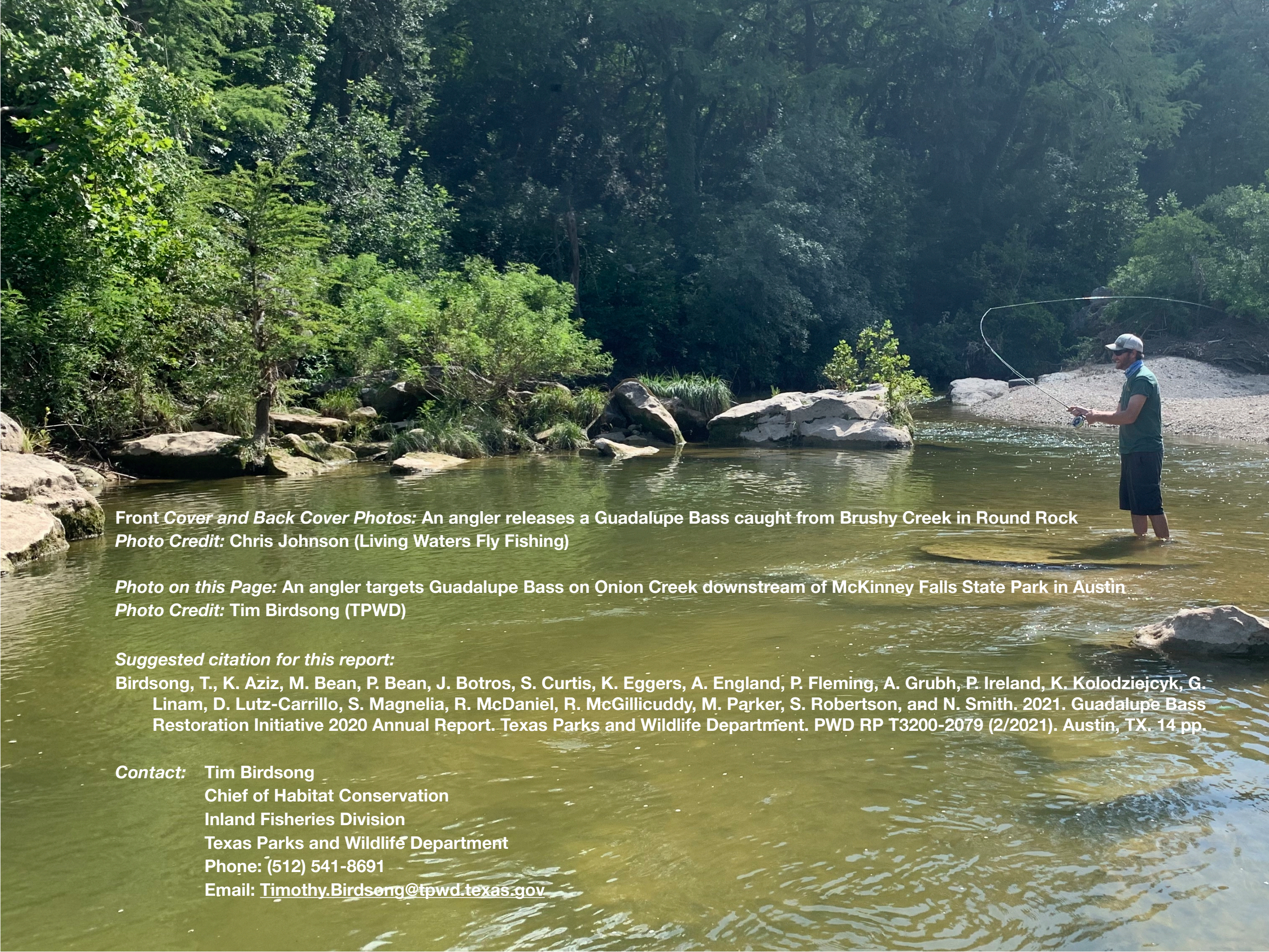




2020 ANNUAL REPORT

GUADALUPE BASSES

RESTORATION INITIATIVE

A man in a green shirt and dark shorts is standing in a river, casting a fly fishing line. The river is surrounded by a dense forest of green trees and bushes. Large rocks are visible in the water and along the banks. The water is a murky green color.

Front Cover and Back Cover Photos: An angler releases a Guadalupe Bass caught from Brushy Creek in Round Rock
Photo Credit: Chris Johnson (Living Waters Fly Fishing)

Photo on this Page: An angler targets Guadalupe Bass on Onion Creek downstream of McKinney Falls State Park in Austin
Photo Credit: Tim Birdsong (TPWD)

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Contact: Tim Birdsong
Chief of Habitat Conservation
Inland Fisheries Division
Texas Parks and Wildlife Department
Phone: (512) 541-8691
Email: Timothy.Birdsong@tpwd.texas.gov



Photo Caption: Llano River near Kingsland

CONSERVING THE STATE FISH OF TEXAS

Guadalupe Bass *Micropterus treculii* are endemic to rivers of central Texas, where populations are threatened with local extirpation by habitat degradation, flow alteration, and hybridization with non-native Smallmouth Bass *Micropterus dolomieu*. These threats are enormously challenging to address, but since 1991, Texas Parks and Wildlife Department (TPWD) and partners have restored or conserved Guadalupe Bass populations in 14 rivers. This was supported through conservation stocking of over 2.4 million genetically pure Guadalupe Bass, implementation of nearly 50 habitat restoration or preservation projects, and watershed-scale management of riparian invasive plants in eight watersheds.

Although outcomes achieved for Guadalupe Bass represent an incredible conservation success story, threats to the long-term persistence of the species continue to expand. Central Texas is one of the fastest-growing human population centers in the USA. Associated development pressures, changes in watershed land uses, and increased and competing demands for water have the potential to alter rivers, degrade habitats for Guadalupe Bass, and result in local extirpations of the species.

To catch a Guadalupe Bass, the official state fish of Texas, from one of the clear, spring-fed rivers in the heart of the state should be on the bucket list of every Texan. Guided by a range-wide conservation plan, concerted efforts by TPWD and an extensive network of passionate and committed partners continue to ensure that current and future generations of Texas anglers are able to experience this storied fish.

This annual report for the Guadalupe Bass Restoration Initiative (GBRI) profiles ongoing actions taken by TPWD and partners during state fiscal year 2020 (September 1, 2019 - August 31, 2020) to restore and preserve Guadalupe Bass. If you have questions, feedback, or would like to explore ways to get involved or support the GBRI, please do not hesitate to reach out to TPWD at the contact provided.



Photo Credit: Tim Birdsong (TPWD)

Photo Caption: An angler holds a Guadalupe Bass caught from the Llano River near Kingsland

MAJOR ACCOMPLISHMENTS IN 2020

Outreach and Education - Efforts to conserve Guadalupe Bass were featured in numerous presentations, podcast interviews, blogs, newsletters, and popular articles, including the following:

- August 2020 – TPWD biologist Patrick Ireland provided an interview for the article “Why Brushy Creek is an Unsung Gem of Central Texas” published by The Houston Chronicle ([Link](#)).
- July 2020 – TPWD biologists Preston Bean, Paul Fleming, and Nate Smith provided an interview for the article “Saving Guadalupe Bass in the Texas Hill Country” by Steve Ramirez published in the July/August 2020 issue of American Angler.
- February 2020 – TPWD biologist Tim Birdsong gave a presentation titled “Conserving the State Fish of Texas throughout its Native Range: A Case Study in Strategic Opportunism” at the Annual Meeting of the Southern Division of the American Fisheries Society in Little Rock, Arkansas.
- February 2020 – Tim Birdsong gave a presentation at the 2020 Texas Land Conservation Conference titled “Collaboration with Private Riparian Landowners to Conserve Texas Freshwater Fish Diversity,” which profiled efforts to conserve Guadalupe Bass and other native fishes in rivers of the Texas Hill Country.
- February 2020 – TPWD biologists John Botros, Sarah Robertson, and Clint Robertson organized and staffed a TPWD river access exhibit at Troutfest 2020, a fly fishing event hosted by the Guadalupe River Chapter of Trout Unlimited. The exhibit profiled TPWD’s river conservation and angler access initiatives, including the GBRI.
- November 2019 – TPWD technician Kristen Eggers and biologists Angela England, Monica McGarrity, and Patricia Thompson coauthored a presentation at the Annual Meeting of the Texas Society for Ecological Restoration in Galveston titled “Watershed-Scale Approach to Elephant Ear (*Colocasia esculenta*) Control Efforts in the Upper Llano River, Texas.” The presentation profiled efforts

to restore habitats for Guadalupe Bass and other native species in the watershed.

- November 2019 – Tim Birdsong gave a plenary presentation at the Annual Meeting of the Desert Fishes Council in Alpine, Texas that profiled efforts by TPWD and partners to conserve native freshwater fishes statewide, including efforts to restore Guadalupe Bass.
- October 2019 - Nate Smith gave a presentation titled “Abundance and Movement of Guadalupe Bass and Largemouth Bass in Headwater Streams on the Edwards Plateau, Texas” at the Annual Meeting of the American Fisheries Society in Reno, Nevada.
- September 2019 – Tim Birdsong gave a presentation at the Texas State Parks Natural Resources Program Meeting that profiled the GBRI.
- A Kerrville elementary school designed a Guadalupe Bass sticker (see below) to raise money for water bottle refilling stations in their school and to raise awareness of the state fish of Texas, which occur locally in Kerrville within the namesake Guadalupe River.



Photo Caption: Guadalupe Bass sticker designed and sold by an elementary school in Kerrville to raise money for a water bottle refilling station

Photo Credit: Megan Bean (TPWD)

Conservation Outcomes - A litany of conservation actions were implemented in 2020 to conserve Guadalupe Bass populations and enhance Guadalupe Bass fisheries, including 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 for conservation or restoration of Guadalupe Bass.

Llano River

- John Botros, in coordination with the Llano River Watershed Alliance, improved angler access at the following six sites on the Llano River by renewing or establishing new public river access agreements with cooperating private riparian landowners.
 - *South Llano River at County Road 150*: Offers a paddlecraft launch and a quarter-mile of bank fishing access
 - *Llano River at Pete's Pecan Patch*: Offers a paddlecraft launch and 800 feet of bank fishing access and day-use picnicking areas surrounded by a historic pecan orchard
 - *Llano River at Maso-Llan Road*: Offers a paddlecraft launch and 350 feet of bank fishing access and day-use areas
 - *Llano River at Castell Crossing*: Offers a paddlecraft launch and 950 feet of bank fishing access
 - *Llano River at HR Seventh Heaven*: Offers a paddlecraft launch
 - *Llano River at Kingsland Slab*: Offers access to bank and wade fishing and a day-use area
- John Botros and TPWD biologist Ryan McGillicuddy, in cooperation with the Llano River Watershed Alliance, Llano River Region Adventures, Texas Master Naturalists, and the Texas Council of Fly Fishers International, organized a volunteer work day to perform riparian habitat restoration at two river access sites in Mason County. Brush piles, seeding, and geotextile fabric were installed along Comanche Creek in Fort Mason Park. Willow stakes were also planted

at a public river access area on the Llano River at the James River crossing (i.e., Farm to Market Road 2389 bridge crossing).

- Ryan McGillicuddy cooperated with the Llano River Watershed Alliance and TPWD State Parks Division to plan a conservation demonstration site at the South Llano River State Park.
 - The demonstration site will include riparian transplants for bank stabilization, brush and small circular cages to protect vegetation from browsing by ungulates, and brush berms on contour rows to slow overland flow, reduce erosion, and promote water infiltration.
- Angela England and Kristen Eggers led a team of volunteers to survey and manage invasive elephant ear plants along the South Llano River and Llano River to support restoration of riparian and instream habitats.
 - Approximately 53 river miles are currently being managed through this project, which celebrated its 10th anniversary in 2020.
- Angela England and Kristen Eggers continued to collaborate with the South Llano River State Park and Texas Tech University Llano River Field Station to manage infestations of invasive giant reed along the South Llano River.
- In November 2019, Kristen Eggers, Ryan McGillicuddy, and TPWD cartographer Karim Aziz, along with TPWD pilot Bryan Reed, conducted a helicopter survey for giant reed over approximately 160 miles of the North, South, and mainstem Llano rivers. Data are being used to guide and inform habitat restoration efforts.
- Preston Bean continued a study validating the use of otoliths, fin rays, fin spines, and scales for aging Guadalupe Bass using molecular parentage analysis to identify known-age fish stocked in the South Llano River during the genetic restoration project completed in 2018.
- Preston Bean continued annual sampling, including side-scan sonar habitat surveys and fish collections, for the project "Trajectory of Habitat and Fish Assemblages in the Llano River Watershed Following a Large-Scale Flood."

Pedernales River

- Angela England, Kristen Eggers, and Heather Hannusch, in cooperation with the Hill Country Alliance, led surveys for invasive giant reed on over 100 cooperating landowners' properties via the Healthy Creeks Initiative. This initiative celebrated its fifth year of progress to restore riparian habitats in the Pedernales River watershed.
- Karim Aziz, Stephen Curtis, Kristen Eggers, Angela England, Archis Grubh, Kevin Kolodziejcyk, and Ryan McGillicuddy continued to monitor restoration progress on study sites where giant reed control efforts are underway.

Gorman Creek

- Angela England and Kristen Eggers continued to collaborate with the Colorado Bend State Park to manage invasive species and restore riparian habitats along Gorman Creek.

Nueces, Frio, and Sabinal rivers

- TPWD provided cost-share funding to Nueces River Authority's "Pull. Kill. Plant." program to support the management of giant reed along the Nueces, Sabinal, Frio, and Dry Frio rivers. The project is now in its 11th year and extends over 92 river miles, including 72 miles of the Nueces, 8 miles of the Sabinal, and 12.5 miles of the Frio and Dry Frio rivers. Although outside of the native range of Guadalupe Bass, the Nueces, Frio, and Sabinal rivers host genetically pure introduced refuge populations of Guadalupe Bass.

San Antonio River

- TPWD biologist Gordon Linam and TPWD geneticist Dijar Lutz-Carrillo continued to cooperate with the San Antonio River Authority to perform genetic monitoring of Guadalupe Bass in the Mission Reach of the San Antonio River. Efforts to restore Guadalupe Bass to the Mission Reach were launched in 2013 in conjunction with large-scale river restoration efforts led by the San Antonio River Authority.

Medina River

- Angela England and Kristen Eggers continued to collaborate with the Bandera County River Authority and Groundwater District and The Nature Conservancy to restore riparian habitats by controlling invasive giant reed in the upper Medina River watershed. Almost 50 properties are currently being managed. The Medina River hosts a hybrid population of Guadalupe Bass that is considered a priority for restoration. TPWD is exploring possible conservation stockings of Guadalupe Bass in the Medina River in spring 2022.

Brushy Creek

- New fisheries management regulations were enacted by the Texas Parks and Wildlife Commission to prohibit cast netting in Brushy Creek, in part to protect forage for Guadalupe Bass and prevent illegal harvest.

San Gabriel River

- Gordon Linam, Kevin Kolodziejcyk, Stephen Curtis, and TPWD biologist Steve Magnelia collected Guadalupe Bass from the North and South Forks of the San Gabriel River, in the headwaters of the San Gabriel River watershed. The majority of the Guadalupe Bass collected were from the North Fork. Of the 45 fish collected, 75% were determined through genetic analysis to be pure Guadalupe Bass. This is quite different from what was found in earlier collections from the mainstem San Gabriel River east of Georgetown, where most of the fish were Guadalupe Bass x Spotted Bass hybrids. Among the 25% of the fish that were hybrids, Guadalupe Bass x Spotted Bass hybrids were the most prevalent. Only one fish had a high percentage of Smallmouth Bass alleles. Given the high percentage of Guadalupe Bass in at least the North Fork, the headwaters of the San Gabriel River watershed is now considered a priority for investments in habitat restoration and preservation to help conserve this population of Guadalupe Bass.



Photo Caption: TPWD biologists survey fish populations on the Llano River

Guadalupe River

- Angela England and Kristen Eggers continued to collaborate with the Upper Guadalupe River Authority, Kerr County, Water Oriented Recreation District of Comal County, City of New Braunfels, and over 60 cooperating landowners in portions of the upper and middle Guadalupe River watershed to restore riparian habitats by controlling invasive giant reed.
- TPWD biologists Nate Smith and Paul Fleming initiated a new TPWD research project in the upper Guadalupe River to investigate efficiency and efficacy of new stocking strategies for reducing hybridization and introgression with Smallmouth Bass in hybridized Guadalupe Bass populations.
 - Objectives include comparison of stocking standard (50 mm) fingerling vs. larger (100 mm) fingerlings, and an overstocking strategy vs. removal of resident adults.
 - Approximately 19,000 standard fingerling and 3,000 large fingerling Guadalupe Bass were stocked into the Guadalupe River and tributaries upstream of Kerrville in 2020 as part of this research.
 - Over the summer of 2020, TPWD hosted an intern from Tarleton State University who conducted feeding trials to help determine optimal feeding strategies for growing fingerlings from 50 mm to 100 mm most efficiently.
- Guadalupe Bass fin clips collected longitudinally from the Guadalupe River headwaters to the lower reach downstream of Victoria were analyzed to investigate the pattern of hybridization between Guadalupe Bass and Spotted Bass.
 - Preliminary results indicate that pure Spotted Bass were limited to the lower river reaches while pure Guadalupe Bass were mostly limited to sites upstream of Canyon Lake. Hybrids between the two species were found throughout the river indicating that Spotted Bass alleles found in the upper river are likely a result of natural hybridization or incomplete lineage sorting.

- Stephen Curtis continued to collaborate with Jessica Graham and Kat Hoenke (Southeast Aquatic Resources Partnership), and Kimberly Meitzen (Texas State University) to develop an Upper Guadalupe River Prioritization Tool to rank road-related barriers for remediation that would provide the greatest benefit to aquatic organism passage in the Guadalupe River upstream of Canyon Reservoir.
- Ed Mager (University of North Texas) and Preston Bean initiated a project to evaluate swimming performance of Guadalupe Bass and other fishes recognized as Species of Greatest Conservation Need in the Guadalupe River to inform stream crossing design and barrier removal prioritization.

Blanco River

- Steve Magnelia led the most geographically comprehensive Guadalupe Bass genetics sampling event since repatriation efforts were initiated in 2012. This included the mainstem from sites upstream of Blanco State Park to a site near the confluence with the San Marcos River. The Little Blanco River and Lone Man Creek, tributaries where Guadalupe Bass were stocked in 2017 in an attempt to establish genetically pure populations, were also sampled. No Guadalupe Bass were collected from the Little Blanco River or Lone Man Creek, indicating stockings were unsuccessful at establishing populations. On the mainstem, in the repatriation area upstream of the Narrows fish passage barrier, almost all the fish collected were pure Guadalupe Bass. Only a few had a small percentage (<5%) of Smallmouth Bass alleles. In an area directly downstream of the Narrows, previously unsampled and not stocked, 74% of the bass morphologically identified as Guadalupe Bass were genetically pure. Downstream movement from above the Narrows may be responsible for the high percentage of pure Guadalupe Bass collected in this area. Sites downstream from this area continued to have a high percentage of Guadalupe Bass x Smallmouth Bass hybrids.

Blanco River Continued

- In cooperation with the Hill Country Alliance, Ryan McGillicuddy continued to facilitate 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. In partnership with the Meadows Center for Water and the Environment, the friends group is working toward completion of gain-loss and watershed characterization studies for the Little Blanco River.
- Ryan McGillicuddy, Angela England, and Kristen Eggers continued to collaborate with The Nature Conservancy and over 100 cooperating landowners in the Blanco River watershed (year-5) to implement the Healthy Creeks Initiative, an effort to control giant reed and restore riparian habitats.
- Archis Grubh completed field collections and preliminary analyses for a study that will evaluate the effects of catastrophic floods on macroinvertebrates and implications on Guadalupe Bass recruitment. Data were collected from the Blanco and Colorado rivers in late 2015 – mid-2016, and thereafter annually through summer 2020.

Upper Colorado, Lower Colorado, Sabinal, and Lampasas rivers

- No activities to report

Informing and Facilitating Watershed Conservation

- Led by TPWD biologists Melissa Parker, Ryan McGillicuddy, and John Botros, 12 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. Additionally, Ryan McGillicuddy, along with workshop instructors from partner organizations, recorded a series of

instructional videos for use as a distance learning tool during the global pandemic.

- A subset of these workshops in the Sandy Creek and Guadalupe River watersheds consisted of a new and innovative three-part model developed in partnership with the Hill Country Alliance to provide hands-on instruction for riparian restoration methods, including seeding, transplanting, and the use of live stakes. Participants return to the site to learn monitoring strategies and adaptive management techniques.
- In partnership with the Hill Country Alliance, Ryan McGillicuddy assisted with the development of a scientific survey to gauge landowner attitudes and management practices implemented prior to and after these workshops through which to evaluate on-the-ground stewardship outcomes.
- 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.
- Ryan McGillicuddy conducted nine technical guidance site visits with landowners to provide prescriptive management recommendations for the conservation of Hill Country streams, including in the Guadalupe, Blanco, San Marcos, and Medina watersheds.



Photo Collage Caption: TPWD biologists display Guadalupe Bass collected during surveys conducted on the South Llano River and mainstem Llano River

American Fisheries Society Hutton Scholar

- American Fisheries Society Hutton Scholar, Rebekah McDaniel, spent the summer with TPWD's River Studies Program and took on a special project to sample fish communities at TPWD fishing access areas within the native range of Guadalupe Bass. Rebekah used data and photos collected at these sites to develop outreach materials to increase public awareness of the fishing access areas.
- Three fishing access areas on the Llano River and one on the San Marcos River were sampled using seining and backpack electrofishing techniques.
- Adult and juvenile Guadalupe Bass were collected from all access areas except Maso-Llan Road, where only juveniles were identified. Catch-worthy adults were collected from Pete's Pecan Patch (13 inches) and the San Marcos River Retreat (8 inches).
- While Largemouth Bass were collected from some areas, overall, there were more Guadalupe Bass found than any other black bass species. At Maso-Llan Road, Guadalupe Bass were the only species of black bass collected. No Smallmouth Bass were detected at any of the areas sampled; however, genetic analysis was not conducted to evaluate hybridization.
- The presence of multiple year-classes of Guadalupe Bass across areas was encouraging, especially on the Llano River, which experienced a 100-year flood event in 2018, after which anglers reported a decline in catch rates.



Photo Caption (both photos): American Fisheries Society Hutton Scholar, Rebekah McDaniel, participates in fisheries surveys on the San Marcos and Llano rivers

THANK YOU TO OUR COOPERATORS

All Water Guides
American Fisheries Society
Bandera County River Authority and Groundwater District
City of Fredericksburg
City of New Braunfels
Hill Country Alliance
Hill Country Conservancy
Kerr County
Living Waters Fly Fishing
Llano River Region Adventures
Llano River Watershed Alliance
Meadows Center for Water and the Environment
National Fish Habitat Partnership
Nueces River Authority
San Antonio River Authority
Southeast Aquatic Resources Partnership
Tarleton State University
Texas Council of Fly Fishers International *(and member clubs)*
Texas Master Naturalists
Texas Parks and Wildlife Foundation
Texas State University
Texas Streams Coalition
Texas Tech University Llano River Field Station
The Nature Conservancy
University of North Texas
U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program
Upper Guadalupe River Authority
Water Oriented Recreation District of Comal County

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

Photo Caption: A TPWD biologist targets Guadalupe Bass from the South Llano River in support of a research project

Photo Credit: Preston Bean (TPWD)



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