Inland Fisheries
Annual Report
2021

Providing the best possible fishing opportunities
while protecting and enhancing freshwater aquatic resources

TEXAS
PARKS &
WILDLIFE

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Executive Director

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INLAND FISHERIES ANNUAL REPORT 2021

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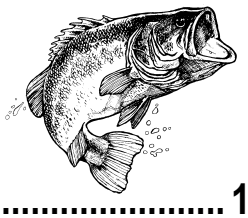
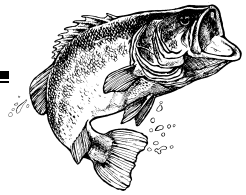
TABLE OF CONTENTS



INLAND FISHERIES OVERVIEW



Mission

To provide the best possible fishing opportunities while protecting and enhancing freshwater aquatic resources.

Scope

The Inland Fisheries Division is responsible for managing the fishery resources in greater than 1,100 public impoundments and about 191,000 miles of rivers and streams together totaling 1.7 million acres. These resources are used by 1.78 million anglers ages 16 and over, whose fishing activities result in at least $1.7 billion in trip and equipment expenditures annually supporting 13,000 Texas jobs.

Agency Goals

Texas Parks and Wildlife Department's Land and Water Resources Conservation and Recreation Plan (2015) established four primary goals to direct the agency's divisions regarding the state's conservation and recreation needs.

- Practice, encourage, and enable science-based stewardship of natural and cultural resources
- Increase access to and participation in the outdoors
- Educate, inform, and engage citizens in the support of conservation and recreation
- Employ efficient, sustainable, and sound business practices

Division Goals

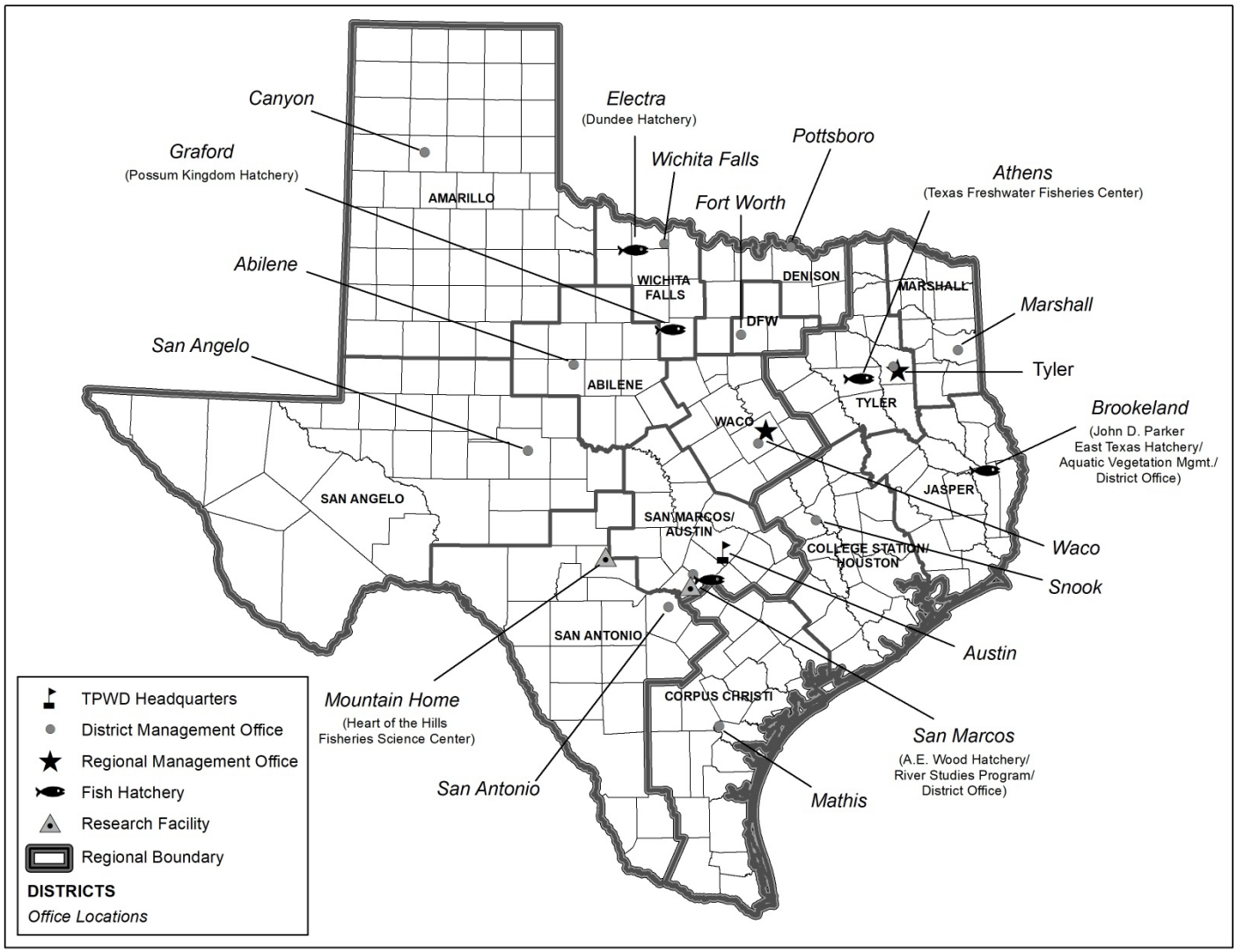
The division goals were developed to address the major issues facing the freshwater fisheries resources of Texas.

- Maintain or restore appropriate conditions to support healthy aquatic ecosystems
- Maintain quality fish communities for recreation and ecological health and value
- Maintain or increase constituent satisfaction, participation, or stewardship
- Employ efficient and sustainable business practices in fisheries management

Staff

Inland Fisheries has 208 positions assigned to management, hatchery, research, outreach, habitat, analytical services, and administrative programs and branches. For details, see Appendix – Organization Charts.

Facilities



Contact Information

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Funding and Allocation

In FY21, $20,286,606 was budgeted for Inland Fisheries (not including fringe benefits or capital construction). Federal Aid grants are expected to reimburse the Department $8,968,086 on eligible Inland Fisheries activities. The allocation of Federal Aid monies was $2,749,046 for Fish Hatchery and Laboratory facilities and $6,219,040 for Management and Research, Habitat, Outreach, and Administrative services.

FY21 Budget by Program

Administration	$1,912,132
Management and Research	$6,148,900
Hatcheries and Laboratory	$5,377,662
Habitat Conservation and Aquatic Invasive Species	$5,382,129
Outreach/Texas Freshwater Fisheries Center	$1,465,783
Total FY20 w/o fringe	**$20,286,606**

WHAT WE DO

Administration

The Administrative function of the Inland Fisheries Division occurs primarily at Texas Parks and Wildlife Department headquarters in Austin. The administrative staff provides critical leadership, management of budgets and grants, and managerial support to field offices that carry out the mission of the division. The Inland Fisheries Division seeks to maximize collaborative efforts among its work groups to accomplish projects and to achieve the larger goals of the division. These efforts, at least in part, are due to the close coordination of a small group of leaders who direct activities of staff in the areas of fisheries management and research, hatcheries, habitat conservation, information and regulations, analytical services, and outreach.

Habitat Conservation

Habitat Conservation Branch biologists perform a stream survey.

Healthy fish populations and quality freshwater fishing opportunities depend upon healthy aquatic habitats in Texas creeks, rivers, and reservoirs. The Inland Fisheries Division's Habitat Conservation Branch cooperates with local, state and federal agencies, private landowners, local communities, river authorities, fishing clubs, watershed alliances, and other nongovernmental organizations to design, plan, and conduct aquatic habitat restoration, enhancement, and protection projects. Examples include restoration and protection of natural river flows by protecting springs or augmenting reservoir dam releases, management of reservoir water levels to maximize the availability of fish spawning and nursery habitats, restoration and protection of riparian buffers along creeks and rivers, cleanup and recovery of habitats negatively affected by oil spills and other pollution, and management of aquatic invasive plants. The Habitat Conservation Branch also monitors the status and trends of the diversity of Texas freshwater fishes, mussels, and other aquatic species, and develops and implements conservation plans to preserve the state's freshwater biodiversity. Another area of emphasis for the branch is improving angler access to bank, wade, and kayak fishing opportunities on Texas rivers through the Texas Paddling Trails Program and the River Access and Conservation Areas Program.

Fisheries Management and Research

Fisheries management biologists and technicians perform a catfish population survey.

The Fisheries Management and Research Branch assesses fish communities, fish habitat, angler access, and angler use of public water resources. Sampling activities performed by this group are guided through scientifically accepted procedures that ensure a high degree of data quality, integrity, and validity for use in analyzing trends and making sound fisheries management decisions. This team develops fisheries management plans for individual water bodies, develops the statewide fish stocking plan, recommends changes to harvest regulations, implements habitat improvement projects, assists with treatment of aquatic invasive species, conducts public outreach, manages our urban fishing programs, and performs research to evaluate and improve fisheries management strategies. Staff members provide assistance and information to the public, fishing-related industries, water-controlling authorities, local governments, angling groups, civic groups, property owners, media, universities, and other natural resource agencies. Work teams are located at two regional offices and 14 district offices statewide.

The Inland Fisheries research program at the Heart of the Hills Fisheries Science Center in Mountain Home provides leadership, support, and coordination for all research activities supported by the division. The program also provides intensive research investigations, literature reviews, statistical analyses, staff training, and science-based position papers that inform decision makers on critical aquatic resource-related issues or problems.

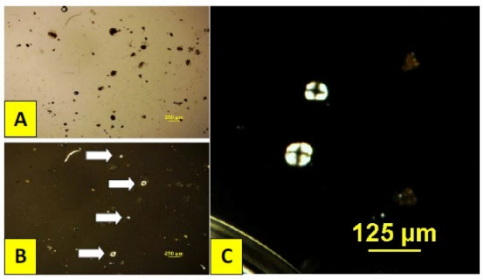
Hatcheries

Hatcheries serve as an important component of Inland Fisheries resource management. Fish stocking is one of several essential tools used to protect, manage and enhance statewide fisheries resources as well as achieve specific fisheries resource objectives. Stocked fish must meet specific requirements including number, size, genetic integrity, disease-free status, and time of stocking. Hatchery-stocked fish are used to start new fish populations, supplement existing fish populations, restore depleted or threatened populations, provide fish in small urban lakes, enhance population genetics and performance, take advantage of improved habitat, and increase angler opportunities and success. Also, hatchery personnel are involved in outreach programs and agency-sponsored fishing events as well as providing educational hatchery tours to the public and students of all ages.

Aerial photo of production ponds at the Dundee State Fish Hatchery.

Analytical Services

Analytical laboratories serve a unique function within Inland Fisheries by providing scientific analyses in water quality, fish pathology, and fish genetics. Analytical Services conducts a variety of analyses in support of divisional, interdivisional, and interagency programs. Analyses are routinely performed in support of ongoing monitoring, routine fish health inspection, disease diagnosis and treatment, program evaluation and focused research conducted by Inland Fisheries.



Microscopic view of zebra mussel veligers.

Information and Regulations

The Information and Regulations Branch works closely with the Fisheries Management and Research Branch to develop fishing regulation change proposals, obtain public input on the changes, and communicate the proposals to the Texas Parks and Wildlife Commission. Staff members also provide administrative support to division staff based in Austin and furnish expertise for division-wide and agency-wide assessments of relevant data. This group coordinates the issue of triploid grass carp permits and handles the freshwater fishing web pages, river access information including Texas Paddling Trails, Angler Recognition, and general information for the public. Staff are located at TPWD headquarters in Austin.

Texas Freshwater Fisheries Center

The Texas Freshwater Fisheries Center (TFFC) in Athens is a multipurpose facility that strives to provide educational experiences representing the breadth of the activities of the Inland Fisheries Division to the public. A main component of TFFC is serving as a working state fish hatchery that produces millions of fish each year to meet the stocking needs of fisheries managers. TFFC also serves as headquarters for the Toyota ShareLunker program and is home to the Texas Freshwater Fishing Hall of Fame. More than 30,000 people typically visit the center annually; at least 14,000 of those are youth aged 12 and under. The visitor center opens to individuals and families six days a week in spring and summer, and five days a week in fall and winter. In addition, TFFC provides high quality, intensive, hands-on outdoor and science educational experiences for K-12 students and educators. Special events are held throughout the year to encourage and enhance constituent participation. These activities result in connections to aquatic resources in Texas, information about Inland Fisheries management and hatchery efforts, and great fishing experiences. Due to the covid-19 pandemic the facility offered limited visitation and public operations through May 3, 2021 and reopened to regular operations on May 4, 2021.

Aerial photo of TFFC's Zebco pond, hatchery raceway building, hatchery ponds, start of the Wetland Trail, and Hart-Morris Conservation Center.

Inland Fisheries Division Strategic Planning and a Look Ahead

The Inland Fisheries Division's history can be traced to establishment of the Texas Office of the Fish Commissioner (1879) and TPWD's predecessor agencies, but the modern-day Inland Fisheries Division was formed in 1963. The Division continues to be recognized as a progressive leader among state fisheries programs in the USA, routinely developing solutions that are science-based, cost-effective, scalable, and transferrable. Throughout its history, the Division has continually adapted, refocused, and retooled its programs to build and maintain the necessary capacity to confront challenges and deliver generational outcomes for freshwater fisheries resources and Texas anglers. Contemporary problems and challenges facing Texas freshwater fisheries consist of:

1. Watershed alteration, stream habitat degradation, and reservoir sedimentation
2. Loss of structural fish habitats in rivers and reservoirs
3. Water management strategies for rivers and reservoirs inconsistent with the habitat requirements necessary for fish populations to thrive
4. Increased and competing demands for water
5. Recurring severe droughts
6. Introduction and spread of aquatic invasive species
7. Human population growth and increased pressure on fisheries resources
8. Changing angler demographics and the need for diverse angling opportunities near human population centers

The Inland Fisheries Division is committed to continue to strive for excellence and innovation, and to continually adapt and refine our strategies, approaches, and techniques to achieve increased efficiencies and effectiveness. Toward these desired outcomes, the Inland Fisheries Division performed an organizational assessment and strategic planning process during 2020–2021 that culminated in selection of Division activities considered priorities for increased programmatic growth and expansion (listed below), as well as priorities for increased internal collaboration among Division programs and teams (also listed below).

Priorities for Increased Programmatic Growth and Expansion:

1. Broaden and diversify our constituency through increased investments in urban fisheries management, engagement of river anglers, shoreline-based access improvements, and implementation of R3 initiatives (i.e., recruitment, retention, and reactivation of anglers)
2. Increase the scope and scale of fish habitat improvements including in-water structural habitat improvements and watershed and riparian best management practices
3. Conserve Species of Greatest Conservation Need
4. Improve fisheries management support functions including Striped Bass and Hybrid Striped Bass production programs, conversion to ShareLunker broodfish for Largemouth Bass production, and production of 12-inch Channel Catfish

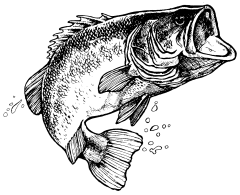
Greatest Opportunities for Increased Collaboration Among Division Programs:

- Angler access (motorboat, paddlecraft, shoreline)
- Fish habitat restoration and enhancement
- Outreach and R3
- River fisheries management
- Native fish conservation

This strategic planning process was also used to identify opportunities for increased efficiencies, effectiveness, and capacity to deliver strategic priorities through realignment of the Division organizational structure. Related changes to the Division organizational structure are expected to be implemented during 2022 and will include repurposing of multiple vacancies, as well as realignment and integration of multiple branches, programs, and teams. These changes are intended to: (1) facilitate a more integrated, holistic, and unified approach to the management and conservation of freshwater fisheries resources, (2) increase capacity to advance Division priorities, (3) enhance efficiencies and effectiveness in delivery of Division programs and services (to benefit internal and external customers), (4) alleviate inequities in managerial and administrative responsibilities among regional and program directors, and (5) clarify roles for the Inland Fisheries Division's senior management team including clarity for Division representation in interactions with TPWD agency and division leaders, external agencies, and stakeholders.

Past successes achieved by the Inland Fisheries Division were realized through constant innovation, continuous improvements, and the desire to maintain relevancy. The Division's senior management team believes that emphasizing and guiding investments toward the strategic priorities listed above will enable the Division to better confront contemporary challenges and opportunities facing Texas freshwater fisheries resources.

KEY ACCOMPLISHMENTS



Monitoring, Management Plans, and Permits

Reservoir Surveys — Staff conducted 312 surveys of fish populations, habitat, vegetation, water quality, angler access, and angler use on 160 reservoirs covering 1,303,433 surface acres of water. These led to the production of 40 comprehensive reservoir fisheries management plans designed to improve freshwater fishing opportunities.

Biologists perform habitat surveys on the Devils River.

River Surveys — Staff conducted 98 surveys to assess the status of fish communities, freshwater mussels, benthic invertebrates, aquatic and riparian habitats, and recreational access in selected rivers throughout the state including mainstem reaches and tributaries of the Blanco, Brazos, Colorado, Concho, Cypress, Devils, Frio, Guadalupe, Llano, Medina, Neches, Nueces, Pedernales, Rio Grande, Sabine, San Saba, Trinity and Wichita rivers. Surveys were used to inform a variety of river recreation and other public access improvements, and conservation projects including riparian invasive species control, riparian vegetation recolonization, water management decisions, fish and freshwater mussel species distribution, aquatic life use assessments, restoration of Guadalupe Bass populations, population monitoring, and other native fish conservation efforts. Focal fish species included Guadalupe Bass, Alligator Gar, American Eel, Devils River Minnow, Gray Redhorse, Channel Catfish, Largemouth Bass, Smallmouth Bass, Smallmouth Buffalo, White Bass, and imperiled West Texas fishes.

Fish Health Investigations — The Analytical Services Laboratory (and collaborating laboratories) investigated 37 fish health cases, analyzing approximately 1,767 fish. A total of 192 water samples were processed for zebra mussel larvae and/or DNA. A total of 167 samples were analyzed for Prymnesium parvum (golden alga) toxicity and presence in public lakes. In addition, the laboratories completed 25 genetics projects with 2,170 samples.

Permits — The division issued 34 permits authorizing private partners to introduce fish into public waters to enhance fishing opportunities and 80 permits for commercial harvest of nongame fishes from public fresh waters.

Introduction permits were also issued for aquatic plant restoration (4) and for relocation of aquatic resources (88) to minimize impacts of projects that temporarily disturbed aquatic habitats.

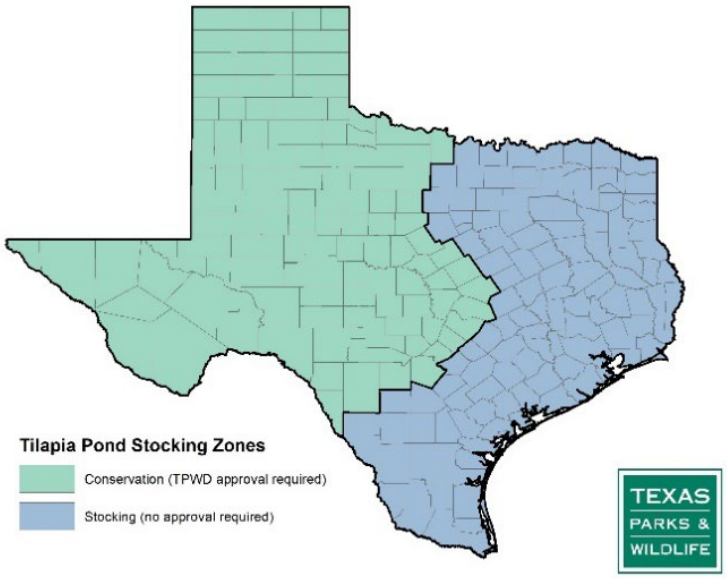
Staff issued 137 permits (including renewals) authorizing possession of prohibited exotic fish, shellfish or aquatic plants for the purpose of:

- Invasive plant management (4)
- Fish/shrimp aquaculture (49)
- Culture of water spinach as a food source (39)
- Research (10)
- Zoological display (12)
- Pond Stocking Sales (22)
- Biological Control Production (1)

2 permits for Broodstock collection were issued. 1 permit authorizing Interstate Transit of an exotic species was issued.

1 application for the renewal of a water spinach permit was denied.

In 2021, a Conservation Zone was identified based on a conservation assessment that weighed potential harmful impacts of tilapia escapes on imperiled native fishes against the economic importance of the tilapia pond stocking trade in Texas. Approval from the department is now required before tilapia can be stocked in a pond located within the Conservation Zone. The department reviewed 82 requests to stock tilapia in private ponds in the Conservation Zone. 46 of those requests were approved.



Applied Management and Conservation Actions

Guadalupe Bass, the official state fish of Texas, caught by an angler on Brushy Creek.

2021 Conservation Award from Fly Fishers International — In 2021, the Inland Fisheries Division received the Conservation Award from Fly Fishers International. This prestigious award is presented in recognition of extraordinary contributions to the conservation of fisheries resources that preserve the legacy of fly fishing. The 2021 Conservation Award was presented in recognition of three decades (1991-2021) of concerted efforts to manage and conserve the official state fish, Guadalupe Bass, in the crystalline streams of the Texas Hill Country. Since 1991, the Inland Fisheries Division and partners have restored or conserved Guadalupe Bass populations in 14 creeks and rivers. This was supported through a litany of conservation actions including 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. Restoration of Guadalupe Bass populations is underway in another six rivers, while status assessments are planned for another eight rivers over the next two years. The Division helps manage 20 public river access areas that offer angling opportunities for Guadalupe Bass, which have served as focal points for engagement of fly fishing clubs, local conservation non-profits, and communities in efforts to restore and preserve the species and its habitats. Although outcomes achieved for Guadalupe Bass represent an incredible conservation success story, continued actions are needed to ensure that current and future generations of Texas anglers can experience this storied fish.

Example of the types of fishing access amenities being supported through the Division's Habitat and Angler Access Program.

Habitat and Angler Access Program — Sold as an endorsement on each freshwater fishing license, the Texas Freshwater Fish Stamp was established by the Texas Legislature in 2003 to generate revenue for the construction and renovation of freshwater fish hatcheries. The Texas Legislature recently expanded eligible uses of this revenue and appropriated $500,000 during 2022–2023 to support shoreline-based angler access improvements and enhance freshwater fish habitats on public creeks, rivers, ponds, and lakes. Referred to as the Inland Fisheries Division's Habitat and Angler Access Program, this new initiative enables cooperation among Inland Fisheries biologists, city and county governments, river authorities, watershed alliances, and angling clubs to make fishing better for all Texans. Through a competitive request for proposals announced during 2021, the Division selected 21 projects to be implemented during 2022–2023. Project components will include installation of aeration systems, fishing piers, floating docks, fishing pads, kayak launches, ADA-compliant fishing access ramps, boardwalks, trails, and parking areas, as well as dredging, bank stabilization, revegetation, and placement of structural fish habitats. To learn more about the projects being supported through this new program, visit: https://tpwd.texas.gov/landwater/water/habitats/habitat-angler-access-program/

Zebra Mussel Monitoring & Prevention — Inland Fisheries and partners continued to intensively monitor water bodies (48) for early detection of zebra mussel infestations or population monitoring, using a combination of shoreline surveys, settlement samplers, plankton sampling, and DNA analysis. At year's end, 28 Texas lakes across six river basins were classified as infested, meaning the lake was determined to have an established, reproducing population. Zebra mussels or their larvae had been found more than once in five other lakes and in rivers downstream of infested waters. As part of efforts to prevent further spread of this highly invasive species, Inland Fisheries continued to partner with the Texas Parks and Wildlife Department Communications Division and external cooperators to implement a targeted Protect the Lakes You Love public awareness outreach campaign encouraging boaters to clean, drain, and dry their boats to prevent the spread of aquatic invasive species.

Aquatic Vegetation Control — Inland Fisheries and partners continued to maintain control of giant salvinia and water hyacinth throughout Texas' reservoirs and river systems. TPWD's Inland Fisheries' integrated pest management (IPM) plan was greatly expanded in late 2015 (FY16) as a result of record funding provided by the State Legislature. The IPM plan included installing floating booms, conducting herbicide treatments, and releasing biocontrol agents as well as employing an effective giant salvinia outreach campaign.

TPWD routinely uses herbicides to rapidly gain control of aquatic invasive vegetation.

In FY21, Inland Fisheries and partners treated 13,362 acres of giant salvinia and 2,067 acres of water hyacinth with herbicides. Since the beginning of FY16, nearly 95,000 acres of giant salvinia and nearly 11,000 acres of water hyacinth have been treated with herbicides by Inland Fisheries and partners.

Floating containment booms were utilized again in FY21 to contain giant salvinia infestation from spreading lake-wide at Houston County Lake and Lake Raven as well as create giant salvinia weevil rearing sites in lakes Raven, Caddo, and Naconiche. These in-lake rearing sites are an important supplement to TPWD's giant salvinia to the rearing greenhouses.

Floating booms contain giant salvinia and other non-native floating plants thereby increasing the efficiency of control efforts and making eradication a possibility.

Additionally, in FY21, Inland Fisheries released approximately 290,000 giant salvinia weevils among lakes Caddo, Naconiche, and Toledo Bend. Since FY16, Inland Fisheries has released approximately 1,880,000 adult, giant salvinia weevils throughout many reservoirs and river systems in east and southeast Texas. Inland Fisheries has documented self-sustaining populations of giant salvinia weevils in many of the stocked water bodies as well as documented survival of giant salvinia weevils through the severe winter weather in February 2021.

Riparian Invasive Species — A variety of projects are underway to manage nonnative, invasive plants that grow along the banks of Texas rivers and streams. When left unchecked, these invaders often crowd out native plants and may alter the aquatic food webs on which native fish depend. Some of the worst offenders can also alter channel geomorphology, reduce stream flow, alter soil chemistry, worsen flooding, increase wildfire risk, and harbor other nonnatives such as feral hogs.

Invasive Arundo crowds out native vegetation.

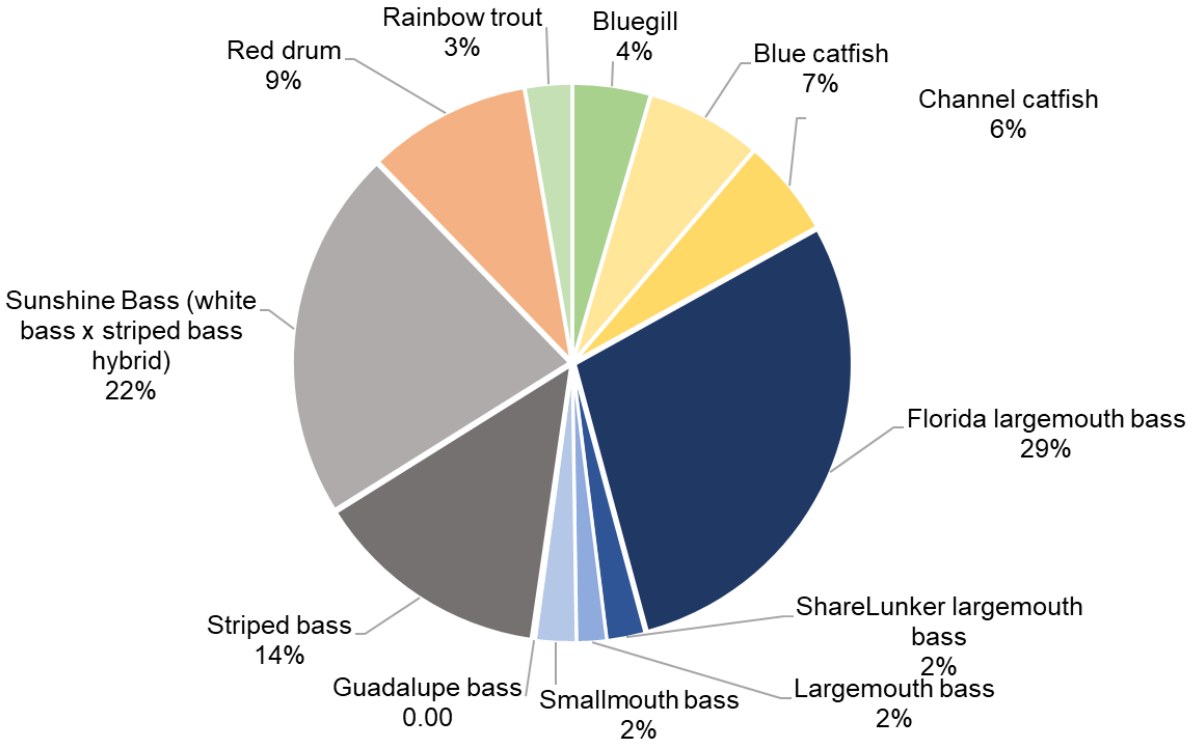
- Watershed-scale management of saltcedar in the Upper Brazos River Native Fish Conservation Area began in late 2015 (FY16), spanning more than 600 river miles designated as critical habitat for Smalleye Shiner and Sharpnose Shiner where saltcedar is contributing to habitat degradation. The project is a partnership with the U.S. Fish and Wildlife Service and other agencies, private landowners, and researchers to manage saltcedar and reduce its negative impacts over time. To date, 18,591acres of saltcedar have been treated across nearly 140 properties in the project area, with 2,932 acres treated in FY21. Eight research sites have also been established to study the vegetation community, river geomorphology, and hydrology and monitoring is ongoing.
- TPWD's Healthy Creeks Initiative has been actively seeking out and treating infestations of Arundo (a.k.a. giant reed) in headwater rivers and streams of the Hill Country since 2015. Currently, over 330 landowner partners are enrolled in the program along 225 river miles of the Blanco, Guadalupe, Llano, Medina, and Pedernales rivers and their tributaries in seven counties. Efforts to reduce the prevalence of Arundo and restore native riparian plant communities are expected to benefit Guadalupe Bass and other native fish species.
- Inland Fisheries also continues to support control of Arundo in the Nueces River and its tributaries through cost-share agreements. Now in the 12th year of the Nueces River Authority's "Pull Kill Plant" project, the private properties of more than 230 landowners along 110 river miles in four counties have been monitored and treated to improve boater access and benefit native fish and associated habitat.
- Since 2010, TPWD has been working with partners and volunteers to treat nonnative elephant ear plants on the upper Llano River. Approximately 53 river miles are currently in management status with infestations steadily decreasing.
- At Gorman Creek in Colorado Bend State Park, TPWD staff continued treatments of invasive elephant ears. The infestation has been greatly reduced from its original extent recorded in 2017 but will need continued monitoring and spot treatments.

Invasive elephant ear is treated with herbicide.

- In the summer of 2021, the Nueces River Authority (NRA) began to implement their successful "Pull Kill Plant" Arundo control and riparian restoration program on San Felipe Creek in Del Rio. The first step toward success involved outreach and communication with landowners, city staff and citizen groups. Aerial surveys were conducted to determine the extent of infestation along the entire eight miles of creek. NRA treated 6.5 acres of Arundo on city-owned lands and private tracts in summer 2021.

Hatcheries and Stocking — Hatcheries are an important component of Inland Fisheries resource management. Fish stocking is utilized as one of several essential tools to protect, manage and enhance statewide fisheries resources as well as achieve specific fisheries resource objectives. Stocked fish must meet specific stocking requirements including number, size, genetic integrity, disease-free status and time of stocking. Hatchery stocked fish are used to start new fish populations, supplement existing fish populations, restore depleted or threatened populations, provide fish in small urban lakes, enhance population genetics and performance, take advantage of improved habitat and increase angler opportunities and success. Additionally, TPWD hatcheries also play a significant role in public education and outreach. Hatchery personnel are involved at public outreach programs and agency sponsored fishing events as well as providing educational hatchery tours to the general public and students of all ages.

Fingerlings Stocked



A total of 12.77 million fingerlings were produced and stocked in public water. Species stocked included largemouth bass, Guadalupe bass, striped bass and hybrid striped bass, channel catfish, smallmouth bass, Bluegill sunfish, rainbow trout and red drum. Rainbow trout are acquired from a commercial producer and red drum are produced by the Coastal Fisheries Division. Additionally, a portion of the advanced channel catfish fingerings (12”-14”) stocked in support of the Neighborhood Fishin Program are acquired from a commercial producer. Most of the fingerlings stocked are largemouth bass (33%) or either striped bass or hybrid striped bass (36%) which collectively comprise approximately 69% of the total number of fingerlings stocked. Hatchery staff drove more than 269,842 miles during more than 850 stocking trips to distribute the fish to more than 388 water bodies throughout Texas.

Most notably in fiscal year 2021, hatchery production of striped bass and hybrid striped bass met or exceeded stocking requests. Additionally, 285,357 ShareLunker offspring were produced and stocked representing the most productive year to date.

Regulation Updates — The following regulation changes were adopted by the Texas Parks and Wildlife Commission to improve angling opportunities and protect fisheries resources.

Blue and Channel Catfish: Statewide

- No minimum length limit and a daily bag limit of 25 fish (combined), with the additional restriction that no more than 10 fish of 20 inches or larger could be harvested per day.

Blue and Channel Catfish: Exceptions to Statewide

- No minimum length limit and a daily bag limit of 25 fish (combined), with a harvest restriction of five fish 20 inches or larger per day, and of these, only one 30 inches or larger.

  Belton (Bell and Coryell), Bob Sandlin (Camp, Franklin, and Titus), Conroe (Montgomery and Walker), Hubbard Creek (Stephens), Kirby (Taylor), Lavon (Collin), Lewisville (Denton), Palestine (Cherokee, Anderson, Henderson, and Smith), Ray Hubbard (Collin, Dallas, Kaufman, and Rockwall), Richland-Chambers (Freestone and Navarro), Tawakoni (Hunt, Rains, and Van Zandt), Waco (McClennan)

- 14-inch minimum length limit and a 15-fish daily bag limit (combined).

  Braunig (Bexar), Calaveras (Bexar), Choke Canyon (Live Oak and McMullen), Fayette County (Fayette), Proctor (Comanche)

- No minimum length limit and a 50-fish bag limit with the additional restriction that no more than five fish of 30 inches or larger could be harvested per day.

  Livingston (Polk, San Jacinto, Trinity, and Walker), Sam Rayburn (Jasper)

- Enacted exceptions to statewide commercial fishing harvest regulations (14-inch minimum length limit and a daily bag limit of 25 fish [both species combined])

  Daily bag limit of 50 fish, with a retention limit of not more than five fish 30 inches or longer for Caddo (Harrison and Marion), Livingston (Polk, San Jacinto, Trinity, and Walker), Sam Rayburn (Jasper), Sabine River (Newton and Orange) from the Toledo Bend dam to the IH-10 bridge, Toledo Bend (Newton Sabine, and Shelby)

  No minimum length limit and daily bag of five fish (combined) for Community Fishing Lakes and lakes lying totally within a state park.

Passive gears

- Standardized specifications for floats dimensions for passive gears

Research Highlights

American Eel Research – TPWD has partnered with the University of Texas at Austin, University of Houston-Clear Lake (UHCL), multiple universities and NGOs, and numerous citizen science volunteers to assess the status of American Eel in Texas to better inform conservation and management decisions for this species. The primary objectives of this study are to assess the distribution and abundance, habitat use, movement patterns and population structure (genetics and demographics) of American Eel across all life stages. A total of 114 yellow eel have been collected/donated from 34 sites across Texas and have been processed for laboratory analysis. Eel mops and fyke nets have been used to sample for glass and elver eel since 2018 across 153 sites along the mid-upper Texas Coast. TPWD plans to work with UHCL to continue the effort to collect juvenile eel by establishing a network of eel ramps along the coast to sample from 2021-2022. Additionally, TPWD staff presented research and co-hosted the third biennial American Eel Symposium at the 2021 Southern Division of the American Fisheries Society Meeting. The event featured speakers from across the United States who are conducting research on American Eel.

Economics of the Lake Texoma Sport Fishery – TPWD, Oklahoma Department of Wildlife Conservation (ODWC), and Texas A&M (TAMU) AgriLife partnered to conduct a two-year creel survey and economic valuation of fishing at Lake Texoma from December 2018 to November 2020. A similar study conducted in 1990 estimated Lake Texoma anglers contributed $25.6 million in fishing expenditures primarily associated with the reservoir's world-renowned Striped Bass fishery. Despite intensive flooding in 2019 and anomalies associated with the COVID pandemic in 2020, anglers conducted almost a quarter-million fishing trips annually to Lake Texoma and spent an estimated $46.0 million and $42.1 million in the Lake Texoma region in 2019 and 2020, respectively. Creel surveys estimated that Texoma Striped Bass anglers catch over one-million fish each year and harvest approximately half of those fish caught.

Angler Partnership in Management and Research of the Alligator Gar – Growth in Alligator Gar fishing prompted the TPWD to actively manage populations, including regulating harvest in 2009. Research has shown that Alligator Gar are long-lived, recruit infrequently, and exhibit sexual dimorphism in both size and longevity. Such life-history characteristics result in sensitivities to overharvest, requiring managers to closely monitor populations. However, fishery-independent sampling is often plagued by low catch rates, making it difficult to detect population trends. Therefore, TPWD scientists partnered with avid Alligator Gar catch-and-release fishing guides and anglers on the Trinity River – Texas' premier Alligator Gar fishery – to initiate a catch-tag-release program in 2019. To date, 2,050 Alligator Gar, ranging in length from 118 to 2,362 mm, have been tagged providing information on abundance, distribution, movement, and return to the fishery of caught and released fish. Based on the average catch rate during fishery-independent, riverine sampling for Alligator Gar by the TPWD, tagging an equivalent number of fish would have required about 7,750 person-hours. This partnership with anglers and guides provides an efficient way to monitor the fishery and accumulate valuable biological data, enhance relationships with constituents, and provide anglers with information of interest.

Outreach

Sharing the Great Outdoors — Texas Freshwater Fisheries Center (TFFC) is our division's primary outreach and education center. In 2021, TFFC provided facility tours, workshops, aquatic education classes, and other special events. Visitors included 23,352 people from 136 Texas counties, 43 states and 2 foreign countries. The Center provided hands-on fishing for 12,969 visitors, with 459 receiving First Fish Awards. A total of 5,630 people toured the hatchery ponds via 184 guided tram trips. In addition to TFFC, all 14 Fisheries Management District offices, the Heart of the Hills Fisheries Science Center, and the A.E. Wood State Fish Hatchery also conducted fisheries outreach events.

State-Fish Art Contest — TFFC hosts the Texas division of this contest, which is sponsored by the national non-profit Wildlife Forever and Gulf States Toyota, through the Toyota Bassmaster Texas Fest. In 2021, 767 entries from grades K-12 were submitted to the program. The top 10 contestants in each of four grade divisions were recognized. All entries received certificates. First-place winners in each of the four age groups advanced to the national level and competed against winners from other states. Two Texas winners were announced as national place winners by Wildlife Forever. Grace Cao's Guadalupe bass won second place in the nation for the 4th through 6th grade category and Lisa Hwang's bluegill won third place in the Kindergarten through 3rd grade division. A 2021 calendar was published highlighting the top three entries in each of the four grade categories from 2020.

Merit Badge University — TFFC partnered with Boy Scouts of America Circle 10 to plan a conservation themed Merit Badge University on the TFFC campus. This event typically hosts more than 500 scouts from across northeast Texas to be educated in such topics as fly-fishing, archery, and plant identification. Due to covid-19 this event conducted in partnership with TFFC offsite at the Clements Scout Ranch.

Toyota ShareLunker Program — After three decades of partnering with anglers to collect and breed big bass, the Toyota ShareLunker Program relaunched in 2018 with new goals that would create much broader public participation. Since that time, ShareLunker has partnered with anglers year-round (January 1 – December 31) to collect catch and genetic data on bass 8 pounds or 24 inches and larger, and to collect bass 13 pounds and larger during our ShareLunker collection season (January – March) for selective breeding. The relaunch was a collaborative effort of TPWD's Inland Fisheries, Communications, and Information Technology Divisions, along with Toyota and several new external donor partners. New branding, media campaign, website and award-winning mobile app were among the accomplishments of this team. Thus far, in the fourth season of ShareLunker 2.0, more than 7,000 additional anglers registered to participate increasing the number of app users to more than 21,000 anglers. This increase in users was greatly supported by a partnership with the TPWD marketing team to conduct a digital ad campaign. Through August of the 2021 season, 365 entries from 80 lakes across the state were approved into the program. Of those entries: 256 were Lunker Class (8+ lbs.), 84 Elite Class (10+ lbs.), 2 Legend Class (13+ lbs.), 23 Legacy Class (13+ lbs. and donated for spawning). Collection of this angler-driven data is vital in evaluating the impact of ShareLunker stockings as well as understanding the Lunker potential of each reservoir. It will ultimately lead to better management of fisheries and help make Texas bass fishing bigger and better. The

An angler holds up a replica of ShareLunker #1 "Ethel" at the Toyota ShareLunker program outreach display at the 51st BassMaster Classic Expo in Fort Worth.

2021 collection season (January through March) was the busiest since 1995 when 27 were loaned to the program. This season pushed the program total Legacy Class collection to 608, which came from 10 different lakes, set five new lake records, added four new lakes to the list to produce a Legacy Class, and included five fish over 15-pounds. This 2021 season included the full implementation of the ShareLunker Response Team whose goal was more quickly and efficiently get Legacy Class lunkers in the care and transportation of Inland Fisheries personnel. Efforts of this team were successful and directly increased the number and quality of Legacy Class lunkers collected.

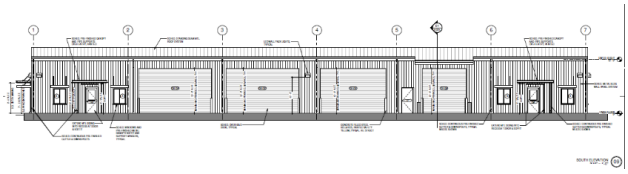
Hatchery staff successfully obtained 18 spawns from the Legacy Class lunkers loaned to the program this season. Hatchery staff produced and stocked an all-time high of 271,872 fingerlings from the selective breeding of the Legacy Class bass. Fingerlings were stocked into reservoirs that loaned a Legacy Class fish. Further, 79,482 fingerlings were stocked to help meet management objectives of the new Bois d'arc Reservoir in Fannin County.

Toyota ShareLunker Awards Banquet and Outreach Events – The 51st Bassmaster Classic was held in Dickie's Arena in Fort Worth and served as the location for the Toyota ShareLunker Awards banquet. This event enabled the Toyota ShareLunker program and 2021 Legacy Class anglers to be recognized on-stage as part of the championship day show in Dickie's Arena. Additionally, the program was provided online video coverage, written articles in Bassmaster Magazine and Bassmaster.com, promotion on Bassmaster Live, network television, and though digital advertising media on Bassmaster.com, and booth space in the Expo. These efforts increased statewide and national exposure of the program at a reduced cost to the agency. Further, the Toyota ShareLunker program participated in additional major outreach events that included a BASS Elite event at Lake Fork that included coverage of the successful return of ShareLunker 608 to the water, a Major League Fishing Bass Pro Tour event at Lake Travis, Bass Pro Shops U.S. Open on Ray Roberts, and Ducks Unlimited Expo at Texas Motor Speedway.

Texas Freshwater Fishing Hall of Fame — In 2021, the Texas Freshwater Fishing Hall of Fame committee chose not to induct a new member

Infrastructure Enhancements

Construction and renovation efforts continued at several facilities (table below) including the Tyler Nature Center, Possum Kingdom and Dundee Fish Hatcheries and Corpus Christi District Office in Mathis. Work on the Tyler Nature Center is schedule for completion in the fall of 2021 and will accommodate the Tyler District office as well as serve and the regional headquarters for State Parks and Wildlife and Law Enforcement. In response to the growing threat of zebra mussels, work continued on a microfiltration facility at the Possum Kingdom. Project completion has experience complication and delays and is not yet fully operational. The ozone disinfection system and effluent pump back projects and at the Dundee were awarded in late 2021. Work is expected to be completed on both project in Early 2023. Additionally, construction of the new district fisheries office in Mathis was awarded in late 2021. The project will construct new office, maintenance and storage space on available property at Lake Corpus Christi State Park in Mathis and is expected to be completed in late 2022.



Elevation view of the new Mathis District Office at Lake Corpus Christi State Park.

Micro-filtration system constructed at the Possum Kingdom Fish Hatchery.

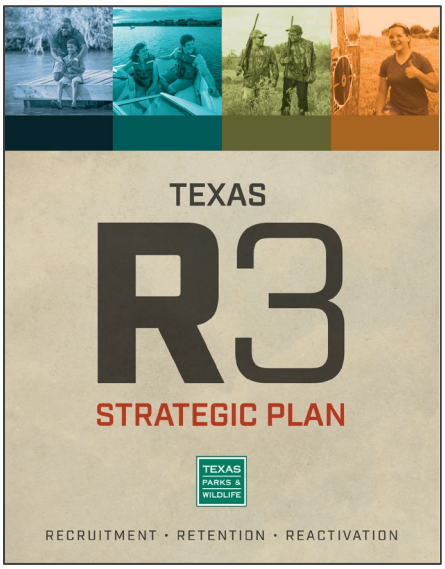
IF Capital Projects

	Project #	Phase	Expended
Tyler Nature Center*	126484	Design/Construction	$16,094,865.55
Micro-filtration at PK	1210301	Construction	$2,457,839.80
Pump back at Dundee	1110061	Design	$445,074.52
Ozone Disinfection at Dundee	128632	Design	$257,013.91
Mathis Office Replacement	127144	Design	$154,212.09
			$19,409,005.87

*Joint project with State Parks, Wildlife and Law Enforcement Divisions; dollars expended include all divisions (Inland Fisheries portion was $1,719,268.70)

Agency-wide Collaboration

Responding and adapting to the COVID-19 Pandemic — The COVID-19 global pandemic continued to impact many aspects of Division operations during FY 2021. Activities and large meetings were modified or deferred until they can be resumed safely out of concern for the health and wellbeing of Division staff and their families. Headquarters staff who could productively work from home, continued to do so under a planned mixture of teleworking and in-office schedules. Staff levels at TPWD Headquarters was limited to 50%. Staff continued to adapt to the proficient and judicious use of online technology such as MS Teams, Zoom and Skype to effectively maintain functional teams and collaborative work groups. Hatchery production was not directly impacted by COVID-19 and associated staffing issues. Operations at the Texas Freshwater Fisheries Center (TFFC) were modified and offering at times limited access to the indoor exhibits and spaces in the Visitor Center while allowing full access to outdoor venues.



Texas Recruitment, Retention, and Reactivation (R3) Strategic Plan — Following many years of coordinated agency-wide collaboration the Texas R3 Strategic Plan was finalized in 2021. The Texas R3 Vision is "Increasing participation in the outdoors is an ongoing process and a strategic approach is needed to develop successful R3 efforts as part of TPWD's overall agency mission. Commitment from partners and pooling of resources are imperative in implementing the strategies of this plan. The aspirational outcomes the department seeks for this plan are to: 1) Create lifelong participants in hunting, fishing, boating, and shooting sports, 2) Expand resources to successfully deliver nature-based conservation and recreation, and 3) Increase public support for hunting, fishing, and shooting sports." The Inland Fisheries Division participated in the development of the strategic plan and is actively involved in its implementation. The Inland Fisheries Division Director is serving as Executive Sponsor of the plan implementation and IF Division team members are serving on the Fishing/Boating and License/Data Support Teams.

APPENDIX

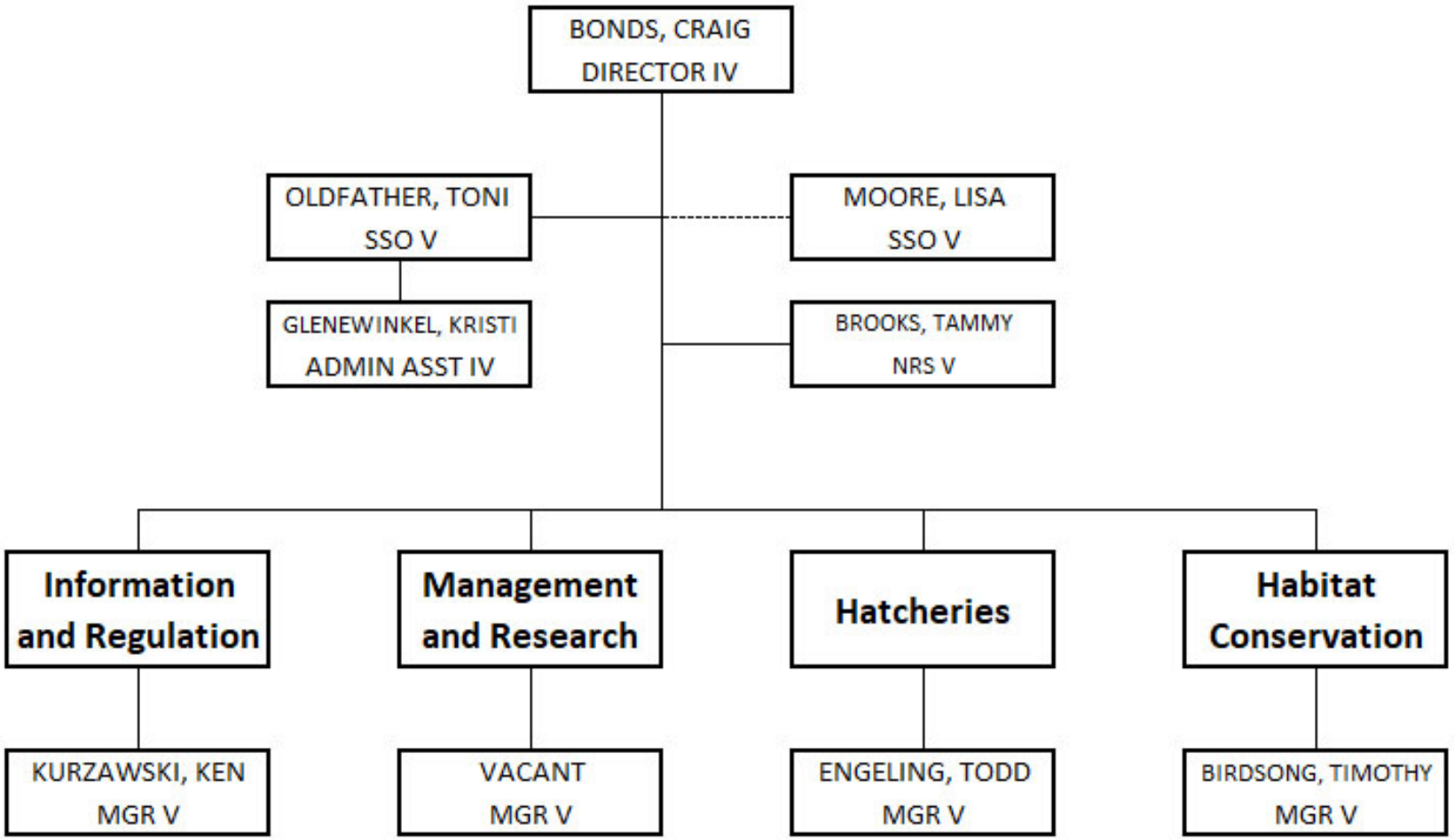
Organization Charts

The following organizational charts were valid through July 31, 2021. A division reorganization plan was implemented on August 1, 2021 and will be reflected in the FY 22 division annual report.

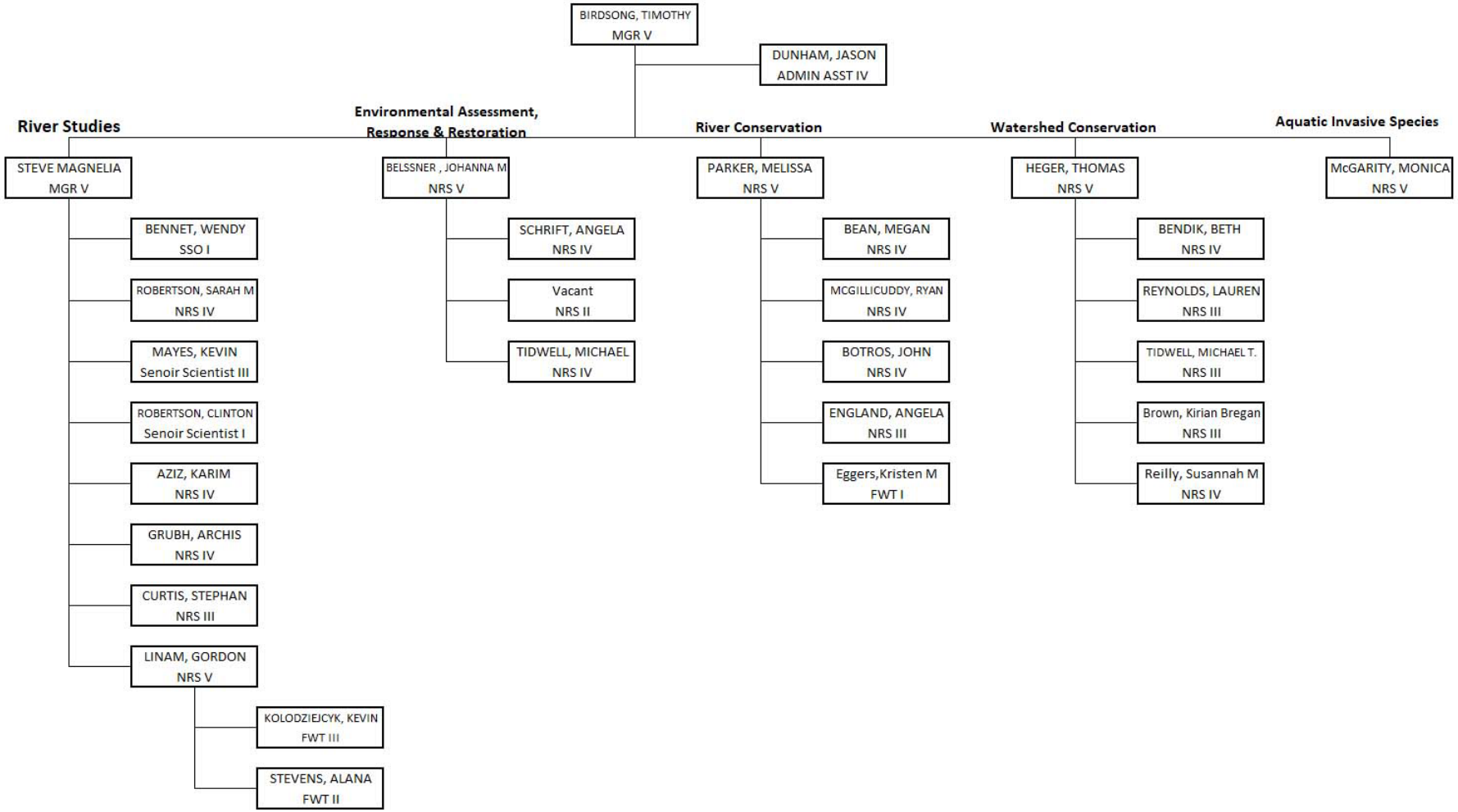
Legend

Abbreviation	Job Title
ADMIN ASST	Administrative Assistant
FWT	Fish and Wildlife Tech
INV & STORE SPEC	Inventory & Store Specialist
MAINT SUPER	Maintenance Supervisor
MGR	Manager
NRS	Natural Resources Specialist
PS	Program Specialist
SSO	Staff Services Officer
WEB ADMIN	Web Administrator

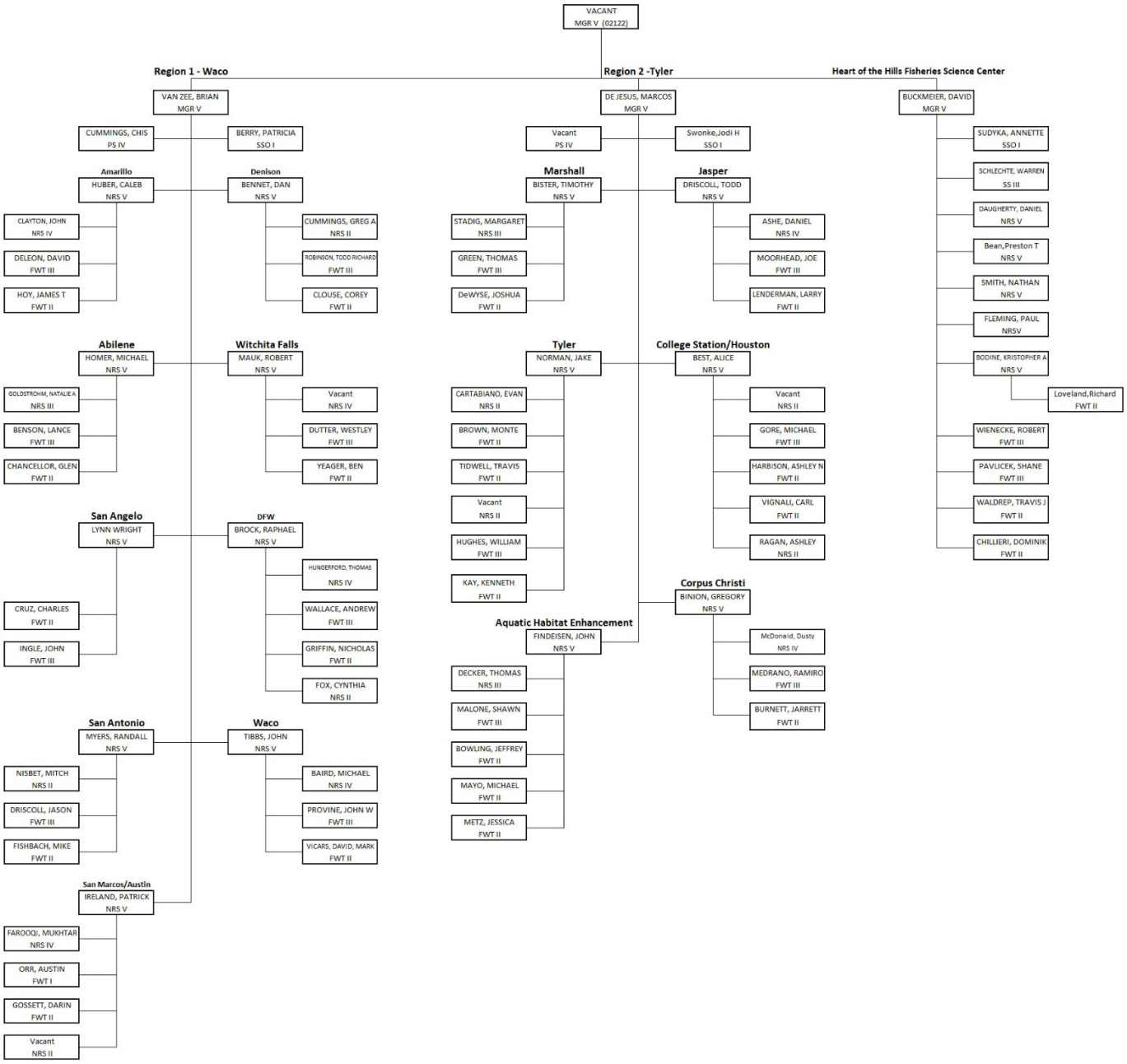
Inland Fisheries Administration



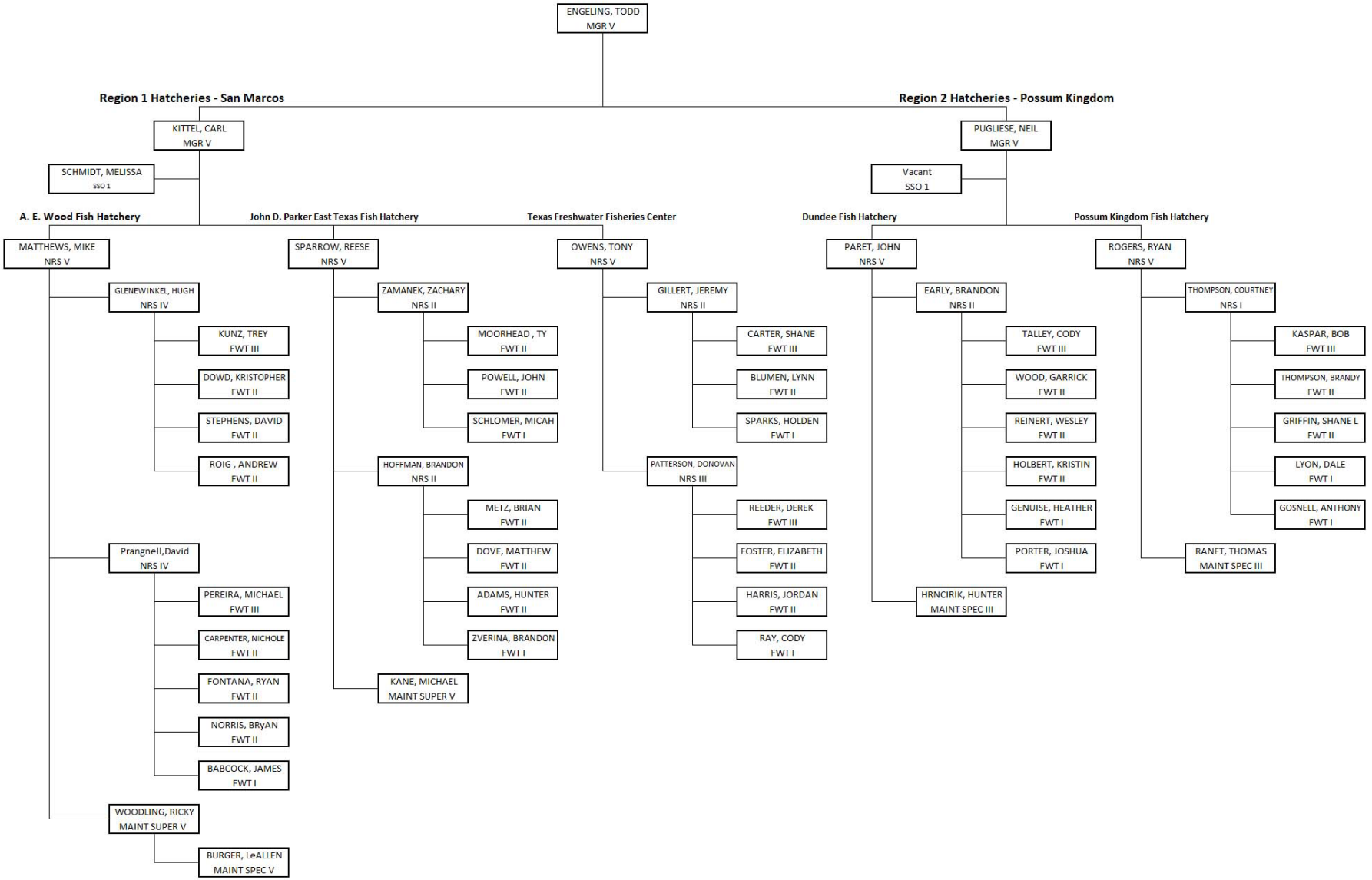
Habitat Conservation



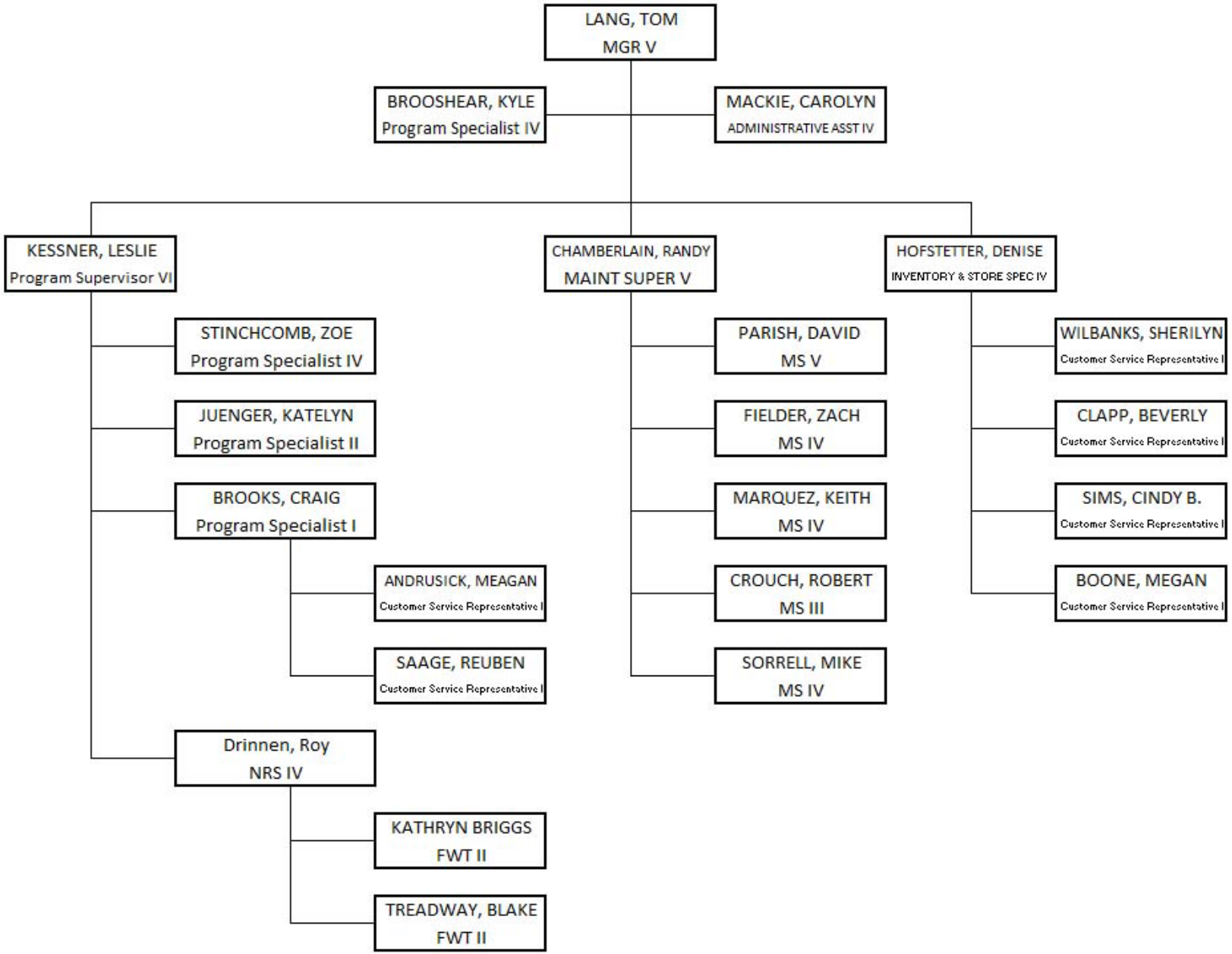
Fisheries Management and Research



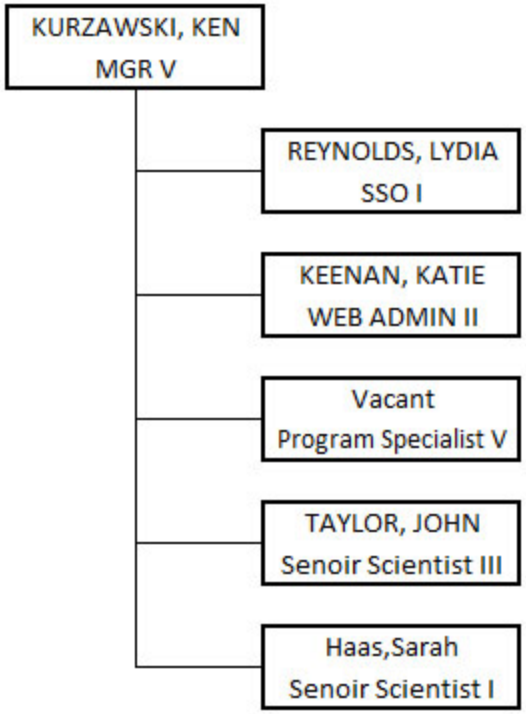
Hatcheries


ENGELING, TODD
MGR V
Region 1 Hatcheries - San Marcos
Region 2 Hatcheries - Possum Kingdom
KITTEL, CARL
MGR V
SCHMIDT, MELISSA
SSO 1
PUGLIESE, NEIL
MGR V
Vacant
SSO 1
A. E. Wood Fish Hatchery
John D. Parker East Texas Fish Hatchery
Texas Freshwater Fisheries Center
Dundee Fish Hatchery
Possum Kingdom Fish Hatchery
MATTHEWS, MIKE
NRS V
SPARROW, REESE
NRS V
OWENS, TONY
NRS V
PARET, JOHN
NRS V
ROGERS, RYAN
NRS V
GLENEWINKEL, HUGH
NRS IV
KUNZ, TREY
FWT III
DOWD, KRISTOPHER
FWT II
STEPHENS, DAVID
FWT II
ROIG , ANDREW
FWT II
Prangnell,David
NRS IV
PEREIRA, MICHAEL
FWT III
CARPENTER, NICHOLE
FWT II
FONTANA, RYAN
FWT II
NORRIS, BRyAN
FWT II
BABCOCK, JAMES
FWT I
WOODLING, RICKY
MAINT SUPER V
BURGER, LeALLEN
MAINT SPEC V
ZAMANEK, ZACHARY
NRS II
MOORHEAD , TY
FWT II
POWELL, JOHN
FWT II
SCHLOMER, MICAH
FWT I
HOFFMAN, BRANDON
NRS II
METZ, BRIAN
FWT II
DOVE, MATTHEW
FWT II
ADAMS, HUNTER
FWT II
ZVERINA, BRANDON
FWT I
KANE, MICHAEL
MAINT SUPER V
GILLERT, JEREMY
NRS II
CARTER, SHANE
FWT III
BLUMEN, LYNN
FWT II
SPARKS, HOLDEN
FWT I
PATTERSON, DONOVAN
NRS III
REEDER, DEREK
FWT III
FOSTER, ELIZABETH
FWT II
HARRIS, JORDAN
FWT II
RAY, CODY
FWT I
EARLY, BRANDON
NRS II
TALLEY, CODY
FWT III
WOOD, GARRICK
FWT II
REINERT, WESLEY
FWT II
HOLBERT, KRISTIN
FWT II
GENUISE, HEATHER
FWT I
PORTER, JOSHUA
FWT I
HRNCIRIK, HUNTER
MAINT SPEC III
THOMPSON, COURTNEY
NRS I
KASPAR, BOB
FWT III
THOMPSON, BRANDY
FWT II
GRIFFIN, SHANE L
FWT II
LYON, DALE
FWT I
GOSNELL, ANTHONY
FWT I
RANFT, THOMAS
MAINT SPEC III

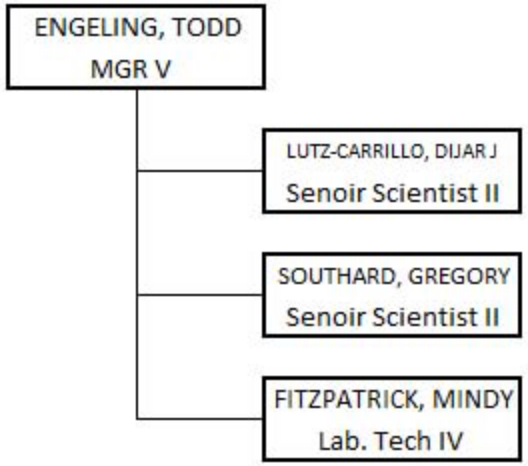
Texas Freshwater Fisheries Center



Information and Regulations



Analytical Services



Stocking Reports

Inland Fisheries Hatchery Stockings

Species	Adult	Fingerling	Fry	Total
Black Crappie		10,000		10,000
Bluegill		578,286		578,286
Blue Catfish		858,372		858,372
Brown Trout	3,940			3,940
Channel Catfish	578	741,389		741,697
ShareLunker Largemouth Bass	631	284,726		285,357
Florida Largemouth Bass	765	3,686,209	756,459	4,443,433
Guadalupe Bass		21,580		21,580
Largemouth Bass		220,939	331,850	552,789
Paddlefish		7,436		7,436
Smallmouth Bass	640	301,758		302,398
Rainbow Trout	350,097			350,097
Red Drum		1,215,415		1,215,415
Striped Bass	38	1,761,820	3,883,138	5,644,996
Sunshine bass (White Bass x Striped Bass Hybrid)		2,766,940	3,397,967	6,164,907
Threadfin Shad	100			100
Triploid Grass Carp	501			501
Walleye			2,494,020	2,494,020
Total	357,290	12,454,870	10,863,434	23,675,594

Research and Special Projects

Research works to develop innovative solutions and improve the efficiency and effectiveness of Division operations and programs. This year progress was made on 49 studies that focused on:

Understanding anglers to ensure satisfaction and increase participation (8 studies)

Highlights:

- Survey of anglers recruited during the COVID pandemic
- Assess fishery and economic value of Guadalupe Bass in the Mission Reach
- Economic impacts of Lake Texoma recreational fishery
- Develop partnerships and marketing techniques to recruit, retain, and reactivate anglers
- Understand Alligator Gar anglers and public perception

Evaluating fish habitat use, enhancement efforts, and assessment tools (3 studies)

Highlights:

- Understand post-flood habitat and fish assemblage recovery
- Assess use of artificial habitats by fish and effect on angling success

Filling data gaps for species of greatest conservation need including associated fisheries (8 studies)

Highlights:

- Develop genetic tools and assess hybridization in Micropterid species
- Assess Guadalupe Bass populations and tools to reduce hybridization
- Evaluate population structure and hybridization in Gambusia and Cyprinodon species
- Quantify population and recruitment dynamics of Alligator Gar

Largemouth Bass stocking, management, and genetics (9 studies)

Highlights:

- Use sequencing approaches to genotype native Largemouth and Florida Bass
- Evaluate growth and survival of ShareLunker and Florida Bass
- Quantify habitat use and movement of Largemouth Bass in large reservoirs

- Estimate contribution of stocked northern Largemouth Bass in power plant reservoirs

Informing catfish management and conservation (7 studies)

Highlights:

- Assess Channel and Blue Catfish growth, mortality, and gill net selectivity
- Assess customer segmentation of catfish anglers
- Evaluate relative catchability of Channel Catfish and hybrids by anglers
- Assess population structure and hybridization in Headwater Catfish

Assessing and reducing threats to fisheries and native fish populations (5 studies)

Highlights:

- Development of feminization protocol Common Carp as a tool for invasive control
- Quantification of White Pelican effort at NFP lakes in conjunction with stocking events
- Investigate Golden Algae blooms and control methods

Increasing hatchery production and evaluating fish production protocols (5 studies)

Highlights:

- Assess Morone fry deformities as related to maternal stress
- Evaluate effects of feeding regimes and feed utilization in Morones and Koi

Evaluating current management strategies and development of new techniques (4 studies)

Highlights:

- Evaluate various approaches to providing hybrid Striped Bass fisheries
- Assess uptake of OTC for marking and understanding zonation in otoliths
- Assess utility of self-reported creel data

Publications and Presentations

Scientific Publications and Reports

Acre, M. R., J. S. Perkin, and M. G. Bean. 2020. Multiple survey methods reveal greater abundance of endangered pupfish in restored habitats. Aquatic Conservation: Marine and Freshwater Ecosystems 2020:1-12.

Acre, M. R., T. B. Grabowski, D. J. Leavitt, N. G. Smith, A. A. Pease, and J. E. Pease. 2021. Blue Sucker habitat use in a regulated Texas river: implications for conservation and restoration. Environmental Biology of Fishes. DOI:10.1007/s10641-021-01093-9

Birdsong, T. W., G. P. Garrett, M. G. Bean, S. G. Curtis, K. B. Mayes, and S. M. Robertson. 2021. Conservation status of Texas freshwater fishes: informing state-based species protection. Journal of the Southeastern Association of Fish and Wildlife Agencies 8:40-52.

Birdsong, T. W., G. P. Garrett, M. Bean, P. Bean, S. Curtis, P. Fleming, A. Grubh, D. Lutz-Carrillo, K. B. Mayes, C. Robertson, S. Robertson, J. W. Schlechte, and N. G. Smith. 2020. Conservation of Texas freshwater fish diversity: selection of Species of Greatest Conservation Need. Texas Parks and Wildlife Department. PWD RP T3200-2780 (10/20). Austin, Texas.

Clayton, J. B., R. Patiño, R. H. Rashel, and S. Tábora-Sarmiento. 2021. Water quality associations and spatiotemporal distribution of the harmful alga *Prymnesium parvum* in an impounded urban stream system. Journal of Urban Ecology 7:1-13.

Fleming, B. P., and D. J. Daugherty. 2021. Effects of experience and training on side-scan sonar image interpretation as a fish survey tool: a case study of Alligator Gar. Journal of Fish and Wildlife Management. DOI:10.3996/JFWM-21-026

Garrett, G. P., M. G. Bean, R. J. Edwards, and D. A. Hendrickson. 2021. Mining hidden waters: groundwater depletion, aquatic habitat degradation, and loss of fish diversity in the Chihuahuan Desert ecoregion of Texas. Pages 125-135 *in* D. Propst, J. Williams, K. Bestgen, and C. Hoagstrom, editors. Standing between life and extinction: ethics and ecology of conserving aquatic species in North American deserts. The University of Chicago Press.

Hernández, B. A., Z. A. Mitchell, C. R. Robertson, and A. N. Schwalb. 2021. Burrowing behaviour of unionid mussels in subtropical rivers: implications for survey guidelines. Aquatic Conservation Marine and Freshwater Ecosystems 31: 903-915.

Hungerford, T., K. A. Bodine, J. Tibbs, R. Myers, D. Prangnell, D. J. Daugherty, and J. W. Schlechte. 2021. Relative catchability of Channel Catfish and Blue Catfish x Channel Catfish hybrids by anglers in put-and-take urban fisheries. North American Journal of Fisheries Management. DOI:10.1002/nafm.10596

Lang. T. J. 2020. A few kernels of wisdom from my cache about living a life of meaning through, example, inspiration, and service. Pages 239-243 *in* W. W. Taylor, A. K. Carlson, A. Bennett, and C. P. Ferreri, editors. Lessons in leadership: integrating courage, vision, and innovation for the future of sustainable fisheries. American Fisheries Society, Bethesda, Maryland.

Matthews, M. D. 2021. A review of: Practical Hatchery Management of Warmwater Fishes by J. R. Snow and R. P. Phelps. North American Journal of Aquaculture. DOI:10.1002/naaq.10214

Nisbet, M. T., R. A. Myers, G. R. Binion, and D. McDonald. 2021. Using creel data to evaluate Blue and Channel Catfish aggregate harvest regulations for Texas reservoirs. North American Journal of Fisheries Management. DOI:10.1002/nafm.10568

Osborne, M. J., D. S. Portnoy, A. T. Fields, M. G. Bean, C. W. Hoagstrom, and K. W. Conway. 2021. Under the radar: genetic assessment of Rio Grande Shiner (*Notropis jemezanus*) and Speckled Chub

(*Macrhybopsis aestivalis*), two Rio Grande basin endemic cyprinids that have experienced recent range contractions. Conservation Genetics 22:187-204.
Parker, S. T., J. S. Perkin, M. G. Bean, D. Lutz-Carrillo, and M. R. Acre. 2021. Temporal distribution modelling reveals upstream habitat drying and downstream non-native introgression are squeezing out an imperiled headwater fish. Diversity and Distributions 27:533-551.
Patterson, D., D. Gatlin, D. Prangnell, B. Ray. 2021. Effects of feeding regimens on the proximate composition and condition indices of juvenile Koi *Cyprinus carpio* used as forage. North American Journal of Aquaculture 83:114–24.
Schlechte, J. W., D. J. Daugherty, N. G. Smith, and D. L. Buckmeier. 2021. Angler practices and preferences for managing Alligator Gar in Texas. Journal of the Southeastern Association of Fish and Wildlife Agencies 8:23-31.
Schlechte, J. W., J. B. Taylor, D. L. Buckmeier, C. Hutt, and K. Hunt. 2021. Identifying potential anglers and customer segments of Texas catfish anglers to guide management actions. North American Journal of Fisheries Management. DOI:10.1002/nafm.10538
Smith, C. H., N. A. Johnson, C. R. Robertson, R. D. Doyle, and C. R. Randklev. 2021. Establishing conservation units to promote recovery of two threatened freshwater mussel species (Bivalvia: Unionidae: Potamilus). Ecology and Evolution 11:11102-11122.

Technical Presentations

A total of 39 presentations were given by staff as author or co-author, at more than 10 professional meetings or conferences. Venues included:

- American Fisheries Society – The Wildlife Society, joint annual meeting, Reno, NV
- Aquaculture America, annual meeting, San Antonio, TX
- American Fisheries Society, annual meeting, virtual
- Desert Fishes Council, annual meeting, virtual
- East Texas Aquatic Work Group Meeting, virtual meeting
- Freshwater Mollusk Conservation Society 12th Biennial Symposium, virtual meeting
- Society for the Preservation of Natural History Collections, virtual meeting
- Southeastern Association of Fish and Wildlife Agencies, annual meeting, virtual
- Southern Division American Fisheries Society, annual meeting, virtual
- Texas Aquatic Plant Management Society, annual meeting, virtual
- Texas Chapter American Fisheries Society, annual meeting, virtual
- Urban Riparian Symposium (Texas Riparian Association), virtual meeting
- Western Division American Fisheries Society, annual meeting, virtual

Popular Articles

Sixteen popular articles were written and published by Inland Fisheries staff in two different outlets. A total of 44 press releases were written and 176 media coordination efforts were conducted with TV, radio, news, and outdoor-related media outlets, regarding aquatic natural resource conservation, fisheries management, and recreational fishing opportunities across the Division. There were 666 social media posts uploaded in Facebook and Instagram, communicating Division interests from various programs. These posts reached 7,278,172 people and engaged over 550,000 of them.

Also, for ShareLunker, app downloads increased to 21,514; the website reached over 45,000 visitors; 156 third-party articles were written about the program, reaching 110,466,319 readers; the digital add campaign made 1,306,658 impressions; and e-mail blasts reached 152,516 people during the record-breaking year..

Outreach Events

Inland Fisheries staff members were event leaders at 95 outreach events for targeted user groups (youth under 17, minorities, women, and physically challenged) in which 5,641 individuals participated.

Event Summary

	Youth 17 & under	Adults	Total
Males (1)	1,890	1,076	2,966
Females (2)	1,616	1,059	2,675
Minorities	1,288	674	1,962
Physically Challenged	39	28	67
Total (1+2)	3,506	2,135	5641

Work with Other Organizations

Program Contracts and Agreements

Rio Grande Joint Venture	Conservation Delivery within Native Fish Conservation Areas of the Chihuahuan Desert	$ 95,245.75
American Bird Conservancy	Implementing Conservation Delivery and Developing Conservation Networks for Species of Greatest Conservation Need in the Chihuahuan Desert	$ 49,999.99
American Fisheries Society	The Hutton Junior Fisheries Biology Program	$ 30,000.00
Angelina and Nacogdoches Counties WCID	Lake Striker Salvinia Control	$ 40,000.00
Auburn University	Evaluating the spatial and temporal distribution and ecology of Bighead and Silver Carp and native fishes of the Lower Red River basin	$ 203,879.55
Brazos River Nature Center	Public Leased Access to the Brazos River at Brazos River Nature Center	$ 6,000.00
Caddo Biocontrol Alliance	Biological control of giant salvinia	$ 60,000.00
Camp Huaco Springs	Public Leased Access to the Guadalupe River Trout Fishery at Camp Huaco Springs	$ 2,600.00
Private Landowner	Public Leased Access to the Llano River at 14717 RR 152, Llano, TX	$ 24,750.00
Chautauqua Foundation	Leased Angler Access to the Lower Colorado River at the Texas River School River Camp	$ 18,000.00
Coastal Water Authority	Control of water hyacinth and hydrilla at Lake Houston and its tributaries	$ 50,000.00
Cypress Valley Navigation District	Boat lane maintenance and boater access on Caddo Lake and Big Cypress Bayou	$ 70,000.00
Devils River Conservancy	Development of a Web-based Clearinghouse Offering Access to Current and Historic Data, Reports, and Other Pertinent Information from the Devils River Native Fish Conservation Area	$ 93,077.00
Dick's Canoes	Public Leased Access to the Brazos River at Dick's Canoes	$ 21,000.00
Private Landowner	Pena Blanca Spring and Creek Restoration Project	$ 31,502.93
Fishing's Future	George H.W. Bush Vamos A Pescar	$ 10,000.00
Guadalupe Blanco River Authority	Control of water hyacinth and other aquatic	$ 40,000.00

	or riparian plant species in the Guadalupe River and its tributaries	
Hill Country Alliance	Community Outreach and Capacity Building for Hill Country River Stewardship	$ 50,050.00
Hill Country Alliance	Landowner and Community Engagement in Control Of Arundo and Restoration of Hill Country Rivers	$ 28,402.00
Private Landowner	Public Leased Access to the Llano River at 535 KC 312, City of Junction, TX	$ 24,750.00
Private Landowner	Public Leased Access to the Sabine River at FM 1794, Beckville, TX	$ 18,000.00
Private Landowner	Public Leased Access to the Colorado River at 203 Hidden Shores Loop, Smithville, TX	$ 21,600.00
Kingsland Slab Group LLC	Public Leased Access to the Llano River at 7300 River Oaks Drive, Kingsland, TX	$ 6,000.00
Llano River Watershed Alliance	Facilitating Conservation Delivery of Species of Greatest Conservation Need in the Central Edwards Plateau Native Fish Conservation Area through Technical Guidance and Planning Assistance	$ 154,300.00
Llano River Watershed Alliance	Landowner and Community Engagement in Control of Giant Reed (*Arundo donax*) in the Upper Llano River Watershed, Summer 2021	$ 4,902.48
Lavaca-Navidad River Authority	Control of water hyacinth, giant salvinia, and other invasive aquatic or riparian plant Species in Lake Texana and its tributaries	$ 100,000.00
Loma Paloma, Inc	Bishop Wetlands Salix and Riparian Nursery	$ 5,240.00
Lower Neches Valley Authority	Control of water hyacinth, giant Salvinia, and other aquatic or riparian plant species in Sam Rayburn Reservoir and B.A. Steinhagen Reservoir	$ 270,000.00
Private Landowner	Public Leased access to the South Llano River at KC 150	$ 28,800.00
Private Landowner	Public Leased Access to the Brazos River at 151 FM 1304, Aquilla, TX	$ 6,000.00
Nueces River Authority	Arundo Control and Riparian Restoration in the Upper Nueces River Watershed	$ 33,346.78
Nueces River Authority	Arundo Control and Riparian Restoration in the Sabinal, Frio and Dry Frio River Watersheds	$ 62,544.63
Nueces River Authority	Arundo Control and Riparian Restoration in San Felipe Creek	$ 41,757.00

William D. O'Hara Land Surveyor	Expert Services	$ 10,000.00
Private Landowner	Public Leased Access to the Llano River at FM 2768 Crossing	$ 18,750.00
Private Landowner	Cienega Creek Restoration	$ 51,153.74
Private Landowner	Public Leased Access to the Colorado River at 750 Hwy FM 2571, Smithville, TX	$ 32,400.00
Private Landowner	Public Leased Access on the Llano River at 4373 Maso Llano Rd, City of Mason, TX	$ 32,826.40
Sam Houston State University	The Texasinvasives.org Program	$ 35,503.00
Southeast Aquatic Resources Partnership	Assessment and Prioritization of Barriers in the Upper Guadalupe River Upstream from Canyon Reservoir, TX	$ 74,998.00
Private Landowner	Public Leased Access to the Devils River in Val Verde County	$ 72,000.00
Private Landowner	Public Leased Access to the San Marcos River at 9515 FM 1979, Martindale, TX	$ 9,000.00
Stephen F. Austin University	Assessing pathways of introduction of non-native Fishes in Texas streams	$ 74,580.00
Texas A&M University, AgriLife Extension Service	An Economic Analysis of the Lake Texoma Fishery	$ 18,967.00
Texas A&M University, AgriLife Research	Alligator Gar Lateral Movements and Habitat Use in the Lower Brazos River	$ 99,640.00
Texas A&M University, AgriLife Research	Assessing the phylogenetic relationships and species boundaries of the genus *Truncilla* (Family: Unionldae) In Texas	$ 98,914.00
Texas A&M University, AgriLife Research	Ecological forecasting and conservation contingency planning for imperiled Great Plains fishes of Texas	$ 91,218.00
Texas A&M University, AgriLife Research	Examining the conservation status of freshwater mussels in Texas	$ 79,993.00
Texas A&M University, AgriLife Research	Examining trematode prevalence at mussel biodiversity hotspots throughout the state	$ 50,000.00
Texas A&M University, AgriLife Research	Host Fish Use of Three Rare Central Texas Mussel Species	$ 207,361.00
Texas A&M University, AgriLife Research	Host fish use, reproduction, and propagation potential of two East Texas threatened mussel species	$ 100,000.00
Texas A&M University, AgriLife Research	Measuring and Predicting Movement Ecology for Imperiled Great Plains Fishes in Texas	$ 141,558.00

Texas A&M University, AgriLife Research	Temporal Trajectories and Landscape Correlates for Stream Fish Community Change in Central and West Texas with Emphasis on Conservation Status of Chihauhua Catfish and Conchos Pupfish	$ 200,000.00
Texas Christian University	Growth, survival, and reproductive success of zebra mussels	$ 37,515.00
Texas Conservation Science	Assessment of Passive Revegetation of Upper Brazos River Basin Saltcedar Management Sites	$ 29,980.31
Texas Conservation Science	Cypress Basin Riparian Productivity and Environmental Flow Management: Trend Analysis And Paired-Watershed Assessment	$ 29,600.00
Texas Conservation Science	Hydraulic connectivity to riverine habitats in the Colorado and Lavaca basins	$ 75,000.00
Texas Conservation Science	Riparian productivity in three Texas river basins	$ 84,000.00
Texas State University	Analytical Services Genetics Student Worker Laboratory Assistant	$ 35,977.15
Texas State University	Geographic Information System Data Update for Healthy Creeks Initiative	$ 5,948.59
Texas State University	Impact of zebra mussels on unionid mussels, population dynamics, and limiting factors for growth and survival	$ 60,403.00
Texas State University	Life History, Distribution and Trophic Ecology of the Endangered Comal Springs Dryopid Beetle	$ 42,988.00
Texas State University	The impact of environmental contaminants on Texas unionid mussels in the Guadalupe Basin	$ 21,699.35
Texas State University	Zebra Mussel Monitoring in Texas Water Bodies	$ 52,957.00
Texas Tech University	Distribution and habitat use of Kisatchie Painted Crayfish in northeast Texas with investigation of Multi-scale environmental influences on crayfish Community structure	$ 59,998.00
Texas Tech University	Dimensions of diversity in urban fisheries: Examining Habitat, fish, and anglers to inform the management of Texas Community Fishing Lakes	$100,000.00
Texas Tech University	Ecology of Devils River Minnow *Dionda diaboli* in an Invaded stream-riparian ecosystem	$107,484.00
Texas Tech University	Population assessment of Asian Carp (hypophthalmichthys spp.) in the Sulphur River, Texas	$126,431.00
Texas Tech University Cooperative	Texas Cooperative Fish and Wildlife Research Unit	$ 40,000.00
Private Landowner	Public Leased Access to the San Marcos River	$ 36,000.00

Nedra F. Townsend, Shine & Assoc.	Expert Services	$ 25,000.00
Trinity River Authority	Control of giant Salvinia, water hyacinth, and other aquatic or riparian plant species in Lake Livingston and its tributaries	$ 50,000.00
University of Houston Clear Lake	Distribution, Abundance and Habitat use of the American Eel in the Lower Sabine, Colorado, and Guadalupe River Basins	$ 109,657.00
University of North Texas	Alligator Gar Population Connectivity and Habitat Use in the Trinity River National Wildlife Refuge	$ 149,979.00
University of North Texas	Assessing Swimming Performance to Inform Stream Crossing Design and Barrier Prioritization-Guadalupe Bass	$ 33,862.00
University of North Texas	Assessing Swimming Performance to Inform Stream Crossing Design and Barrier Prioritization-Guadalupe Darter, Guadalupe Roundnose Minnow and Plateau Shiner	$ 40,000.00
University of Texas Austin	American Eel: Utilization Modern Techniques to Assess Conservation Status in Texas	$ 79,945.00
University of Texas Austin BEG	Hydrologic monitoring of priority habitats in the Devils River	$ 91,731.00
University of Texas Austin	Gap Sampling within the Texas Native Fish Conservation Areas Network	$ 229,297.00
University of Texas Austin	Conservation Planning within the Texas Native Fish Conservation Areas Network	$ 280,786.00
University of Texas Austin	FY20 Monitoring Hydrologic Effects of Salt Cedar Control in the Upper Brazos River Basin, Texas	$ 82,955.72
University of Texas Austin	Airborne Lidar bathymetry survey and aquatic habitat evaluation for Devils River Minnow and Texas Hornshell in the Devils River	$ 276,862.00
University of Texas San Antonio	Evaluating the suppression of *Hydrilla verticillata* by Manual removal and planting native aquatic plants	$ 64,397.00
Private Landowner	Public Leased Access to the Nueces River at 12317 Figueroa St., Corpus Christi, Texas	$ 18,000.00
Western Association of Fish and Wildlife Agencies	YY Consortium Agreement	$ 6,000.00

Grants and Donations — Incoming Funds

Donor	Program	Amount
Friends of TFFC	Metro Tram	Non-cash, valued at $192,250
Recreational Boating and Fishing Foundation	Wrap of TPWD outreach trailer, tent, flags, bobbers, photo props, and table throw	Non-cash
Texas Parks and Wildlife Foundation	ShareLunker Program	$100,000

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