

# **INLAND FISHERIES ANNUAL REPORT 2018**



## **IMPROVING THE QUALITY OF FISHING**



Carter Smith  
Executive Director

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Director, Inland Fisheries





# **INLAND FISHERIES ANNUAL REPORT 2018**



# **TEXAS PARKS AND WILDLIFE DEPARTMENT**

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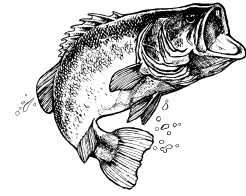
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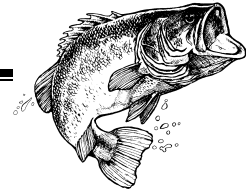


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# INLAND FISHERIES OVERVIEW

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## 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 approximately 1,100 public impoundments and about 191,000 miles of rivers and streams together totaling 1.7 million acres. These resources are used by 1.21 million anglers aged 16 and over, whose fishing activities result in at least \$960 million in trip and equipment expenditures.

## Agency Goals

Texas Parks and Wildlife Department's Land and Water Resources Conservation and Recreation Plan (2015) establishes four primary goals to direct the agency's division operating plans and decisions 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

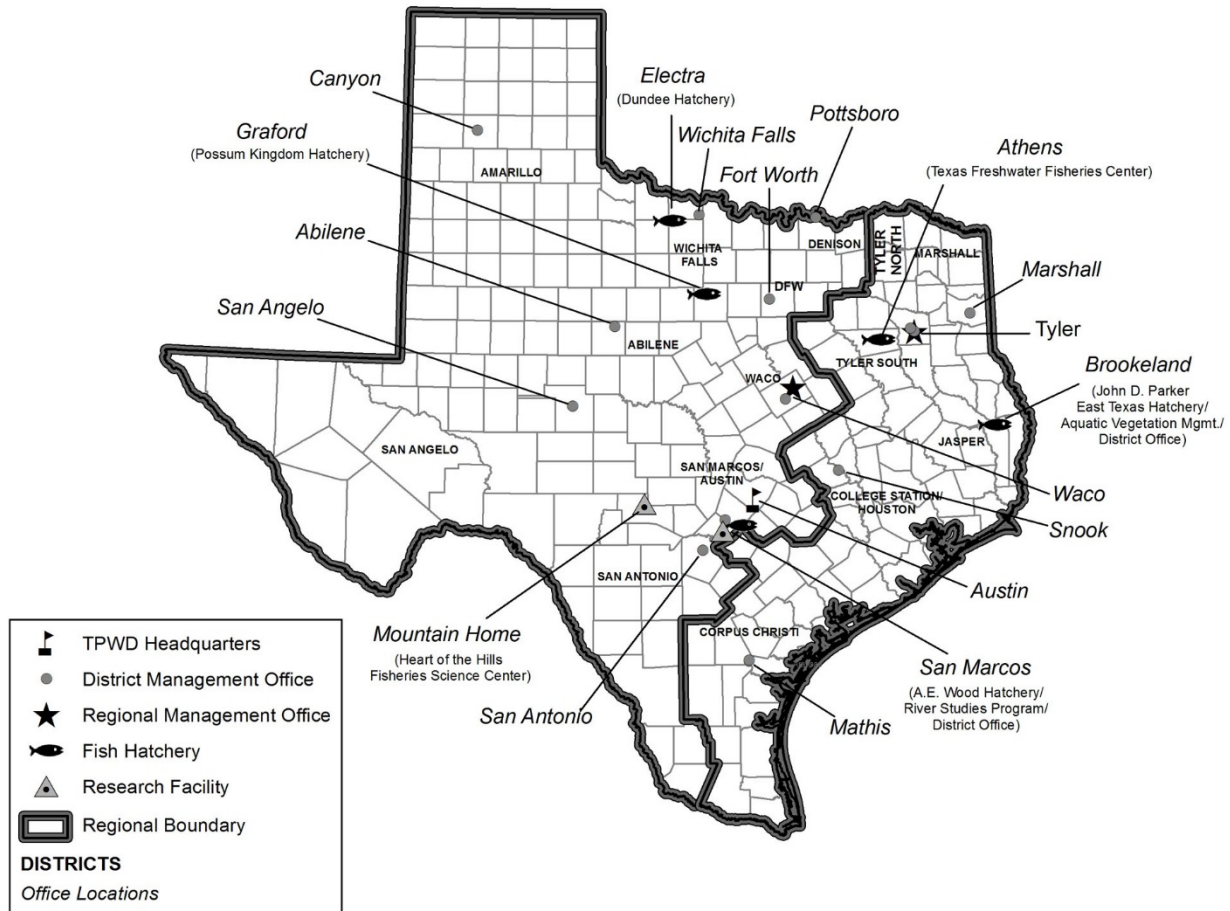
The division goals were developed to address the major issues facing the freshwater fisheries resources of Texas.

- 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 212 positions assigned to management, hatchery, research, outreach, habitat, analytical services, and administrative branches. For details, see Appendix – Organization Charts.

## Facilities



## Contact Information

Inland Fisheries Division • Texas Parks and Wildlife Department  
 4200 Smith School Road • Austin, Texas 78744  
 (800) 792-1112 or (512) 389-4444 • [www.tpwd.texas.gov](http://www.tpwd.texas.gov)



## Funding and Allocation

In FY18, \$20,604,599 was budgeted for Inland Fisheries (not including fringe benefits or capital construction). Federal Aid grants are expected to reimburse the Department \$8,996,596 on eligible Inland Fisheries activities. The allocation of Federal Aid monies was \$2,489,383 for Fish Hatchery and Laboratory facilities and \$6,507,213 for Management and Research, Habitat, Outreach, and Administrative services.

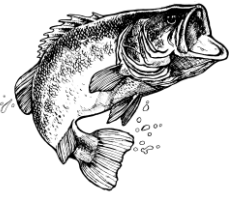
### FY18 Budget by Program

Administration	\$2,921,847
Management and Research	\$5,579,210
Hatcheries and Laboratory	\$5,269,227
Habitat/Aquatic Invasive Species	\$5,498,555
Outreach/Texas Freshwater Fisheries Center	\$1,335,760
<b>Total FY18 w/o fringe</b>	<b>\$20,604,599</b>



# WHAT WE DO

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## Administration

The administrative function of the Inland Fisheries Division occurs at Texas Parks and Wildlife Department headquarters in Austin. The administrative staff provides critical leadership, management of budgets and grants, and managerial support to a number of field offices that work to carry out the mission of the division, largely outside the walls of headquarters. The Inland Fisheries Division seeks to maximize collaborative efforts between 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 Texas Freshwater Fisheries Center (outreach).

## Habitat Conservation

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 non-governmental 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



*Fish sampling on the Llano River helps monitor the success of habitat restoration efforts.*

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



*Management biologists sample striped bass at Lake Texoma.*

The division's fisheries management program 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 statistically 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 16 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

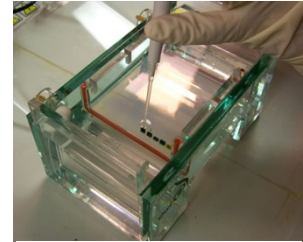
Hatcheries serve as an important component of Inland Fisheries resource management. Fish stocking is one of several essential tools used to protect, manage and enhance statewide fisheries resources and achieve specific fisheries resource objectives. Stocked fish must meet specific requirements including 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, TPWD hatcheries play a significant role in public education. 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.



*Staff collect broodfish below Lake Livingston dam for producing hybrid striped bass.*

## Analytical Services

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



The Fish Health and Genetics Laboratory provides specialized expertise in fish health and genetics and in support of hatchery discharge permits. In-house expertise facilitates timely and efficient response to emerging and ongoing concerns. Fish health expertise imparts an ability to focus on specific pathogens of interest. Genetics expertise and equipment are used to facilitate management and advance scientific knowledge of important sport fish including Largemouth Bass, Striped Bass, and catfishes, along with species of concern such as Guadalupe Bass and the Pecos River Pupfish. In the case of fish kill investigations, the lab may work to analyze both biological and chemical agents of concern.

*Laboratory staff use an agarose gel to analyze DNA samples.*

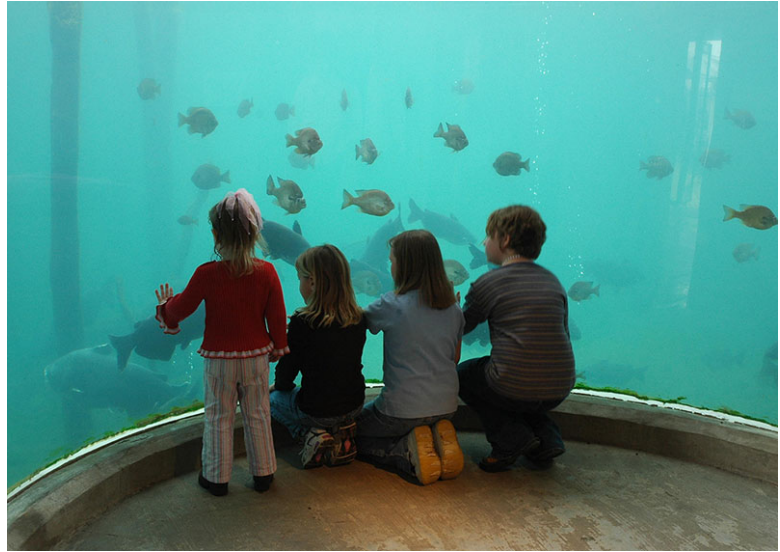
## Information and Regulations

The Information and Regulations group 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

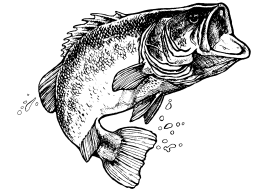
The Texas Freshwater Fisheries Center (TFFC) in Athens is a multipurpose facility that provides educational experiences to the public while producing millions of fish each year to meet the stocking needs of fisheries managers. TFFC also serves as headquarters for the Toyota ShareLunker program. Over 30,000 people 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 work, and great fishing experiences.

# KEY ACCOMPLISHMENTS

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## Fish Habitat Improvement Efforts

The Inland Fisheries Division was an early supporter of the National Fish Habitat Action Plan, National Fish Habitat Partnership (NFHP), and Fish Habitat Partnerships (FHPs), playing active leadership roles in the steering committees and science teams of the Southeast Aquatic Resources Partnership (SARP), Desert Fish Habitat Partnership (DFHP), and Reservoir Fisheries Habitat Partnership (RFHP). Contributions have included engaging the Texas Congressional delegation to support passage of the National Fish Habitat Conservation Act;



*Installation of fish-attracting brush piles at Lake Georgetown*

co-authoring the 2012 National Fish Habitat Action Plan, SARP Southeast Aquatic Habitat Plan, and RFHP Strategic Plan; and co-authoring the 2015 National Fish Habitat Assessment. In FY2018, Inland Fisheries hosted meetings of the Reservoir Fisheries Habitat Partnership and National Fish Habitat Board, which brought public and private partners together from across the United States to discuss fish habitat issues, state-of-the-art science, outreach initiatives and habitat improvement projects in reservoirs, rivers and streams.

From 2008 through 2018, 75 fish habitat projects were supported in Texas through \$1,140,000 in funding from SARP, DFHP, and RFHP. Those projects resulted in the restoration, enhancement, or protection of more than 10,000 acres of fish habitats in the ciénegas, creeks, rivers, and reservoirs listed below, eight of which were recognized as NFHP “Waters to Watch” (lakes Houston, Conroe, Livingston, and Wichita, the Rio Grande, Balmorhea Springs, and the Blanco and Llano rivers).

### Southeast Aquatic Resources Partnership

- 51 projects supported in Texas through \$882,500 in funding
- 35 habitat restoration projects completed at Caddo Lake (1), Blanco River (7), Llano River (15), Pedernales River (7), and James River (5)
- 6 conservation assessments conducted (e.g., James River springs assessment, James River aquatic gap sampling, Llano River habitat mapping using side-scan and sUAS)
- 6 conservation plans assembled (e.g., Master Plan for the South Llano River Conservation Demonstration Area, Upper Llano River Watershed Conservation Plan, Hill Country Rivers Restoration Guidelines)

- 4 conservation demonstration projects conducted (e.g., Blanco River flood recovery and South Llano River fire recovery workshops and field-based demonstration of best management practices)

### **Desert Fish Habitat Partnership**

- 5 habitat projects completed in Texas at Alamito Creek (2), Rillito Springs, and Phantom Springs Ciénega (2)

### **Reservoir Fisheries Habitat Partnership**

- 16 fish habitat enhancement projects supported in Texas through \$128,000 in funding at lakes Conroe (2), Palestine (2), Livingston (4), Possum Kingdom, Austin, Canyon (2), Fork (2), Buchanan, and John Paul Landing
- 1 multi-lake fish habitat study at lakes Sam Rayburn, Nacogdoches, Naconiche, Toledo Bend, Conroe, and Fork
- 2 additional fish habitat projects were approved at the 2018 Annual RFHP Meeting (\$30,000, Lake Lewisville; \$25,000, Lake Coleman), contingent upon grant awards from U.S. Fish and Wildlife Service
- RFHP projects are supported by 24 public Friends of Reservoirs Chapters in Texas, more than any other state in the Nation

## **Monitoring, Management Plans and Permits**

**Reservoir Surveys** — Staff conducted 305 surveys of fish populations, habitat, water quality, and angler use on 141 reservoirs covering 1,208,445 surface acres of water. These led to the production of 40 comprehensive reservoir fisheries management plans designed to improve freshwater fishing opportunities.

**River Surveys** — Staff conducted 53 surveys to assess the status of fish communities, freshwater mussels, benthic invertebrates, aquatic and riparian habitats, and recreational use in selected rivers including mainstem reaches and tributaries of the Angelina, Blanco, Bosque, Brazos, Canadian, Colorado, Comal, Conchos, Devils, Frio, Guadalupe, Little, Llano, Neches, Rio Grande, Sabine, San Gabriel, San Marcos, and Trinity rivers. Surveys helped inform a variety of river recreation and other public access improvements, along with conservation projects including riparian invasive species control, riparian vegetation recolonization, water management decisions, fish and freshwater mussel species distribution modeling, aquatic life use assessments, fish passage, restoration of Guadalupe Bass populations, and other native fish conservation efforts. Focal species for river fish surveys included Guadalupe Bass, Largemouth Bass, Alligator Gar, American Eel, Blue Sucker, Devils River Minnow, Conchos Pupfish, Shoal Chub, Plains Minnow, Sharpnose and Smalleye Shiner, and White Bass.

**Fish Health Investigations** — A.E. Wood and collaborating laboratories investigated 43 fish health cases, analyzing approximately 1,762 fish. A total of 150 water samples were processed for zebra mussel larvae or DNA and 136 samples were analyzed for *Prymnesium parvum* (golden alga) toxicity and presence in public lakes. In addition, the laboratories completed 22 genetics projects with 2,208 samples.



**Permits** — The division issued 29 permits authorizing private partners to introduce fish into public waters to enhance fishing opportunities and 44 permits for commercial harvest of nongame fishes from public waters. Introduction permits were also issued for aquatic plant restoration (3) and for relocation of aquatic resources (82) to minimize impacts of projects that temporarily disturbed aquatic habitats. Staff issued 214 permits or renewals authorizing possession of prohibited exotic fish, shellfish, or aquatic plants for the purpose of invasive plant management (37); fish/shrimp aquaculture (92); culture of water spinach as a food source (48); research (26); and zoological display (11). Staff issued 1,022 permits to stock Triploid Grass Carp for biological control of nuisance vegetation, authorizing a total of 30,745 fish. One broodfish collection permit and a permit authorizing interstate transport of an exotic species were also issued. In addition, sand and gravel permits for disturbing or taking sedimentary material within navigable streams were issued for pipeline/utility line crossings (4), road crossings (2), and channel stabilization and maintenance (6).

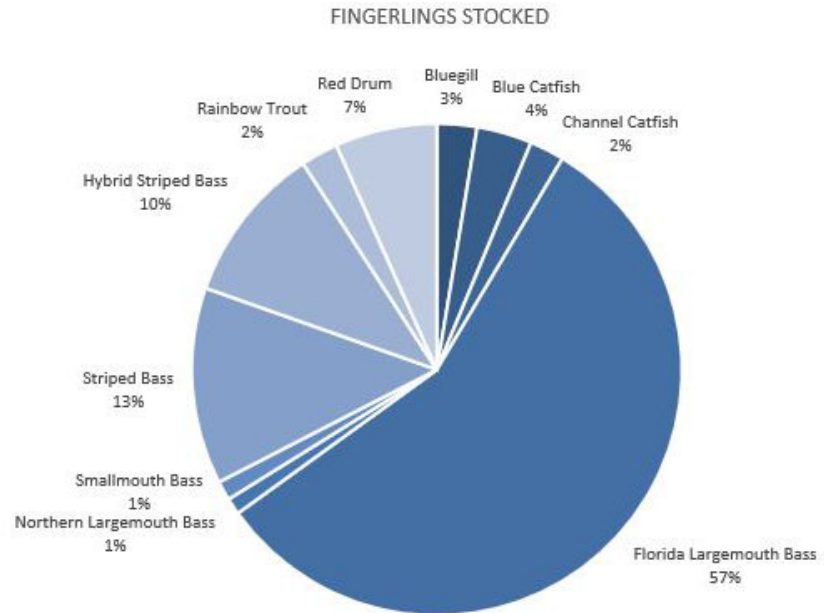
## **Applied Management and Conservation Actions**

**Zebra Mussel Monitoring & Prevention** — TPWD and a growing number of partners continue to intensively monitor more than 60 water bodies 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, 15 Texas lakes across five river basins were classified as infested, meaning the lake has an established, reproducing population. Zebra mussels or their larvae had been found more than once in six other lakes and in rivers downstream of infested waters. As part of efforts to prevent further spread of this highly invasive species, TPWD and partners continued a targeted outreach campaign encouraging boaters to Clean, Drain and Dry and Protect the Lakes You Love. Outreach expanded to more than 200 marinas.

**Aquatic Vegetation Control** — Mother Nature provided much-needed assistance with control of giant salvinia and water hyacinth. A cold weather event in January 2018, followed by spring periods of high flow, substantially reduced non-native aquatic vegetation in much of the state. However, by late spring both giant salvinia and water hyacinth were showing signs of recovery. TPWD and partners continued efforts to control these invasive plants through integrated pest management. Herbicide treatments were applied to 12,255 acres of giant salvinia and 2,001 acres of water hyacinth. While the January cold snap helped with vegetation control, it also killed most of the giant salvinia weevils. TPWD and its partners reared and released 388,527 adult giant salvinia weevils across East Texas to rebuild those populations.

### Hatcheries and Stocking —

In fiscal year 2018, a total of 13.6 million fingerlings were produced and stocked in public water. Species stocked included Largemouth Bass, Guadalupe Bass, Striped and hybrid striped bass, Channel Catfish, Blue Catfish, Smallmouth Bass, Bluegill, Walleye, 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 fingerlings (12-14 inch) stocked



in support of the Neighborhood Fishin' Program are acquired from a commercial producer. The majority of fingerlings stocked are Largemouth Bass (56%) or Striped/hybrid striped bass (23%) which together comprise approximately 79% of the total number of fingerlings stocked. Hatchery staff drove more than 202,063 miles during more than 837 stocking trips to distribute the fish to more than 384 water bodies.

**Regulation Updates** — As part of an effort to make fishing regulations easier to understand and enforce, Inland Fisheries staff worked with the Texas Parks & Wildlife Commission to modify or eliminate site-specific Largemouth Bass limits on 20 reservoirs:

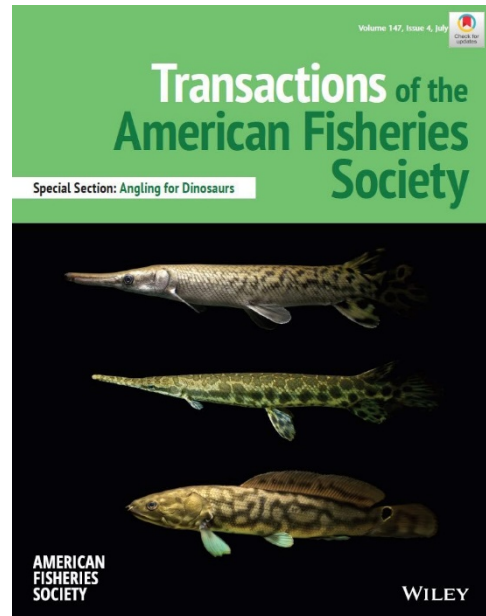
- Twelve lakes that had slot limits or other special regulations for Largemouth Bass reverted to the statewide 14-inch minimum length and five fish per day bag limit. These include lakes Bridgeport, Bryan, Burke-Crenshaw, Cooper, Georgetown, Granbury, Madisonville, Old Mount Pleasant City, Possum Kingdom, Ratcliff, San Augustine City, and Sweetwater.
- Fayette, Gibbons Creek, and Monticello reservoirs now have a 16- to 24-inch slot limit. Only one of the five-bass daily bag can be longer than 24 inches.
- Anglers at Lake Raven and Purtis Creek State Park Lake (formerly catch-and-release for Largemouth Bass) can now keep up to five bass per day with a 16-inch **maximum** length limit. The same limit applies to lakes Bellwood and Davy Crockett. At these four lakes, a bass measuring 24 inches or more may be temporarily retained and weighed for possible submission to the Toyota ShareLunker Program.
- Grapevine Lake no longer has a slot limit or minimum length limit on Largemouth Bass. However, only two of its five-fish daily bag can measure less than 18 inches.

**Looking ahead.** Management and Research formed a committee to explore new harvest regulation options and identify new research needs for catfishes in Texas. Their actions are guided by the Statewide Catfish Management Plan developed in 2016. The committee is analyzing existing data sets and seeking opinions of district management biologists and catfish anglers. The goal is to recommend a set of new harvest regulations that will help us achieve fisheries management goals identified in our statewide plan.

## Research Highlights

**AFS Special Journal Section on Ancient Fishes** — A special section of the journal *Transactions of the American Fisheries Society* was released that focused on ancient fishes. A section titled “Angling for Dinosaurs” presented a series of new research articles on the biology, ecology, and conservation of ancient sport fish, specifically gars and bowfins. TPWD scientists contributed seven of 11 articles published, highlighting research on gar survey, sex identification, and age estimation methodology; coastal population trends; population responses to harvest; and floodplain inundation modeling to assess recruitment success.

**Other Publications** - TPWD scientists published 11 additional papers in FY2018. These publications covered a range of topics including mussel identification and conservation; Guadalupe Bass production, genetics, ecomorphology; and invasive species control.



## Outreach

**Alligator Gar Media Blitz and Public Survey** — Interest in Alligator Gar continues to increase, yet management of this species is still in its infancy. Data from recent statewide surveys suggest that about 100,000 Texans fish for Alligator Gar. These include rod-and-reel, bow, jugline and trotline fishers. Texas Alligator Gar fisheries also support a thriving guide industry, serving clients from all over the world. Over the past decade, TPWD has put significant effort into studying Alligator Gar. To share its findings with the public, the department launched a media blitz and unveiled a website ([tpwd.texas.gov/texasgar](http://tpwd.texas.gov/texasgar)) to provide anglers



and non-anglers with science-based information and clear up some misconceptions surrounding our state's largest freshwater fish. Between content shared on social media and news articles that were published, over 1 million people were reached with our educational messages.

While a great deal is now known about Alligator Gar, relatively little is known about the anglers who

fish for them. To address this information gap, the website hosted a link to a constituent survey. The survey attracted almost 13,000 people, of which 8,600 provided responses. Substantial information about angler preferences, attitudes, and opinions was acquired and will be used to inform future management.

**Increased Hall of Fame and ShareLunker Promotion** — In FY18, the division moved to begin promotion of the Texas Freshwater Fishing Hall of Fame and Toyota ShareLunker at the Toyota Bassmaster Texas Fest, an Elite Series Bass Tournament benefiting the Texas Parks and Wildlife Department. We leveraged relationships with Bassmaster and Gulf States Toyota to deliver on-stage award presentations and written articles in Bassmaster Magazine and Bassmaster.com. We promoted these programs and related videos on Bassmaster Live, ESPN network television, and through digital advertising media on Bassmaster.com. The move helped increase statewide and national exposure of these valued programs supported by our department at a reduced cost to the agency.



**Sharing the Great Outdoors** – Texas Freshwater Fisheries Center (TFFC) is our division’s primary outreach and education center. In FY18, TFFC provided facility tours, workshops, aquatic education classes, and other special events. Visitors included 33,864 people from 144 Texas counties, 45 states and 11 foreign countries. The Center provided hands-on fishing for 20,659 visitors, with 449 receiving First Fish Awards. A total of 12,981 people toured the hatchery ponds via guided tram.

**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 2018, we had 488 entries from grades K-12. The top 10 contestants in each of four grade divisions were recognized with an awards ceremony, luncheon, fishing gear, and a day at TFFC.

**Merit Badge University** – TFFC partnered with Boy Scouts of America Circle 10 to launch a conservation-themed Merit Badge University on the TFFC campus. Over 300 scouts from across northeast Texas attended and were educated in such topics as fly-fishing, archery, and plant identification.

**Working with Schools** – TFFC facilitated intensive aquatic science training for school groups such as the Outdoor Education class from Stephenville High School, and Science Academy for all eighth-grade students of Eustace ISD.



## Infrastructure Enhancements

Construction and renovation efforts continued at several facilities including the Texas Freshwater Fisheries Center (TFFC) and A.E. Wood Fish Hatchery. Renovation of the ozone disinfection system at TFFC, the incubation system at the A.E. Wood Fish Hatchery, and upgrades to the SCADA systems at three facilities (A.E. Wood, ETFH and Possum Kingdom) were completed. The projects will offer improved operational effectiveness and provide greater operational flexibility. Major projects scheduled in 2019 include a micro-filtration facility at Possum Kingdom Hatchery to mitigate the potential impact of zebra mussels, and an effluent pump back and ozone disinfection system at the Dundee Fish Hatchery to mitigate toxic golden algae and provide a way to sustain operations during drought conditions.



*A newly renovated incubation system will improve operations at A.E. Wood Hatchery.*

## Agency-wide Collaboration



**ShareLunker 2.0** - 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. ShareLunker now partners with anglers year-round (Jan 1 – Dec 31) to collect catch and genetic data on bass 8 pounds or 24 inches and larger, and to selectively breed bass 13 pounds and larger during our spawning season (January – March.) 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.

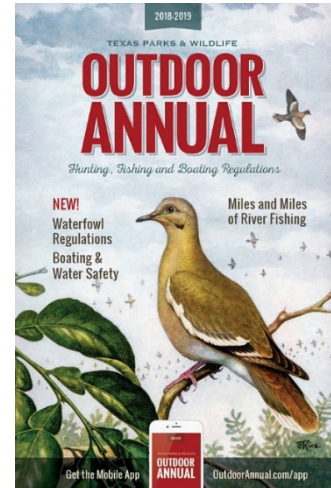
In the inaugural 2018 season ShareLunker had more than 5,000 anglers register to participate and received close to 500 entries from 89 lakes across the state. Of those entries:

- 368 were Lunker Class (8+ lbs)
- 107 Elite Class (10+ lbs)
- 5 Legend Class (13+ lbs)
- 6 Legacy Class (13+ lbs and donated for spawning)

Hatchery staff harvested more than 80,000 fingerlings from the selective breeding of the Legacy Class bass. Over 60,000 of those fingerlings were stocked into reservoirs that loaned a Legacy Class fish. The rest remained at TFFC and will be reared as future ShareLunker brood fish.

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.

**Outdoor Annual Revision** – Each year, staff from Information and Regulations work with other TPWD divisions to update the hunting and fishing regulations booklet. In FY2018, due in part to a new vendor contract, the update became a comprehensive overhaul. An agency-wide team took on the task of reviewing each page of the booklet, reducing redundancy, incorporating new sections on boating and migratory waterfowl regulations, and putting it all into a more user-friendly layout. The finished product was published on schedule and fit within its limited allotment of printed pages.



**Senior Scientist Career Track** – The Division rolled out a plan and began implementation of a Senior Scientist Career Track (SSCT) for employees whose major job focus is devoted to science aspects of our business, such as statewide research or service as a science “expert” in related field(s). This will foster increased levels of collaboration and communication on science-related topics and research across our branches. These benefits should also improve our past effectiveness and efficiencies for providing science-related support or assistance on problem solving at the agency level. Other TPWD resource divisions are considering use of a SSCT within their organizational structures.

Consistent with the implementation of the SSCT, leadership also began work to create a career track for employees whose primary job focus is on team, or programmatic, leadership and supervision. A goal of both tracks is to enhance advancement opportunity and increase retention of NRS V employees who will assume increased levels of responsibility closely tied to the business needs of the Division.

**Recruiting, Retention and Reactivation** - Inland Fisheries staff are participating in an interdivisional team that is evaluating TPWD’s recruitment, retention, and reactivation (R3) efforts. It’s part of a national effort to create new participants in outdoor activities and increase participation rates of current/lapsed outdoor recreationists. For our division, the primary focus is anglers, and ultimately, fishing licenses. During FY18, considerable efforts were made by our fisheries management and research teams to identify and promote public fishing opportunities in our major metropolitan areas (Houston, Austin, San Antonio and DFW), engage new partners, and initiate new research projects to increase efficiency. We also worked with teams in the Communications Division to help increase public awareness about available fishing opportunities and promote current programs such as Neighborhood Fishin’ and Diversified Community Fishing. Our efforts feed into the Recreational Boating and Fishing Foundation’s 60 in 60 campaign, which aims to increase license sales from 46 million to 60 million in 60 months.

# **APPENDIX**



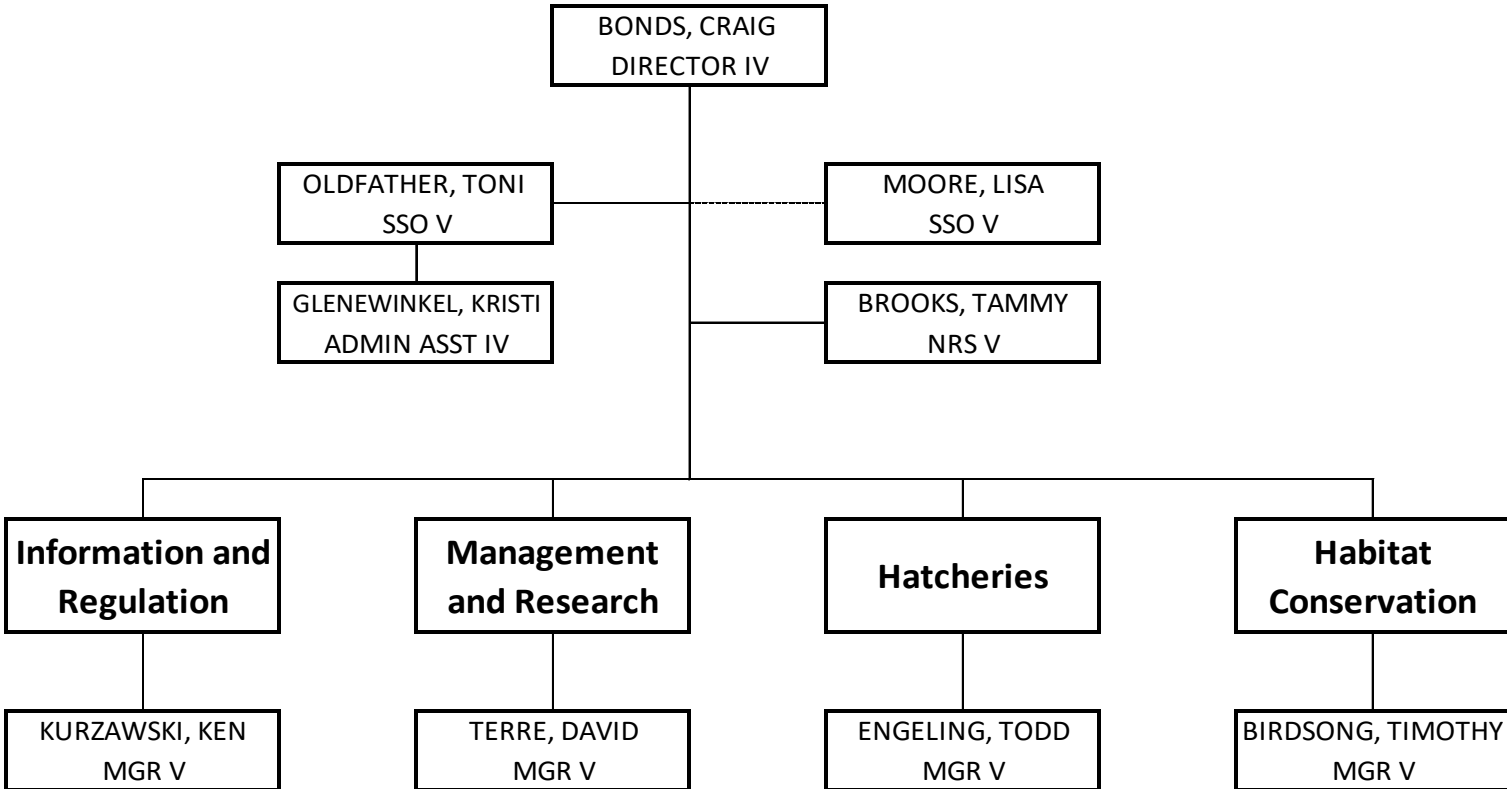


# Organization Charts

## Legend

<b>Abbreviation</b>	<b>Job Title</b>
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

BIRDSONG, TIMOTHY  
MGR V

DUNHAM, JASON  
ADMIN ASST IV

## River Studies

## Environmental Assessment, Response & Restoration

## Aquatic Invasive Species

## River Conservation

## Watershed Conservation

STEVE MAGNELIA  
NRS V

BENNETT, WENDY  
SSO I

ROBERTSON, SARAH  
NRS II

MAYES, KEVIN  
NRS V

ROBERTSON, CLINT  
NRS III

CURTIS, STEPHAN  
NRS II

BOTROS, JOHN  
NRS IV

AZIZ, KARIM  
NRS IV

GRUBH, ARCHIS  
NRS IV

LINAM, GORDON  
NRS V

KOŁODZIEJCYK, KEVIN  
FWT III

STEVENS, ALANA  
FWT II

PITTS JR, DONALD  
NRS V

GREGORY, JOHANNA  
NRS V

SCHRIFT, ANGELA  
NRS IV

BURGER, KATHRYN  
NRS II

CONLEY, GREGORY  
PS V

TIDWELL, MICHAEL T.  
PS II

McGARRITY, MONICA  
NRS V

REYNOLDS, LAUREN  
NRS III

ENGLAND, ANGELA  
NRS III

THOMPSON, PATRICIA  
NRS II

EGGERS, KRISTEN  
FWT I

PARKER, MELISSA  
NRS V

BEAN, MEGAN  
NRS III

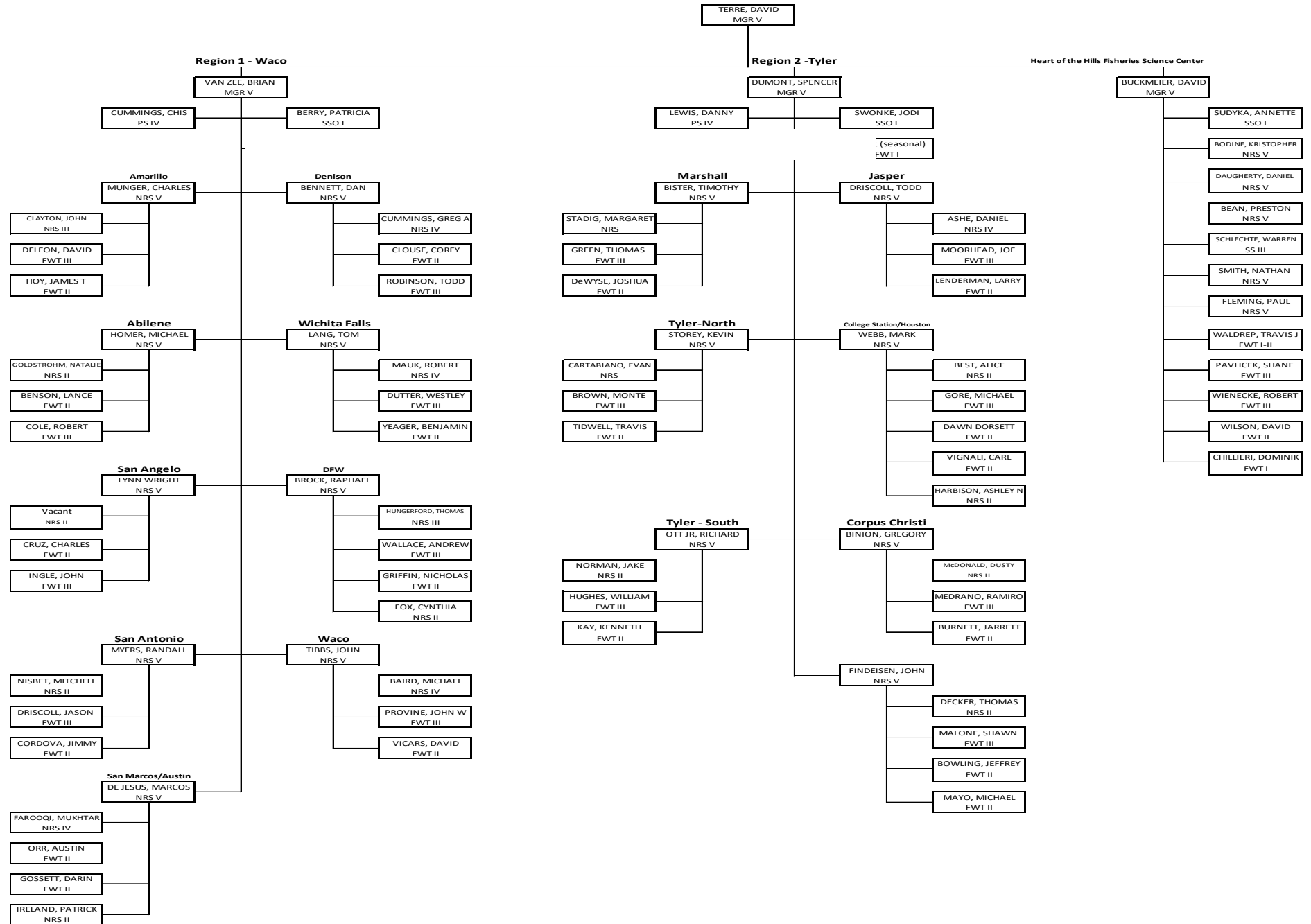
Vacant  
NRS II

HEGER, THOMAS  
NRS V

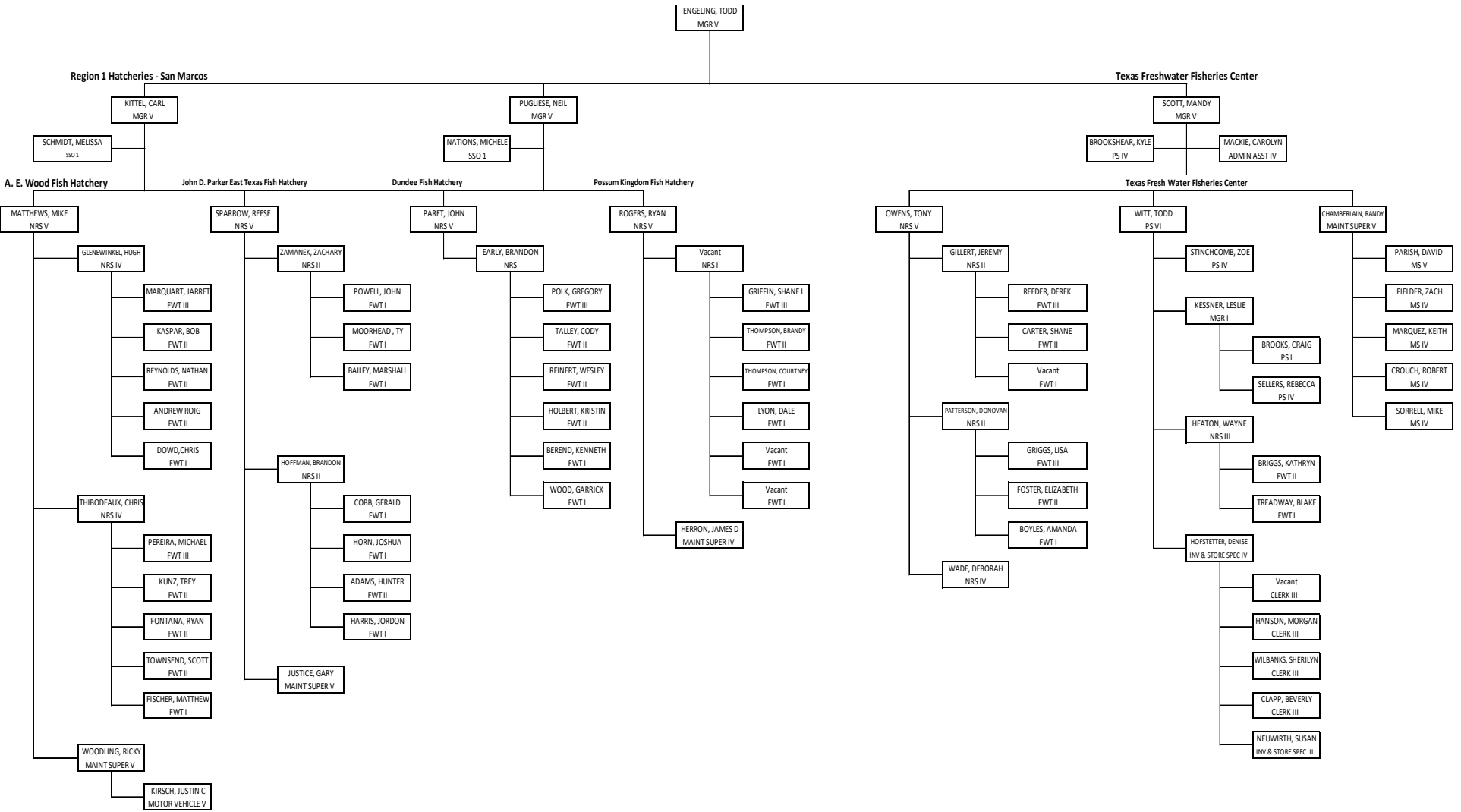
BENDIK, BETH  
NRS IV

MCGILICUDDY, RYAN  
NRS IV

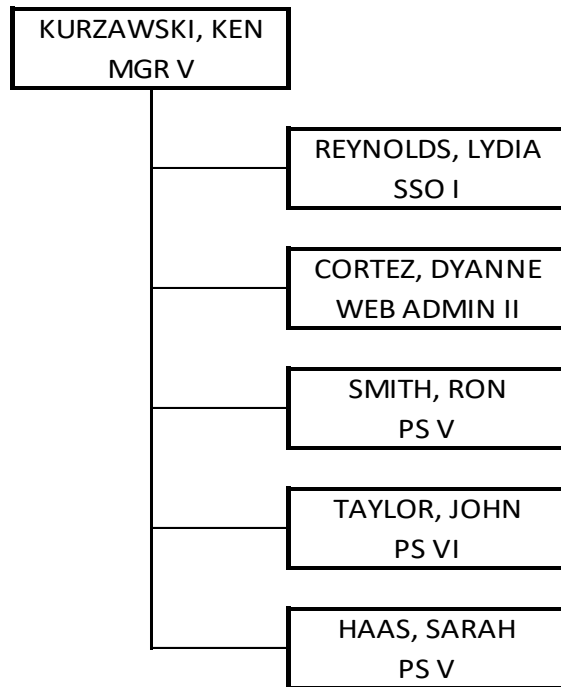
# Fisheries Management and Research



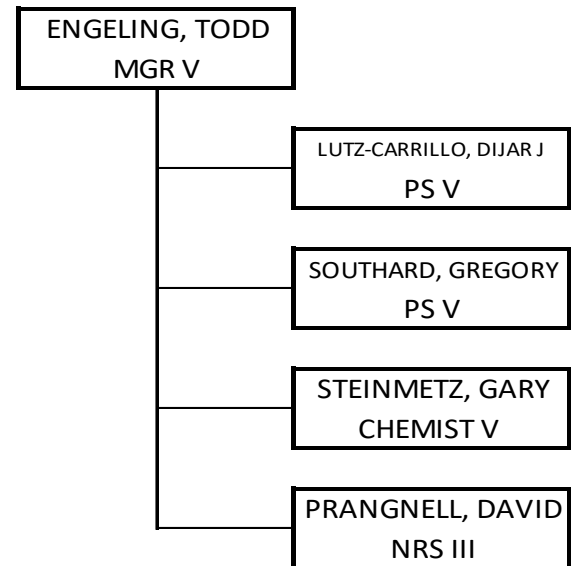
# Hatcheries



## Information and Regulations



## Analytical Services



# Stocking Reports

## Inland Fisheries Hatchery Stockings

Species	Adult	Fingerling	Fry	Total
Blue Catfish		496,031		496,031
Bluegill		358,416		358,416
Channel Catfish		310,992	126,027	437,019
Florida Largemouth Bass	58	7,684,951	744,277	8,429,286
Guadalupe Bass	37		44,475	44,512
Largemouth Bass		148,912		148,912
Palmetto Bass (striped X white bass hybrid)		1,194,445	2,517,581	3,712,026
Rainbow Trout	334,990			334,990
Red Drum		914,753		914,753
ShareLunker Largemouth Bass		61,414		61,414
Smallmouth Bass		172,831		172,831
Striped Bass	25	1,759,203	2,687,247	4,446,475
Sunshine Bass (white X striped bass hybrid)		223,919		223,919
Walleye			2,750,838	2,750,838
Grand Total	335,110	13,325,867	8,870,445	22,531,422

## **Research and Special Projects**

Research works to improve the efficiency and effectiveness of division operations and programs. This year progress was made on 48 studies that focused on:

### **Increasing hatchery production of fish and improving fish production protocols (8 studies)**

Highlights:

- Post-stocking survival of Guadalupe Bass fry in hatchery ponds
- Developing best practices for spawning Smallmouth Bass
- Fish disease and algal control in hatcheries

### **Managing and understanding the ecology of river fishes (11 studies)**

Highlights:

- Assessing population and recruitment dynamics of Alligator Gar
- Habitat association of Rainbow Trout in a tailwater
- Assessing Guadalupe Bass population densities and movements in central Texas rivers
- Determining age and swimming performance of Blue Sucker

### **Largemouth bass genetics and management (6 studies)**

Highlights:

- Comparing growth of ShareLunker offspring and other Florida Largemouth Bass
- Economic value of large fishing tournaments at Lake Fork
- Genetic assessment of relatedness among ShareLunker program entries

### **Catfish management (5 studies)**

Highlights:

- Relative catchability of Channel Catfish and hybrids by anglers
- Assessing harvest and identifying catfish regulations to achieve fishery objectives



### **Aquatic invasive species management or control (4 studies)**

Highlights:

- Identifying treatments for preventing zebra mussel transfers during fish transport
- Evaluating treatments for controlling golden alga blooms and toxicity

### **Fish habitat improvement (2 studies)**

Highlights:

- Using fish attractors to enhance aquatic habitat

### **Development and validation of new techniques (6 studies)**

Highlights:

- Evaluation of sampling gears for estimating river-reservoir ecosystem fish assemblages
- Using low cost side-scan sonar technology for identifying fish
- Validating age estimation procedures

### **Recruiting anglers, urban fisheries, and other studies (6 studies)**

Highlights:

- Developing partnerships and identifying marketing strategies to recruit anglers
- Understanding Alligator Gar angler perceptions
- Evaluating stocking success of hybrid Striped Bass

# Publications and Presentations

## Scientific Publications and Reports

- Buckmeier, D. L., P. C. Sakaris, and D. J. Schill. 2017. Validation of annual and daily increments in calcified structures and verification of age estimates. Pages 33-79 in M. C. Quist and D. A. Isermann, editors. Age and growth of fishes: principles and techniques. American Fisheries Society, Bethesda, Maryland.
- Cummings, G. 2018. Proposed standard length categories for Guadalupe Bass. Management Data Series number 294. Texas Parks and Wildlife Department, Austin.
- Fleming, B. P., D. J. Daugherty, N. G. Smith, and R.K. Betsill. 2018. Efficacy of low-cost, side-scan sonar for surveying Alligator Gar. Transactions of the American Fisheries Society 147:696-703.
- Grubh, A. R., and K. O. Winemiller. 2018. Spatiotemporal variation in wetland fish assemblages in the Western Ghats region of India. Knowledge & Management of Aquatic Ecosystems 419:35.
- Hess, M. C., K. Inoue, M. Hart, C. Robertson, E. Tsakiris, and C. Randklev. 2018. Misidentification rates of sex for *Lampsilis teres*, Yellow Sandshell, and its implications for mussel conservation. PLOS ONE. DOI:[10.1371/journal.pone.0197107](https://doi.org/10.1371/journal.pone.0197107).
- Hoffmann, K. E., M. E. McGarrity, and S. A. Johnson. 2018. Lack of behavioral and chemical interference competition for refuges among native treefrogs and invasive Cuban treefrogs (*Osteopilus septentrionalis*). Diversity 10:78.
- Li, S., P. Wang, Z. Su, E. Lozano, O. LaMaster, J. B. Grogan, Y. Weng, T. Decker, J. Findeisen, and M. McGarrity. 2018. Endocrine-induced abnormal growth forms of invasive giant salvinia (*Salvinia molesta*). Scientific Reports 8:8006.
- Lutz-Carrillo, D. J., M. Husemann, P. T. Bean, J. C. Williamson, M. J. De Jesús, and J. W. Ray. 2018. Hybridization and genetic structure in Texas' phenotypic Spotted Bass. Transactions of the American Fisheries Society 147:891-905.
- Matthews, M. D., D. Prangnell, and H. Glenewinkel. 2017. Sensitivity of Guadalupe Bass swim-up fry to hyperoxia. North American Journal of Aquaculture 79:289–298.
- Pease, J. E., T. B. Grabowski, A. A. Pease, and P. T. Bean. 2018. Changing environmental gradients over forty years alter ecomorphological variation in Guadalupe Bass *Micropterus treculii* throughout a river basin. Ecology and Evolution. Early view published online 30 July 2018.
- Pieri, A. M., K. Inoue, N. A. Johnson, C. Smith, J. L. Harris, C. Robertson, and C. R. Randklev. 2018. Molecular and morphometric analyses reveal cryptic diversity within freshwater mussels (Bivalvia: Unionidae) of the Western Gulf coastal drainages of the United States. Biological Journal of the Linnean Society. DOI:[10.1093/biolinnean/bly046](https://doi.org/10.1093/biolinnean/bly046).

Randklev, C. R., T. Miller, M. Hart, J. Morton, N. A. Johnson, K. Skow, K. Inoue, E. T. Tsakiris, S. Oetker, R. Smith, C. Robertson, and R. Lopez. 2018. A semi-arid river in distress: contributing factors and recovery solutions for three imperiled freshwater mussels (Family Unionidae) endemic to the Rio Grande Basin in North America. *STOTEN* 631-632:733-744.

Robertson, C. R., K. Aziz, D. L. Buckmeier, N. G. Smith, and N. Raphael. 2018. Development of a flow-specific floodplain inundation model to assess Alligator Gar recruitment success. *Transactions of the American Fisheries Society* 147:674-686.

Stein, J. A., S. M. King, D. L. Buckmeier, and N. G. Smith. 2018. Comment: The challenge of age estimation in gars (*Lepisosteus* spp.). *Transactions of the American Fisheries Society* 147:649-652.

## Technical Presentations

A total of 72 presentations were given by staff as author or co-author, at 38 professional meetings or conferences. Venues included:

- American Fisheries Society, annual meeting, Atlantic City, NJ
- Brazos River Authority Rules and Regulations Training, Granbury, TX
- Capital Area Council of Governments Regional Environmental Task Force, Leander, TX
- Colorado River Alliance Barstow Speaker Series, Austin, TX
- Conservation Science Webinar Series, USFWS National Conservation Training Center
- Cypress Basin Clean Rivers Program, Hughes Springs, TX
- Desert Fishes Council, annual meeting, San Luis Rio Colorado, Mexico
- Earthmoving Contractors Association of Texas, Lubbock, TX
- FLOW 2018, Fort Collins, CO
- Frio River Landowner Workshop, Leakey, TX
- Guadalupe-Blanco River Basin, coordination meeting, Seguin, TX
- Gulf of Mexico Oil Spill and Ecosystem Science Conference, New Orleans, LA
- Gulf and South Atlantic Regional Panel of the Aquatic Nuisance Species Task Force, Jackson, MS
- Lake Cherokee Water Board Meeting, Longview, TX
- Mid-continent Warm Water Fish Culture Workshop, Mount Magazine, AR
- Native Plant Society of Texas – Kerrville Chapter, Kerrville, TX

- Natural Disaster Operational Work Group & U.S. Coast Guard Pollution Responder College, Corpus Christi, TX
- Red River Authority, annual meeting, Wichita Falls, TX
- Regional Water Alliance, New Braunfels, TX
- Reservoir Fish Habitat Partnership, State College, PA
- Sabine River Clean Rivers Program, Longview, TX
- Southeastern Association of Fish and Wildlife Agencies, annual meeting, Louisville, KY
- Southern Division American Fisheries Society, annual meeting, San Juan, PR
- Southwestern Association of Naturalists, annual meeting, San Marcos, TX
- Surface Water Quality Monitoring Workshop, Bandera, TX
- Texas A&M Soils and Water Conservation Society, College Station, TX
- Texas Aquatic Plant Management Society, San Antonio, TX
- Texas Chapter American Fisheries Society, annual meeting, College Station, TX
- Texas Commission on Environmental Quality Dam Safety Conference, Austin, TX
- Texas Commission on Environmental Quality Dam Safety Conference, Granbury, TX
- Texas Invasive Species Coordinating Committee, public meeting, Austin, TX
- Texas Master Naturalist Meeting, Corpus Christi, TX
- Texas Master Naturalist, annual meeting, Georgetown, TX
- Texas Master Naturalists Chapter Trainings, Huntsville and Kerrville, TX
- Texas Zebra Mussel Prevention and Management Partner Webinar Meeting
- Upper Guadalupe River Authority, board of directors meeting, Kerrville, TX
- Women in Science and Engineering Annual Conference, San Marcos, TX
- World Wetlands Day Event, Karnack, TX

## Popular Articles

Forty-seven popular articles were written and published by Inland Fisheries staff in seven different publications. Popular articles were produced by Dyanne Cortez (4) and five Inland Fisheries management district offices: Abilene (19), Jasper (12), San Angelo (3), College Station/Houston (8), and Waco (1). A total of 125 press releases on aquatic natural resources, fisheries management, and recreational fishing opportunities were provided to TV, radio, news, and outdoor-related media outlets by management district offices and habitat conservation teams. There were 158 social media posts with a reach of 758,531 people and 112,909 people engaging.

## Outreach Events

Inland Fisheries staff members were event leaders at 238 outreach events for targeted user groups (youth under 17, minorities, women, and physically challenged) in which 21,987 individuals participated.

	<b>Youth 17 &amp; under</b>	<b>Adults</b>	<b>Total</b>
Males (1)	7,729	3,361	11,090
Females (2)	7,035	3,862	10,897
Minorities	6,174	1,993	8,167
Physically Challenged	361	54	415
Total (1+2)	14,764	7,223	21,987

## Work with Other Organizations

### Program Contracts and Agreements — Outgoing Awards

Angelina and Nacogdoches Counties Water Control and Improvement District	Lake Striker Salvinia Control	\$ 40,000.00
Caddo Biocontrol Alliance	Biological control of giant salvinia	\$ 20,000.00
Camp Huaco Springs	Public Leased Access to the Guadalupe River Trout Fishery at Camp Huaco Springs	\$ 2,600.00
Chautauqua Foundation	Leased Angler Access to the Lower Colorado River at the Texas River School River Camp	\$ 12,000.00
Coastal Water Authority	Control of water hyacinth, <i>Eichhornia crassipes</i> , hydrilla Lake Houston and its tributaries	\$ 25,000.00
Cypress Valley Navigation District	Boat lane maintenance and boater access on Caddo Lake and Big Cypress Bayou	\$ 61,000.00
Devils River Conservancy	Community-Based Restoration within the Devils River Access and Conservation Area	\$ 68,482.00
Devils River Conservancy	Development of a Web-based Clearinghouse Offering Access to Current and Historic Data, Report and Other Pertinent Information from Texas Native Fish Conservation Areas	\$ 93,077.00
Dick's Canoes	Public Leased Access to the Brazos River at Dick's	\$ 31,450.00
Environmental Conservation Alliance	Riparian Productivity along the Middle Trinity River and refinement of riparian productivity versus flow relationships for Texas rivers	\$ 63,010.06
Guadalupe Blanco River Authority	Control of water hyacinth, <i>Eichhornia crassipes</i> , and other aquatic or riparian plant species in the Guadalupe River and its tributaries	\$ 50,000.00
Hill Country Alliance	Landowner and Community Engagement in Control of Arundo and Restoration of Hill Country Rivers	\$ 60,698.00
Hill Country Alliance	Conserving Texas Rivers Initiative: Community Outreach, Education and Capacity Building for Stewardship of Hill Country Rivers	\$ 39,476.00
John Cooke II	Public Leased Access to the Sabine River at FM 1794, Beckville	\$ 21,500.00
Karrie Lera McKeown	Public Leased Access to the Colorado River at 203 Hidden Shores Loop, Smithville	\$ 31,458.00

Keep Texas Beautiful	Organization and Implementation of Litter Clean-up at TPWD River Access and Conservation Area Sites	\$ 4,350.00
Kingsland Slab Group, LLC	River Access Lease Agreement	\$ 23,500.00
Kona Coast Ventures	Public Leased Access to the Guadalupe River Trout Fishery at Whitewater Sports	\$ 3,366.67
Lavaca-Navidad River Authority	Control of water hyacinth, <i>Eichhornia crassipes</i> ; giant salvinia, <i>Salvinia molesta</i> ; and other invasive aquatic or riparian plant species in Lake Texana and its tributaries	\$ 50,000.0
Lower Neches Valley Authority	Control of water hyacinth, <i>Eichhornia crassipes</i> ; giant Salvinia, <i>Salvinia molesta</i> ; and other aquatic or riparian plant species in Sam Rayburn Reservoir and B.A. Steinhagen Reservoir	\$280,000.00
Mountain Breeze Campground	Public Leased Access to the Guadalupe River Trout Fishery at Mountain Breeze Campground	\$ 3,000.04
Nol Dear	Public Leased access to the South Llano River at KC 150	\$ 5,500.00
Nueces River Authority	Arundo Control and Riparian Restoration in the Nueces River Basin: Upper Nueces River	\$ 20,900.00
Nueces River Authority	Arundo Control and Riparian Restoration in the Nueces River Basin: Sabinal, Frio and Dry Frio Rivers	\$ 64,840.00
River Valley Campground (Rio Raft)	Public Leased Access to the Guadalupe River Trout Fishery at the River Valley Campground	\$ 3,015.08
Sandra Hightower	Public Leased Access to the Colorado River at 750 FM 2571, Smithville	\$ 34,631.88
Southeast Aquatic Resources Partnership	Assessment and Prioritization of Barriers in the Upper Guadalupe River Upstream from Canyon Reservoir: A Pilot Project	\$ 74,998.00
Skyline Ranch	Public Leased Access to the Devils River in Val Verde County	\$ 44,000.00
Stephen F. Austin University	Control of <i>Salvinia molesta</i> with an endocide	\$ 49,990.00
Texas A&M University, AgriLife Research	Host Fish Use of Three Rare Central Texas Mussel Species	\$207,361.00
Texas A&M University, ArgiLife Research	Influence of thermal tolerance on population performance of rare and common freshwater mussel species in central and east Texas, and assessment of taxonomic status and population genetic structure of Texas fatmucket throughout its distributional range	\$120,180.00

Texas A&M University, AgriLife Research	Thermal tolerance of <i>Popenaias popeii</i> from the Rio Grande, Texas	\$124,303.00
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 A&M University, AgriLife Research	Mussel Data Collection in the Middle Trinity River	\$ 65,000.00
Texas Conservation Science	Riparian Productivity in the Brazos, Guadalupe and Trinity River Basins	\$ 50,000.00
Texas Conservation Science	Riparian productivity in three Texas river basins	\$ 81,000.00
Texas State University	A Framework for Conservation in the Guadalupe River Basin: Towards Collaborative Stewardship Through Strategic Geographic Prioritization and Stakeholder Coordination	\$120,000.00
Texas State University	Analytical Services Genetics Student Worker Laboratory Assistant	\$ 61,918.42
Texas State University	Dispersal and Migration of Freshwater Mussels	\$ 95,840.00
Texas State University	Dispersal of Zebra Mussels Downstream of Invaded Reservoirs and Assessing the Impact of Zebra Mussels	\$ 64,149.00
Texas State University	Life History, Distribution and Trophic Ecology of the Endangered Comal Springs Dryopid Beetle ( <i>Stygoparnus comalensis</i> )	\$ 42,988.00
Texas State University	The impact of environmental contaminants on Texas unionid mussels in the Guadalupe Basin	\$ 81,915.00
Texas Tech University	Recruitment Dynamics and Reproductive Ecology of Blue Sucker in Texas	\$166,157.00
Texas Tech University	Towards a Better Understanding of Blue Suckers: Validation of Age Determination Methods and Establishing the Influence of Temperature on Aerobic Scope and Swimming Performance	\$131,874.00
Thomas A. Goynes	Public Leased Access to the San Marcos River	\$ 36,000.00
Trout Unlimited	Feasibility Study for Native Fish Establishment in West Texas Streams, including Potential Re-Establishment of Rio Grande Cutthroat Trout in McKittrick Creek, Guadalupe Mountains National Park	\$ 26,225.00
University of Alabama	Impacts of Zebra Mussels on Reservoir Water Quality: Spatio-temporal Patterns	\$ 48,213.00



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 Maternal/Egg Contaminant Analyses	\$ 16,500.00
University of North Texas	Experimental Determination of Host Suitability for Sandbank Pocketbook	\$ 4,548.00
University of Texas Austin	Airborne Lidar bathymetry survey and aquatic habitat evaluation for Devils River Minnow and Texas Hornshell Mussel in the Devils River	\$276,862.00
University of Texas Austin	American Eel: Utilization Modern Techniques to Assess Conservation Status in Texas	\$ 79,945.00
University of Texas Austin	Conserving Texas Biodiversity: Status, Trends and Conservation Planning for Fishes of Greatest Conservation Need	\$833,553.00
University of Texas Austin	Continued Monitoring hydrologic effects of salt cedar control in the Upper Brazos River basin	\$123,521.46
University of Texas Austin	Exploring the distribution of groundwater salamanders and catfish with environmental DNA	\$ 75,288.00
University of Texas Austin	Gap Sampling within the Texas Native Fish Conservation Areas Network	\$173,061.00
University of Texas Austin-BEG	Surface water-groundwater interactions in the Upper Brazos River basin in Texas and quantitative relationship to smalleye and sharpnose shiner reproductive success	\$ 99,935.00
University of Texas Austin-LBJWC	The TexasInvasives.org Program	\$ 93,844.00
University of Texas Austin	Texas Native Fish Conservation Areas Network	\$195,465.00
University of Texas Rio Grande Valley	Impacts of hydrologic alteration on imperiled Brazos River vertebrates	\$ 51,405.00
University of Texas Tyler	Demographic Data for Two State-Threatened Mussels in the Neches River	\$ 15,489.00
William H. Haley, III	Public Leased Access to the Nueces River at 12317 Figueroa St., Corpus Christi	\$ 27,500.00

## Grants and Donations — Incoming Funds

Bass Pro Shops	Gift Cards for ShareLunker prize drawing	\$ 10,000.00
City of Fredericksburg	Healthy Creeks Initiative	\$ 25,000.00
City of Sherman	Artificial Fish Attractor project	\$ 997.84
Texas Parks and Wildlife Foundation	Devil's River conservation project	\$ 55,000.00
Texas Parks and Wildlife Foundation	Conserving Texas Rivers initiative	\$ 76,073.25
Texas Parks and Wildlife Foundation	Neighborhood Fishin' program	\$250,000.00
Brazos River Authority	Habitat Improvement	\$ 15,000.00





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