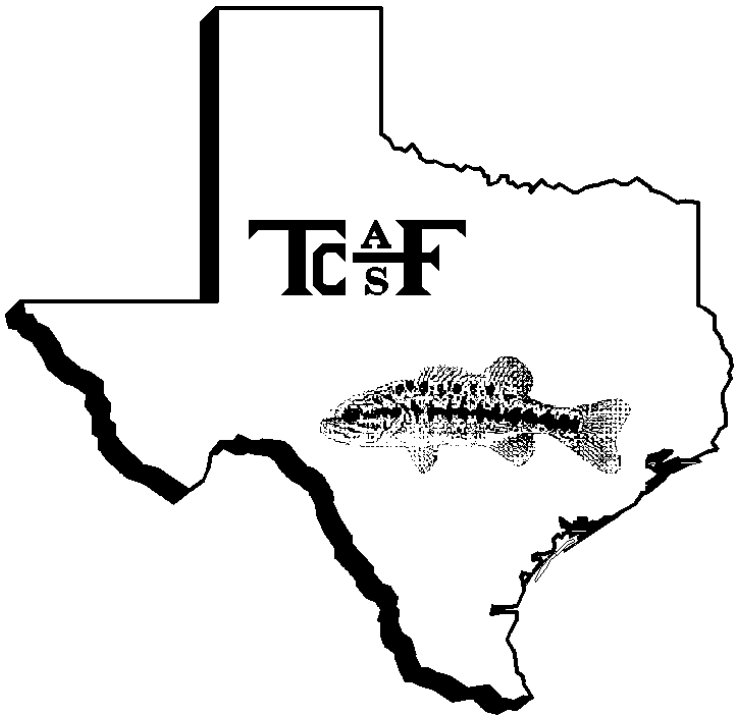
ANNUAL PROCEEDINGS
of the
TEXAS CHAPTER

AMERICAN FISHERIES SOCIETY



Athens, Texas

21-23 January 2010

Volume 32

TEXAS CHAPTER

AMERICAN FISHERIES SOCIETY

The Texas Chapter of the American Fisheries Society was organized in 1975. Its objectives are those of the parent Society – conservation, development and wise use of recreational and commercial fisheries, promotion of all branches of fisheries science and practice, and exchange and dissemination of knowledge about fishes, fisheries, and related subjects. A principal goal is to encourage the exchange of information among members of the Society residing within Texas. The Chapter holds at least one meeting annually at a time and place designated by the Executive Committee.

MEMBERSHIP

Persons interested in the Texas Chapter and its objectives are eligible for membership and should apply to:

Texas Chapter, American Fisheries Society
Secretary-Treasurer
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

Annual membership dues are $12 for Active Members and $5 for Student Members.

ANNUAL PROCEEDINGS OF THE TEXAS CHAPTER AMERICAN FISHERIES SOCIETY

Annual Meeting
21-23 January 2010
Athens, Texas

2010-2011 Officers

Brian Van Zee, President
Texas Parks and Wildlife Department

Ken Kurzawski, President-Elect
Texas Parks and Wildlife Department

Greg Conley, Secretary-Treasurer
Texas Parks and Wildlife Department

Editorial Committee: Tim Birdsong and Dan Daugherty, Co-Chairs

2010

Published by:
Texas Chapter, American Fisheries Society
c/o Texas Parks & Wildlife Department
4200 Smith School Rd
Austin, Texas 78744

TABLE OF CONTENTS

Abstracts of Posters Presented at the Annual Meeting but not Published in the Proceedings

PAST TEXAS CHAPTER PRESIDENTS AND MEETING LOCATIONS

Date	President	Location
1976		College Station
1976	Ed Bonn	Lake Brownwood
1977	Jim Davis	San Antonio
1978	Bill Rutledge	San Marcos
1979	Bobby Whiteside	College Station
1980	Richard Noble	Arlington
1981	Charles Inman	Austin
1982	Gary Valentine	Kerrville
1983	Don Steinbach	Lake Texoma, OK
1984	Gary Matlock	Port Aransas
1985	Maury Ferguson	Junction
1986	Brian Murphy	San Marcos
1987	Joe Tomasso	Kerrville
1988	Dick Luebke	Abilene
1989	Mac McCune	San Antonio
1990	Bobby Farquhar	Lake Texoma, OK
1991	Gene McCarty	Galveston
1992	Bill Provine	Kerrville
1993	Barbara Gregg	Port Aransas
1994	Loraine Fries	Lake Travis
1995	Pat Huston	College Station
1996	Mark Webb	Pottsboro
1998	Katherine Ramos	Athens
1999	John Prentice	Corpus Christi
2000	Paul Hammerschmidt	Bossier City, LA
2001	Charles Munger	San Marcos
2002	Gordon Linam	Junction
2003	Gene Wilde	Galveston
2004	Gary Garrett	College Station
2005	Fran Gelwick	Grapevine
2006	Dave Terre	San Antonio
2007	Debbie Wade	Lake Jackson
2008	Art Morris	Junction
2009	Tim Bonner	Fort Worth
2010	Brian Van Zee	Athens

TEXAS CHAPTER AWARDS RECIPIENTS

1977 Fish Culture - Don Steinbach (TAMU)
Fisheries Management - Edward Bonn (TPWD)
Fisheries Administration - David Pritchard (TPWD)
Fisheries Research - John Prentice and Richard Clark (TPWD)

1978 Fish Culture - Pat Hutson (TPWD)
Fisheries Education - Clark Hubbs (UT)
Fisheries Research - Clark Hubbs (UT)
Special Recognition - Edward Lyles (USFWS)

1979 Fish Culture - Robert Stickney (TAMU)
Fisheries Education - Richard Noble (TAMU)
Fisheries Management - Gary Valentine (SCS)
Fisheries Research - Phil Durocher (TPWD)
Special Recognition - Charles Inman (TPWD)

1980 None

1981 Fish Culture - Billy White (TPWD)
Fisheries Education - Bobby Whiteside (TXSTATE)
Fisheries Management - Steve Smith (TUGC)
Fisheries Research - Al Green (TPWD)
Special Recognition - Jim Davis (TAMU)

1982 Fish Culture - Roger McCabe (TPWD)
Fisheries Research - Clell Guest (TPWD)
Special Recognition - Bob Hofstetter (TPWD)

1983 Special Recognition - Robert Kemp (TPWD)

1984 None

1985 Fisheries Education - Donald Wohlschlag (UTMSI)
Fisheries Research - Connie Arnold (UTMSI)

1986 Fisheries Management - Billy Higginbotham (TAES)
Fisheries Research - Robert Colura (TPWD)

1987 Fish Culture - Kerry Graves (USFWS)
Special Recognition - The Sportsmen's Club of Texas
Best Presentation - Kerry Graves (USFWS)

1988 Honorable Mention (culture) - Loraine Fries (TPWD)
Fisheries Research - Gary Garrett (TPWD)
Special Recognition - Kirk Strawn (TAMU)
Best Presentation - Joe Fries (USFWS)
Honorable Mention (presentation) - Catherine Dryden (TAMU)

1989 Fish Culture - Robert Vega (TPWD)
Fisheries Management - Joe Kraai (TPWD)
Fisheries Administration - Gary Matlock (TPWD)
Fisheries Research - Roy Kleinsasser and Gordon Linam (TPWD)
Honorable Mention (research) - Bob Edwards (UTPA)
Best Presentation - Robert Smith (TAMU)

1990 Fish Culture - Glen Alexander and David Campbell (TPWD)
Fisheries Management - Dave Terre (TPWD)
Fisheries Administration - Gene McCarty (TPWD)
Best Presentation - Joe Kraai (TPWD)
Scholarships - Tommy Bates (TAMU:1989), Michael Brice (TTU)

1991 Fish Culture - Jake Isaac (TPWD)
Fisheries Management - Mark Webb (TPWD)
Fisheries Administration - Pat Hutson (TPWD)
Fisheries Research - Ronnie Pitman (TPWD)
Special Recognition - The Wetland Habitat Alliance of Texas
Best Presentation - Mark Stacell (TPWD)
Scholarships - Jim Tolan (TAMUCC), Michelle Badough (TXSTATE)

1992 Fish Culture - Camilo Chavez (TPWD)
Fisheries Education - Brian Murphy (TAMU)
Fisheries Management - Ken Sellers (TPWD)
Fisheries Research - Bob Colura (TPWD)
Special Recognition - Bobby Farquhar, Andy Sansom, and Rudy Rosen (TPWD)
Best Presentation - Maurice Muoneke (TPWD)

1993 Fisheries Management - Bruce Hysmith (TPWD)
Special Recognition - Joe Martin and Steve Gutreuter (TPWD)
Best Presentation - Jay Rooker (UTMSI)
Scholarships -Erica Schlickeisen (TXSTATE), Brian Blackwell and Nancy McFarlen (TAMU)

1994 Fish Culture - Ted Engelhardt (TPWD)
Fisheries Management - Steve Magnelia (TPWD)
Fisheries Administration - Dick Luebke (TPWD)
Special Recognition - Bob Howells (TPWD)
Best Presentation - Travis Kelsey (TXSTATE)
Scholarships - Kathyrn Cauble (TXSTATE), Howard Elder and Kim Jefferson (TAMU)

1995 Fish Culture - Robert Adami (TPWD)
Fisheries Education - Bill Neill (TAMU)
Fisheries Management - Spencer Dumont (TPWD)
Fisheries Administration - Roger McCabe (TPWD)
Fisheries Research - Maurice Muoneke (TPWD)
Special Recognition - Tom Heffernan and Robin Reichers (TPWD) S. Ken Johnson (TAMU)
Best Presentation (s) - Robert Weller (TTU), Robert D. Doyle (ACE)
Scholarships - Jay Rooker (UTMSI), Robert Weller (TTU), Gil Rosenthal (UT), John Findiesen and Karen Quinonez (TXSTATE)

1996 Fisheries Education - Billy Higginbothan (TAMU)
Fisheries Management - Gary Garrett (TPWD)
Fisheries Administration - Gene McCarty (TPWD)
Fisheries Research - Ivonne Blandon (TPWD)
Special Recognition - Reeves County Water Improvement Board
Best Presentation (s) - Craig Paukert (OSU), Gene Guilliland (ODWC)

Scholarships - Chad Thomas (TXSTATE), Anna-Claire Fernandez (UTMSI), Kenneth Ostrand (TTU), Dawn Lee Johnson
Technical Support - Jimmy Gonzales (TPWD)
Honorable Mention (technical support) - Eric Young (TPWD)

1997/8 Fish Culture - Tom Dorzak (TPWD)
Fisheries Education - Robert Ditton (TAMU)
Special Recognition - Fred Janssen, Chris Cummings, Dan Lewis, Dan Strickland, and Gary Graham (TPWD), Jim Davis (TAMU)
Best Presentation (s) -Timothy Bonner (TTU) and Gene Wilde (TTU)
Scholarships - Tony Baker and Allison Anderson (TAMU), Patrick Rice (TAMU-Galveston), Laurie Dries (UT)

1999 Fisheries Administration - Lorraine Fries (TPWD)
Special Recognition - Pat Hutson (TPWD, retired)
Best Presentation (s) - Gene R. Wilde and Kenneth G. Ostrand (TTU)
Scholarships - Scott Hollingsworth and William Granberry (TTU), Brian Bohnsack and Michael Morgan (TAMU)

2000 Fisheries Research - Gene R. Wilde (TTU)
Best Presentation - J. Warren Schlechte, coauthors - Richard Luebke, and T.O. Smith (TPWD)
Best Student Presentation - Scott Hollingsworth, coauthors - Kevin L. Pope and Gene R. Wilde (TTU)
Special Recognition - Emily Harber, Joe L.Hernandez, Robert W. Wienecke, and John Moczygemba (TPWD), Joe N. Fries (USFWS)
Scholarships - Mandy Cunningham and Calub Shavlik (TTU), Laurieanne Lancaster(SHSU)

2001 Fisheries Administration - Ken Kurzawski (TPWD)
Fisheries Education - Kevin Pope (TTU)
Fisheries Management - Brian Van Zee (TPWD)
Fisheries Research - Reynaldo Patino (TTU)
Fisheries Student - Timothy Bonner (TTU)
Technical Support - David DeLeon (TPWD)
Special Recognition - Rhandy Helton, Rosie Roegner, and Walter D. Dalquest (TPWD)
Best Presentation – Jason Turner, coauthors – Jay Rooker and Graham Worthy (TAMUG), and Scott Holt (UTMSI)
Scholarships, Undergraduate - Mandy Cunningham, and Cody Winfrey (TTU)
Scholarship, Graduate - Abrey Arrington (TAMU), and Laurianne Dent (SHSU)

2002 Fisheries Administration – Leroy Kleinsasser (TPWD)
Fisheries Management – Gordon Linam (TPWD)
Special Recognition – Raymond Mathews, Jr. (TWDB), Austin Bass Club of the Deaf
Best Presentation – Jay Rooker, coauthors – Bert Geary, Richard Kraus, and David Secor (TAMUG)
Best Student Presentation – J. P. Turner, coauthor – Jay Rooker (TAMUG)
Best Poster Presentation – Michael Lowe, Gregory Stunz, and Thomas Minello (NMFS)
Scholarships, Undergraduate – Felix Martinez, Jr. (TTU), Stuart Willis (TAMU)
Scholarships, Graduate – Mathew Chumchal (TCU), Michael Morgan (TAMU)

2003 Fisheries Culture – Dennis Smith (TPWD)
Fisheries Education – Gene Wilde (TTU)
Fisheries Student – Christine Burgess (TAMU)
Special Recognition – Larry McEachron (TPWD)
Best Presentation – Gregory Stunz (TAMUCC), coauthors Thomas Minello and Phillip Levin (NMFS)
Best Student Presentation – Monte Brown, coauthors Felix Martinez Jr., Kevin Pope, and Gene Wilde (TTU)
Best Poster Presentation – Suraida Nanez-James (TAMUG) and Thomas Minello (NMFS)

2004 Fisheries Culture - Lisa Griggs (TPWD)
Fisheries Education - Timothy Bonner (TXSTATE)
Fisheries Research - Dave Buckmeier (TPWD)
Fisheries Student - Casey Williams (TXSTATE)
Special Recognition - Deborah Wade (TPWD)
Best Presentation - Richard Kraus and David Secor (TAMUG)
Best Student Presentation - Tracy Leavy, coauthor Timothy Bonner (TXSTATE)
Best Poster Presentation - Brian Scott and Gary Aron (TXSTATE)

2005 Fisheries Administration – Roger McCabe (TPWD)
Fisheries Management – Todd Driscoll (TPWD)
Fisheries Student – Bart Durham (TTU)
Special Recognition – Jimmie Green (TPWD) and Kirk Green
Special Recognition – The Patsy B. Hollandsworth Family Foundation
Best Presentation – Gregory Stunz (TAMUCC), and coauthors Jay Rooker (TAMUG), Joan Holt and Scott Holt (UT)
Best Student Presentation – Julie Hulbert, and coauthors Timothy Bonner and David Pendagrass (TXSTATE), and Joe Fries (National Fish Hatchery – San Marcos)
Best Poster Presentation – Michael Baird (TPWD)
Scholarships, Undergraduate – Brian Bartram (TAMUCC), John Putegnat (TAMU)
Scholarships, Graduate – Megan Fencil (UTMSI), Casey Williams (TXSTATE)

2006 Fisheries Education – Kevin Pope (TTU)
Fisheries Management – Dave Terre (TPWD)
Fisheries Research – Loraine Fries (TPWD)
Technical Support – Todd Robinson (TPWD)
Special Recognition – Bruce Hysmith (TPWD)
Special Recognition – Joan Glass (TPWD)
Best Presentation - Richard Kraus and David Secor (TAMUG)
Best Student Presentation - Tracy Leavy, coauthor Timothy Bonner (TXSTATE)
Best Poster Presentation - Brian Scott and Gary Aron (TXSTATE)
Scholarships, Undergraduate – Chris Arredondo (TAMUCC), Josh Perkin (TXSTATE)
Scholarships, Graduate – Bart Dunham (TTU), Casey Williams (TXSTATE)

2007 Fisheries Administration – Larry McKinney (TPWD)
Fisheries Culture – Gary Garrett (TPWD)
Fisheries Management – Charlie Munger (TPWD)
Fisheries Research – Gary Garrett (TPWD) and Bob Edwards (UTPA)
Fisheries Student – Chris Chizinski (TTU)
Honorable Mention (Fisheries Student) – Brad Littrell (TXSTATE)
Technical Support – Reynaldo Cardona (TPWD)
Special Recognition – Robert Howells (TPWD)
Special Recognition – Fred Janssen (TPWD)
Special Recognition – Craig Scofield (TPWD)
Special Recognition – Sandy Henry (Science Spectrum, Lubbock)
Best Presentation – Craig Bonds, coauthors John Taylor and Jeremy Leitz (TPWD)
Best Student Presentation – Matthew Chumchal (OU), coauthors Michael Slattery, Ray Drenner, Matthew Drenner and Leo Newland (TCU)
Best Poster Presentation – Richard Ott and Timothy Bister (TPWD)
Scholarships, Graduate (M.S.) – Brian Bartram (Baylor)
Scholarships, Graduate (Ph.D.) – John Froeschke (TAMUCC)

2008 Fisheries Administration – Lance Robinson (TPWD)
Fisheries Education – Andre M. Landry, Ph. D. (TAMUG)
Fisheries Research – Bart Durham (TTU)
Fisheries Student – Preston Bean (TXSTATE)
Honorable Mention – Zachary Shattuck (TXSTATE)
Technical Support – Corey Clouse (TPWD)
Special Recognition – Chad Thomas (TXSTATE)
Best Presentation – Matthew Chumchal (TCU)
Best Student Presentation – Rodney Gamez (TAMUCC)
Best Poster Presentation – James Tolan (TPWD)
Scholarships, Undergraduate – JoHanna Weston (UD)
Scholarships, Graduate (M.S.) – Megan Bean (TXSTATE)
Scholarships, Graduate (Ph.D.) – Preston Bean (TXSTATE)

2009 Fisheries Administration – Phil Durocher (TPWD)
Fisheries Education – Michael Masser (TAMU)
Fisheries Research – Ray Drenner (TCU)
Fisheries Student – Joshuah Perkin (TXSTATE)
Honorable Mention –
Fisheries Management – John Moczygemba (TPWD)
Technical Support – Mike Gore (TPWD)
Special Recognition –
Best Professional Presentation – Ray Drenner (TCU)
Best Student Presentation – Ted Valenti (BAYLOR)
Best Professional Poster Presentation – Pat Bohannon (TPWD)
Best Student Poster Presentation – Brianne Kiester (TCU)
Scholarships, Undergraduate – Michelle Parmley (TXSTATE); Nicholas Bertrand (TXSTATE)
Scholarships, Graduate (M.S.) – Joshuah Perkin (TXSTATE)
Scholarships, Graduate (Ph.D.) – Bridgette Froeschke (TAMUCC)
Clark Hubbs Research Award – Ben Labay (TXSTATE)

2010 Fisheries Administration – Mike Ray (TPWD)
Fisheries Research – Aaron Barkoh (TPWD)
Fisheries Culture – Hugh Glenewinkel (TPWD)
Fisheries Student – Ben Labay (TXSTATE)
Fisheries Management – Richard Ott (TPWD)
Special Recognition – Mandy Scott (TPWD)
Best Professional Presentation – Michael Tobler (TAMU)
Best Student Presentation – Ben Labay (TXSTATE)
Best Professional Poster Presentation – Mike Stahl (TPWD)
Best Student Poster Presentation – Ben Labay (TXSTATE)
Scholarships, Undergraduate – Jake Wimberly
Scholarships, Graduate (M.S.) – Laura Bivins
Scholarships, Graduate (Ph.D.) – Gabriella Ahmadia
Clark Hubbs Research Award – Seiji Miyazono

Abbreviations:

ACE – Army Corps of Engineers
BAYLOR – Baylor University
NMFS – National Marine Fisheries Service
ODWC – Oklahoma Department of Wildlife Conservation
OSU – Oklahoma State University
SCS – Soil Conservation Service
SHSU – San Houston State University
TAES – Texas Agricultural Extension Service
TAMU – Texas A&M University – College Station
TAMUG – Texas A &M University - Galveston
TAMUCC – Texas A&M University – Corpus Christi
TCU – Texas Christian University
TCEQ – Texas Commission on Environmental Quality
TPWD – Texas Parks and Wildlife Department
TTU – Texas Tech University
TUGC – Texas Utilities Generating Company
TXSTATE – Texas State University – San Marcos
UD – University of Dallas
USFWS – U.S. Fish and Wildlife Service
UT – University of Texas – Austin
UTMSI – University of Texas Marine Science Institute
UTPA – University of Texas – Pan American

TECHNICAL SESSION ABSTRACTS

Ecosystem-level impacts of invasive suckermouth catfish (Loricariidae) on the San Marcos River, Texas

Weston H. Nowlin *(Texas State University, Department of Biology/ Aquatic Station, San Marcos, TX 78666, (512) 245-8794, wn11@txstate.edu)*
Corey L. Pray *(Texas State University, San Marcos, TX 78666)*
Susanna E. Scott *(Texas State University, San Marcos, TX 78666)*
Crystal M. LeBoeuf *(Texas State University, San Marcos, TX 78666)*
Katrina L. Cohen *(Texas State University, San Marcos, TX 78666)*
Timothy H. Bonner *(Texas State University San Marcos, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*
Yixin Zhang *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*

Suckermouth catfishes (Loricariidae) are a group of neotropical fishes that have invaded multiple spring-influenced river systems in the United States. Invasive suckermouth catfishes *(Hypostomus* sp.) were first noted in the spring-fed San Marcos River (Texas) in the late 1990s and are of great concern due to their potential to reduce algal resources, alter benthic sediment transport, and affect nutrient cycling. Here, we present a synthesis of a multi-year, multi-part study in which we examined the ecology and impacts of *Hypostomus* in the San Marcos River. We assessed the trophic ecology, abundance, and distribution of *Hypostomus* in the San Marcos River and conducted a series of replicated stream channel experiments to examine the ecosystem- and community-level impacts of *Hypostomus* on the river. In addition, we examined the influence of *Hypostomus* on nutrient cycling of the San Marcos River through their nutrient excretion. *Hypostomus* densities are highest in the upper portion of the San Marcos River (> 0.5 individuals / m^2) and gut content and stable isotope analyses indicated that they consume algal detritus. In the stream channel experiments, *Hypostomus* decreased algal biomass, altered algal nutrient ratios, and increased sediment transport and OM decomposition. Among fish species in the San Marcos River, *Hypostomus* exhibited among the highest body P content, lowest P excretion, and highest excreted N:P. Further, *Hypostomus* populations in the upper San Marcos River represent a substantial P pool which has the potential to influence nutrient cycling in the river. Cumulatively, these results indicate that *Hypostomus* populations have a strong influence on the trophic and nutrient dynamics of the San Marcos River.

Distribution and abundance of billfish larvae in the northern Gulf of Mexico

Jeffrey R Simms *(Texas A & M University at Galveston, Department of Marine Biology, 5007 Ave U Galveston, TX 77551 (409) 740-4784, jsimms2003@tamu.edu)*
Jay R Rooker *(Texas A & M University at Galveston, Department of Biology, 5007 Ave U Galveston, TX 77551 (409)740-4774, rookerj@tamug.edu)*

Billfishes (family Istiophoridae) are commonly taken by recreational and commercial fisheries in the Gulf of Mexico (Gulf) during their presumed spawning periods and billfish larvae have been collected in the region. As a result, the aim of this study was to evaluate the relative importance of the Gulf as essential spawning and/or nursery habitat of Atlantic billfishes. Ichthyoplankton surveys were conducted during spring and summer months from 2005 to 2009 in shelf and slope waters off the Texas and Louisiana coasts from 26 to 28°N and 88 to 94°W. During the five year study more than 4500 istiophorid larvae were collected, with our catch including sailfish (*Istiophorus platypterus*), white marlin (*Kajikia albida*), and blue marlin (*Makaira nigricans*). Sailfish were the dominant species, accounting for 73.9 % of the total catch, with the remainder of our samples comprised of blue marlin (22.6 %), and white marlin (3.5 %) larvae. Istiophorid larvae were observed in 49.9 % of collections with a maximum density of 51.5 individuals per 1000 m^{-2}. Catch rates and densities of sailfish and blue marlin larvae from the northern Gulf were comparable to or higher than values reported for other billfish spawning areas throughout the western Atlantic. Further, peak densities were observed within frontal features of the Loop Current and associated anti-cyclonic eddies. Multivariate analysis indicated that biotic (chlorophyll, prey abundance) and abiotic (temperature, water depth) factors were partly responsible for observed spatial variation in istiophorid distribution and abundance. Results of this study indicate that billfish larvae are abundant in the northern Gulf

and, based on comparisons of catch rate and density to other presumed spawning areas, it appears that this region represents important spawning/nursery habitat for these species.

Water spinach risk assessment and permitting

Earl Chilton II *(Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, TX, (512) 389-4652, Earl.Chilton@tpwd.state.tx.us)*
Joedy Gray *(Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, TX, (512) 389-8037, Joedy.Gray@tpwd.state.tx.us)*
Mark Webb *(Texas Parks and Wildlife Department, P.O. Box 427, Snook, TX, (979) 272-1430, Mark.Webb@tpwd.state.tx.us)*

Water spinach *Ipomoea aquatica* is a member of the Morning Glory Family (Convolvulaceae) which contains somewhere between 1600-1700 other species including potatoes. The genus *Ipomoea* alone has 600-700 species, including the sweet potato. The plant is native to India and Southeast Asia, but has been widely cultivated in many areas around the world. In Texas water spinach cultivation is a growing industry. The largest concentration of growers is in Rosharon near Houston. There are approximately 80 growers in the area comprising an industry estimated to be in excess of $1,000,000 annually. Water spinach has been cultivated in the area for at least 20 years. The purpose of this risk assessment is to evaluate the potential for water spinach to establish in the state of Texas and become invasive. It is a federally listed noxious weed, and is currently a prohibited aquatic plant in Texas. Evaluation of the risk associated with water spinach was based primarily on three sets of information including a review of available literature, an examination of streams, creeks, ditches, and other water bodies in the vicinity of commercial facilities where water spinach was grown to determine if there was any evidence of water spinach establishment, and a comparison of climate data for water spinach at selected sites within its native range with climate data from selected sites in Texas using CLIMATE (Bureau of Rural Sciences 2006). As a result of there being no evidence of establishment after approximately 30 years of commercial cultivation, TPWD modified regulations regarding water spinach in 2005 making production legal with an exotic species permit, and possession for personal consumption legal. Unfortunately, exotic species permits could only be issued to Texas Fish Farmers at that time. Through several iterations the regulation was finally modified in 2007 to allow Texas Aquaculturists, and not just fish farmers, to obtain a permit. This allowed the legal cultivation of water spinach with a permit. No permits were issued in 2007 or 2008 because it was determined that state law would require a permit from the Texas Department of Agriculture (TDA) in order for TPWD to issue a permit. Similarly, it was determined that the TDA could not issue a permit without a permit from the Texas Commission on Environmental Quality. In late 2008 a legal remedy was found to allow TPWD to issue exotic species permits without permits from the other state agencies. TPWD is currently in the process of inspecting commercial facilities in preparation for permit issuance.

Conservation of desert stream fish assemblages in the Trans-Pecos region of Texas

Seiji Miyazono *(Texas Tech University, Department of Natural Resources Management, Goddard Hall, Box 42125 , Lubbock, TX 79409 E-mail: seiji.miyazono@ttu.edu)*
Christopher Taylor *(Texas Tech University, Department of Natural Resources Management, Goddard Hall 7A, Lubbock, TX 79409, (806) 742-1983, cmtaylor@ttu.edu)*

The Rio Grande and its tributaries in the Trans-Pecos region of Texas have been impacted by a variety of anthropogenic activities such as dewatering, reduced water quality, impoundment, channelization, and the introduction of non-native species. These environmental manipulations have negatively affected the native fishes leading to extirpations and population declines throughout the region. It is imperative to gain an understanding of the factors that determine the persistence and maintenance of these fish assemblages, in the Rio Grande and its spring-fed, tributary habitats. We hypothesize that the persistence and maintenance of fish assemblages in these spring-fed habitats can be modeled by three primary processes: 1) adequate fish dispersal through the river corridor, 2) local environmental conditions that are maintained by spring flow, and 3) the presence/abundance of introduced species such as the plains killifish, *Fundulus zebrinus*. To understand these local and regional processes, we will determine seasonal and yearly patterns of abundance, distribution, and habitat use for fish assemblages from Alamito, Terlingua and Tornillo Creeks, as well as the Rio Grande proper. Preliminary data and analyses will be presented in light of this hypothetical framework.

Management implications of coastal invasive species

Leslie D. Hartman *(Texas Parks and Wildlife Department, 2200 Harrison Street, Palacios, TX 77465 (361) 972-625, Leslie.Hartman@tpwd.state.tx.us)*
Catherine T. Phillips (U.S. Fish and Wildlife Service, San Marcos National Fish Hatchery and Technology Center, 500 East McCarty Lane, San Marcos, Texas 78666, (512) 353-0011 ext. 223, Catherine_phillips@fws.gov)
Timothy H. Bonner *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*

Invasive species are a global problem; each year non-native species are introduced into new ecosystems, a fraction of which become invasive. Invasive species cause ecological damage, economic loss and can pose human health risks. Marine invasives are particularly hard to control given the combination of limited marine control methods and convergent introduction pathways. By reviewing examples of present and potential invaders (*Calurpa taxifolia, Pterois volitans, Penaeus monodon, Crassostrea gigas, Perna perna, Didemnum* spp and MSX) and their presumed pathways we can begin to determine which management methods would best address the problem of Texas invasive species. Early detection and rapid response, education and outreach, regulatory limits and better communication are a must if the ravages of invasive species are to be contained in coastal waters.

Movement patterns *Etheostoma fonticola* in a headwater stream channel

Nathan T. Dammeyer *(Texas State University, Freeman Aquatic Building Mailbox #9, San Marcos, Texas 78666, (512) 245-3547, nd1079@txstate.edu)*

Movement patterns of individuals within a population provide insight into dispersal capabilities, connectivity among subpopulations, and persistence within specific geographic locations. The fountain darter *Etheostoma fonticola* is a federally listed endangered fish and is found only in the highly urbanized headwaters of Comal River and San Marcos River systems of the Edwards Plateau region of central Texas. These streams are extremely popular with recreationist and are reliant on spring discharge from the Edwards Aquifer where water withdrawals and drought conditions can combine to greatly reduce or eliminate spring flow. Fountain darter's ability to traverse from disturbed habitats to more suitable habitats is thought to occur during periods of duress, but its movement abilities have not been quantified. A mark-recapture study using Visible Implant Elastomer (VIE) was carried out over a one year period, with nine sampling events, in the old channel of the Comal River, New Braunfels, Texas, USA. A total of 955 individuals were given batch marks during the study and 91 individuals were recaptured. 51.2% of the recaptures displayed no net movement (i.e. recaptured in the patch of initial marking) and 48.8% had left the patch of initial capture. The maximum observed movement was 95.15 m by a single individual. Movement of individuals displayed an upstream bias although high site fidelity was a distinct feature in the study reach.

Evaluation of regulatory protection of seagrasses in the Redfish Bay State Scientific Area

Perry Trial *(Texas Parks and Wildlife Department, 702 Navigation Circle, Rockport, TX 78382, (361) 729-2328, Perry.Trial@tpwd.state.tx.us)*
Faye Grubbs *(Texas Parks & Wildlife Department, 702 Navigation Circle, Rockport, TX 78382, (361) 729-2328, Faye.Grubbs@tpwd.state.tx.us)*
Mark Fisher *(Texas Parks & Wildlife Department, 702 Navigation Circle, Rockport, TX 78382, (361) 729-2328, Mark.Fisher@tpwd.state.tx.us)*

In the 1990s, propeller scars created by boaters were causing significant damage to seagrass beds in Redfish Bay on the central coast of Texas. Initial efforts by Texas Parks and Wildlife Department (TPWD) to address the problem through creation of the Redfish Bay State Scientific Area (RBSSA), public outreach, and the establishment of voluntary no-prop zones, were unsuccessful. In May 2006, a regulation went into effect which prohibits the uprooting of seagrasses by boat propellers within the RBSSA. Concurrently, TPWD initiated a more intensive public outreach campaign to inform constituents about the new regulation and the benefits of seagrasses.

As part of an effort to evaluate the efficacy of these seagrass protection measures, data were collected annually from 2005-2009 along 35 randomly-selected 100 m transects using a repeated measures design. The total number of propeller scars on each transect was recorded, and qualitative as well as quantitative information were collected on each scar. Beginning in 2007, scars detected in previous years were re-examined to evaluate their recovery. Significantly fewer scars have been observed since the regulation was enacted, with an overall decline of 45%. Scar recovery data indicates that scars recover more quickly than what has been reported in the literature, with annual recovery rates ranging between 53-86%. Subsequent observations have revealed that newly created scars are capable of recovering in as little as 5 months.

Ecology and evolution of the Amazon molly

Michael Tobler *(Texas A&M University, Department of Wildlife & Fisheries Sciences, 2258 TAMU, College Station, TX 77843; phone: (979) 847-8846, michi.tobler@gmail.com)*

The Amazon molly (*Poecilia formosa*) is one of very few asexual vertebrates. The species reproduces gynogenetically, i.e., inheritance is strictly clonal but sperm is required to trigger the onset of embryonic development. Amazon mollies obtain sperm by copulating with closely related species, with which they co-occur in the natural habitats. In Southern Texas, the sperm-donor is the Sailfin molly, *P. latipinna*, in northern Mexico, the Atlantic molly *P. mexicana*. Some of our recent projects attempted to better understand the ecology of coexisting asexual and sexual fish, as well as potential evolutionary consequences of the sperm-dependence of asexuals. In a first study, we tested the hypothesis whether asexual and sexual mollies occupy similar trophic niches. Although we found considerable variation in resource use and in trophic morphology across different sampling sites in Texas and Mexico, there was large overlap in both diet and gastrointestinal tract length between asexuals and sexuals from the same site. In a second study, we tested whether different populations of Amazon mollies, which rely on different species as sperm-donors, evolved adaptation that would facilitate copulations from heterospecific males. Using geometric morphometrics, we could not only show that Amazon mollies phenotypically resemble females of the local sperm-donor, but that at least Sailfin molly males actually prefer to mate with Amazon mollies from their own population relative to those from populations coexisting with the Atlantic molly. This indicates that male mate choice may have caused an evolutionary shift in female morphology, which constitutes one of the first examples of local adaptation in an asexually reproducing vertebrate.

Use of paired-frame trawls to sample open-water forage fish communities in Texas reservoirs

Ben Labay *(Texas State University, 601 University Dr., San Marcos, TX 78666, (210) 833-8520, benlabay@gmail.com)*
Robby Maxwell *(Texas State University, Department of Biology/ Aquatic Station, San Marcos, TX 78666)*
Tim Bonner *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*

Heterogeneity among subbasins of a large catchment is an important, but often not quantified, component of watershed ecological integrity. Different tributaries within a watershed form the habitat patches from which heterogeneity and thus biodiversity is gained. Protocols for characterizing community diversity in a riverscape context need to be developed to aid watershed conservation. Fish assemblage structure and habitat in major tributary subbasins of the Lower Brazos River watershed were examined during spring, summer, and winter 2008. A total of 110,592 individuals representing 72 species and 20 families were collected and identified from the Lower Brazos watershed. The most abundant families were Cyprinidae (75% in relative abundance), followed by Poeciliidae (11%), and Centrachidae (7%). Land use data were quantified at reach buffer (100 meter buffer, 2km upstream of the site), riparian buffer (100 meter buffer of total reach upstream of site), and catchment above site (cumulative catchment area upstream of site) spatial scales to assess which individual land use category-scale combinations contribute most to explaining fish assemblage variation after accounting for local habitat, geography, and seasonal effects. Canonical Correspondence Analysis indicated that local habitat parameters (15.4%) were the most important environmental parameters structuring fish communities, followed by land use (14.8%), geography, including subbasin categories, (9.6%), and season (2.3%). Land use catchment spatial scales of forest, grasslands,

and agriculture categories contributed the most to the analysis, giving more evidence to riverscape studies stating that management at a regional landscape scale offers greater influence to stream conditions.

Web clientele evaluation of AQUAPLANT: a website for aquatic plant identification and management

Michael P. Masser *(Texas A&M University, 111 B Nagle Hall, 2258 TAMU, College Station, TX 77843-2258, m-masser@tamu.edu)*
Satoshi Kamata *(Texas A&M University, 111 B Nagle Hall, 2258 TAMU, College Station, TX 77843-2258)*

Aquatic plants are a problematic issue for most private waters. To assist private impoundment managers and others a web-base identification and management tool (i.e. AQUAPLANT) was developed for the Texas Agricultural Extension Service (i.e. Texas AgriLife Extension) in 2000. AQUAPLANT went through a major revision in 2005 and continues to be updated semi-annually. The AQUAPLANT site consists of 72 species/families of aquatic plants common to the Southern states and most of the U.S. For each specie or group the site assists in Identification through photographs, drawings, and simple descriptions. Once identification is made, Management Options are provided for possible Mechanical, Biological, or Chemical control. Links are provided to MSDS herbicide labels for all the major aquatically registered (i.e. EPA) herbicides. AQUAPLANT has proven to be a heavily used resource with over 152,000 unique visitors in 2007, over 210,000 in 2008, and 208,811 (i.e. Jan – Sept) 2009. Pages downloaded were 664,440 pages in 2007, over 900,000 in 2008, and over 900,000 in 209. A user satisfaction on-line survey was conducted in 2007 (June – December). The survey reviled that the site was used mostly by private impoundment owners to identify a problem plant, although in most cases no management was to be applied. However, satisfaction was good as users were "Highly Likely" to recommend the site to others. AQUAPLANT has proven to be a useful tool for aquatic plant identification and management.

Hydrologic and geomorphic controls on fish and mussel assemblages in the upper Neches River watershed

Matt J. Troia *(University of Texas at Tyler, Department of Biology, Tyler, TX 75799, (903) 565-5887, mtroia@patriots.uttyler.edu)*
Lance R. Williams *(University of Texas at Tyler, Department of Biology, Tyler, TX 75799, (903)565-5878, lance_williams@uttyler.edu)*
Neil B. Ford *(University of Texas at Tyler,Department of Biology, Tyler, TX 75799, (903) 566-7249), Neil_Ford@uttyler.edu*

The goal of this project was to evaluate how geomorphology, hydrology, and in-stream habitat structure fish and mussel assemblages in the upper Neches River. Fishes and mussels were collected in summer 2009 at nine sites in the river mainstem, clustered into three distinct geomorphic zones. Habitat and geomorphic surveys were conducted in the same reaches as biotic sampling occurred. Overall, we found 44 species of fish and 20 species of mussels. Geomorphic cross sections at each site revealed differences in floodplain connectivity and channel width among the three regions. Reaches in the middle zone were narrow and highly connected to their floodplain while those in the upper zone were highly disconnected. Reaches in the lower zone were highly disconnected and over-widened. Wood abundance was greatest in the middle zone. Fish abundance and species richness was highest in the middle zone indicating floodplain connectivity and wood abundance increased habitat complexity. Mussel abundance and species richness was greatest in the middle and lower zones. Frequent scouring and a narrow, incised channel in the upper zone is characteristic of a channel immediately downstream of a dam (*i.e.*, Lake Palestine) and may be the cause of low mussel abundance and richness. The structure of fish and mussel assemblages is likely determined by the interactive effects of (1) geomorphology (floodplain connectivity) and hydrology and (2) geomorphology (channel width) and wood abundance.

Environmental influences on fish community structure and functional diversity in streams of the Brazos and Trinity River basins

Allison Pease *(Texas A&M University, Department of Wildlife & Fisheries Sciences, 2258 TAMU, College Station, TX, 77843, (979) 862-1279, aapease@tamu.edu)*
Jason Taylor *(Baylor University, Department of Biology, Waco, TX)*
Ryan King *(Baylor University, Department of Biology, Waco, TX, Ryan_S_King@baylor.edu)*
Kirk Winemiller *(Texas A&M University, Department of Wildlife & Fisheries Sciences, 2258 TAMU, College Station, TX 77843, (979) 862-4020, k-winemiller@tamu.edu)*

The influences of local and landscape-scale environmental variables on the taxonomic and functional community structure of fish assemblages were evaluated for 64 stream sites in the Brazos and Trinity River basins in east-central Texas. Multivariate analyses revealed that sites within the same ecoregion tended to group together based on species composition. Within ecoregions, local variables such as substrate type, amount of in-stream woody debris, and number of riffles were correlated with differences in fish community structure. Landscape-scale variables including the amount of agriculture in the watershed, presence of reservoirs, and canopy cover were also related to variation in the composition of fish assemblages. As a complement to traditional taxonomic measures of community structure, functional traits (life-history and morphological features) of fishes within communities were also measured in order to compare functional diversity among sites. The influence of ecoregion on community structure was diminished in this analysis, and relationships with environmental variables were clearer. Our results indicate that these communities are influenced by environmental factors at multiple scales. Examining communities from a functional perspective may elucidate environmental influences more directly and could reveal patterns that are more broadly applicable across regions.

Viral infection surveillance of bait shrimp in four Texas bays

Robert Adami *(Texas Parks and Wildlife Department, 4300 Waldron Road, Corpus Christi, Texas 78418,(316) 939-7784, robert.adami@tpwd.state.tx.us)*
Ya Sheng Juan *(Texas Parks and Wildlife Department, 95 Fish Hatchery Road, Brownsville, Texas 78520, (956) 350-0846, ya-sheng.juan@tpwd.state.tx.us)*

From August 2005 to July 2007, bait shrimp samples were collected from four different Texas bay systems (Matagorda Bay, San Antonio Bay, Corpus Christi Bay and Lower Laguna Madre) to check for diseases of concern which may be associated with exotic farm raised and/or imported shrimp. Matagorda Bay, Corpus Christi Bay and Lower Laguna Madre all had complete samples. During the sampling period, San Antonio Bay was the only site that did not have bait shrimp consistently available. Samples were tested for Taura Syndrome Virus (TSV) and White Spot Syndrome Virus (WSSV) by collecting and preserving pleopods from each shrimp. At least 60 shrimp were used per sample. Two pleopods were collected from each shrimp and put into two separate bottles containing 95% ethyl alcohol. One pleopod sample was for TSV Polymerase Chain Reaction (PCR) testing and the other for WSSV PCR testing. All WSSV PCR tests were performed by Texas Veterinary Medical Diagnostic Laboratory (TVMDL) and TSV testing was conducted by Texas A&M University-Corpus Christi until August 2006. Afterwards, TVMDL conducted the remainder of the TSV testing as well. Over all, 87 bait shrimp samples were collected. All samples (60 shrimp per sample) tested negative for TSV and WSSV. Collecting samples from local bait stands proved to be a useful and a relatively inexpensive method to monitor shrimp health in Texas bay systems. Even though Texas farms and research facilities reported TSV and WSSV infections prior to the study period, no viruses were detected in any adjacent bay systems. The objective of the study was to determine whether shrimp farming facilities and/or processing plants could be potential sites for disease transmission to native wild shrimp stocks in selected Texas bays.

Patterns of endemism and species richness of fishes of the western gulf slope

R. J. Maxwell *(Texas State University, Department of Biology/ Aquatic Station, San Marcos, TX 78666)*
T. H. Bonner *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*

[Not Available]

Comparison summary of historical and current impingement, entrainment, and ambient data characterization studies with industrial water intakes on the upper Texas coast

Kurtis Schlicht (*AECOM, 4888 Loop Central Drive, Suite 600, Houston, TX 77081, kurtis.schlicht@aecom.com)*
John Isaacs
Jessica Stephens
William Stephens
Mark Gerath

AECOM reviewed historical impingement, entrainment and ambient data for six industrial water intakes located on the upper Texas coast. These six intakes are subject to regulations established by Section 316(b) of the Clean Water Act. Compliance is intended to minimize adverse environmental impacts associated with cooling water intake structures by reducing the number of aquatic organisms lost as a result of water withdrawals through these structures. USEPA and TCEQ requirements for NPDES permit renewal include providing biological information to support the development of a calculation baseline for evaluating impingement mortality and entrainment and to characterize current impingement mortality and entrainment. AECOM reviewed extensive historical data from these facilities along with ambient data from Galveston Bay and Sabine Lake to establish the taxonomic identification of all fish and shellfish with potential for impingement and entrainment. AECOM also characterized all life stages of these species and estimated the current impingement and entrainment rate of these facilities. Further entrainment sampling at two of these facilities was conducted in 2007 to determine current levels of entrainment as the basis of determining a calculation baseline and to verify taxonomic identification and characterization of life stages in the historical data. Results of these studies verified the historical data and demonstrated that the operation of the reviewed facilities are in compliance with NPDES discharge permit requirements under best professional judgment (BPJ)-Based Section 316(b) permit conditions and does not contribute to any adverse environmental impacts associated with the aquatic biota of the Upper Texas Coast ecosystems.

Use of high frequency acoustic technology to monitor fish

David Buzan *(PBS&J, 6504 Bridge Point Parkway, Suite 200, Austin, TX 78730 dlbuzan@pbsj.com, 512.947.5411)*
Mike Weeks *(PBS&J, 6504 Bridgepoint Parkway, Suite 200, Austin, TX 78730)*
Andrew Labay *(PBS&J, 6504 Bridgepoint Parkway, Suite 200, Austin, TX 78730)*

PBS&J used DIDSON high frequency acoustic video imaging to monitor fish behavior and count fish in different situations where traditional fish sampling techniques are not effective or possible (i.e. deep water, high velocities, or dark or turbid waters). DIDSON was used at Lake Livingston to measure fish moving from the reservoir through the dam into the river downstream. Over 197 hours of video were collected and 60,400 fish were counted. The average concentration of fish moving through the dam was 2.5 fish/acre-foot and the maximum density was 89 fish/acre-foot. Approximately 8 million fish were estimated to have moved from the reservoir through the dam into the river downstream during the nine-month study period. Ninety-eight percent of fish that moved through the dam were less than 8 inches total length. There were diurnal differences in the rate at which fish moved past the dam. During the late winter and spring samples, higher concentrations of fish moved past the dam between midnight and 5:30 am. During these seasons, most of these fish were believed to be gizzard shad, *Dorosoma cepedianum*, and white and yellow bass, *Morone chrysops* and *Morone mississippiensis*. During the summer, relatively high numbers of small, schooling fish, moved past the dam during the day. DIDSON high frequency acoustic technology, within its limitations, appears to have value in surveying fish populations and observing fish behavior

Mercury contamination of the fish community of a semi-arid and arid river system: spatial variation and the influence of environmental gradients

Alexandra Smith *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos, TX 78666, (512) 922-3976, as55@txstate.edu)*
Alisa A. Abuzeineh *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos, TX 78666)*
Matthew M. Chumchal *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos, TX 78666*
Timothy H. Bonner *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*
Weston H. Nowlin *(Texas State University, Department of Biology/ Aquatic Station, Texas State University, San Marcos, TX 78666, (512) 245-8794, wn11@txstate.edu)*

Mercury (Hg) contamination of aquatic ecosystems is a global environmental problem. There is abundant data on Hg contamination and factors that affect its bioaccumulation in lake fish communities, but comparatively little information on riverine ecosystems exists. This study examines fish Hg concentrations of the Lower Rio Grande/Rio Bravo del Norte drainage, TX, USA and several of its major tributaries in order to assess whether there is spatial variation in fish Hg concentrations in the drainage and if patterns of Hg contamination of fishes are related to gradients in environmental factors thought to affect Hg concentrations in fish communities. We sampled fishes, invertebrates, sediments, and water quality parameters at twelve sites along the lower Rio Grande/Rio Bravo del Norte drainage multiple times over a 1-year period. There was significant spatial variation in fish Hg concentrations when fish were grouped by literature-defined trophic groups or as stable isotope-defined trophic levels, with the highest concentrations found in the Big Bend region of the drainage. Mercury in fishes in most trophic groups and trophic levels were positively related to environmental factors thought to affect Hg in fishes, including water column dissolved organic carbon (DOC) and sediment Hg concentrations. We hypothesize that fish Hg concentrations in the Big Bend region are relatively high because this section of the river has abundant geologic Hg sources and environmental conditions which may make it sensitive to Hg inputs (i.e., high DOC, variable water levels). We contend that Hg contamination of the Rio Grande/Rio Bravo del Norte has substantial implications for management and protection native small-bodied obligate riverine fishes, many of which are imperiled.

ROV surveys of snapper-grouper-grunt complex on natural banks in the Gulf of Mexico

Michael A. Dance *(Texas A&M University at Galveston, 5007 Ave. U, Galveston, TX 77551,(409)740-4784, dancema@tamu.edu)*
Jay R. Rooker *(Texas A&M University at Galveston, Department of Marine Biology, 5007 Ave U, Galveston, Texas 77551, (409)740-4744, rookerj@tamug.edu)*
Richard T. Kraus *(Texas A&M University at Galveston, Department of Marine Biology, 5007 Ave U, Galveston, Texas 77551, (409)740-4784, krausr@tamug.edu)*

The northwestern Gulf of Mexico is characterized by mid and outer-shelf banks that serve as important natural habitat for reef fishes. Many of these banks are present at depths not accessible by SCUBA, and thus information on these banks is limited even though they are assumed to serve as critical habitat for commercially important groupers, snappers, and grunts. Here we characterize reef fish assemblages from the snapper-grouper-grunt complex at both a mid-shelf (Sonnier Bank, 20-60m) and an outer-shelf bank (McGrail Bank, 45-90m) using a remotely operated vehicle (ROV). ROV surveys occurred in August of both 2005 and 2006 at both Sonnier and McGrail bank using three-minute roving counts within set depth zones (20-40m, 40-60m, 60-80m). Rank order abundance of taxa varied between banks and among depth zones surveyed, with shallow sites characterized by creolefish (*Paranthias furcifer*), vermilion snapper (*Rhomboplites aurorubens*), tomtate (*Haemulon aurolineatum*), gray snapper (*Lutjanus griseus*), and rock hind (*Epinephelus adscensionis*), while threadnose bass (*Anthias tenuis*) was the most abundant taxa at deep sites. Atlantic creolefish were numerically dominant at both banks, but less common in the deep zone of McGrail Bank. Snappers and grunts were both abundant at Sonnier Bank but relatively rare at McGrail, which was characterized by greater abundance of large groupers, including

yellowmouth grouper (*Mycteroperca interstitialis*) and marbled grouper (*Dermatolepis inermis*). High densities of reef fishes, specifically snappers and groupers, coupled with high relief, hard bottom habitat suggest that these banks may serve as essential habitat of several members of the snapper-grouper-grunt complex.

Characterization of reef fish recruits on low and high diversity banks in the northwestern Gulf of Mexico

Lynne S. Wetmore *(Texas A&M University at Galveston, Department of Marine Biology, 5007 Ave U, Galveston, Texas 77551, (409)740-4784, scubageek17@gmail.com)*
Jay R. Rooker *(Texas A&M University at Galveston, Department of Marine Biology, 5007 Ave U, Galveston, Texas 77551, (409)740-4744, rookerj@tamug.edu)*
Robert J.D. Wells *(Texas A&M University at Galveston, Department of Marine Biology, 5007 Ave U, Galveston, Texas 77551)*
Richard T. Kraus *(Texas A&M University at Galveston, Department of Marine Biology, 5007 Ave U, Galveston, Texas 77551, (409)740-4784, krausr@tamug.edu)*

Visual SCUBA surveys were used to quantify the density and diversity of juvenile reef fishes present on two low diversity (Sonnier, Stetson) and two high diversity (East and West Flower Gardens) banks in the northwestern Gulf of Mexico (diversity classifications based on the prevalence of reef-building coral species). Surveys were conducted over five monthly cruises (May-September) in 2009, and fish counts were conducted using a line transect method. Overall, 11,234 fishes representing 70 species were enumerated during visual surveys. Nearly 99% of all fishes counted were from six families (Pomacentridae, Labridae, Tetraodontidae, Serranidae, Scaridae, and Gobiidae), with pomacentrids and labrids together accounting for 89-94% of the total reef fish composition at each bank. Mean density of pomacentrids ranged from 1.5 to 4.5 indiv./m^2 and was significantly higher on the two low diversity banks, while mean density of labrids ranged from 1.0 to 1.5 indiv./m^2 and did not differ among the four banks surveyed. Fish assemblage structure was also analyzed, and pairwise comparisons showed that assemblages differed significantly between high diversity and low diversity banks; however, no significant differences were detected between the two high diversity banks or between the two low diversity banks surveyed. Our results indicate that all banks surveyed support diverse assemblages of juvenile reef fishes but suggest that the functional role and relative value of high versus low diversity banks as nursery habitat may be species specific.

Fairfield Lake fish kill assessment, 2003 – 2009

Greg Conley *(Texas Parks and Wildlife Department, 11810 FM 848, Tyler, Texas 75707 (903) 566-2518, greg.conley@tpwd.state.tx.us)*
Adam Whisenant *(Texas Parks and Wildlife Department, 11942 FM 848, Tyler, Texas 75707, (903) 566-8387, adam.whisenant@tpwd.state.tx.us)*
Richard Ott *(Texas Parks and Wildlife Department, 11810 FM 848, Tyler, Texas 75707, (903) 566-2161, richard.ott@tpwd.state.tx.us)*

Lake Fairfield (2,034 acres) in Freestone County, built by, and owned and operated by Luminant as a cooling reservoir for their coal powered steam electric generating plant. The reservoir has experienced multiple fish kills since 2003. Kills occurred in September and October the suspected cause was depressed dissolved oxygen (DO) due to algal respiration but this was never confirmed. In 2005, blue green samples were collected as a possible explanation. Five species were identified (all capable of producing toxicity) but cell counts were too low to be toxic. To help identify the cause, the TPWD Water Quality Program conducted a special study in 2006 and 2007 to establish the correlation between DO concentrations and fish kill events. However, no fish kills occurred, and no abnormal water quality issues were found during the study. In 2008, three fish kills were reported; two of which resulted in an estimated 121,570 dead fish worth $1,179,878.49. In September 2009, another fish kill occurred, involving an estimated 914,189 fish valued at $451,247.30. During and following the September 2009 event, data sondes were deployed in two different locations of the kill area; depressed DO was recorded. Solar radiation was retrieved from a nearby weather station and when plotted against the DO data over the same time period, a strong correlation between the two parameters was observed. It is likely that high trophic status (resulting from nutrient concentration) and discontinuity between day length and water temperature result in

an unstable equilibrium. Cloudy weather limits solar radiation and photosynthesis resulting in rapid O2 crash followed by recovery and oxygen super-saturation when cloud cover dissipates.

Spatial and temporal patterns in lower Rio Grande fish assemblage

Megan G. Bean *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666, (512) 245-2284, mb84@txstate.edu)*
Preston T. Bean *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666, (512) 245-3547, preston.bean@txstate.edu)*
Timothy H. Bonner *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*

Spatial and temporal patterns of Rio Grande fish occurrence, abundance, and habitat associations were examined in 2007. Three sites were sampled seasonally and four sites were sampled opportunistically downstream from Amistad Reservoir to the lower Rio Grande Valley. Near Amistad reservoir, *Menidia beryllina* comprised 98.3% of the assemblage. The fish assemblage near Larado, Texas comprised of 90.8% cyprinids with *Cyprinella lutrensis* (57.7%) and *Macrhybopsis aestivalis* (19.2%) being the most abundant species. Downstream from Falcon Reservoir, the most abundant species included *Cichlasoma cyanoguttatum* (40.5%), *Gambusia affinis* (31.3%), and *Lepomis* (23.3%). Spatial and temporal variation in the fish assemblage was examined using canonical correspondence analysis. The first CCA axis represented a gradient from riffle habitat and gravel substrate to pool habitat and silt substrate. *Macrhybopsis aestivalis* was strongly associated with riffle habitats with gravel substrate while *Menidia beryllina* and *Pylodictis olivaris* were strongly associated with silt substrate. *Micropterus salmoide*s, *Pimephales vigilax*, and *Gambusia affinis* were associated with pool habitats. The second CCA axis represented a strong vegetation gradient with juvenile *Moxostoma congestum* strongly associated with vegetation. Compared to historical accounts within this reach of the Rio Grande, the relative abundance and species diversity of native cyprinids has declined.

Development of a non-invasive gender identification protocol for the spotted seatrout, *Cynoscion nebulosus*

Izhar A. Khan *(Texas Parks and Wildlife Department, Corpus Christi, TX 78418, (361) 939-7784, Izhar.Khan@tpwd.state.tx.us)*
Richard J. Kline (*University of Texas, Marine Science Institute, 750 Channel View Drive, Port Aransas, TX 78373)*
G. Joan Holt (*The University of Texas at Austin, Marine Science Institute, 750 Channel View Drive, Port Aransas, TX 78373)*
Robert R. Vega *(Texas Parks and Wildlife Department, Corpus Christi, TX 78418)*

Spotted seatrout (*Cynoscion nebulosus*; SST) is an important fisheries resource targeted for stock enhancement or replenishment in selected bay systems by the Coastal Fisheries division of Texas Parks & Wildlife Department. Better reproductive management of the broodstocks is critical to a successful and efficient stock enhancement program for this species. Male and female SST cannot be identified reliably without a biopsy of gonadal tissues. This species in particular is very susceptible to handling stress and does not recover well from excessive handling or a tissue biopsy. Therefore, a relatively non-invasive gender identification protocol needs to be developed in order to insure appropriate sex ratio in broodstock tanks for successful spawning of this species. The major objective of this study was to develop a reliable protocol using a 10-min immersion of SST in artificial saltwater (SW) and subsequent extraction of sex steroids such as the fish-specific androgen, 11-ketotestosterone (11-KT) from SW samples. Twenty-three adult SST were collected from the Upper Laguna Madre by hook and line fishing from mid May to early June and maintained in a 3,000-L recirculating seawater tank for five to seven days prior to sampling. Eleven males and 12 females were sampled first for blood and then immersed individually in 5-L SW for 10-min. Blood plasma and water samples were processed and analyzed for 11-KT by an enzyme-linked immunoassay. The 11-KT levels in plasma and SW immersion samples of males were significantly higher than those of females. In addition, plasma and SW 11-KT levels showed a strong positive correlation with clear gender separation in gonadally mature individuals. These data show that this non-invasive protocol could be applied for gender identification in gonadally mature SST, and may be useful for other marine fish species important for stock enhancement such as southern flounder.

Comparison of catfish harvest among angling gear types at Choke Canyon Reservoir

John Findeisen *(Texas Parks and Wildlife Department, P.O. Box 116, Mathis, TX 78368, (361) 547-9712, john.findeisen@tpwd.state.tx.us)*

Choke Canyon Reservoir is a popular destination for catfish anglers. Blue, channel, and flathead catfish are present in the reservoir, with blue catfish being the dominant species and most sought after by anglers. Data collected from access point creel surveys at Choke Canyon Reservoir indicated anglers employ both active (rod and reel) and passive (trotlines and juglines) gear types or use a combination of gears. Passive gear anglers comprised 31.5% of all catfish anglers at Choke Canyon Reservoir from December 1999 to May 2005, (unpublished data). Current protocol and creel data analysis does not include data from passive gear anglers, thereby missing substantial catch and harvest data necessary to properly manage the catfish fisheries. A study was initiated in September 2006 to collect additional data from catfish anglers in order to make comparisons between active and passive gear types. Preliminary results indicate the size range of harvested channel catfish was similar between active and passive angling gears; however, substantially more channel catfish were harvested by anglers using active gear. Passive angling gear types caught a wider size range of blue catfish and appear to be more effective at catching larger individuals and a more efficient use of time (effort; defined as time spent tending). However, active angling gear appears to be more efficient at catching blue catfish (hook effort; defined as the time spent fishing). The size range of blue catfish harvested by passive angling gears was similar between trotlines and juglines but juglines appeared to be more efficient at catching blue catfish than trotlines. Data collection will continue through 2011.

The distribution and status of *Hybopsis amnis* (Hubbs and Greene 1951): an analysis of drainage occupancy from historical records

Michael C. Compton, *(Texas Tech University, Department of Natural Resources Management, Lubbock, Texas 79409, stretch.compton@ttu.edu)*

Although *Hybopsis amnis* (pallid shiner) is a widespread cyprinid, the occurrence of the fish within its range is sporadic. To obtain a better understanding of the distribution and status of the fish a total of 1098 *Hybopsis amnis* (pallid shiner) records, dating from 1891 to 2006, were compiled from data provided by 36 museums, universities, and government institutions. The records were grouped into 25 populations coinciding with the drainages of the Mississippi River basin and western Gulf Coast tributaries. From 1940 to 2006 successive three-year intervals were delineated to determine the presence or absence of the pallid shiner within each drainage. Based on the presence/absence data a frequency ratio of species occurrence for each drainage was calculated. Frequency ratios, pre-1979 and post-1979, for the drainages were compared to elucidate recent trends in *H. amnis* occurrence. H. *amnis* populations from six of eight pre-1979 drainages, with a frequency ratio less than 0.21, were absent from those drainages post-1979. Further evaluation of the frequency ratios of the drainages revealed six populations to be stable, four populations vulnerable, and fifteen populations imperiled. Overall, the presence of *H. amnis* within its historical range has declined and become highly fragmented. To determine possible reasons for the decline of this poorly known species a systematic distributional survey is needed in additional to a watershed analysis of the drainages and life history research.

Status of the spotted seatrout *Cynoscion nebulosus* in Aransas Bay

Christopher Mace *(Texas Parks and Wildlife Department, 702 Navigation Circle, Rockport, TX 78382, (361) 729-2328, christopher.mace@tpwd.state.tx.us)*

Data from TPWD's fishery-independent spring gill nets indicate a decline in spotted seatrout catch per unit effort (CPUE) from 1.16 to 0.48 fish/h between 2001 and 2009. However, seasonal (June – November) bag seine catch rates of young of the year (YOY) spotted seatrout were at a 27-year record high in 2008 with an average CPUE of 81.4 fish/ha. Bag seine catch during 2009 has remained high with a CPUE of 69.1 fish/ha indicating two strong cohort groups. Therefore, if these YOY fish are able to recruit successfully into the adult

population, more slot sized spotted seatrout will be available for harvest by anglers in 2010 – 2011. Further reductions in bag limits do not appear to be warranted at this time.

Spatial variability in the distribution and bioaccumulation of mercury in a subtropical reservoir system

Jesse C. Becker *(Texas State University, Department of Biology/ Aquatic Station, San Marcos, TX 78666, (512) 587-4428, jcbecker@txstate.edu)*
A.W. Groeger *(Texas State University, Department of Biology/ Aquatic Station, San Marcos, TX 78666)*
M.M. Chumchal *(Texas Christian University, Department of Biology, Fort Worth TX)*
W.H. Nowlin *(Texas State University, Department of Biology/Aquatic Station, San Marcos, TX 78666, (512) 245-8794, wn11@txstate.edu)*
D. Hahn *(Texas State University, Department of Biology/ Aquatic Station, San Marcos TX 78666, (512) 587-4428)*

We conducted a study examining spatial variation in mercury (Hg) dynamics of Amistad International Reservoir, a large subtropical water body in the Rio Grande drainage. Sediments and muscle tissue of largemouth bass (*Micropterus salmoides*) were analyzed for concentrations of total Hg, methylmercury (MeHg), and environmental and biological factors known to influence the production and bioaccumulation of MeHg. The Rio Grande arm of the reservoir had the highest sediment concentrations of total Hg. However, the concentration of MeHg was highest at sites in the Pecos River and Devils River arms. Conditions in the sediments of the Pecos and Devils Rivers were likely more favorable to the production of MeHg, with higher sediment porewater dissolved organic carbon, porewater sulfate levels in the optimum range for methylation, and a higher number of detections for subgroups of sulfate reducing bacteria, the microbial group most associated with MeHg production. Counts of total microbes, total bacteria, and two major families of sulfate reducing bacteria were not correlated with sediment MeHg concentrations, suggesting that Hg methylation may be performed by a small number of bacterial subgroups, under a narrow range of environmental conditions. Fish at a standardized length of 18.5 cm from the Devils River and San Pedro Canyon areas of the reservoir had higher muscle Hg concentrations than those collected in the Rio Grande arm, suggesting higher rates of bioaccumulation in the Devil's River arm. This study adds to a growing body of evidence that spatial variation in Hg concentration of fish exists within lakes and reservoirs, and is likely caused by variation in Hg methylation.

Spatial and temporal fish community assessment on major subbasins of the lower Brazos River watershed

Ben Labay *(Texas State University, 601 University Dr., San Marcos, TX 78666, (210) 833-8520, benlabay@gmail.com)*
Robby Maxwell *(Texas State University, Department of Biology/ Aquatic Station, San Marcos, TX 78666)*
Tim Bonner *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*

Heterogeneity among subbasins of a large catchment is an important, but often not quantified, component of watershed ecological integrity. Different tributaries within a watershed form the habitat patches from which heterogeneity and thus biodiversity is gained. Protocols for characterizing community diversity in a riverscape context need to be developed to aid watershed conservation. Fish assemblage structure and habitat in major tributary subbasins of the Lower Brazos River watershed were examined during spring, summer, and winter 2008. A total of 110,592 individuals representing 72 species and 20 families were collected and identified from the Lower Brazos watershed. The most abundant families were Cyprinidae (75% in relative abundance), followed by Poeciliidae (11%), and Centrachidae (7%). Land use data were quantified at reach buffer (100 meter buffer, 2km upstream of the site), riparian buffer (100 meter buffer of total reach upstream of site), and catchment above site (cumulative catchment area upstream of site) spatial scales to assess which individual land use category-scale combinations contribute most to explaining fish assemblage variation after accounting for local habitat, geography, and seasonal effects. Canonical Correspondence Analysis indicated that local habitat parameters (15.4%) were the most important environmental parameters structuring fish communities, followed by land use (14.8%), geography, including subbasin categories, (9.6%), and season (2.3%). Land use catchment spatial scales of forest, grasslands,

and agriculture categories contributed the most to the analysis, giving more evidence to riverscape studies stating that management at a regional landscape scale offers greater influence to stream conditions.

The San Jacinto River watershed management initiative: a model for integrated resource management

Mark Webb *(Texas Parks and Wildlife Department, P.O. Box 427, Snook, TX, (979) 272-1430, Mark.Webb@tpwd.state.tx.us))*

The San Jacinto River along with its watershed in southeastern Texas is nationally recognized as important and imperiled. In 2006 the river was listed by American Rivers as the ninth most endangered river in the United States. In addition, Lake Houston, the lower of two mainstream impoundments on the San Jacinto River and the main surface water supply for the 6 million residents in the Houston MSA, was named as a water to watch by the Reservoir Fisheries Fish Habitat Partnership in 2009. The San Jacinto River Watershed Management Initiative is a community based program coordinated by Texas Parks and Wildlife Department designed as an umbrella to bring components and partners together for information sharing, problem solving, and funding acquisition to better manage this socio-economically important resource.

Assessing the impact of Hurricane Ike on oyster reefs using acoustic techniques and direct on-going restoration efforts in Galveston Bay, Texas

Jennie Rohrer *(Texas Parks and Wildlife Department, 1502 FM 517 East, Dickinson, TX, (281) 534-0103), jennie.rohrer@tpwd.state.tx.us)*
Jennifer Bauer *(Texas Parks and Wildlife Department, 1502 FM 517 East, Dickinson, TX, (281) 534-0100), jennifer.bauer@tpwd.state.tx.us)*
William Rodney *(Texas Parks and Wildlife Department, 1502 FM 517 East, Dickinson, TX, (281) 534-0100), bill.rodney@tpwd.state.tx.us)*
David Westbrook *(Texas Parks and Wildlife Department, 1502 FM 517 East, Dickinson, TX, (281) 534-0100), david.westbrook@tpwd.state.tx.us)*
Lance Robinson *(Texas Parks and Wildlife Department, 1502 FM 517 East, Dickinson, TX, (281) 534-0101), lance.robinson@tpwd.state.tx.us)*
Joseph Carlin *(Texas A&M University, College Station, TX)*
Austin Baker *(Texas A&M University at Galveston, Galveston, TX.)*
Timothy M. Dellapenna *(Texas A&M University at Galveston, Galveston, TX.)*

On September 13, 2008, the eye of Hurricane Ike passed directly over Galveston Bay, with a 5.5 m storm surge building up over the course of three days, but being largely flushed out of the bay in a matter of a few hours. Passage of the storm and retreating storm surge led to significant sediment transport in Galveston Bay, resulting in widespread impact to Texas' major oyster producing area. In order to assess the hurricane's impacts to Galveston Bay oyster reefs, imagery was collected using a bathymetric side scan sonar system (Tledyne Benthos C3D) and a Chirp subbottom profiling system. Pre and Post storm imagery were compared using ArcGIS to estimate change in reef area of selected oyster reef segments. Side scan imagery was ground truthed using georeferenced underwater video. Where storm deposits were identified, Chirp was ground truthed using gravity cores and grab samples. Preliminary results reveal that much of the main stem of Galveston Bay was scoured by retreating storm surge, potentially creating additional oyster substrate, at least in the short term. East Galveston Bay is distal from the main stem of the bay, lies between the mainland to the north and Bolivar Peninsula to the south, and received significant storm surge derived sediment from overwash of Bolivar Peninsula. As a result, we estimate that 80% of reefs were covered with storm-deposited mud as thick as 40 cm. Because of its position and orientation, East Galveston Bay was sheltered from scouring which resulted from retreating storm surge from the main stem of Galveston Bay. These data and results are being used to direct oyster reef restoration efforts throughout the bay.

Distribution, status and habitat associations of the Devils River Minnow in Pinto Creek, Kinney County, Texas

Paul Fleming *(Texas Parks and Wildlife Department, Mountain Home, Texas, (830) 866-3356, Paul.Fleming@tpwd.state.tx.us)*
J. Warren Schlechte *(Texas Parks and Wildlife Department, Mountain Home, Texas, (830) 866-3356, Warren.Schlechte@tpwd.state.tx.us)*
David L. Buckmeier *(Texas Parks and Wildlife Department, Mountain Home, Texas (830) 866-3356 David.Buckmeier@tpwd.state.tx.us)*

The Devils River minnow (*Dionda diaboli*) is a federally-listed threatened species with small restricted populations in west Texas and Mexico that have apparently declined due to reduced water quantity and quality. In 2001 a population was discovered in Pinto Creek in Kinney County that is restricted by water quality to a very short reach in the headwaters of the system. Stream flows in the creek are diminishing and the headwaters are receding downstream, threatening the persistence of this population. This study is one aspect of a collaborative effort of interrelated research projects to identify critical habitat, its availability, and the reproductive success of the fish within this system. As a subset of this larger effort, our research is designed to assess the status, distribution, and habitat associations of the fish within the confines of the creek headwaters. We seined and collected water quality and habitat data from a series of four reaches (riffle-run-pool) to elucidate where the species occurs, its relative abundance and identify fine scale habitat associations. Here we present preliminary findings of our work and discuss conservation implications for the species.

POSTER SESSION ABSTRACTS

Texas Parks and Wildlife southern flounder stock enhancement: update and future plans

Carlos Shane Bonnot *(Texas Parks and Wildlife Department, 300 Medical Drive. Lake Jackson, TX 77566, (979) 292-0100, shane.bonnot@tpwd.state.tx.us)*

Southern flounder, *Paralichthys lethostigma*, is a highly sought after species with pressure from recreational anglers, commercial fisherman, and shrimp trawl by catch. The increasing demand for southern flounder makes it an important candidate for commercial aquaculture and stock enhancement. Data collected by Texas Parks and Wildlife coastal fishery monitoring program shows that southern flounder populations continue to decline coast wide. In addition to recent changes in fishing regulations to address the decline in flounder populations, Texas Parks and Wildlife is evaluating the feasibility of a southern flounder stock enhancement program. During the annual fall migration, adult fish can be easily caught by use of hook and line or netting them under lights at night. Collected broodstock were transported to the hatchery where they are being held in captivity for maturation and spawning. Fish were transitioned from a live feed to fresh dead cut mackerel, squid, and shrimp. In previous studies, natural spawning has been an inconsistent and unreliable source of fertilized eggs. Therefore, both natural and hormone-induced spawning protocols are being attempted. Captive broodstock maintained for over one year under simulated natural photothermal conditions and newly acquired broodfish have been implanted or injected with a GnRH analog (GnRHa) to induce ovulation. A series of studies are being conducted to determine the following: (1) optimal GnRHa (pellet vs. liquid injection), (2) optimal time in which to strip spawn females post implant/injection, and (3) optimal time to stock flounder fry into ponds. Future investigation into optimal broodstock stocking densities, sex ratios, aond tank color will be necessary in order to achieve natural tank spawns. Volitional spawning cmplimented by strip spawning is vital to the development of a successful southern flounder stock enhancement program.

A preliminary assessment of oyster reef and shoreline habitat use by estuarine finfish in East Matagorda Bay and Galveston Bay, Texas

William Balboa *(Texas Parks and Wildlife Department, 1502 FM 517 E, Dickinson, Texas 77539, (281) 534-0110, bill.balboa@tpwd.state.tx.us)*
Brenda Bowling *(Texas Parks and Wildlife Department, 1502 FM 517 E, Dickinson, Texas 77539, (281) 534-0110, Brenda.bowling@tpwd.state.tx.us)*
Mike Stahl *(Texas Parks and Wildlife Department, 1502 FM 517 E, Dickinson, Texas 77539, (281) 534-0110), mike.stahl@tpwd.state.tx.us)*

To assess the role of oyster reef as finfish habitat in upper Texas' estuarine systems, species assemblage and abundance differences were compared between shoreline habitats and mid- to open-water oyster reef habitat in East Matagorda Bay and Galveston Bay, Texas. Texas Parks & Wildlife Department (TPWD) 183 m gill nets were deployed in East Matagorda Bay for two ten week periods per year (spring and fall) from 2005-2007. Each week two nets were set on oyster habitat and three to five nets (45 total) were set on shoreline habitat (spartina marsh, seagrasses, lake shoreline, geotubes, shell and sand flats). Non-parametric analysis using PRIMER software indicated a significant difference ($p<0.001$) in community abundance and species assemblages between shoreline and reef habit with six species contributing to over 50% of the dissimilarities between habitats. The main distinguishing species were *Pogonias cromis*, black drum (more abundant on reef habitat) and *Ariopsis felis*, hardhead catfish (more abundant on shoreline habitat). Additionally differences between *Cynoscion nebulosus*, spotted seatrout, gender ratios were observed with a greater dy was begun in Galveston Bay, Texas, in the fall of 2009. Preliminary analysis again shows a significant difference ($p=0.004$) between reef and shoreline habitat. Eight species contributed to over 50% of the dissimilarities between habitats, the main contributing species being *Brevoortia patronus*, Gulf menhaden, and *Leiostomus xanthurus*, spot, both more abundant on reef habitat. Differences between bay systems will be examined.proportion of male spotted seatrout found on oyster vs shoreline habitat. A similar stu

Diel turnover in a species-poor floodplain river

Katherine Roach *(Texas A&M University, 2258 TAMU, College Station, TX 77843, (785) 766-5592, roackat@gmail.com)*

Diel turnover in community structure occurs in a myriad of aquatic ecosystems, particularly those that are species rich. In this study, I evaluated whether diel turnover also occurs in the Brazos River, a relatively species-poor ecosystem. This pattern is not only scientifically interesting, but also has implications for management decisions on minimum environmental flow levels that are currently being determined for the Brazos River. Seven sandbanks in the main channel were sampled both day and night a total of 33 times. My hypothesis was that communities would reflect whether they were taken during the day or night to a greater extent than they reflected the different sandbanks from which they were taken. Assemblage structure was evaluated with a non-metric multidimensional scaling analysis and a two-way cluster analysis. Both analyses indicated that diel turnover was important in structuring communities on sandbanks. However, sampling date was also important, probably because juvenile Blue and Channel catfish (*Ictalurus furcatus* and *Ictalurus punctatus*) were not present in nocturnal samples until approximately two weeks after sampling began.

Preliminary species distribution models for freshwater fish species of Texas

Ben Labay *(Texas State University, 601 University Drive, San Marcos, TX 78666, (210) 833-8520, benlabay@gmail.com)*
Blake Sissel *(University of Texas, Austin, TX 78712, (512) 471-3434)*
Adam Cohen *(University of Texas, Austin, TX 78712, (512)471-3434)*
Dean Hendrickson (*University of Texas, Austin, TX 78712, (512) 471-3434)*
Tim Bonner *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos, TX 78666)*

Species distribution modeling based on machine learning methods is widely used in research on systematic conservation planning and conservation area network selection, species' response to climate change,

invasive species, and resource management. However, applying this methodology to aquatic organisms presents many novel challenges. Much research is needed to explore ways to produce reliable results in a river network setting. This is especially pertinent in the context of using historical data to extract trends in distributions due to invasions or changing environmental conditions. The objective of this study is to produce preliminary models for a test group of freshwater fish taxa to assess the technique's performance. Models were constructed using the maximum entropy algorithm encoded in the Maxent software package (Phillips et al. 2006; Phillips and Dudik 2008). An advantage of Maxent is that it does not require presence-absence data which is rare in fisheries science. Occurrence (presence-only) data for 24 species provided by the Fishes of Texas Project at the Texas Natural History Collection were used with a full set of 23 environmental parameters along with selected subsets to address issues related to over-fitting. The parameter set includes variables commonly used in modeling such as temperature, precipitation, and topographical variables. These constitute a trial set, expandable to more relevant constraint variables particular to investigations of invasive species, instream flow management, or climate change. The area under the receiver operating characteristic curve (AUC) and a set of eleven binary response variables were used to assess model performance. Preliminary results on a portion of the 24 species to be tested show average AUC values ranging from 0.8 to 0.98 with low standard deviations, indicating moderate to very good performance and giving support for future modeling efforts and environmental parameter set expansion.

Habitat associations, life history, and diet of the blackspot shiner, *Notropis atrocaudalis*

Preston T. Bean *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666 preston.bean@txstate.edu, (512) 245-3547)*
Casey S. Williams *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*
Peter H. Diaz (*Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*
Timothy H. Bonner *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos Texas 78666)*

The ecology of *Notropis atrocaudalis* (Blackspot Shiner) including habitat associations, population age structure, reproduction, and food habits were examined in two east Texas streams from November 2001 through October 2002. Blackspot Shiner were generally found in relatively shallow slow-flowing runs, but exhibited no strong seasonal habitat associations. The population consisted of four age groups (ages 0, 1, 2, and 3) present within a year and estimated maximum life span was 3 y. Reproductively mature individuals were observed from March through August and temporal patterns in ovarian development, gonadosomatic index and ova development indicated that Blackspot Shiner spawns multiple clutches of eggs over an extended spawning period. Blackspot Shiner diets consisted primarily of aquatic insects including Ephemeroptera, Trichoptera, and Coleoptera larvae.

Assessing changes in areas scarred by boat propellers between 2007-2009 using ArcGIS for Redfish Bay, TX

Faye Grubbs *(Texas Parks and Wildlife Department, 702 Navigation Circle, Rockport, TX 78382, (361) 729-2328, faye.grubbs@tpwd.state.tx.us)*
Ashley Summers *(Texas Parks and Wildlife Department, 702 Navigation Circle, Rockport, TX 78382, (361) 729-2328)*
Mark Fisher *(Texas Parks & Wildlife Department, 702 Navigation Circle, Rockport, TX 78382, (361) 729-2328, Mark.Fisher@tpwd.state.tx.us)*

Texas Parks and Wildlife Department (TPWD) implemented a law in 2006 prohibiting the up-rooting of seagrass within Redfish Bay State Scientific Area (RBSSA). To aid in the assessment of the regulation, aerial imagery was acquired for north Redfish Bay (7,800 acres) in March of 2007 and January 2009 at 1:4,800 resolution (0.10 meter) to determine total scarred area. The first step involved using automated software to extract scars from the 2007 imagery. The automated product was split into three groups according to the level of scarring present: low, medium, and high to make the estimates more accurate. The entire study area was split into 75 X 75 meter grids and a stratified random sample was selected, based on the scarring-intensity groups. This resulted in 300 grids in which a GIS analyst digitized "linear disturbances." After the linear disturbances for 2007 and 2009

were digitized, the difference was found between them for each grid. ArcGIS interpolation tools were used to estimate all the unknown areas. From 2007 to 2009 there was increased scarring in the northern areas and decreased scarring around the Terminal Causeway area.

Texas commercial license buyback exit survey preliminary results 2000-2009

Tonya R. Wiley *(Texas Parks and Wildlife Department, 1502 FM 517 E, Dickinson, Texas 77539, (281) 534-0131, tonya.wiley@tpwd.state.tx.us)*
Artussee D. Morris *(Texas Parks and Wildlife Department,6300 Ocean Drive, Corpus Christi, Texas 78412-5848)*
Brian L. Bohnsack *(U.S. Fish and Wildlife Service, c/o Association of Fish and Wildlife Agencies, 444 North Capitol Street, NW, Suite 725, Washington, DC 20001)*

Texas Parks & Wildlife Department has administered a voluntary license buyback program for bay and bait shrimp boats since 1997, crab fishermen since 2001 and finfish fishermen since 2002. The goal of the license buyback program is to reduce the number of license holders and fishing effort in these commercial fisheries without creating excessive social and economic disruptions within coastal communities. Exit surveys were completed at the time of license transfer (shrimp=819, crab=26 and finfish=158) to determine the sociodemographics of buyback participants and measure the success of the program. Preliminary analysis of survey responses for each of the three commercial sectors indicated 52-65% were full-time fishermen, more than half of the respondents had purchased the license for 10 years or less, 74-79% had fished with the license in the prior year, and only 3% of the shrimp and finfish licenses had never been used. Most crab (58%) and finfish (80%) respondents held no other commercial licenses, while 53% of shrimpers owned other commercial sector licenses. The most common reason given by shrimpers and crabbers for selling the license was that they were going into another line of work, and by finfishermen was that they were retiring. Survey results indicate ethnic crab and finfish license holders participated at the same rate as the original license holder population. However, Southeast Asians and Hispanics participated less in shrimp license buybacks. Only 29% of shrimp, 21% of crab, and 18% of finfish respondents reported that all of their household income was derived from their commercial efforts. Preliminary survey results indicate the commercial license buyback program has reduced the number of license holders and purchased mostly active licenses.

Changes in abundance of two non-game species: Atlantic threadfin and Atlantic bumper

Josh Harper *(Texas Parks and Wildlife Department, 2200 Harrison, Palacios, TX 77465, (361) 972-6253, joshua.harper@tpwd.state.tx.us)*
Leslie Hartman *(TPWD Coastal Fisheries, 2200 Harrison Street, Palacios, TX 77465 (361) 972-625, Leslie.Hartman@tpwd.state.tx.us)*
Bill Balboa *(Texas Parks and Wildlife Department, 1502 FM 517 E, Dickinson, Texas 77539, (281) 534-0110, bill.balboa@tpwd.state.tx.us)*
Norman Boyd (*Texas Parks and Wildlife Department, 418 South 16th Street, Port O'Connor, Texas 77982 phone: (361)983-4425)*

The Texas Parks and Wildlife Department (TPWD) Coastal Fisheries resource monitoring program has more than 25 years of standardized otter-trawl data from Texas bays and near-shore waters of the Gulf of Mexico. Though population trends of collected game species have been well analyzed, the abundances of many non-game species are rarely examined. Long term population trends of two non-game species common to Matagorda Bay, the Atlantic threadfin (*Polydactylus octonemus*) and Atlantic bumper (*Chloroscombrus chrysurus*), were examined. Preliminary analyses indicate an increase in the abundance of Atlantic bumper and a decrease in the abundance of Atlantic threadfin. To better understand changes to the entire ichthyofaunal assemblage and to socio-economically important species, we need a better grasp of the changes taking place in less charismatic species and the causes of these changes.

Effect of shoreline characteristics on largemouth bass condition in Lubbock lakes

Scott Jones *(Texas Tech University, Department of Natural Resource Management, Box 42125, Lubbock, TX 79409-2125, scott.jones@ttu.edu)*
Charlie Munger *(Texas Parks and Wildlife Department, P.O. Box 835, Canyon, Texas 79015, (806) 655-4341, Charlie.Munger@tpwd.state.tx.us)*
David Rogowski *(Texas Tech University Lubbock, TX 79406, David.Ragowski@ttu.edu)*

It is often assumed that habitat quality and their characteristics have a direct effect on fish communities and overall fish condition. We predicted that fish in lakes with greater bank cover, such as, trees, vegetation, and rocks, would have better overall condition than those with more open banks, and presumably less fishing pressure. I quantified the ease of bank fishing access on 9 Lubbock lakes to see if there was a correlation between bank cover and largemouth bass condition. Bank access was quantified based on a variety of factors that could potentially affect fishing pressure, such as distance to a parking lot, cattail beds, trees, and other similar measures. Basic lake morphology data was also quantified. Combining each of the lakes overall bank accessibility, lake morphology measures, with water quality and electrofishing data collected by Texas Parks and Wildlife, we tested for relationships between bank access and largemouth bass condition. Preliminary results suggest that there was no significant relationship between bank accessibility and largemouth bass condition. There was a significant positive relationship between largemouth bass condition and water temperature. In lakes that were warmer largemouth bass condition was greater. It is possible that greater largemouth bass condition is due to a longer growing season in warmer lakes. Another explanation greater forage availability; however, there was no significant relationship between largemouth bass condition and prey availability (e.g. gizzard shad, bluegills…). Many Lubbock lakes periodically go dry, thus the time span between drying events might play a greater part in structuring fish communities and fish condition than bank access. Additionally, all 9 of these lakes were located in urban/ suburban areas of Lubbock with fairly similar bank characteristics. A wider sample of lakes that were more varied in their shoreline characteristics might have revealed different relationships.

Land Use and temporal influence on the macroinvertebrate assemblages of tributaries of the Brazos River

Frances Lash *(Texas State University, Department of Biology/ Aquatic Station, 601 University Dr., San Marcos, TX 78666, (540) 449-4495, Fl1022@txstate.edu)*
Timothy H. Bonner *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos, TX 78666)*
Weston H. Nowlin *(Texas State University, Department of Biology/ Aquatic Station, San Marcos, TX 78666, (512) 245-8794, wn11@txstate.edu)*
Yixin Zhang *(Texas State University, Department of Biology/ Aquatic Station, 601 University Drive, San Marcos, TX 78666)*

Human impacts due to land use influence the processes and biota of a river. This alteration causes changes to the instream habitat which then affects invertebrate diversity and abundance. This study looks at the differences in the macroinvertebrate assemblages with respect to diversity, abundance, and functional feeding groups in the tributaries of the Brazos River, TX USA. We hypothesize that there is a difference in the invertebrate assemblage in the tributaries of the Brazos River due to the variation of land use, abiotic factors (habitat and subbasin), and season. Invertebrates were sampled during three seasons (spring, summer and fall) from 33 sites (six subbasins) in the tributaries of the Lower Brazos River south of Waco, TX. 184,000 invertebrates were collected and identified to the lowest practical taxanomic level and classified into functional feeding groups. Local habitat variables (including flow, depth, canopy cover, and dominant substrate) were collected from transects where invertebrates were sampled. Habitat variables showed differences between sites and subbasins, but no differences due to temporal variation. There was a total of 185 different taxa from all three seasons. The dominant functional feeding groups were predators (78 taxa), collector-gatherers (41 taxa) and scrapers (29 taxa). Relative abundance and richness for both taxa and functional feeding groups revealed significant differences amoung seasons and subbasins.

Recent observations on day-time versus night-time electrofishing for black bass in five central Texas reservoirs

Michael S. Baird *(Texas Parks and Wildlife Department, 8684 LaVillage Avenue, Waco, TX 76712, Michael.baird@tpwd.state.tx.us)*
John Tibbs *(Texas Parks and Wildlife Department, 8684 LaVillage Avenue, Waco, TX 76712, (254) 666-5190), john.tibbs@tpwd.state.tx.us)*

There has been much debate on the pros and cons of day-time versus night-time electrofishing. Most researchers agree that higher catch rates and better precision can be obtained from night-time sampling; however no one disputes the safety and logistical benefits of day-time sampling. This was evident from our recent survey of black bass electrofishing procedures sent to southeastern state agencies, which confirmed that day-time electrofishing is often used, even to the exclusion of night-time electrofishing. Currently the Inland Fisheries Division of Texas Parks and Wildlife Department conducts its standardized electrofishing sampling during night-time hours, and these data are used to create and evaluate black bass regulations throughout the state. Since most black bass regulations target the mid to upper size classes of fish, we compared a variety of population indices including CPUE-11, CPUE-14, and CPUE-18 from day-time and night-time electrofishing samples on five central Texas reservoirs with varying water clarity. On average, total catch of largemouth bass was higher for night-time samples, however, with only one exception, catch of bass larger than 11", 14", and 18" was consistently higher during day-time samples for all five reservoirs. Catch-per-unit-effort is only one metric used to compare populations. Other metrics such as relative weight and length at age aren't affected by what time of day the electrofishing takes place. The results from these five reservoirs support the idea that the Texas Parks and Wildlife Department could benefit from safer day-time electrofishing procedures without sacrificing important data needed to manage most of its black bass fisheries.

Geographic distribution and historical trends of species within the Trinity River, Texas

George Guillen *(University of Houston Clear Lake, Environmental Institute of Houston, 2700 Bay Area Blvd, Box 540 Houston, TX 77058 (281) 283-3950, guillen@uhcl.edu)*
Jenny Wrast *(University of Houston Clear Lake, Environmental Institute of Houston, 2700 Bay Area Blvd, Box 540 Houston, TX 77058)*
Dianna Ramirez *(University of Houston Clear Lake Environmental Institute of Houston 2700 Bay Area Blvd, Box 540 Houston, TX 77058)*
Priyanka Lokanath *(University of Houston Clear Lake Environmental Institute of Houston 2700 Bay Area Blvd, Box 540 Houston, TX 77058-1098, (281) 283-3950)*

During 2007-2009 we conducted a multi-year project funded by the Trinity River Authority (TRA), Texas Commission on Environmental Quality (TCEQ) and the Texas Water Development Board to evaluate spatial and temporal trends in Trinity River fish populations and communities. A comprehensive database was developed to accomplish this project. We combined and analyzed existing government and published data sets in Trinity River fish populations. An Access® OBDC compliant database and EndNote® annotated bibliography were created. In addition, an ArcGIS® spatial database was developed to expedite spatial analysis. A total of 382 publications and records were examined ranging from 1892 to 2009. A total of 134 species were identified. The database contains location and time of collection, gear used, effort, species collected or observed, catch or CPUE and numbers of species/taxa. This database was used to facilitate recent ecological instream flow analyses of Trinity River. Large scale temporal changes in fish community structure were associated primarily with poor water quality during the late 1970s. By the late 1980's water quality had begun to improve due to improvements in wastewater treatment and new regional treatment capacity. By the mid 1990s as a result of improved water quality fish communities had recovered substantially in the area below Dallas. The Trinity River has a diverse fish community that should be protected from future stressors including water diversions, habitat degradation, and water pollution. Potential bias and problems associated with construction of the database and subsequent analysis included uncertain taxonomy, collection site bias, gear selectivity and flow selective sampling.

Construction of river fish community guilds using life history characteristics and multivariate classification methods: case study Trinity River, Texas

George Guillen *(University of Houston Clear Lake, Environmental Institute of Houston, 2700 Bay Area Blvd, Box 540, Houston, TX 77058, (281) 283-3950, guillen@uhcl.edu)*
Jenny Wrast *(University of Houston Clear Lake, Environmental Institute of Houston, 2700 Bay Area Blvd, Box 540, Houston, TX 77058)*
Dianna Ramirez *(University of Houston Clear Lake, Environmental Institute of Houston, 2700 Bay Area Blvd, Box 540 Houston, TX 77058)*

During 2009 we conducted a project funded by the Trinity River Authority (TRA), Texas Commission on Environmental Quality (TCEQ) and the Texas Water Development Board to evaluate spatial and temporal trends in Trinity River fish populations and communities. This was done in part to evaluate potential impacts of future flow regimes on river fish communities. A comprehensive database was developed to accomplish this project. A total of 134 species were identified. However to evaluate potential flow ecology relationships it was necessary to focus the analysis on target "focal" species of concern. These species represented sensitive species and/or important game fish. To address potential impacts on the entire community we also attempted to reduce this species matrix into a smaller group of ecologically similar "guilds" based on habitat preferences, environmental tolerances trophic levels, reproductive traits and biological processes. We utilized cluster analysis techniques to construct guilds based on the similarity of these traits. These guilds represent species assemblages with similar life history characteristics which should exhibit similar responses to environmental stressors. In addition previously identified candidate "focal" species were examined to determine if they were present in most guilds. Membership in a guild would suggest that the focal species exhibits life history characteristics similar to other members of the group. Management of flow regimes for protection of this focal species could be used to protect associated guilds. Trinity River focal species were found in the majority of cluster groupings. This technique proved to be a useful screening approach for summarizing and analyzing relationships between river fish communities and environmental changes.

Effectiveness of a no-take zone on benthic reef fish populations in the Wakatobi National Park, SE Sulawesi

Gabby N. Ahmadia *(Texas A&M University-Corpus Christi, Corpus Christi, TX 78412)*
Frank L. Pezold *(Texas A&M University-Corpus Christi, Corpus Christi, TX 78412)*

Cryptobenthic fishes have recently been recognized as having a substantial impact on coral reef ecosystem processes due to their numerical strength (up to 50% of reef species) and contribution to energy flow (up to 25%). Thus, alteration of their communities due to habitat degradation are likely to have far reaching effects throughout coral reef ecosystems, highlighting the necessity of studying this group. Cryptobenthic fishes were surveyed in reefs within a no take zone and an open access area in the Wakatobi Marine National Park, located within a group of islands off the coast of SE Sulawesi, Indonesia. Cryptobenthic fishes were collected using clove oil from three microhabitats at four different reef sites (n=78). Microhabitats were categorized as soft coral, hard coral, and rubble/sand. A total of 393 cryptobenthic reef fishes representing approximately 60 different species from nine different families were collected. Most species belonged to the families Gobiidae, Bleniidae, and Pseudochromidae. Cryptobenthic reef fishes observed in the different microhabitats in the open access reef supported higher fish abundance and in some cases, even a higher diversity than healthy reefs, consistent with patterns observed in previous studies.

Acknowledgments

The contributions of the abstract authors and the Editorial Committee towards the preparation of these Proceedings are gratefully acknowledged. Special recognition is provided to Debora Hildreth (TPWD volunteer) for her superb contributions this year to the Editorial Committee.

The Texas Chapter is appreciative to the many contributors who donated goods, money, and services for auction and raffle during the 2010 meeting in Athens, Texas.

CITATION:

Author(s). 2009. Title. Pages ____ *in* Birdsong, T. and D. Daugherty, editors. Annual Proceedings of the Texas Chapter, American Fisheries Society, Volume 32. Texas Chapter, American Fisheries Society, Austin, Texas.

ISSN 1060-2224