

# **Texas Freshwater Mussel Conservation and Stakeholder Summit**



*Hosted by the*  
**Southwest Region of the U.S. Fish and Wildlife Service,  
Texas Parks and Wildlife Department, and the  
Office of the Texas Comptroller of Public Accounts**

*November 14-15, 2017*

**Austin, Texas**

## SCHEDULE

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### Tuesday, November 14

Registration .....	7:30 – 10:20 am
Keynote: Welcome Day One.....	8:00 – 8:30 am
Session A: Status of Freshwater Mussels.....	8:30 – 10:00 am
Break.....	10:00 – 10:20 am
Session B: Mussel Surveys, Sampling, and Relocation Protocols.....	10:20 – 12:30 pm
Lunch Break (box lunches available for pre-order).....	12:30 – 1:00 pm
Session C: Mussel Propagation.....	1:00 – 4:00 pm
Day 1 Remarks and Adjourn.....	4:00 – 4:15 pm

### Wednesday, November 15

Registration .....	7:30 – 10:20 am
Keynote: Welcome Day Two.....	8:00 – 8:30 am
Session D: Mussels and Water Quality.....	8:30 – 10:30 am
Break.....	10:30 – 10:50 am
Session E: Mussels and Water Quantity.....	10:50 – 12:20 pm
Lunch Break (box lunches available for pre-order).....	12:20 – 1:00 pm
Session F: Information for Private Landowners and Stakeholders.....	1:00 – 3:00 pm
Open Discussion and Wrap Up .....	3:00 – 3:45 pm
Closing Remarks and Adjourn .....	4:00 – 4:15 pm

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## CONFERENCE HOTEL

Embassy Suites by Hilton Austin Central

5901 North Interstate Highway 35  
Austin, Texas 78723

<http://www.embassysuitesaustin.com/>

512-454-8004

## Keynote Speakers

### Amy Lueders



Ms. Amy Lueders is Regional Director of the U.S. Fish and Wildlife Service's Southwest Region, in Albuquerque, New Mexico. Amy graduated from Duke University with a Bachelor of Arts degree in Economics. She began her career with the Bureau of Land Management in 1984 at the Washington Office as a mineral economist. She later held a number of budget development and program analysis positions. Prior to becoming the Regional Director, Amy served as the Field Manager in Las Cruces, New Mexico, and as the BLM Nevada Associate State Director and, most recently the BLM Nevada State Director.

### Tim Birdsong



Mr. Tim Birdsong is Chief of Aquatic Habitat Conservation for Texas Parks and Wildlife Department. Tim Birdsong is Chief of Aquatic Habitat Conservation for Texas Parks and Wildlife Department where he coordinates conservation programs focused on restoring and preserving habitats for the diversity of native freshwater fishes and mussels. Since 2010, these programs have delivered river conservation workshops for nearly 2,000 local community partners, assisted in delivery of stewardship practices on 138,890 acres of ranchlands to preserve aquatic habitats, restored over 10,000 acres of spring, stream and riparian habitats to improve habitat conditions for focal species, and delivered large-scale control of invasive riparian plants along more than 200 miles of Texas rivers. Additionally, these programs have helped establish 149 river access areas that facilitate nature-oriented recreation on 762 miles of Texas rivers. Tim's presentation will reflect on the importance of collaborative stewardship and public-private partnerships, and profile case studies in connecting and empowering local communities and river users to take action to conserve aquatic resources.

**The purpose of the mussel summit is to create a forum for sharing information regarding current mussel science and conservation programs in Texas and throughout the nation.**

**The summit will bring together scientists and other professionals who have expertise in mussel science and in the design and implementation of mussel conservation programs with other stakeholders and interested parties.**

**Summit Planning Committee:**

Chris Harper, U.S. Fish and Wildlife Service  
Ben Kahler, USFWS  
David Martinez, USFWS  
Gary Pandolfi, USFWS  
Susan Oetker, USFWS  
Charrish Stevens, USFWS

Meghan Hope, Texas Comptroller of Public Accounts  
Kimberley Horndeski, TXCPA  
Colin McDonald, TXCPA  
Marsha May, Texas Parks and Wildlife Department  
Clint Robertson, TPWD

## WELCOME DAY 1: TUESDAY, NOVEMBER 14

8:00 AM                    **Welcome**  
*Ms. Amy Lueders*, Regional Director, Southwest Region,  
U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

## SESSION A: TUESDAY, NOVEMBER 14

### Freshwater Mussels in Texas and an overview of the Species Status Assessment framework.

**Overview:** The U.S. Fish and Wildlife Service is evaluating the status of four species of freshwater mussels in Texas, and will evaluate the status of another seven species over the next five years. This session presents a general overview of the Species Status Assessment framework and how the Endangered Species Act listing process could apply to freshwater mussels in Texas. This session will also present an update of the current state of the science regarding the distribution and abundance of known populations of the four freshwater mussel species currently under evaluation.

**Moderator:** Adam Zerrenner, U.S. Fish and Wildlife Service, Austin, Texas

8:30 AM                    **Overview of North American freshwater mussels:  
Conservation Challenges and Opportunities**  
*Heidi Dunn*, Science Coordinator, Ecological Specialists/  
EcoAnalysts, Inc., O’Fallon, Missouri

9:10 AM                    **Stakeholder Engagement and the Species Status Assessment  
framework**  
*Adam Zerrenner*, USFWS Field Supervisor, Austin Texas

9:40 AM                    **Texas freshwater mussels of conservation concern**  
*Clint Robertson*, TPWD, San Marcos, Texas  
and *Gary Pandolfi*, USFWS, Austin, Texas

10:00 AM                    **Break:** Twenty minutes

*Presenting author denoted by an asterisk (\*)*

**SESSION B: TUESDAY, NOVEMBER 14**

## Mussel Surveys, Sampling Designs, and Relocation Protocols

**Overview:** This session will explore survey methods, sampling designs, and relocation protocols. Experts from Texas and elsewhere will present case studies and lessons learned.

**Moderator:** Susan Oetker, U.S. Fish and Wildlife Service, Atlanta, Georgia

- 10:20 AM            **Sampling, survey and relocation methodology**  
*Dr. Charles Randklev*, Natural Resources Institute, Texas A&M University, Dallas, Texas
- 10:50 AM            **Case studies: mussel surveys, relocation, and permitting**  
*Matthew Johnson*, Malacologist, EnviroScience, Inc., Nashville, Tennessee
- 11:20 AM            **Case studies: mussel surveys, relocation, and permitting**  
*Heidi Dunn* and *David Ford\**, Malacologist, Ecological Specialists/EcoAnalysts, Inc., O’Fallon, Missouri
- 11:50 AM            **Fifteen years of studying the Texas hornshell: what we know, and what that means**  
*Dr. David J. Berg\**, Professor, Department of Biology, Miami University, Hamilton, Ohio and *Dr. Kentaro Inoue*, Natural Resources Institute, Texas A&M University, Dallas, Texas
- 12:15 PM            **A comparison of three survey methods at sites in Central Texas.**  
*Brittney Sanchez* and *Dr. Astrid Schwalb\**, Texas State University, San Marcos, Texas
- 12:30 PM            **Lunch Break:** Thirty minutes (box lunches available for pre-order)

*Presenting author denoted by an asterisk (\*)*

**SESSION C: TUESDAY, NOVEMBER 14**

## Mussel Propagation

**Overview:** Captive propagation can be an important component of a conservation or recovery strategy to benefit native freshwater mollusks. This session will provide an overview of mussel propagation techniques, the role of propagation in a comprehensive mussel management program, and will highlight some important policies related to propagation of rare mollusks.

**Moderator:** Gary Pandolfi, U.S. Fish and Wildlife Service, Austin, Texas

- 1:00 PM            **Overview of Freshwater Mussel Propagation and Reintroduction Efforts in Alabama**  
*Dr. Paul Johnson*, Program Supervisor, Alabama Aquatic Biodiversity Center, Marion, Alabama
- 1:45 PM            **Genetics considerations and management**  
*Dr. David J. Berg*, Professor, Department of Biology, Miami University, Hamilton, Ohio
- 2:30 PM            **Molecular studies and their importance to mussel conservation: A case study of cryptic diversity in central and east Texas.**  
*Dr. Kentaro Inoue*, Research Scientist, Natural Resources Institute, Texas A&M University, Dallas, Texas
- 3:00 PM            **Invasive freshwater mussels in Texas**  
*Dr. David Britton*, Deputy Center Director, San Marcos Aquatic Resources Center, USFWS, San Marcos, Texas
- 3:30 PM            **Efforts to establish captive propagation facilities at Central Texas National Fish Hatcheries**  
*Joshua Abel*, USFWS, San Marcos, Texas  
and *Dr. Scott Walker*, USFWS, Burnet, Texas
- 4:00 PM            **Day 1 Remarks and Adjournment**  
*Susan Oetker* and *Gary Pandolfi*, USFWS

*Presenting author denoted by an asterisk (\*)*

## WELCOME DAY 2: WEDNESDAY, NOVEMBER 15

8:00 AM                    **Restoring and Preserving Native Fishes and Mussels by Spawning River Conservation Stewards**  
*Tim Birdsong*, Chief of Aquatic Habitat Conservation  
Texas Parks and Wildlife Department, Austin, Texas

## SESSION D: WEDNESDAY, NOVEMBER 15

### Mussels and Water Quality

**Overview:** The degradation of water quality from point and non-point source pollution is a known stressor to freshwater mussels. Among the many components of water quality, sediments are known to be especially detrimental to mussel populations. While it is well known that streams transport water, the fact that they also transport sediment is frequently overlooked. The capacity for a stream to transport sediment is related to the capacity of a stream to transport water. Many known sources of sediment have been identified. One known solution to excess sedimentation is the use of appropriate best management practices along riparian habitats and adjacent uplands. A case study will be presented.

**Moderator:** Chris Harper, U.S. Fish and Wildlife Service, Austin, Texas

8:30 AM                    **Water quality constituents relevant to freshwater mussels**  
*Sean Buczek\**, Research Coordinator, and *Dr. W. Gregory Cope*,  
Distinguished Professor, Department of Applied Ecology, North  
Carolina State University, Raleigh, North Carolina

9:00 AM                    **Saving Mussels with Proper Wastewater Treatment: The Austin Water Story**  
*Rajendra Bhattarai*, Austin Water Environmental & Regulatory  
Services, City of Austin, Texas

9:30 AM                    **Effects of sediment and suspended solids on freshwater mussels**  
*Dr. Jim Stoeckel*, Auburn University, Auburn, Alabama

10:00 AM                    **A Case Study in Watershed Conservation: Implementing Watershed Scale Best Management Practices in the San Antonio River Basin**  
*Steve Raabe*, San Antonio River Authority, San Antonio, Texas

10:30 AM                    **Break:** Twenty minutes

*Presenting author denoted by an asterisk (\*)*

**SESSION E: WEDNESDAY, NOVEMBER 15**

## Mussels, Water Quantity and Environmental Flows

**Overview:** Flowing water is a primary component of habitat common among freshwater mussels in Texas. This session will provide an overview of the currently-known flow needs of freshwater mussels, will provide some background on environmental flows and water policy in Texas, and will discuss options for considering freshwater mussels. Case studies will be presented.

**Moderator:** Chris Harper, U.S. Fish and Wildlife Service, Austin, Texas

- 10:50 AM            **Overview of Environmental Flows in Texas**  
*Dr. Kathy Alexander*, Water Availability Division, Texas Commission on Environmental Quality, Austin, Texas
- 11:20 AM            **Environmental flow considerations for freshwater mussels: droughts, dams, timing, and temperature**  
*Dr. Jason Julian\**, Associate Professor, Department of Geography, Texas State University, San Marcos, Texas  
*Dr. Caryn Vaughn*, Department of Biology, University of Oklahoma, Norman, Oklahoma  
*Dr. Carla Atkinson*, Department of Biological Sciences, University of Alabama, Tuscaloosa, Alabama  
*Dr. Kiza Gates*, Department of Biology, University of Oklahoma, Norman, Oklahoma
- 11:50 AM            **Validating environmental flow standards and recommendations in Texas with implications for freshwater mussel monitoring**  
*Dr. Timothy Bonner*, Texas State University, San Marcos, Texas
- 12:20 PM            **Lunch Break:** Forty minutes (box lunches available for pre-order)

*Presenting author denoted by an asterisk (\*)*

**SESSION F: WEDNESDAY, NOVEMBER 15**

## Information for Private Landowners and Other Stakeholders

**Overview:** This session will highlight sources of assistance for private landowners and present case studies on efforts develop and implement various conservation plans that benefit water quality, water quality, and aquatic habitats.

**Moderator:** Ben Kahler, U.S. Fish and Wildlife Service, Lafayette, Louisiana

- 1:00 PM            **Watershed conservation initiatives on private lands**  
*Russell Castro* and *Kyle Wright*, Natural Resources Conservation Service, Temple, Texas
- 1:30 PM            **Conservation Planning with Case Studies**  
*Dr. David Smith*, U.S. Geological Survey, Kearneysville, West Virginia
- 2:00 PM            **Watershed versus Species Restoration**  
*Mike Montagne*, Project Leader, Texas Fish and Wildlife Conservation Office, USFWS, San Marcos, Texas
- 2:30 PM            **Resources for Private Landowners: The Partners for Fish and Wildlife Program and Landowner Incentive Program**  
*Cyndee Watson*, U.S. Fish and Wildlife Service, Austin, Texas  
*Arlene Kalmbach* and *Megan Bean*, Texas Parks and Wildlife Department
- 3:00 PM            Open Discussion Period (Audience-Driven): From Big Picture to Fine Details  
*Chris Harper* and *Ben Kahler*, USFWS
- 4:00 PM            **Day 2 Remarks, Wrap-up, and Adjournment**  
Chris Harper, USFWS

*Presenting author denoted by an asterisk (\*)*

## SELECTED SPEAKER BIOGRAPHIES:



**Joshua Abel** joined the staff of the San Marcos Aquatic Resources Center in 2015. Since that time, his work has focused on applied research and culture of endemic Texas mussels. He has a Bachelor of Science degree from the University of Washington in Aquatic and Fishery Sciences. Prior to joining U.S. Fish & Wildlife Service, he studied non-target effects of pesticides used in the commercial shellfish industry.



**Dr. Kathy Alexander** is the Technical Specialist for the Texas Commission on Environmental Quality's Water Availability Division. She began her career with TCEQ in 1999. In her role as a Technical Specialist, Dr. Alexander provides input on a broad range of permitting, hydrology, and policy issues for the Water Availability Division.

Dr. Alexander received her doctorate in Aquatic Resources from Texas State University. She has published articles and book chapters on Interbasin Transfers, Water Availability Determinations, and Texas' Boundary Water Agreements.



**Dr. David Berg** is Professor of Biology at Miami University. His training includes a BS from the University of Notre Dame, an MS from Northwestern State University of Louisiana, and a PhD from Ohio State University. Since 1993, his laboratory has been conducting basic and applied science research that seeks to explain mechanisms creating biodiversity in evolutionary time, while also investigating how human activities lead to loss of biodiversity. Their current research foci are population genetics and conservation biology of freshwater mussels, and evolution and conservation genetics of desert spring invertebrates. They have been funded by the National Science Foundation, the US Fish & Wildlife Service, and numerous state conservation agencies and NGOs. Results of our research have been published in journals such as *Global Change Biology*, *Molecular Ecology*, *Conservation Genetics*, and *Freshwater Biology*. They are committed to providing research that is useful to agencies charged with conservation of imperiled organisms.



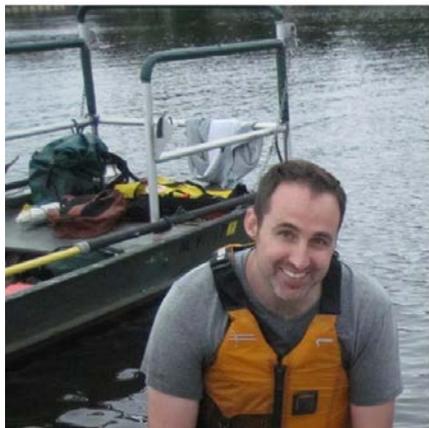
**Raj Bhattarai** has nearly four decades of public sector experience in water quality management, and water resource recovery. He manages Austin Water's Environmental and Regulatory Services Division. Raj is a Past-President of the Water Environment Association of Texas, and served as a Board Member of the Water Environment & Reuse Foundation, where he also Chaired the Research Council. A Fellow of the Water Environment Federation, he is a current Board Member of the National Association of Clean Water Agencies.



**Dr. Timothy Bonner** is a stream ecologist with emphasis on fishes and other aquatic biota (freshwater sponges, macroinvertebrates, and mussels). Tim is Professor and Director of the Aquatic Biology B.S. Program within the Department of Biology at Texas State University. His research interests include: Threatened and endangered fish ecology, Life history and population dynamics of warm-water fishes, Abiotic and biotic regulation of fish assemblages, and Reproductive ecology.



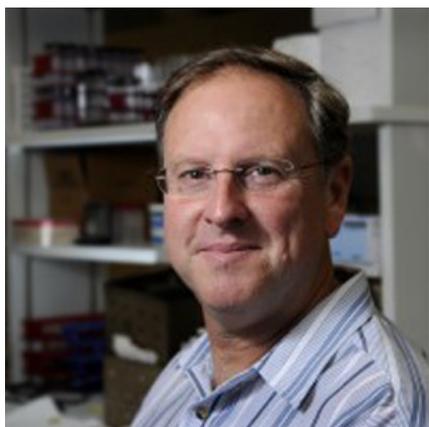
**Dr. David Britton** is the Deputy Director of the San Marcos Aquatic Resources Center, a federal research facility in San Marcos, Texas. He has worked for the U.S. Fish & Wildlife Service for 13 years. After completing his Ph.D. in Quantitative Biology if from the University of Texas at Arlington, he served for over a decade as an aquatic invasive species coordinator for the U.S. Fish & Wildlife Service's Southwest Region. He helped develop the federal Quagga/Zebra Mussel Action Plan for Western U.S. Waters and was instrumental in developing and adapting Hazard Analysis and Critical Control Point (HACCP) planning for use by federal and state natural-resource agencies.



**Sean Buczek** is a Research Coordinator for the Aquatic Toxicology Laboratory in the Department of Applied Ecology at North Carolina State University. Sean received his B.S. in Biology from Eastern New Mexico University in 2004. He then spent 6 years with the New Mexico Department of Game and Fish as a Fisheries Biologist, before pursuing a M.S. degree in Fisheries, Wildlife, and Conservation Biology from North Carolina State University. After earning his M.S. degree in 2016 he has continued to work on a variety of research projects focused on the ecological and physiological impacts of contaminants to aquatic fauna along with nutrient management in eutrophic systems, with emphasis on the functional roles of freshwater mussels and their ecosystem services.



**Russell Castro** has worked for SCS/NRCS for 38 years, beginning his career as a Range Conservationist, working in Zapata, Bandera and Tulia, Texas. He has worked as a District Conservationist in Edna, Texas, before becoming the Area/Zone Biologist in Terrell and Weatherford, Texas. Russell has worked as the Wildlife Biologist on the Water Resources Staff working primarily on the environmental permitting and issues associated with the NRCS Small Watershed Program. He moved to his current position as State Biologist for NRCS in Texas in 2005. Russell provides the leadership and responsibility for all biological actions regarding NRCS conservation efforts in Texas. Russell is versed in all aspects of biological issues affecting wildlife species, including threatened and endangered species, pollinators, wetland conservation and habitat restoration.



**Dr. W. Gregory Cope** is a William Neal Reynolds Distinguished Professor in the Department of Applied Ecology at NC State University. He also serves as Department Extension Leader and Coordinator of the NC Agromedicine Institute. He received a B.S. in Environmental Sciences in 1983 from Lenoir-Rhyne College in Hickory, NC, an M.S. degree in Biology with emphasis in aquatic sciences from the University of Wisconsin-La Crosse in 1988, and a Ph.D. with a double major in Fisheries Biology and Toxicology from Iowa State University in 1991. His interests are in aquatic toxicology, ecology, and physiology, and in the transport, fate, and effects of aquatic pollutants and other human-mediated stressors on freshwater mollusks and fish. His research utilizes sentinel aquatic organisms, biomarkers of exposure, effect, or susceptibility, or alternative toxicological models from which linkages to environmental and human health are evaluated. Major areas of research

focus include the assessment of pesticides, persistent organochlorine contaminants, and metals in surface waters, the effects of waterborne and sediment-associated contaminants on fish and native mollusks in inland waterways, the efficacy of constructed wetlands and other Best Management Practices for reducing non-point source pollution from urban (e.g., polycyclic aromatic hydrocarbons) and agricultural (e.g., nutrients) watersheds, and the effects of contaminant availability and cycling on imperiled species. Dr. Cope is a Charter Member of the Freshwater Mollusk Conservation Society and has held numerous officer and committee positions in the Society, including President and Chair of the Awards Committee, and currently serves as Editor-in-Chief of the Society's Journal, *Freshwater Mollusk Biology and Conservation*.



**Heidi Dunn** is a malacologist, with EcoAnalyst (dba Ecological Specialists). She holds a BS in Wildlife Science from Purdue University and a MS in Biology from Southern Illinois University at Edwardsville, IL. She was introduced to freshwater mussels in 1978 while working as a summer technician with USFWS, and started sampling and working with other malacologists in the Mississippi River basin in the 1980s. She has been working with these animals ever since and never ceases to be amazed at their diversity, beauty, and behavior. She has conducted over 600 mussel study designs, surveys, relocations, Biological Assessments, and workshops since founding Ecological Specialists in 1990. She has sampled throughout the interior basin, on the Atlantic coast and down to Texas. She is also currently an instructor for USFWS Conservation of Freshwater Mussel Biology at the National Conservation Training Center in Shepherdstown, WV and President of the Freshwater Mollusk Conservation Society.



**David Ford** is a malacologist with EcoAnalysts, Inc., formerly Ecological Specialists (ESI), an aquatic ecology group focusing on unionids and other aquatic ecological issues out of O'Fallon, Missouri. He began studying unionids with his Master's work at UT Tyler which involved creating predictive ecological niche modeling maps for the 6 state listed unionid species in East Texas based on their habitat preferences. Since graduating in 2013 he has conducted unionid surveys for various entities in Texas, primarily focusing on East Texas rivers. Mr. Ford joined ESI in 2016 and has since worked on unionid projects across the US, including projects involving federally listed species. He has helped to author several scientific papers focusing on various aspects of unionid ecology, and continues to play an active role in the ongoing research being conducted on unionids in Texas.



**Dr. Kentaro Inoue** is a research scientist at the Texas A&M Natural Resources Institute. He works with genetics and conservation of freshwater molluscs. He endeavors to understand how natural and anthropogenic forces affect the current distribution of biodiversity, and to use the information for conservation and management of imperiled species. His research focuses on understanding spatiotemporal patterns of biodiversity in response to environmental changes and the processes that promote and assemble diversity.



**Matthew Johnson** is a malacologist with EnviroScience, Inc. and is responsible for the firm's freshwater mussel services in the Mid-Atlantic and Southern United States. He earned his M.S. in Fish and Wildlife Conservation from Virginia Tech while studying the life histories of two federally endangered mussel species and assessing the status of the fauna in the Powell River in Virginia and Tennessee. During his 11 year career as a malacologist, he has held positions in the academic (Virginia Tech and Texas A&M University-IRNR), government wildlife agency (U.S. Fish and Wildlife Service), and consulting realms (EnviroScience, Inc.) and completed mussel surveys in 14 states.



**Dr. Paul Johnson** is Program Supervisor of the Alabama Aquatic Biodiversity Center (AABC), an imperiled species recovery and research facility operated by the Alabama Department of Conservation and Natural Resources (ADCNR), located outside Marion, Alabama. A native of Kentucky, he obtained his Bachelor's and Master's degrees in Aquatic Biology from the University of Louisville. He then earned his Doctorate in Zoology with a minor emphasis in Fisheries from Louisiana State University. After nearly 8 years with the Tennessee Aquarium Conservation Institute, he was hired by ADCNR to initiate the AABC in 2005. The first 5-years were devoted to conservation planning, development, construction and renovation efforts. Recovery programs became operational in 2010, and have cultured thousands imperiled and federally listed freshwater mollusks in support of large scale reintroduction efforts. Recovery programs have also initiated multiple research projects resulting in numerous scientific publications. manages the Alabama Aquatic Biodiversity Center, a unit of the Wildlife and Freshwater Fisheries Division of the Alabama Department of Conservation and Natural Resources.



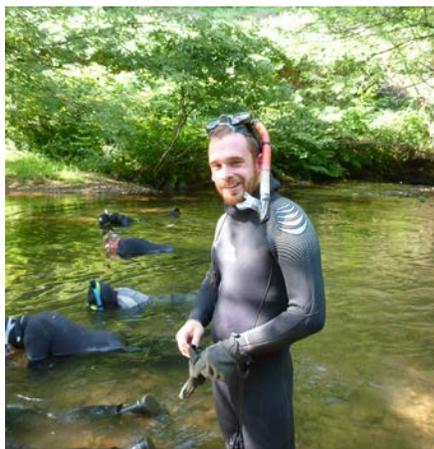
**Dr. Jason Julian** is an Environmental Geographer and Earth Systems Scientist who investigates landscape changes and ecosystem processes across broad scales, with a focus on human-environment interactions, water resources, and protected places. Past projects have included land use effects on watershed processes and river ecosystems, modeling light availability and primary production in rivers, ecohydrologic feedbacks in rivers, and ecosystem service demands with population growth. He was a Fulbright Senior Scholar (New Zealand) and is currently an Associate Professor at Texas State University, where he teaches courses on Water Resources, Geomorphology, and Environmental Systems.



**Arlene Kalmbach** has been the Texas Parks and Wildlife Department's state coordinator for the Landowner Incentive Program for eleven years & the Pastures for Upland Birds Program administrator for four years. She completed a master's degree in ecology at Texas State University in 2006 with a thesis focused on the effects of nonindigenous plant species on bird communities in Central Texas periurban habitats and a Bachelor of Science in Agriculture from Truman State University in Missouri in 1997.



**Mike Montagne** has worked for the U.S. Fish and Wildlife Service (USFWS) for 24 years, managing National Fish Hatcheries in Colorado and Utah, and is now the Project Leader of the Texas Fish and Wildlife Conservation Office (TXFWCO). In his early career, Mike worked as part of the Upper Colorado River Endangered Fish Recovery Program, producing endangered fish for stocking into the Colorado, Gunnison, Green, Yampa, and San Juan Rivers, and helping to monitor the success of the recovery effort. Since 2010, Mike has been the Project Leader for the TXFWCO and has been responsible for; the conservation of aquatic species, recovery efforts of listed and candidate species, and conservation, restoration and enhancement of aquatic habitats in Texas. Currently, the TXFWCO, other USFWS offices, and our partners, are focusing on watershed level conservation in multiple river systems in Texas.



**Gary Pandolfi** works as a Freshwater Mussel Conservation Biologist with the U.S. Fish & Wildlife Service in the Ecological Services Field Office located in Austin, Texas. Gary is a freshwater mussel biologist (malacologist) whose training focused on the effects human alteration of the landscape have on sensitive freshwater mussel species. He completed his B.S. and M.S. in Biology at Appalachian State University in North Carolina. During his college career he worked with various state and federally listed mussel species in North Carolina, Georgia, Alabama, Mississippi, and Florida. Gary moved to Austin TX in 2016 to continue his career as a biologist with the US Fish and Wildlife Service specifically concerned with freshwater mussel listing and recovery efforts. Gary is a native of North Carolina and enjoys spending his free time hunting, fishing, camping, and hiking or any other activity that gives him an excuse to be outdoors.



**Steven Raabe** is Director of Technical Services for the San Antonio River Authority (SARA) and is responsible for the Watershed Engineering, Real Estate and Environmental Science departments. Mr. Raabe has been with SARA since 1992. Mr. Raabe received a B.S. in Agricultural Engineering from Texas A&M University in 1979 and a Master of Engineering in Agricultural Engineering from Texas A&M University in 1980 and is a Licensed Professional Engineer in the State of Texas. Mr. Raabe directed the San Antonio River Authority's participation in the Texas Instream Flow Program and provided technical and policy guidance for the SARA in the Texas Environmental Flow process. Mr. Raabe currently serves as chair of the Edwards Aquifer Habitat Conservation Plan Stakeholder Committee. He served on the Steering Committee and chaired the Recharge Facility Feasibility subcommittee for the Edwards Aquifer Recovery Implementation program which is a collaborative, consensus-based stakeholder process in Texas where many stakeholders are working to develop a plan to protect the federally-listed spring species potentially affected by the management of the Edwards Aquifer and other activities. Mr. Raabe is

leading the San Antonio River Authority's efforts regarding the effects of the potential endangered species listing of the Golden Orb mussel through development of scientific data about the distribution and habitat needs of mussels and coordination with the US Fish and Wildlife Service. Mr. Raabe is also serving as the Administrator for the Senate Bill 1 South Central Texas (Region L) Water Planning Group that is charged with developing a 50 year water resource plan for twenty-one counties in south central Texas.



**Dr. Charles Randklev** is a Research Scientist for the Texas A&M Natural Resources Institute where he serves as Principal Investigator of the Aquatic Conservation Program. His research activities focus on status assessments of native mussel populations, understanding how habitat conditions contribute to mussel persistence and life-history and reproductive behavior of rare mussel species. He has authored or coauthored a number of papers on these topics. Randklev provides ten years of experience studying freshwater mussels in Texas river systems. <https://dallas.tamu.edu/research/mussels/>



**Clint Robertson** is an aquatic biologist with Texas Parks and Wildlife Department's River Studies Program in San Marcos, Texas. Mr. Robertson earned a B.S. and a M.S. at Texas A&M University in Fisheries Ecology. He has been studying native freshwater fish in rivers in Texas for the past 15 years and has included freshwater mussels in Texas for the past 9 years. He has been working in the River Studies Program at Texas Parks and Wildlife for the past 10 years where he works at ensuring sufficient water quality and quantity for Texas rivers through work with the Texas Instream Flow Program and currently serves as the Department's coordinator for freshwater mussel research and issues.



**Dr. Astrid Schwalb** has studied freshwater mussels for the past 13 years and has published numerous papers on the ecology of freshwater bivalves. She received her PhD at the University of Guelph, Canada, and joined the Biology Department of Texas State University in San Marcos in 2014 as Assistant Professor. Her lab currently works on several mussel projects in Central Texas addressing questions concerning their reproductive ecology, behavior, mussel host-fish interactions, sampling methods, and invasive zebra mussels.



**Dr. David Smith** is a researcher at the USGS Leetown Science Center with a focus on population assessment, aquatic ecology, and decision analysis. Currently, Dave works with other researchers, biologists, and managers to develop and evaluate management strategies to optimize conservation efforts using adaptive management and decision analysis. For example, Dave is collaborating with the Fish and Wildlife Service to implement a new framework for biological assessment of species status to inform endangered species activities and to develop a strategic conservation plan for imperiled aquatic species in the Upper Tennessee River Basin and North Carolina watersheds. Recent collaborative projects include development of an adaptive management plan for restoration of Herring River estuary on Cape Cod National Seashore and optimization of hydropower generation in rivers with downstream eel migration. Dave works with other decision analysts to build capacity in decision analysis through a collaborative training program at the National Conservation Training Center. Dave graduated from Colorado State (BS and MS in Fish and Wildlife Biology) and University of Georgia (MS in Statistics and PhD in Forest Resources).



**Dr. Jim Stoeckel** is an Associate Professor in the School of Fisheries, Aquaculture, and Aquatic Sciences at Auburn University. He obtained his Ph.D. at Miami University, Ohio in 2007 and then joined Auburn University where he teaches Conservation of Freshwater Invertebrates, and Molluscan and Crustacean Aquaculture. His research program focuses on potential population bottlenecks and stressors for freshwater invertebrates, especially freshwater mussels and crayfish. He has published numerous peer-reviewed journal articles and serves as the permanent Secretariat for the International Association of Astacology.



**Dr. Scott Walker** is the Assistant Project Leader at Ink's Dam in 2014 after five years with Texas Parks and Wildlife Department (TPWD) as a Natural Resource Specialist. Scott began his fisheries career as a Peace Corps Volunteer in the Philippines where he worked as a Coastal Resource Manager. Following his Peace Corps Service, Scott worked as a National Marine Fisheries Service Groundfish Observer in the Bering Sea, Gulf of Alaska and Pacific Northwest. He began his graduate studies in 2002 and conducted research in the areas of penaeid shrimp feed chemoattractants and computer simulation modeling of shrimp growth based on metabolism and conventional bioenergetics. Scott finished his graduate studies in 2009 and went to work in marine stock enhancement with TPWD. During his time with TPWD, Scott worked with red drum, spotted seatrout and southern flounder. Scott has a B.S. in Biology from Texas Tech University, M.S. in Mariculture from Texas A&M University - Corpus Christi and a PhD in Wildlife and Fisheries Sciences from Texas A&M University - College Station. His areas of expertise are recirculating aquaculture systems, larval fish rearing and eco-physiology.



**Cyndee Watson** is State Coordinator for the U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program in Texas, a position she has held since August 2016. Cyndee is a native Texan. She graduated from the University of Texas at Austin majoring in Geography with an emphasis in Resource Management with a Zoology minor. She later received her Masters degree in Biology from Texas State University. While there she conducted her thesis on Estimating the Probability of Detecting golden-cheeked warblers. She started with the U.S. Fish and Wildlife Service in the Student Career Experience Program in 2003. In 2006, she was converted to a permanent Fish and Wildlife Biologist. She has worked on the recovery of 16 endangered karst invertebrates and was named the 2014 Recovery Champion for Region 2 for her work with those species. She also worked on Mexican long-nosed bat recovery and was the Texas Section 6 coordinator. Cyndee enjoys spending time in the outdoors hiking, climbing, and camping with her husband Rick and 5-year old daughter Lauren.



**Kyle Wright** is the State Water Quality Specialist on the Landscape Planning staff at the USDA Natural Resources Conservation Service (NRCS) Texas State Office in Temple, Texas. Kyle has a Bachelor's and Master's degree from Angelo State University. Kyle has 20 years of experience in the private sector as well as 15 years of federal employment. Kyle spent much of his life in West Texas and now resides in Salado, Texas.



**Adam Zerrenner** has worked in the field of environmental policy and natural resource management for more than 20 years. Mr. Zerrenner has worked for the U.S. Fish and Wildlife Service in Washington DC, California's Central Valley, and the Northeast. In his career Mr. Zerrenner has worked collaboratively with community leaders to resolve complex and controversial water and land use issues that protect the environment and the economy. Mr. Zerrenner currently manages a field office in Austin, Texas, which has Endangered Species Act responsibility for Central and West Texas and he has served in this position for over ten years. Under Mr. Zerrenner's leadership, the office oversees the fastest growing region in the country that also has some of the highest numbers of threatened and endangered species. Mr. Zerrenner received his bachelor's degree from Cornell University and Master's Degree from the University of Vermont in Natural Resources, and a Master's in Business Administration from the University of Texas at Austin's McCombs School of Business.