ABOUT THE TEXAS INVASIVE PLANT & PEST COUNCIL

The 2009 Texas Invasive Plant and Pest Conference is a product of the Texas Invasive Plant and Pest Council also known as TIPPC. TIPPC originated as a motion from the floor at the 2007 statewide Invasive Species Conference held at the Lady Bird Johnson Wildflower Center in Austin, Texas. The motion passed unanimously and invasive species stakeholders from state and federal agencies, conservation organizations, academia, green industry and the public sector now have a unified body to address the threat of invasive species in Texas.

The objectives of the Texas Invasive Plant and Pest Council are

- To promote understanding and awareness of invasive plant and pest impacts and management in Texas;
- Provide a forum for the exchange of scientific, educational and technical information; and
- Support research and restoration activities that reduce the impact of invasive plants and pests in Texas.

To help meet these objectives, the main program for the 2009 Texas Invasive Plant & Pest Conference is organized around key strategies from the National Invasive Species Council’s National Management Plan for invasive species:

**Leadership & Coordination** - States play a key role in the management of invasive species within their borders. The Leadership and Coordination theme reflects the need for Texas to build capacity and coordinate a response to invasive species.

**Early Detection & Rapid Response** - Over the long term, the most cost-effective strategy against invasive species is preventing them from becoming established. Early detection of incipient invasions and quick coordinated responses are needed to contain invasive species before they become widespread.

**Control & Management** - When invasive species appear to be permanently established, the most effective action may be to prevent their spread or lessen their impacts through control and management measures.

**Research** - Invasive species can cause a wide range of disturbances, both to the structure of ecosystems and their processes. Complementary research projects and restoration efforts with broad application are needed in the state.

**Information Management** - Although there are many sources of information concerning invasive species, incompatible databases and other factors can impede information sharing.

**Education & Public Awareness** - We all have a stake in reducing the negative impacts of invasive species. A successful plan to address invasive species in Texas will depend on the public's understanding and acceptance of actions needed to protect our natural resources.

For more information about the Texas Invasive Plant and Pest Council, please visit our website at [www.texasinvasives.org](http://www.texasinvasives.org).
ACKNOWLEDGEMENTS FROM THE PROGRAM CHAIRS

Welcome to the 2009 Texas Invasive Plant and Pest Conference!

We’ve gathered experts from across the country and the state to address one of the most significant ecological and economic issues in Texas – invasive species. Designed to serve scientists, land managers, private landowners, state and federal agencies, local governments, and other professionals interested in invasive plant and pest issues, this conference is a professional level meeting with keynotes, concurrent sessions, poster presentations, exhibits, a symposium and a panel discussion.

We would like to begin the acknowledgements with a special thanks to our plenary speakers Ross Melinchuk (Deputy Executive Director of Texas Parks and Wildlife Department), and Stan Reinke (Natural Resources Conservation Service-retired). They have some very interesting perspectives and news to share regarding statewide invasive species issues-past, present and future. We also thank Carlos Bográn for his detailed overview of pest issues in Texas presently and those potentially on the horizon. Finally, we thank Earl Chilton for his overview related to invasive plants in Texas and his perspectives on securing financial support for addressing key threats.

Also high on the list of acknowledgements is our host, Trinity University, and our sponsors (U.S. Forest Service National Forests and Grasslands in Texas, Texas Forest Service, Texas Parks and Wildlife, Texas Nursery and Landscape Association, The Nature Conservancy, Waste Management and Magnolia Trust). Their generous support made this conference possible.

We would also like to express gratitude to our session chairs: Damon Waitt (Leadership and Coordination), Thomas Philipps (Early Detection and Rapid Response), Stephen Clarke (Control and Management), Michael Merchant (Research), Alexander Mathes (Information Management), Travis Gallo (Education and Public Awareness), and Forrest Smith (South Texas Invasive Grass Management and Research Symposium). Thank you for chairing the sessions and providing a summary during the panel discussion at the end of the conference.

We hope you will agree that we have assembled a robust program for 2009. All told, 48 abstracts were submitted and divided into 39 oral presentations and 9 posters. In addition, several new features were added to the program including a symposium on South Texas Invasive Grasses, moderated discussions, a field trip, and workshops. Thank you to all who submitted abstracts or helped organize activities for your willing participation in this conference.

Lastly, we would like to thank all the people who helped pull this conference together, especially the conference planning committee: Marilyn Good, Jim Houser, Alex Mathes, Scott Walker, Damon Waitt, and local host Kelly Lyons and the list discussion, field trip and workshop leaders: Norma Fowler, Lee Marlowe and Robert Howells. This conference would not have been possible without their support. In particular, we would like to express our deep appreciation and gratitude to Damon Waitt who is the original architect and founder of the Texas Invasive Plant Conference. Damon’s hard work and dedication to addressing the threat of invasive species in Texas is unparalleled and his contributions are beyond measure.

Deb Overath and Jim Bergan
Program Co-Chairs
2009 Texas Invasive Plant and Pest Conference
October 21, 2009

To the Texas Invasive Plant & Pest Conference Attendees,

On behalf of Trinity University, it gives us great pleasure to welcome you the University campus, the city of San Antonio, and the El Tropicano Hotel. Trinity University is a private, primarily undergraduate institution with approximately 2500 students. Founded in 1869, Trinity relocated in the early 1940s from Waxahachie, Texas, to its present red-brick campus approximately two miles north of downtown, near the leafy historic suburbs of Monte Vista, Olmos Park and Alamo Heights. We are dedicated to the education of undergraduates in the liberal arts tradition.

The new music and art building, where much of our conference will take place, features one of the city's finest recital facilities, the Ruth Taylor Recital Hall. Should you find time, we invite you to take a moment to tour the campus to appreciate the O'Neil Ford tradition of architecture. Ford's affection for our local natural history is demonstrated in the fact that not a building on our campus is viewed but through a screen of live oaks. Some conference sessions will be held in our new Northrup Hall. This building was designed to reflect the O'Neil Ford tradition. The acequia flowing to the east is a reminder of our local roots, a connection to place.

Should you have the opportunity to return for a visit in the near future you can expect to see many changes on the west end of campus. Summer 2010, Trinity will break ground on the first building phase of a new science complex attached to west end of the Cowles Life Sciences building. Over the four years that follow, Cowles will be remodeled and the Moody Engineering Building will be demolished and rebuilt to complete the complex with a new courtyard replacing most of parking lot C. This facility will enhance our liberal arts tradition and facilitate our directive to train undergraduates in the sciences by including them in our research programs. The new facility will also augment our interdisciplinary programs in Environmental Studies; Neuroscience; and Biochemistry, Cellular and Molecular Biology. To facilitate dialogues across the disciplines, the space will be designed to pull in faculty and students from across campus and welcome them to stay and eddy. Finally, we aim to seek gold and platinum LEED certification for the complex to provide a model for the city of San Antonio and south Texas.

It is our privilege to serve as a host institution for the Texas Invasive Plant & Pest Conference. Please accept our warmest wishes for a productive conference.

Sincerely,

David Ribble, PhD
Professor and Chair
Department of Biology

Kelly Lyons, PhD
Assistant Professor
Department of Biology
2009 PLANNING COMMITTEE

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Email: dwaitt@wildflower.org

Registration

Marilyn Good
Texas Nursery & Landscape Association
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Email: mjgood@austin.rr.com

Saturday Afternoon Events

Workshop – Aquatic and Wetland Plants
Robert G. Howells
Texas Parks and Wildlife Department (ret.)
Email: bobhowells@htc.net

Roundtable – Invasive Species List
Norma Fowler
University of Texas at Austin
Email: nfowler@uts.cc.utexas.edu

Field Trip – San Antonio River Improvements Project
Lee Marlowe
San Antonio River Authority
PH: (512) 263-6443
Email: lmarlowe@sara-tx.org
2009 SESSION CHAIRS

1. Leadership & Coordination

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7. South Texas Invasive Grass Management and Research

Forrest Smith
Caesar Kleberg Wildlife Research Institute
PH: (361) 593-5550
Email: kafss00@tamuk.edu
2009 PROGRAM AGENDA

DISCLAIMER
Despite the best efforts of the editors, some errors and misspellings will likely be found in this program. Every attempt was made to correct obvious errors, but aside from those corrections, abstracts appear just as submitted.
PLENARY SPEAKERS

Invasive Species and the Texas Response

Ross Melinchuk – Deputy Executive Director for Natural Resources, Texas Parks and Wildlife Department

Ross Melinchuk is the Deputy Executive Director of the Texas Parks and Wildlife Department and has been with the department since June of this year. He oversees the Department’s Wildlife, Inland Fisheries, and Coastal Fisheries Programs. Prior to his arrival to TPWD, Ross was with Ducks Unlimited since 1992 serving as Director of Public Policy. He also served as Director of State and Federal Coordination from 1995-2003. From 1992-1995 he was the liaison to state agencies involved in the North American Waterfowl Management Plan (NAWMP). Prior to his 17 year career with DU, he served as NAWMP coordinator for the Association of Fish and Wildlife Agencies from 1990-1992. He began his professional career at the Saskatchewan Environment Agency, working his way up from wildlife biologist in 1981 to NAWMP coordinator, the position he held in 1990 when he left Canada to work in Washington D.C. He graduated from the University of Guelph with a Bachelor of Science in Wildlife Biology and earned a Master of Science degree in 1983 from Lakehead University.

The Unintended Consequences of Introductions

Stan Reinke – USDA-NRCS, Retired-Victoria, Texas

Stan Reinke worked for 38 years for the Soil Conservation Service and the Natural Resources Conservation Service as a biologist, range conservationist, and district conservationist. He has worked with literally 1,000’s of private landowners in Texas. After retirement, Stan went to work for Environmental Defense on habitat restoration in lower Rio Grande Valley for the endangered ocelot. Stan is presently employed by DuPont Crop Protection as a range and pasture specialist. Stan was born and raised in Refugio, Texas and graduated from Refugio HS in 1960. He graduated from Texas A&M University in 1965 with BS in Wildlife Management and minor in Range Management. Stan also served 2 years in the US Army. When he is not working with private landowners, Stan can usually be found fishing his collection of favorite fishing spots on the Texas coast.
OVERVIEWS

Invasive Pest Overview

Carlos E. Bográn – Department of Entomology and Department of Plant Pathology & Microbiology, Texas AgriLife Extension Service, The Texas A&M System.

Dr. Carlos Bográn is an Associate Professor & Extension Specialist supporting the Texas floriculture and nursery industries in the areas of pest and disease management. Carlos’ programs emphasize the application of scientific principles in the design, evaluation and implementation of reduced-risk pest management systems, including those targeted at invasive arthropod species. He is the Texas representative in the Southern Plant Diagnostic Network-Entomology committee and actively supports on-going Texas Department of Agriculture/USDA-APHIS invasive-pest surveillance efforts. He was President of the Society of Southwestern Entomologists (2007-08), has been with Texas AgriLife for 8 years, and has been involved in pest management research for 16 years.

Invasive Plant Overview

Earl W. Chilton II – Texas Parks and Wildlife Department

As Director of the Aquatic Habitat Enhancement Program, Dr. Earl Chilton coordinates aquatic habitat enhancement and invasive species prevention and management activities in Texas’ public waters. Dr. Chilton established the first Texas Invasive Species Coordinating Committee, serves on the national Invasive Species Advisory Committee, and represents Texas on the Gulf and South Atlantic States Regional, the Mississippi River Basin Regional, and the Western Regional Panel of the Aquatic Nuisance Species Task Force. Additionally, he serves on the Board of Directors for the Texas Invasive Plant and Pest Council.
PAPER SESSION I

Friday Early Afternoon • November 13, 2009

Control and Management • RTRH Auditorium

1:00 PM 1. BIOLOGICAL CONTROL OF ARUNDO DONAX - GIANT REED: AN INVASIVE WEED OF THE RIO GRANDE BASIN. John Goolsby, U.S. Dept. of Agriculture, Agricultural Research Service, Weslaco, TX.

1:20 PM 2. A HISTORY OF LAKE AUSTIN HYDRILLA: TEN YEARS OF MANAGEMENT. Mary Gilroy, City of Austin, Austin, TX.

1:40 PM 3. ENVIRONMENTAL IMPACTS OF NON-HERBICIDAL CONTROL OF INVASIVE SPECIES. Jimmie Cobb, Dow AgroSciences, Auburn, AL.

2:00 PM 4. THE POTENTIAL NEED FOR CONTROL AND MANAGEMENT OF THE INVASIVE CACTOBLASTIS CACTORUM (CACTUS MOTH) IN TEXAS. Barron Rector, Texas Agrilife Extension, TAMU, College Station, TX.

2:20 PM 5. SALTCEDAR BIOLOGICAL CONTROL, FIELD RESULTS – EMPHASIS BIG SPRING AREA OF TEXAS, 2004-2009. C. Jack DeLoach*, USDA-Agricultural Research Service (ARS), Temple, TX, Allen E. Knutson, Texas AgriLife, Dallas, TX, Chris M. Ritzi and Andrew Berezin, Sul Ross State University, Alpine, TX, Patrick J. Moran and James H. Everitt, ARS, Weslaco, TX, David C. Thompson, New Mexico State University, Las Cruces, NM, James L. Tracy and Thomas O. Robbins, ARS, Temple, TX.

2:40 PM 6. INTRODUCTION OF THE BEETLE (DIORHABDA SPP.) AS A SALT CEDAR (TAMARISK) BIOCONTROL AGENT ALONG THE RIO GRANDE RIVER IN PRESIDIO AND BREWSTER COUNTY, TEXAS. Andrew Berezin*, Chris Ritzi, Department of Biology, Sul Ross State University, Alpine, TX. and Jack Deloach, James Tracy, USDA/ARS, Temple, TX.

Early Detection and Rapid Response • Northrup Hall 214

1:00 PM 7. EMERGING TECHNOLOGIES FOR CITIZEN SCIENTIST-BASED EARLY DETECTION PROGRAMS. Kathleen Ward* and Thomas Philipps, USDA-Forest Service-National Forests & Grasslands in Texas, Lufkin, TX.

1:20 PM 8. BASS ANGLERS – REDNECK PARTNERS IN PROTECTION. Leslie McGaha, SE TX BASS Federation Nation, Spring, TX.

1:40 PM 9. INVASIVE SPECIES EXCLUSION AND MONITORING ACTIVITIES OF THE TEXAS DEPARTMENT OF AGRICULTURE. Awinash P. Bhatkar*. Texas Department of Agriculture, Austin, TX.
Research • Northrup Hall 218

1:00 PM 10. WATER LOSS AND SALVAGE IN SALTCEDAR (TAMARIX SPP.) STANDS ON THE PECOS RIVER IN TEXAS. Will Hatler, Texas Agrilife Extension Service, Stephenville, TX.

1:20 PM 11. NEW SCALE PEST OF CRAPE MYRTLE: INVASIVE, OR OLD PEST WITH A NEW APPETITE? Michael Merchant, Texas AgriLife Extension Service, Dallas, TX.

1:40 PM 12. ANALYSIS OF SOIL BIOTA FOR KR BLUESTEM REPLACEMENT IN THE HILL COUNTRY. David L. Davidson, San Antonio, TX.

2:00 PM 13. BIRDS AND VEGETATIVE CHARACTERISTICS OF NATIVE AND EXOTIC GRASSLANDS ON U.S. NAVY FACILITIES IN SOUTHERN TEXAS. Marc C. Woodin* and Mary Kay Skoruppa, U.S. Geological Survey, Corpus Christi, TX.

PAPER SESSION II

Friday Late Afternoon • November 13, 2009

Control and Management • RTRH Auditorium

3:20 PM 14. IMPLEMENTING BIOLOGICAL CONTROL OF SALTCEDAR IN WEST TEXAS. Allen Knutson, Texas AgriLife Extension, Dallas, TX.

3:40 PM 15. GIANT SALVINIA (SALVINIA MOLESTA) CONTROL IN TEXAS. Elder, Howard. Texas Parks and Wildlife, Aquatic Habitat Enhancement, Jasper, TX.

4:00 PM 16. MANAGEMENT AND CURRENT RESEARCH EFFORTS OF THE RED IMPORTED FIRE ANT (SOLENOPsis INVICTA, BUREN) IN TEXAS. Molly Keck, Texas AgriLife Extension Service, San Antonio, TX.

4:20 PM 17. CHILLI THRIPS, SCIRTOHRIPS DORSALIS (THYSANOPTERA: THRIPIDAE), MANAGEMENT ON ORNAMENTAL PLANTS. Scott Ludwig, Texas AgriLife Extension Service, Overton, TX.

Early Detection and Rapid Response • Northrup Hall 214

3:20 PM 18. CURRENT STATUS OF THE INVASIVE RASBERRY CRAZY ANT, PARATRECHINA SP. NR. PUBENS IN TEXAS. Alejandro A. Calixto, Bart Drees, Roger Gold and Danny McDonald. Department of Entomology, Texas A&M University, College Station, TX.
3:40 PM 19. INITIAL OBSERVATIONS OF TRIFOLIATE ORANGE (PONCIRUS TRIFOLIATA) IN THE COLUMBIA BOTTOMLANDS. Jeremy Pryor, Lower Brazos River Field Representative, The Nature Conservancy of Texas, P.O. Box 1018, West Columbia, TX.

4:00 PM 20. POTENTIAL INVADERS: WHAT COULD COME TO TEXAS NEXT? Saul Petty, USDA Forest Service, Forest Health Protection, Pineville, LA.

Research • Northrup Hall 218

3:20 PM 21. USING MICROSATellites TO TRACE THE ORIGIN(S) OF INVASIVE ARUNDO DONAX IN NORTH AMERICA. Daniel Tarin*, James Manhart, Alan Pepper, Texas A&M University Dept. of Biology College Station, TX.

3:40 PM 22. DECOMPOSITION AND NUTRIENT CYCLING OF NATIVE GRASSES AND BOTHRIOCHLOA ISCHAEMUM (KR BLUESTEM) IN SOUTH CENTRAL TEXAS GRASSLANDS. Amanda Benbow* and Lyons, K.G., Trinity University, San Antonio, TX.

4:00 PM 23. DEVELOPMENT OF MOLECULAR RESOURCES FOR THE NOXIOUS WEED, IMPERATA CYLINDRICA (L.) BEAUV. Millie Burrell, Department of Biology, Texas A&M University, College Station, TX.

4:20 PM 24. SUBSPECIFIC CLASSIFICATION WITHIN PHORADENDRON SEROTINUM (SANTALACEAE): ASSESSMENT OF POPULATION STRUCTURE USING MOLECULAR AND MORPHOLOGICAL DATA. Angela K. Hawkins*, Christopher P. Randle, Justin K. Williams, Alan D. Archambeault, and Brandi C. Cannon. Sam Houston State University, Huntsville, TX.

PAPER SESSION III

Saturday Morning • November 14, 2009

South Texas Invasive Grass Management and Research • RTRH Auditorium

8:00 AM 25. INVASIVE GRASSES IN SOUTH TEXAS – AN ECOLOGIST’S PERSPECTIVE. Andrea R. Litt* and Fred C. Bryant, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX.

8:20 AM 26. INVASIVE GRASSES IN SOUTH TEXAS - A LAND MANAGERS PERSPECTIVE. Don Draeger, Comanche Ranch, Carrizo Springs, TX.

8:40 AM 27. CAESAR KLEBERG WILDLIFE RESEARCH INSTITUTES’ INVASIVE GRASS RESEARCH APPROACH. Timothy E. Fulbright*, Forrest S. Smith, Leonard A. Brennan, Alfonso Ortega-Santos, Andrea R. Litt, and Fred C. Bryant, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX.
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<th>Time</th>
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<td>9:00 AM</td>
<td>28.</td>
<td>CATTLE GRAZING AND FIRE TO MANAGE EXOTIC GRASS STANDS</td>
<td>Eric D. Grahmann and J. Alfonso Ortega-Santos*, Caesar Kleberg Wildlife Research Institute,</td>
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<td>Department of Animal and Wildlife Sciences, Texas A&amp;M University, Kingsville, TX.</td>
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<td>9:20 AM</td>
<td>29.</td>
<td>NATIVE PLANT RESTORATION AS AN INVASIVE GRASS MANAGEMENT TOOL</td>
<td>Anthony Falk*, Forrest S. Smith, Tim Fulbright, Caesar Kleberg Wildlife Research Institute,</td>
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<td>Texas A&amp;M University, Kingsville, TX.</td>
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<td>9:40 AM</td>
<td>30.</td>
<td>ASSESSING ECOLOGICAL IMPACTS AND MANAGEMENT OF TANGLEHEAD ON SOUTH</td>
<td>Aaron D. Tjelmeland*, Forrest S. Smith, Fred C. Bryant, Mike Buelow, and Leonard A. Brennan,</td>
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<td>TEXAS RANGELANDS.</td>
<td>Texas A&amp;M University, Kingsville, TX.</td>
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<td><strong>Information Management • Northrup Hall 214</strong></td>
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<td>8:00 AM</td>
<td>31.</td>
<td>INVASIVE PLANT ATLAS OF THE UNITED STATES.</td>
<td>Karan A. Rawlins(1), Jil M. Swearingen(2), Charles T. Barger(1), and Les Mehrhoff(3).</td>
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<td>(1)Center for Invasive Species and Ecosystem Health, University of Georgia, (2)Center for</td>
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<td>Urban Ecology, National Park Service, (3)Invasive Plant Control, Inc.</td>
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<td>8:20 AM</td>
<td>32.</td>
<td>A SIMPLE ECOREGIONALLY-BASED ASSESSMENT OF INVASIVE PLANTS IN TEXAS</td>
<td>James F. Bergan*, Bill Carr, The Nature Conservancy of Texas, San Antonio, TX, and Lee</td>
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<td>Elliott, Missouri Resource Assessment Partnership, Columbia, MO.</td>
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<td>8:40 AM</td>
<td>33.</td>
<td>ASSESSMENT OF INVASIVENESS AND ECOLOGICAL IMPACT IN NON-NATIVE</td>
<td>Guy L. Nesom, 2925 Hartwood Drive, Fort Worth, TX.</td>
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<td>SPECIES OF TEXAS.</td>
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<td><strong>Education and Public Awareness • Northrup Hall 214</strong></td>
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<td>9:00 AM</td>
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<td>TEXAS PARKS AND WILDLIFE PLANS TO IMPLEMENT A PUBLIC AWARENESS</td>
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<td>ADVERTISING CAMPAIGN WITH A PRIMARY FOCUS ON GIANT SALVINIA</td>
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<td>(SALVINIA MOLESTA).</td>
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<td>9:20 AM</td>
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<td>INCREASING PUBLIC AWARENESS OF THE SOAPBERRY BORER - AN INVASIVE</td>
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<td>PEST OF TEXAS WOODLAND AND RESIDENTIAL LANDSCAPES.</td>
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<td>9:40 AM</td>
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<td>USING CITIZEN SCIENCE DATA TO BETTER UNDERSTAND THE DISTRIBUTION</td>
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<td>OF SOME KEY INVASIVE SPECIES IN TEXAS.</td>
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Control and Management • Northrup Hall 218

8:00 AM  37.  SYSTEMIC INSECTICIDE INJECTIONS FOR PROTECTION OF HARDWOODS AND CONIFERS FROM INVASIVE PESTS IN TEXAS. Donald Grosman, Forest Pest Management Cooperative & Texas Forest Service, Lufkin, TX.

8:20 AM  38.  TOTAL NON-STRUCTURAL CARBOHYDRATE TRENDS IN EXOTIC INVASIVE DEEP-ROOTED SEDGE: IMPLICATIONS FOR MANAGEMENT IN COASTAL PRAIRIE. Jon R. King and Warren C. Conway*, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX David J. Rosen, Lee College, Baytown, TX.

8:40 AM  39.  UPDATE ON COGONGRASS INFESTATION IN TYLER COUNTY, TEXAS. Michael Murphrey*, Ronald F. Billings (College Station), Herbert ‘Joe’ Pase and Aleksandar Dozic, Texas Forest Service, Lufkin, TX.

POSTER SESSION

Saturday • November 14, 2009 • 10-11:00 AM • RTRH Foyer

P1. SOAPBERRY BORER, AGRILUS PRIONURUS (COLEOPTERA: BUPRESTIDAE): THE ATTACK CHARACTERISTICS AND KNOWN DISTRIBUTION OF AN INVASIVE PEST OF WESTERN SOAPBERRY IN TEXAS. Ronald F. Billings and Herbert A. Pase III Texas Forest Service, College Station, TX.

P2. SURVEYING FOR EMERALD ASH BORER AND LIGHT BROWN APPLE MOTH IN TEXAS. Manuel Campos, Texas AgriLife Extension Service, Dallas, TX.


P4. USING EXOTIC PLANT INVENTORIES TO PLAN AND IMPLEMENT CONTROL EFFORTS AT SAN ANTONIO MISSIONS NATIONAL HISTORICAL PARK. Greg Mitchell, National Park Service, San Antonio Missions, San Antonio, TX.

P6. THE SAN ANTONIO INVADERS: AN ERADICATION PILOT PROGRAM. Cheryl Hamilton, Alamo Area Master Naturalist, and Wendy Cooley, City of San Antonio Natural Area Division of Parks and Recreation, San Antonio, TX.

P7. COMPARISON OF SEED HEAT SENSITIVITY AMONG NATIVE SPECIES AND KR BLUESTEM: IMPLICATIONS FOR INVASIVE SPECIES MANAGEMENT AND RESTORATION USING PRESCRIBED FIRE. T.R. Robinson and K.G. Lyons, Trinity University, San Antonio, TX and E. Ruckman, Texas State University, San Marcos, TX.

P8. TESTING THE RESOURCE USE OVERLAP HYPOTHESIS IN INVASIVE SPECIES CONTROL. H.N. Nguyen and K.G. Lyons, Trinity University, San Antonio, TX.

P9. ISOLATION OF INVASIVE SPECIES EPICENTERS, USING HERBARIUM RECORDS AND PREDICTIVE MODELING; A CASE STUDY ALONG THE RIO BRAVO/RIO GRANDE. Justin K. Williams* and Angela Hawkins, Sam Houston State University, Huntsville, TX.
ABSTRACTS


Giant reed (Arundo donax L.) also known as carrizo cane is an exotic perennial grass that has invaded riparian corridors in the southwestern U.S. The most severe infestations are in the Lower Rio Grande Basin (> 50,000 ha), where giant reed along the Rio Grande and Mexican tributaries threatens critical water resources, alters stream flow patterns, increases stream bank erosion and flood damage, fuels wildfires along rivers, displaces native wildlife, and hinders river access for law enforcement personnel. Currently, giant reed infestations are being managed with costly chemical and mechanical control. The USDA-Agricultural Research Service has developed a biological control program involving several insects from the native range of giant reed in Mediterranean Europe. Two agents, a stem-galling wasp, Tetramesa romana, and a scale insect, Rhizaspidiotis donacis, that feeds on side shoots and rhizomes, have been recommended for field release in North America on the basis of host range, biology, and efficacy studies. These agents do not harm non-target native grasses, crops, or habitat associates, produce many offspring on giant reed, complete multiple generations per year, and can be produced in large quantities, indicating that they will rapidly establish populations on both mature shoots and on young post-mechanical/chemical control regrowth shoots of giant reed. In greenhouse studies, combined attack by the wasp and scale significantly reduced plant height and increased shoot mortality compared to plants protected from attack. Laboratory studies are underway on additional biological control agents, including a fly that feeds on and kills juvenile giant reed shoots, and a leafsheath-mining fly. Technology is now being developed to inundate field populations of giant reed with biological control agents and to integrate this approach with mechanical and chemical controls. Our primary goal is to reduce the ecological and economic impacts of giant reed in the Rio Grande Basin of Texas and northern Mexico.

2. A HISTORY OF LAKE AUSTIN HYDRILLA: TEN YEARS OF MANAGEMENT. Mary Gilroy, City of Austin, Austin, TX.

The invasive plant hydrilla (Hydrilla verticillata) was first documented on Lake Austin in Travis County, Texas in 1999. Growing to over 320 acres by 2002, the plant caused significant public safety, access and water resource use concerns. Working with interested partners, the City of Austin developed an integrated management plan that included stocking triploid grass carp and resulted in several years of control (coverage < 50 acres) without an overall decline in submerged vegetation. In September 2009, Texas Parks and Wildlife Department documented an upsurge in hydrilla growth to over 300 acres, prompting additional management efforts.

3. ENVIRONMENTAL IMPACTS OF NON-HerbICIDAL CONTROL OF INVASIVE SPECIES. Jimmie Cobb, Dow AgroSciences, Auburn, AL.

Although herbicidal control of invasive species has been proven to be effective and environmentally sound, many invasive species control program feature non-herbicidal control methods. These methods are used because they are claimed to be better for the environment. These include polyethylene sheeting, boiling water, mechanical and manual
control, flame weed burners, vinegar, and other organic methods. These non-herbicidal methods are examined for their environmental impact, including total pounds of chemicals used, toxicity of all chemicals used, fuel use, and long term environmental fate of the non herbicidal chemicals utilized. In addition, the long term safety record of the different methods are compared in terms of worker injuries.

4. THE POTENTIAL NEED FOR CONTROL AND MANAGEMENT OF THE INVASIVE CACTOBLASTIS CACTORUM (CACTUS MOTH) IN TEXAS. Rector, Barron. Texas Agrilife Extension, TAMU, College Station, TX.

The cactus moth (Cactoblastis cactorum), a native moth of South America, was first reported in 1989 in the United States in the Florida Keys. It has spread northward and westward along the coast for both the Atlantic and Gulf Coasts. With the discovery of the cactus moth in the central southern region of Louisiana in late May of 2009, a "red flag" has appeared and the probable invasion of this organism into southeast Texas along the coast has heightened. To control and manage the spread of this organism, early detection is the paramount line of defense as the cactus moth has been shown in the southeastern United States to move at a rate of 70 to 100 km per year. The tools available for slowing or even temporarily stopping the spread of the cactus moth include continual and periodic visual surveys of prickly pear, artificial lure trapping, host removal and the Sterile Insect Technique (SIT). Preparation for an invasion is being done through a cooperative effort between Texas AgriLife Extension Service professionals and volunteers, Texas Department of Agriculture, the Texas Nature Conservancy and USDA, Animal Plant Health Inspection Service, Plant Protection and Quarantine. Experiences with management in the southeastern states, Dauphin Island, Alabama and Isla Mujeres in Mexico will be reviewed.

5. BIOLOGICAL CONTROL, FIELD RESULTS – EMPHASIS BIG SPRING AREA OF TEXAS, 2004-2009. C. Jack DeLoach*, USDA-Agricultural Research Service (ARS), Temple, TX, Allen E. Knutson, Texas AgriLife, Dallas, TX, Chris M. Ritzi and Andrew Berezin, Sul Ross State University, Alpine, TX, Patrick J. Moran and James H. Everitt, ARS, Weslaco, TX, David C. Thompson, New Mexico State University, Las Cruces, NM, James L. Tracy and Thomas O. Robbins, ARS, Temple, TX.

Saltcedars (SC) (Tamarix spp.), small trees from Eurasia, are among the most damaging exotic, invasive weeds of riparian areas in the western United States. Biological control was initiated by USDA-ARS, Temple, TX in 1986. After overseas explorations, quarantine testing, and regulatory clearances, the leaf beetle, Diorhabda carinulata from China and Kazakhstan, was released in 6 western states in 2001 where it quickly became spectacularly successful in NV, UT, CO and WY but not in Texas. Another beetle, D. elongata from Crete, Greece, was obtained, tested and released near Big Spring, TX in April 2004. It quickly established and defoliated 1 acre of SC in 2005, 20 acres in 2006, 1 mile along Beals Creek (50 acres) in 2007, 6.4 miles (145 acres) in 2008, and 35 miles (1,000+ acres) in 2009. Intensive weekly monitoring over the 5 years has tracked beetle populations, dispersal and damage to SC over the now 11 km transect along the creek. Local grasses have naturally and abundantly revegetated the former bare soil under SC thickets within 1-2 years after defoliation. The SC resprouted after each of the 2-3 annual defoliations but green SC biomass is now only about 10%, with 25% dead trees in the central area. Beetle field ecology indicates a high reproductive strategy, potentially high predation from insects and spiders, and distant migration in swarms (predator
avoidance). The Crete beetles seem best adapted in central, those from Uzbekistan (*D. carinata*) in northern, and from Tunisia (*D. sublineata*) in southern Texas, discussed here by presenters Knutson et al. and Berezin et al.

6. INTRODUCTION OF THE BEETLE (DIORHABDA SPP.) AS A SALT CEDAR (TAMARISK) BIOCONTROL AGENT ALONG THE RIO GRANDE RIVER IN PRESIDIO AND BREWSTER COUNTY, TEXAS. Andrew Berezin*, Chris Ritzi, Department of Biology, Sul Ross State University, Alpine, TX. and Jack Deloach, James Tracy, USDA/ARS, Temple, TX.

Salt cedar (*Tamarisk* spp.) is a deciduous shrub or small tree that was introduced into the United States from Eurasia in the early 1800’s to stabilize riverbank erosion and to serve as a windbreak and ornamental. However, due to a high reproductive potential and the absence of natural predators, salt cedar has become invasive on many river systems in the Western United States such and the Colorado and Rio Grande. In 2006, attempts to establish the Tamarisk leaf beetle (*Diorhabda* spp.) at three locations along the Rio Grande was conducted in an attempt to control the spread of salt cedar and restore the riparian corridor which has become populated by a monoculture of salt cedar. Currently, two release sites along the Rio Grande are showing early signs of success as beetles are becoming established and over 2,000 square meters of Tamarisk has been defoliated.

7. EMERGING TECHNOLOGIES FOR CITIZEN SCIENTIST-BASED EARLY DETECTION PROGRAMS. Kathleen Ward* and Thomas Philipps, USDA-Forest Service-National Forests & Grasslands in Texas, Lufkin, TX.

Citizen scientists are volunteers who receive expert training to help identify and track important invaders in their local areas. The use of citizen science networks may allow natural resource professionals to detect and manage invasive species in a rapid and cost-effective way. Emerging technologies can facilitate volunteer efforts by making information readily accessible and easy to transmit. For example, many mobile phones have a global positioning system (GPS) which indicates current geographical location. Volunteers can enter and transmit scientific observations and accompanying digital photographs from their phones to web-based applications which allow invasive species information and locations to be plotted on a map. In addition, commonly used applications like Google Earth and Microsoft Bing Maps have become useful tools for citizen scientists. Reference information such as ArcGIS shapefiles and remotely sensed imagery can be loaded to the applications, invasive plant data can be collected with a GPS at the site, and digital photographs can be uploaded to document the find. Detection of invasive species would be difficult if not impossible to keep track of without the participation of citizen scientists. Fortunately, emerging technologies can aid their efforts through rapid documentation and dissemination of invasive species information.

8. BASS ANGLERS – REDNECK PARTNERS IN PROTECTION. Leslie McGaha, SE TX BASS Federation Nation, Spring, TX.

Sportsmen have long known that as a collective group, they are the largest private source of conservation efforts and funds in this country. Ducks Unlimited, The Rocky Mountain Elk Foundation, Pheasants Forever and the Coastal Conservation Association are just a fraction of the sportsmen’s organizations dedicated to the preservation of the
land, the habitat and the bounty of natural resources that have been integral to our nation’s heritage. In general sportsmen have four main concerns: 1. Availability of hunting and fishing areas, 2. Quality of hunting and fishing areas, 3. Long-term quality of the species, 4. Preservation of those assets for future generations. In this presentation, Leslie McGaha, Conservation Co-Director for SE TX BASS Federation Nation, will introduce the methods that have been used by bass anglers here in Texas to address education and detection of invasive aquatic species. Potential areas for concern, from an angler’s point of view, will also be discussed. Techniques being used include assigning conservation duties to a volunteer leader, training anglers to identify possible invasive aquatic species, public outreach through anglers and partnering with governmental agencies.

9. INVASIVE SPECIES EXCLUSION AND MONITORING ACTIVITIES OF THE TEXAS DEPARTMENT OF AGRICULTURE. Awinash P. Bhatkar*. Texas Department of Agriculture, Austin, TX.

Routine inspection and pest survey activities are conducted to monitor invasive pests that could be introduced through interstate and global commerce to pest-free areas of Texas. The articles that can harbor invasive species are inspected to ensure that they are free of quarantine pests and meet import requirements. Road station and critical point inspections are conducted to ensure that the articles entering into free areas are safeguarded from invasive pests through quarantine and emergency response activities. Plants imported from foreign countries for propagation are monitored cooperatively with USDA through post-entry quarantine and permitting process for soil, plant pests, noxious weeds and biological control organisms. Quarantined articles without proper certification are denied entry into the state. The nursery products or floral items that are infested with a plant pest are subjected to a seizure order, requiring the plants to be withdrawn from sale for treatment or destruction.

10. WATER LOSS AND SALVAGE IN SALTCEDAR (TAMARIX SPP.) STANDS ON THE PECOS RIVER IN TEXAS. Will Hatler, Texas Agrilife Extension Service, Stephenville, TX.

Water use by saltcedar, an invasive phreatophyte, is of significant concern in many riparian zones in the western United States. Diurnal groundwater fluctuations were analyzed to estimate evapotranspiration and water salvage (water available for other ecological functions) in saltcedar stands over a six-year period on a site along the Pecos River in Texas. Seasonal stand-level saltcedar water loss at an untreated control site ranged from 0.42 – 1.18 m/yr. Seasonal water salvage following application of imazapyr ranged from 31% four years after treatment to 82% two years after treatment. Significant water savings may be achieved by chemical saltcedar control, dependent upon water use by replacement vegetation and saltcedar re-growth. A re-growth management strategy is essential to maintain long-term water salvage.

11. NEW SCALE PEST OF CRAPE MYRTLE: INVASIVE, OR OLD PEST WITH A NEW APPETITE? Michael Merchant, Texas AgriLife Extension Service, Dallas, TX.

A new scale pest was identified from crape myrtle in the vicinity around Dallas, TX approximately five years ago. Initially identified as a type of felt scale in the genus
Eriococcus, the specific identity is still in question. As one of the few insect pests of crape myrtle, the scale poses serious management problems for landscapers and homeowners. Current known range of the scale, probable identity and effectiveness of different pest management options are presented.

12. ANALYSIS OF SOIL BIOTA FOR KR BLUESTEM REPLACEMENT IN THE HILL COUNTRY. David L. Davidson, San Antonio, TX.

It has been hypothesized that invasive species, such as KR Bluestem, establish soil biota favorable to that species, and to restore native grasses, it is necessary to reestablish soil conditions that favor native grasses. To test that hypothesis, soil biota in native grass and KR Bluestem dominated areas have been assayed for the past 2 years, although it has been hard to find an area of mixed native grasses for comparison. Results appear to indicate that KR Bluestem areas are bacterially dominated while native grasslands are fungally dominated, and in both areas there is almost no mycorrhizia. Honey Creek SNA appears to be a good reference site for Hill Country prairie, but more sampling is required. Probably, drought conditions have affected these results. It may be possible to treat soils to enhance the probability of native grass restoration, but there are still many unanswered questions.

13. BIRDS AND VEGETATIVE CHARACTERISTICS OF NATIVE AND EXOTIC GRASSLANDS ON U.S. NAVY FACILITIES IN SOUTHERN TEXAS. Marc C. Woodin* and Mary Kay Skoruppa, U.S. Geological Survey, Corpus Christi, TX.

Beginning in the 1800s and extending into the first half of the twentieth century, a large number of exotic grass species have been introduced into southern Texas to improve cattle forage. The effects of exotic grasses on grassland birds wintering in southern Texas have not been investigated. During 2003-2008, we collected data on measures of vegetation structure, density, floristic diversity, seed resources, and winter bird use of native and exotic grasslands on five U.S. Navy facilities in southern Texas. Exotic grasslands were characterized by more grass cover, greater vegetative density, and greater seed biomass availability than native grasslands, whereas native grasslands were characterized by greater forb cover, more bare ground, greater seed diversity, and higher plant species richness than exotic grasslands. Bird surveys along transects in native and exotic grasslands showed that bird species richness was greater in native than in exotic grasslands, although bird numbers, at least in some winters, can be greater in exotic grasslands. Our results suggest that native and exotic grasslands may be contributing in different ways to maintaining winter bird populations in southern Texas.

14. IMPLEMENTING BIOLOGICAL CONTROL OF SALTCEDAR IN WEST TEXAS. Allen Knutson, Texas AgriLife Extension, Dallas, TX.

Saltcedars (Tamarisk spp.) are exotic, invasive shrubs and small trees that degrade riparian habitats and compete with scarce water resources in west Texas. Three species of introduced leaf feeding beetles, Diorhabda spp., have been released in Texas as biological control agents of saltcedar. One species, D. elongata, defoliated dense stands of saltcedar along about 25 miles of drainage in the Upper Colorado River basin in 2009 and is also well established on the Pecos River. An implementation program coordinated by Texas AgriLife Extension and in partnership with NRCS and local Soil and Water
Conservation Boards is now underway to re-distribute and establish *D. elongata* at additional sites in west Texas.

15. GIANT SALVINIA (SALVINIA MOLESTA) CONTROL IN TEXAS. Elder, Howard. Texas Parks and Wildlife, Aquatic Habitat Enhancement, Jasper, TX.

Giant salvinia (*Salvinia molesta*) continues to persist and expand in the nutrient rich waters of the southeastern United States. Once established, meaningful control becomes increasingly elusive and expensive. Herbicide applications have proven effective but, even with significant commitment, only delay the inevitable. Well-timed drawdowns can provide significant reductions in giant salvinia infestations but are neither popular nor possible in many situations. Large-scale introductions of the giant salvinia weevil (*Cyrtobagous salviniae*) offer great promise in reducing infestations but success can vary depending on location and winter temperatures. Effective management of giant salvinia infestations requires an integrated approach, utilizing a wide variety of complimentary prevention and control techniques. The only positive control discovered after 10 years of trial and error is the containment and removal of all plants immediately after detection.

16. MANAGEMENT AND CURRENT RESEARCH EFFORTS OF THE RED IMPORTED FIRE ANT (SOLENOPSIS INVICTA, BUREN) IN TEXAS. Molly Keck, Texas AgriLife Extension Service, San Antonio, TX.

The Red Imported Fire Ant, *Solenopsis invicta*, has been an invasive pest ant in Texas since its introduction in the 1960's. As its range spreads throughout Texas and the United States, efforts are being made to control this ant through biological and chemical controls. Fire ants can be managed through various chemical controls, but eradication will never occur. Texas AgriLife Extension is a current participant and leader in research efforts to control the Red Imported Fire Ant.

17. CHILLI THRIPS, SCIRTOTHIRPS DORSALIS (THYSANOPTERA: THRIPIDAE), MANAGEMENT ON ORNAMENTAL PLANTS. Scott Ludwig, Texas AgriLife Extension Service, Overton, TX.

In 2007, an established population of Chilli thrips was found on roses in a residential landscape in Harris County. Prior to that this new invasive thrips had been found in retail stores in South and East Texas. By 2009, they had become a serious pest of landscape plants in the Houston area and in commercial nurseries throughout Texas. USDA APHIS and AgriLife Extension started evaluating potential control techniques for this pest on ornamental pests in 2007. As a result of these trials, we were able to develop management programs for chilli thrips on ornamental crops when they were detected in Texas.

18. CURRENT STATUS OF THE INVASIVE RASBERRY CRAZY ANT, PARATRECHINA SP. NR. PUBENS IN TEXAS. Alejandro A. Calixto, Bart Drees, Roger Gold and Danny McDonald. Department of Entomology, Texas A&M University, College Station, TX.

In 2002 a new invasive ant was found in an industrial area in the Houston area (Pasadena). This ant has the potential to spread rapidly, as October 2009, high numbers of this species have been reported for 13 counties including Jim Hogg (South TX) and
Bexar Co. as new counties are expected to be invaded. They are becoming a serious pest in rural and urban areas by damaging electrical equipment and disturbing pets and farm animals. They also tend and protect sap-feeding insects (i.e. scales) where they collect honeydew from, some of economic importance. These associations are expected to fuel the spread of this species in the future. Taxonomic studies indicates this species is similar to the Caribbean crazy ant, *P. pubens*, previously reported in Florida but differs from descriptions in the literature (both morphologically and genetically), some others places this species near to *P. fulva*, a serious pest in South America. Basic and applied research is being conducted at Texas A&M University primarily focusing on early detection (locating and surveying recently infested areas), impact on resident arthropod assemblages and evaluation of potential control techniques for developing management strategies for *P. nr. pubens*.

19. INITIAL OBSERVATIONS OF TRIFOLIATE ORANGE (PONCIRUS TRIFOLIATA) IN THE COLUMBIA BOTTOMLANDS. Jeremy Pryor, Lower Brazos River Field Representative, (jeremy_pryor@tnc.org) The Nature Conservancy of Texas, P.O. Box 1018, West Columbia, TX.

A native of inner China, Trifoliate Orange has been under cultivation for thousands of years, eventually spreading to Japan where it has been valued as a citrus rootstock for a millennium. A deciduous shrub or small tree, the primary tree-like stem is protected by vine-like basal sprouts with thorns up to 2 inches (5cm) in length extending into the canopy. Although Trifoliate is remarkably different than citrus, the cold-hardy rootstock hybridizes freely with citrus species found as far north as New England. Indicative of trifoliates potential to hybridize, breeding programs have led to biogeneric hybrids such as the citranges, citrumelos, citrandarins, citremons, citradias, and citrumquats among others. First introduced in United States as an ornamental in the 1850s, Trifoliate is now found throughout the eastern United States including both the coastal prairie and mixed bottomland hardwood forests in the Columbia Bottomlands, and habitat edges and other associated disturbed sites. Trifoliate was successfully established as a citrus rootstock in TX in 1908, though earlier attempts began in the 1880s. The mechanisms by which trifoliate escapes cultivation and invades native habitats are presently unknown, as are many aspects of its impact upon native biota. Trifoliate is thought to initially colonize via vine-like basal sprouts, exponentially expanding into dense impenetrable stands as animals disperse the abundant citrus-like seeds.

20. POTENTIAL INVADERS: WHAT COULD COME TO TEXAS NEXT? Saul Petty, USDA Forest Service, Forest Health Protection, Pineville, LA.

Every year new invasive species are identified in the United States. These pests often target species that were previously unthreatened and leave researchers and land managers scrambling for a control solution. Often these efforts come too late as the pests are already widely established before they are noticed. Three pests that are currently receiving significant regional attention and are not known to be in Texas are redbay ambrosia beetle in conjunction with laurel wilt disease, emerald ash borer and cactus moth. Host species for each of these insects are present in Texas. With careful monitoring of possible areas of introduction, public education and effective eradication practices these invaders can be stopped before they become established.
21. USING MICROSATELLITES TO TRACE THE ORIGIN(S) OF INVASIVE ARUNDO DONAX IN NORTH AMERICA. Daniel Tarin*, James Manhart, Alan Pepper, Texas A&M University Dept. of Biology College Station, TX.

Arundo donax (L.), giant reed, is an introduced, invasive weed in many parts of North America. Arundo is a large, rhizomatous grass that can grow up to 10 m in height. It is clonal and spreads primarily through layering and fragmentation. The detrimental effects of this weed are numerous and include loss of habitat and biodiversity, stream bank erosion, and an increase in the risk of catastrophic fires. The most important consequence of giant reed is that it uses much more water than native vegetation and therefore stresses local water resources, especially in areas with limited access to water, like the Rio Grande Basin (RGB) of Texas. The best long-term option for controlling Arundo is importing biocontrol agents from the source(s) of the invasive Arundo. Highly informative genetic markers, like microsatellites, are required to find the original source population(s). The goal of this project is to use microsatellites to trace the origin(s) of invasive A. donax in North America with particular attention to the RGB. Ten polymorphic markers have been developed for giant reed and an analysis of these markers indicates that there have been multiple introductions of A. donax in North America. The RGB populations are genetically similar, indicating a single introduction that was responsible for populations in Mexico, Argentina, and other Southwestern states.

22. DECOMPOSITION AND NUTRIENT CYCLING OF NATIVE GRASSES AND BOTHRIOCHLOA ISCHAEMUM (KR BLUESTEM) IN SOUTH CENTRAL TEXAS GRASSLANDS. Amanda Benbow* and Lyons, K.G., Trinity University, San Antonio, TX.

KR Bluestem (Bothriochloa ischaemum) is a non-indigenous, invasive, C4 grass that was introduced throughout the Midwestern and Southwestern U.S. short- to midgrass prairies with the aim of improving degraded rangelands. The aggressive nature of KR bluestem has led to dramatic alterations of natural and managed ecosystems. Comparative studies of decomposition often show that non-indigenous, invasive plant species have higher rates of nutrient cycling than indigenous species; however, KR bluestem appears to deviate from this trend. Large amounts of litter are observed in KR-dominated grasslands as compared to intact native grasslands, suggesting that the species has a relatively lower decomposition rate and may slow nutrient cycling in these systems. Indeed, as a result of lower decomposition, KR-dominated sites generally have higher fuel loads. We employed a two-way factorial design to assess differences in decomposition between KR Bluestem and three native, perennial grasses in two habitat types, KR-dominated grasslands or intact native grassland. Dried above ground litter for each species was divided into leaves and culms. For each species, replicate fiberglass mesh bags were filled with one gram of leaves plus one gram of culms. The bags measured 10.16 cm x 15.24 cm. Bags were placed in the field in one of three replicate sites of either KR-dominated or intact, native grassland and collected approximately every three months. Litter was analyzed for dry weight biomass, nitrogen, carbon, and lignin. Analysis by ANCOVA demonstrated statistically significant differences in litter quality among the four species, suggesting that KR Bluestem litter is more recalcitrant to decomposition. We found no significant differences in rates of decomposition between the two habitats. Trends in the data suggest that nutrient cycling is slower in KR Bluestem due to higher lignin and C:N and low total nitrogen content.

23. DEVELOPMENT OF MOLECULAR RESOURCES FOR THE NOXIOUS WEED,
IMPERATA CYLINDRICA (L.) BEAUV. Millie Burrell, Department of Biology, Texas A&M University, College Station, TX.

*Imperata cylindrica* (L.) Beauv. is ranked as one of the world's most noxious and invasive plant species. This grass has ravaged the southeastern United States and continues to spread both asexually and sexually, causing vast ecological changes in its wake. In order to address eminent loss of biodiversity and aid in the development of appropriate biological controls for this species, a suite of microsatellite molecular markers has been developed and will be published for public access. These molecular markers can be utilized in subsequent population genetic studies to address the following issues: 1) the genetic diversity within the populations to adapt to the environment, 2) the colonizing mode of the species, 3) the reproductive system of the species, and 4) the invasion history of the species.

24. SUBSPECIFIC CLASSIFICATION WITHIN PHORADENDRON SEROTINUM (SANTALACEAE): ASSESSMENT OF POPULATION STRUCTURE USING MOLECULAR AND MORPHOLOGICAL DATA. Angela K. Hawkins*, Christopher P. Randle, Justin K. Williams, Alan D. Archambeault, and Brandi C. Cannon. Sam Houston State University, Huntsville, TX.

*Phoradendron serotinum*, (leafy mistletoe) is a hemi-parasitic plant of the family Santalaceae found in the United States and Mexico. *P. serotinum* has been divided into four subspecies: subsp. *tomentosum*, subsp. *macrophyllum* and subsp. *serotinum* which occur in the eastern United States from southern New Jersey to southern Florida, through the Midwest south of Oklahoma and into Mexico, and on the west coast from Oregon to Baja California. Subspecies *angustifolium* grows in isolated regions of central Mexico. Subspecies may be difficult to identify based on morphology alone. Identification of *P. serotinum* subspecies in eastern Texas is especially difficult as characters that are otherwise diagnostic of subspecies do not adequately separate three of the subspecies (*macrophyllum, tomentosum, and serotinum*) that overlap in this region. Molecular and morphometric analyses are being utilized in conjunction for a total evidence approach to resolve taxonomic confusion within *P. serotinum*. To date total genomic DNA has been isolated from fresh tissue of more than 600 samples of *P. serotinum* and morphometric measurements have been recorded for approximately 200 vouchers collected from a majority of the growth range.

25. INVASIVE GRASSES IN SOUTH TEXAS – AN ECOLOGIST’S PERSPECTIVE. Andrea R. Litt* and Fred C. Bryant, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX.

Ecologists strive to understand the inter-relationships between organisms and their environment and the factors that influence these relationships. As such, ecologists have become increasingly engaged in research on invasive plants because these species have become more dominant in a variety of plant communities throughout South Texas and worldwide. These changes have many potential effects on native flora and fauna. As an invasive plant increases in dominance, composition of the native plant community is clearly affected aboveground, but the community belowground may also be modified, creating potential problems for restoration and control. Many structural characteristics of the vegetation may also change, such as increases in cover and plant height and decreases in bare ground and heterogeneity across the landscape. Such structural
modifications may have implications for ecological processes such as fire intensity and frequency, soil erosion, and nutrient cycling. With all of these potential changes, invasive plants can alter the quantity and quality of habitat for native wildlife by affecting cover, food, and other habitat features important for these species, resulting in shifts in community composition, abundance, and population structure. As a result, changes caused by invasive plants can have a series of cascading effects, far greater than we may imagine. Although South Texas certainly presents unique characteristics in terms of climate and co-occurring invasive plants, it is important to build on knowledge previously gained about the biology of these invasive species and the changes they create from this and other geographic areas, to develop a series of ecological lessons learned that can direct future research, management, and restoration efforts.

26. INVASIVE GRASSES IN SOUTH TEXAS - A LAND MANAGERS PERSPECTIVE. Don Draeger, Comanche Ranch, Carrizo Springs, TX.

Over the last 2 decades invasive grasses have become increasingly prevalent throughout large portions of Texas. These areas represent a reduction in habitat quality. Invasive grass dominated areas are characterized by loss of native species, lower plant diversity – leading to lower wildlife utilization and excessive fire liability just to mention a few. The management of invasive grasses is at best in its infancy in the state of Texas. It has only been in the last 5-10 years that academics and land managers alike have recognized there is a growing problem. The current state of research is involved in determining the current coverage and growth of these invasive grasses with a small amount of research working on reduction practices. From this research we have a good feel for what causes the spread and eventual monoculture behavior that most of these grasses display. Current knowledge suggests that invasive grass management will require frequent and continual applications of available restraining methods, creating a never ending and expensive scenario of treatment. Research money needs to be gathered for the purpose of creating more robust and competitive versions of our native species, creating and testing invasive grass specific herbicides, finding large herbivore species that will target and consume as a first choice the invasive grasses as well as a myriad of other possibilities. Probably the most discerning fact is that current research suggests that invasive grasses are multiplying at alarming rates in both density and statewide coverage. A call to awareness and action needs to ring across the state before we lose our two most valuable resources – native plants and diversity.

27. CAESAR KLEBERG WILDLIFE RESEARCH INSTITUTES’ INVASIVE GRASS RESEARCH APPROACH. Timothy E. Fulbright*, Forrest S. Smith, Leonard A. Brennan, Alfonso Ortega-Santos, Andrea R. Litt, and Fred C. Bryant, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX.

Part of the mission of the Caesar Kleberg Wildlife Research Institute is to conduct research that will enhance conservation and management of wildlife habitat in south Texas. Our research on invasive grasses can be divided into five areas of emphasis 1) effects on wildlife, 2) developing native plants to replace exotics, 3) management practices to deal with invasive grasses, 4) restoration techniques, and 5) ecology and physiology. We have documented that landscapes dominated by buffelgrass (Pennisetum ciliare) support half the quail (Colinus virginianus) populations found on landscapes dominated by native grasses, and also support fewer insects. We have developed several native plants that are now commercially available and provide
landowners an option to planting exotic grasses. We have found that a combination of burning and grazing reduces guineagrass (*Urochloa maxima*). Studies are ongoing to determine how best to manipulate structure and composition of plant communities dominated by other invasive grasses. Restoration efforts have focused on replacing buffelgrass with native plants. Studies on ecology of invasive plants have dealt with how these plants modify soil properties. A large, well-funded effort done in collaboration with scientists from diverse disciplines is needed to solve the problems posed by exotic grass invasion.

28. CATTLE GRAZING AND FIRE TO MANAGE EXOTIC GRASS STANDS. Eric D. Grahmann and J. Alfonso Ortega-Santos*, Caesar Kleberg Wildlife Research Institute, Department of Animal and Wildlife Sciences, Texas A&M University, Kingsville, TX.

Cattle grazing has received much negative attention from botanists, conservationists, and the public for its contribution to increasingly simplified vegetation communities. Lack of grazing can increase the risk of accidental fires. Grazing impacts on plant biodiversity in Texas have been historically documented by initially reducing plant community vigor and later eliminating palatable native species. In response to overgrazed landscapes and needed livestock feed, exotic grass species were introduced and extensively planted across Texas. Vigorous with a lack of natural pathogens, exotic grasses have spread relatively unimpeded throughout the remaining, previously unaffected remnant plant communities. Little success has been documented for the eradication of exotic grass species. However, research and management experience has shown that same forces that contributed to invasion (cattle grazing and prescribed fire) will be needed to manage it. Cattle in combination with other disturbances such as prescribed fire are needed to maintain biodiversity in areas dominated by exotic, invasive grasses. Without disturbance, most exotic plant species out-compete natives. Instead of viewing cattle grazing as a negative practice promoting exotic species, it would be wise to embrace the benefits cattle may bring to the management of invasive exotic grasses.

29. NATIVE PLANT RESTORATION AS AN INVASIVE GRASS MANAGEMENT TOOL. Anthony Falk*, Forrest S. Smith, Tim Fulbright, Caesar Kleberg Wildlife Research Institute, Texas A&M University, Kingsville, TX.

Invasive grasses have the ability to outcompete the native flora, especially on degraded or recently disturbed sites where little or no native seed bank exists to facilitate natural revegetation. Restoration planting efforts using single species, or low diversity seed mixes are unsuccessful at limiting invasive grasses in south Texas. The use of mixtures of a variety of species and functional groups of native plants may provide greater resistance to invasive grasses. Successful restoration plantings in areas dominated by invasive grasses may also be contingent on the establishment of competitive early successional plant species, and thorough site preparation well in advance of planting efforts. One such restoration project utilizing a diverse native seed mixture suppressed the ingress of invasive grass by 105% compared to areas allowed to revegetate naturally, and species diversity has been increased by 70% since planting. In another project on 7 rangeland sites in south Texas, a diverse adapted native seed mixture has provided 42% cover on planting sites <8 months after seeding. Volunteer natives provided just 15% cover in the same time period. The use of native plant restoration by seeding, as an invasive grass management tool, will be especially important in areas lacking native seed banks, and in degraded habitats where plant community composition and structure have
been severely altered by past disturbance.

30. ASSESSING ECOLOGICAL IMPACTS AND MANAGEMENT OF TANGLEHEAD ON SOUTH TEXAS RANGELANDS. Aaron D. Tjelmeland*, Forrest S. Smith, Fred C. Bryant, Mike Buelow, and Leonard A. Brennan, Texas A&M University, Kingsville, TX.

Historically, tanglehead (Heteropogon contortus) has been present in relatively low abundance across South Texas rangelands. During the past decade, tanglehead has been increasing in distribution and abundance and now dominates large areas in and around the western South Texas sand sheet. This increase in tanglehead has lead to concerns by managers and researchers about the quality of wildlife habitat on these areas. These concerns include reduction or alteration of forb and arthropod communities and deterioration of habitat components for grassland birds. One recently concluded study found that Northern Bobwhites (Colinus virginianus) use tanglehead in proportion to availability for nesting, but tended to avoid it for daily habitat use when not on their nests. Additionally, areas with tanglehead showed reduced forb abundance and lack of bare ground in comparison with areas where tanglehead was not present. These results are similar to those from studies done on buffelgrass, an exotic bunchgrass. We have recently initiated a research program to: 1) assess impacts of tanglehead on south Texas flora and fauna, 2) investigate potential causes of the increase, 3) monitor increases of tanglehead and exotic grasses, and 4) develop effective management practices to control tanglehead on areas in South Texas where it is now a widespread, dominant grass species.

31. INVASIVE PLANT ATLAS OF THE UNITED STATES. Karan A. Rawlins(1), Jil M. Swearingen(2), Charles T. Bargeron(1), and Les Mehrhoff(3). (1)Center for Invasive Species and Ecosystem Health, University of Georgia, cbargero@uga.edu, (2)Center for Urban Ecology, National Park Service, jil_swearingen@nps.edu, (3)Invasive Plant Control, Inc.

The Invasive Plant Atlas of the U.S., previously known as “WeedUS,” was initiated by the National Park Service in 1997 to address the need for current distribution information on alien invasive plants affecting natural areas in the United States. Data was gathered from state and federal agencies, scientific journals, books, and other publications and a survey of the National Park Service conducted by the author. WeedUS was added to the Plant Conservation Alliance’s Weeds Gone Wild website www.nps.gov/plants/alien in 1998. It was widely used for obtaining state level distribution data for plants invading wild lands. In October 2008, the University of Georgia Center for Invasive Species and Ecosystem Health (CISEH) designed an expanded website for WeedUS that allows users to access lists of invasive plants by habit (aquatic, grass, herb/forb, shrub, tree, and vine). Each species has its own web page featuring a brief descriptive paragraph, native range, images from the Center’s extensive image database, distribution maps, links to information resources on identification, biology and management, and suggestions for native plant alternatives provided by the Lady Bird Johnson Wildflower Center. The atlas will soon provide new features including the ability to make queries for species occurring in particular areas or reported by particular sources and the ability to track management efforts. The Invasive Plant Atlas www.invasiveplantatlas.org currently includes 1,027 invasive plant species. Taxonomic information is automatically updated through
coordination with the USDA Plants Database.


Several issues plague the utility of statewide invasive species listing and assessment efforts. A basic challenge is related to the fact that not all invasive species are ecologically problematic in all portions of a state as diverse as Texas. The Nature Conservancy attempted to provide guidance to conservation and science staff in assessing the overall threat of invasive species within and across ecoregions in Texas. We identified 74 invasive plant species as being problematic and assigned a simple 3-tier threat status to each one. We also identified a list of 21 "lookout" species that are not presently key threats but could very well become invasive in Texas in the future. A comparison was also carried out between our list and lists generated by Texas Department of Agriculture, Texas Parks and Wildlife Department, and the Texas Invasives Organization.

33. ASSESSMENT OF INVASIVENESS AND ECOLOGICAL IMPACT IN NON-NATIVE SPECIES OF TEXAS. Guy L. Nesom, 2925 Hartwood Drive, Fort Worth, TX.

A documented account of 813 non-native species reported to grow outside of cultivation in Texas has been developed. About 300 of these have been reported since the 1970 publication of the Manual of the Vascular Plants of Texas, and each of the latter taxa has been documented by at least a literature reference. A “Fundamental Invasiveness Index” provides a framework for ranking of each of the non-native species according to their invasiveness and ecological impact, according to the criteria below. The Index is based on knowledge of the species from field, herbarium, and literature. F1: Invasive in both disturbed and natural habitats, negatively affecting native species or natural biodiversity by altering native vegetation and habitats or by outcompeting or hybridizing with native species; or, invasive into agricultural habitats and causing significant economic damage; including woody, herbaceous, and aquatic species. F2: Abundant in number and widespread, commonly invasive in disturbed habitats, much less commonly in natural habitats; subdivided into woody, herbaceous, and aquatic species. F3: Relatively few in number, known from relatively few localities, usually in disturbed habitats; subdivided into woody and herbaceous species. F4: Status unknown. Numbers of species per category are F1-Woody, Herbaceous, and Aquatic (51), F2-Woody (14), F2-Herbaceous (228), F2-Aquatic (16), F3-Woody (76), F3-Herbaceous (348), and F4 (80). A Watch List includes 55 woody, herbaceous, and aquatic species most likely to warrant F1 ranking. The lists and accompanying information are maintained and updated at www.guynesom.com (see “Texas plants”).

34. TEXAS PARKS AND WILDLIFE PLANS TO IMPLEMENT A PUBLIC AWARENESS ADVERTISING CAMPAIGN WITH A PRIMARY FOCUS ON GIANT SALVINIA (SALVINIA MOLESTA. Darcy Bontempo, Glenda Beasley and Carly Drees*, Texas Parks and Wildlife, Austin, TX.

Aquatic invasive species currently pose serious threats to the Texas’ wildlife, environment, outdoor recreation and the state’s economy. Giant salvinia (GS) is one of
the aquatic invasive species that poses the greatest immediate threat to Texas water bodies. While GS can be controlled to an extent with herbicides and biological control agents, this is very expensive and the number of personnel that would be required to treat all infested areas is greater than the resources of TPWD and its partners. It is therefore critical that Texas Parks and Wildlife (TPWD) do more than simply treat the spread of invasives. TPWD received funding from the Texas Legislature in FY 2010 to help stop the spread of Giant Salvinia, and this is being used, along with boater access dollars, to fund a quarter of a million dollar effort to develop and implement a public awareness campaign. TPWD’s marketing staff has hired the advertising agency Sherry Matthews Advocacy Marketing to develop this campaign, which will launch in April 2010. The focus will be four lakes in east Texas: Caddo Lake, Lake Conroe, Sam Rayburn and Toledo Bend. The campaign aims to motivate the general public, especially anglers and boaters, by effectively communicating how giant salvinia will impact their enjoyment of the outdoors and what they can do to help stop its spread. Television, print, custom buoys, gas station pump toppers, billboards, events, media launches at each of the targeted lakes, promotional items, a new website design, online advertising and social media strategies will all be used in this comprehensive campaign. In addition, TPWD is in the process of developing partnerships with fishing clubs, communities and corporate sponsors to help spread the message. The results of the campaign will be measured by a pre- and post-awareness survey of east Texas boaters and anglers.

35. INCREASING PUBLIC AWARENESS OF THE SOAPBERRY BORER - AN INVASIVE PEST OF TEXAS WOODLAND AND RESIDENTIAL LANDSCAPES. Ronald Billings, Texas Forest Service, College Station, TX.

The soapberry borer, Agrilus prionurus (Coleoptera: Buprestidae), is killing western soapberry (Sapindus saponaria var. drummondii) trees throughout a large range of Central Texas. First detected in Bastrop County in 2003, this close relative of the emerald ash borer has been found infesting and killing host trees of all diameters larger than 3 inches DBH. The Texas Forest Service, with financial support from the US Forest Service, Forest Health Protection, has begun efforts to map the distribution of soapberry borer in Texas and increase public awareness of this pest. Information on this introduced insect is being distributed to woodland owners, state park administrators, and the general public via a combination of posters, web-based information, e-mail questionnaires, and other means.

36. USING CITIZEN SCIENCE DATA TO BETTER UNDERSTAND THE DISTRIBUTION OF SOME KEY INVASIVE SPECIES IN TEXAS. Travis Gallo* and Damon E. Waitt, Lady Bird Johnson Wildflower Center at the University of Texas at Austin, Austin, TX.

E. O. Wilson once stated, “On a global basis…the two great destroyers of biodiversity are, first, habitat destruction and second, invasion by exotic species.” The ecological impacts of invasive species are becoming increasingly worrisome. Invasive plant species do not provide significant food or shelter for native wildlife and displace the native plants that do. Every invasive plant species creates its own problems and Texas habitats and wildlife are increasingly suffering as a result. The Invaders of Texas Program was developed to address this conservation need. The Invaders of Texas Program trains citizen scientists to detect and report invasive plant species throughout Texas. Citizen scientists have reported over 7,000 observations that have been validated and delivered into a statewide database. This information contains the ecological information collected
at the site along with the GPS coordinates for every observation. The program dramatically and systematically increases early detection, reporting and monitoring of invasive species in critical wildlife habitats. Citizen science data from the Invaders of Texas program has allowed us to better understand the distribution of some key invasive species, in Texas, such as *Arundo donax*, *Triadica sebifera*, and *Lonicera japonica*. This study compares Texas county records from two existing data sources, USDA PLANTS Database and the Atlas of the Vascular Plants of Texas, with citizen scientist data obtained from the Invaders of Texas program. Comparing citizen science data with existing data helps better understand the current distribution and spread of these particular species, allowing for better invasive plant management plans and priority areas for management and restoration.

37. SYSTEMIC INSECTICIDE INJECTIONS FOR PROTECTION OF HARDWOODS AND CONIFERS FROM INVASIVE PESTS IN TEXAS. Donald Grosman, Forest Pest Management Cooperative & Texas Forest Service, Lufkin, TX.

In 2004, it was discovered that injections of a systemic insecticide, emamectin benzoate, could prevent the successful attack and mortality of loblolly pine by Ips engraver beetles. Since then, this chemical also has been found to protect pines and hardwoods against *Dendroctonus* bark beetles and emerald ash borer (EAB), respectively. This presentation described the establishment of additional tests in 2009 to evaluate the efficacy of emamectin benzoate for protection of western soapberry against the soapberry borer, *Agrilis prionurus*, a cousin of EAB, and Afghan pines against a chalcid wasp, *Eurytoma* spp. Preliminary results indicates that emamectin benzoate appears to be effective against western soapberry borer but not the chalcid wasp. The injection of systemic insecticides may 1) provide long-term (3+ years) protection of high-value trees in residential, recreational, or administrative sites; 2) reduce or eliminate problems associated with hydraulic spray applications, such as worker exposure and drift, expense, and impact to non-targets; and 3) allow treatment of trees in environmentally or socially sensitive areas that is not currently permissible with conventional spray equipment.

38. TOTAL NON-STRUCTURAL CARBOHYDRATE TRENDS IN EXOTIC INVASIVE DEEP-ROOTED SEDGE: IMPLICATIONS FOR MANAGEMENT IN COASTAL PRAIRIE. Jon R. King and Warren C. Conway*, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX David J. Rosen, Lee College, Baytown, TX.

Exotic invasive plant management often requires aggressive, sometimes frequently repeated herbicide application(s) to achieve some level of control and aboveground cover reduction. However, herbicides are often applied without knowledge of the physiological capacity of the target species to assimilate and translocate herbicides to achieve desired phytotoxic effects. As root/rhizome total nonstructural carbohydrate (TNC) reserve cycling is correlated with phenological development, TNC trends can be used to delineate optimal periods in which to time herbicide applications. We examined monthly deep-rooted sedge (*Cyperus enterrianus* Boeck.) rhizome TNC trends at three sites in coastal Texas (The Nature Conservancy of Texas’ Texas City Prairie Preserve (TCP), Attwater Prairie Chicken National Wildlife Refuge (APCR), and Anahuac National Wildlife Refuge (ANWR)) from May 2005 - May 2006. Rhizomes were collected from homogeneous stands at each site during each month, after which rhizomes were dried, cleaned, and exposed to the anthrone reagent procedure to quantify TNC concentrations. Overall, TNC
concentration varied among months (P < 0.001), but was similar among study areas (P = 0.268). Rhizome TNC levels were highest from May-August, and lowest from October-January; when most culms were alive and dead, respectively. Rhizome TNC levels were lowest during winter (30-40%), but are probably sufficient to reinitiate spring growth after late winter prescribed burns, which alone, generally fail to reduce deep-rooted sedge cover. Conversely, higher (50-60%) rhizome TNC levels during spring and summer provide evidence that growing season herbicide application can be successful. When herbicide applications coincide with downward translocation of TNCs (i.e., during the growing season), herbicides are effectively assimilated, translocated to the rhizomes, and exert the desired effect. In contrast to other large seeded, perennial plants, deep-rooted sedge may not invest as much stored reserves into seed production. Rather, deep-rooted sedge appears to attain positive TNC accumulation throughout the growing season, providing a wider temporal scale for which to effectively control this exotic invasive plant.

39. UPDATE ON COGONGRASS INFESTATION IN TYLER COUNTY, TEXAS. Michael Murphrey*, Ronald F. Billings (College Station), Herbert 'Joe' Pase and Aleksandar Dozic, Texas Forest Service, Lufkin, TX.

Cogongrass (*Imperata cylindrica* (L) Beauv.) is native to Southeast Asia and was introduced into several southern states in the early 1900s for soil stabilization and improved forage. Cogongrass has since been placed on the federal noxious weed list. In some southern states, this grass has become a significant problem; however, in Texas, it does not have a large presence at this time. In Tyler County an area of cogongrass was established on private lands in the 1950s. Since its initial treatment with herbicides in the fall of 2007 the infestation has been treated two more times (Spring 2008 & 2009.) From its original size of approximately four acres it has been substantially reduced. However through educational programs and numerous inspections of the surrounding area we have found several other infestations near the original planting in Tyler County. This presentation will cover background material about cogongrass and the herbicide treatments used on the Tyler County site and adjacent infestations, along with update information from the last presentation in 2007.

**POSTERS**

P1. SOAPBERRY BORER, AGRILUS PRIONURUS (COLEOPTERA: BUPRESTIDAE): THE ATTACK CHARACTERISTICS AND KNOWN DISTRIBUTION OF AN INVASIVE PEST OF WESTERN SOAPBERRY IN TEXAS. Ronald F. Billings and Herbert A. Pase III Texas Forest Service, College Station, TX.

The soapberry borer, *Agrilus prionurus*, has been found infesting and killing western soapberry (*Sapindus saponaria* var. *drummondii*) trees in various Texas counties. The biology, attack characteristics and current known distribution of this introduced pest are described.

P2. SURVEYING FOR EMERALD ASH BORER AND LIGHT BROWN APPLE MOTH IN TEXAS. Manuel Campos, Texas AgriLife Extension Service, Dallas, TX.
The Emerald Ash Borer is an exotic pest of ash (*Fraxinus* spp.) and is expanding its range from the initial infestation in the Midwest. Currently, the southernmost known EAB infestation is in southern Missouri. To determine if EAB is present in Texas, the Texas AgriLife Extension Service, in cooperation with USDA-APHIS, conducted the Emerald Ash Borer Survey in 2008 and 2009. The Light Brown Apple Moth, *Epiphyas postvittana*, is a small caterpillar that feeds on 150 plant genera in over 70 families. It was first reported in the US in California in 2007. The Texas AgriLife Extension Service, in cooperation with APHIS and Texas Department of Agriculture, is conducting the 2009 LBAM Survey in Texas. Survey methods, locations, reporting procedures and agency interactions are discussed.


The Cactus Moth (*Cactoblastis cactorum*) was first documented in the United States in 1989 upon its arrival in the Florida Keys. Since that time it has spread thru Florida, Alabama, Mississippi and as of spring 2009, Louisiana. Early detection and rapid response will be critical in keeping the Cactus Moth from invading Texas. However, political and logistical support for the Animal Plant Health Inspection Service, at the present time, is minimal. This fact, along with the cactus rich environment of Texas, makes potential control efforts very problematic and daunting. Impacts to wildlife populations, especially in South Texas, would be tangible and serious. Commercial hunting and livestock enterprises could be seriously threatened.

P4. USING EXOTIC PLANT INVENTORIES TO PLAN AND IMPLEMENT CONTROL EFFORTS AT SAN ANTONIO MISSIONS NATIONAL HISTORICAL PARK. Greg Mitchell, National Park Service, San Antonio Missions, San Antonio, TX.

The park completed a formal inventory of the frequency and distribution of non-native plants over the entire 826-acre park in 2005. We have also supplemented the inventory with more specific data on the actual location and size of isolated plants or patches of non-natives such as *Arundo donax*. This information has helped us prepare funding proposals, plan projects, and direct a program to control selected species and manage the cultural and natural landscape. Our program has used several partnerships, such as the City of San Antonio Parks and Recreation and the American Youth Works, to carry out the control work. Results have included the eradication of virtually all mature woody species from the park.


Guineagrass (*Urochloa maxima*), Elephant ear (*Colocasia esculenta*) and Chinese privet (*Ligustrum sinensis*) are non-native plants commonly found in both natural and agricultural areas of south and central Texas. Highly invasive, these plants have been reported to (1) displace native vegetation, (2) compete for valuable water resources in agricultural and natural riparian areas, and (3) interrupt management protocols in agriculture by requiring expensive repeated removal effort using chemical or mechanical means. Thus, these plants have been targeted for biological control. However, the
feasibility of a biological control program for these is still undetermined, especially since these plants have some commercial value, either as forage (guineagrass) or ornamentals (elephant ear). I present preliminary research on the potential of biological control for these exotic plants, including preliminary information of current range of these plants, and their possible economic costs and social benefits. Biological information on possible biological control agents already identified will also be presented.

P6. THE SAN ANTONIO INVADERS: AN ERADICATION PILOT PROGRAM. Cheryl Hamilton, Alamo Area Master Naturalist, and Wendy Cooley, City of San Antonio Natural Area Division of Parks and Recreation, San Antonio, TX.

In November 2008, a group of Alamo Area Master Naturalists attended an Invaders of Texas Citizen Scientist Workshop held in San Antonio, Texas. The workshop was sponsored by the Native Plant Society of San Antonio with the assistance of the San Antonio River Authority, Headwaters Coalition, Green Spaces Alliance and University of the Incarnate Word Recyclers student organization. Lady Bird Johnson Wildflower Center staff presented the training, and a list of twelve particularly problematic Bexar County invasive plants was given to participants. During the workshop, participants were given the Citizen Scientist Handbook, and learned about the Invaders of Texas program. They were taught how to detect and report invasive plant species. Participants became the founding members of the San Antonio Satellite.

Inspired and ready to do more for their local environment, the group asked the City of San Antonio Natural Areas division of Parks and Recreation if they could assist in the City’s effort to map and eradicate exotic invasives. Lead by Alamo Area Master Naturalist and newly trained Invader, Cheryl Hamilton, the group began organizing and recruiting volunteers. City staff held a brief training session for the group which covered GPS and compass training. The group was given all relevant equipment including maps, GPS coordinates of previously recorded invasives, and hand tools. Work would initially focus on Rancho Diana, a 1300-acre Natural Area owned by the City of San Antonio.

Working on their own, the San Antonio Invaders meet at Rancho Diana once a week. To date, they have identified and recorded 9 different invasive species and have eradicated over 3,000 invasive plants. They have recruited 28 volunteers and have contributed over 200 volunteer hours. The work often includes hiking or scrambling through difficult terrain, time spent on hands and knees in thickets and under fallen trees and oppressive heat. This group hopes that their work will result in the restoration of sensitive biological communities and benefit native flora and fauna in the Natural Area.


The timing of prescribed burns is critical to the development of effective invasive species management programs. The widespread introduction of KR Bluestem (Bothriochloa ischaemum), an invasive, non-indigenous, C4 grass, threatens the biodiversity of grasslands and rights-of-ways of the Edwards Plateau, TX, U.S.A. To date, approaches to control the species have included dormant-season prescribed burns, growing-season prescribed burns as well as more traditional approaches such as grazing, herbicides, and
mowing. Previous results with prescribed burns suggest that dormant-season fire may select for KR Bluestem growth over the native species while growing-season fire has the opposite effect. The goal of this study was to determine the comparative effects of convective heat on the germination of five native, C4, herbaceous species and KR Bluestem. In a two-way factorial experiment, replicates of seeds of each species were heated at five temperature levels (25°C, 125°C, 175°C, 225°C, 275°C) and four durations (15 secs., 30 secs., 1 min., 2 min.) to simulate field conditions in which seeds are exposed in a prescribed burn. We found that, with the exception of 25°C, heat treatments at all temperatures and durations negatively affected germination of three of the five natives species. Two of the five natives were relatively tolerant of heat treatment, particularly at 125°C across all durations. Significantly, KR Bluestem germination was enhanced, relative to the control, at 125°C across all durations and at 175°C for 1 minute. Thus, burning, in general, may enhance germination of KR Bluestem while negatively affecting the native grass species. These results may explain observations that active-season burns reduce KR Bluestem abundance while dormant-season burns increase its abundance. In both seasons germination of KR Bluestem is enhanced; however, only in the active season burn is above ground growth negatively affected. Results of this study suggest that prescribed burns used to control KR Bluestem should be restricted to the fall growing season in the Edwards Plateau ecosystem.

P8. TESTING THE RESOURCE USE OVERLAP HYPOTHESIS IN INVASIVE SPECIES CONTROL. Nguyen, H.N. and K.G. Lyons, Trinity University, San Antonio, TX.

Theories of niche partitioning and competitive exclusion suggest that where species utilize resources differently in space and time more species can be supported. We apply these theories to test whether restoration of native species with niches that overlap with an invasive species will be more effective in controlling the invasive than restoration using native species with complementary resource use. *Bothriochloa ischaemum* (KR bluestem) is a C4, perennial grass, introduced into grasslands of Texas and the Midwest to improve degraded rangelands. The species is highly invasive and its introduction has resulted in widespread homogenization of these ecosystems. Through a target neighbor greenhouse competition experiment focused at the seedling establishment phase, we aimed to assess the suppressive abilities of five native herbaceous species and correlate this information with the species overlap in resource use in space and time with KR Bluestem. The study focused on the following native species: *Schizachyrium scoparium*, *Bouteloua curtipendula*, *Sorghastrum nutans*, *Bothriochloa laguroides*, *Lupinus texensis*. KR Bluestem and all native species were grown as plugs in seedling trays for three months. Well-established seedlings were transferred simultaneously to construct neighborhoods and then grown in a greenhouse in full sunlight thereafter. Treatments consisted of three individuals of all six species grown in monoculture plus three of each native species grown with KR Bluestem as the target. Five pots per treatment were harvested at five dates over the course of one year. The following response variables were measured: root depth, plant height, leaf area, leaf mass, above and below ground biomass (per pot and per individual where possible) and soil available NPK. For all measures of fitness, KR Bluestem was unaffected by competition with the native species. In contrast, fitness measures for native species were either neutrally or negatively affected by growing in competition with KR Bluestem. We found no significant differences in soil resource use among the various treatments. Our results suggest that overlap in resource use does not determine the effectiveness of native species to suppress a non-indigenous, invasive species at the seedling stage under controlled greenhouse
Many past and recent studies have touted the use of herbarium records as valid sources of data to determine ecological preference, flowering time, and distribution of invasive species. Few studies, however, have sought to use the specimens for determining specific areas of invasive species clustering. This is most probably due to the paucity of geo-referenced herbarium records for the majority of the Earth’s collections. Because a large selection of Mexican herbarium specimens have already been geo-referenced we selected the middle Rio Bravo/Rio Grande basin as our test area. We isolated the Mexican and Texan herbarium records of the F2 and F3 watch list species as determined by Nesom (2009). Next we geo-referenced the specimens that were located on the Texas side of the Rio Grande. We then combined the Mexican and Texan databases to produce a GIS based map of the species along the Rio Bravo/Rio Grande. Then using methodologies developed in Hernandez and Navarro (2007) we determined the estimated ranges of the invasive species. We then isolated areas that had a high number of species exhibiting overlap/sympatry. Land condition types (soil, disturbance, water, etc.) were then determined for the areas high in invasive species richness. Utilizing the various data sources and map layers determined from the above steps we then generated a map predicting areas high in actual or potential invasive species richness. Field studies will be conducted the following spring to determine the accuracy of map.
WORKSHOP

AQUATIC AND WETLAND PLANTS: A WORKSHOP ON NATIVE AND EXOTIC SPECIES, INCLUDING SELECTED AQUARIUM AND WATER-GARDEN FORMS

Maximum: 30 people.
Location: Mars MCLean 225
Time: 1:00 – 4 PM
Coordinator: Robert G. Howells (bobhowells@hctc.net), 160 Bearskin Trail, Kerrville, TX 78028, PH: 830-367-5940

This workshop will cover identification and basic biology of native aquatic and wetland macrophytes, introduced exotic species, and comments on additional forms from aquarium and water-garden culture. Topics will include a basic introduction to aquatic and wetland plants as well as invasive species and their source, pathways, and impacts. Floating, emergent, submersed, and wetland-riparian species will be addressed. Non-native species reported in Texas and legal restrictions on exotic plants will also be covered. The workshop will include an extensive Power Point presentation with a large number of photographs, illustrations, and actual specimens. Additionally, a display of introduced exotic mollusks in Texas will be available.

About the Instructor: Bob Howells is a fisheries scientist/aquatic ecologist with experience with exotic plants, fishes, and shellfishes, in addition to his work with freshwater mussels and general freshwater and marine fisheries research. Work history included classes and lectures on the staff of the Cleveland Museum of Natural History, 10 years with Ichthyological Associates, Inc. (an environmental consulting firm), and 22 years with Texas Parks and Wildlife Department’s (TPWD) Heart of the Hills Fisheries Science Center. He retired from (TPWD) in mid-2006, but has continued work in the field as a consultant (BioStudies) and continues to conduct personal research and writing. His publications include several books, as wells as scientific journal articles, technical reports, and educational materials. This current workshop is an updated expansion of programs prepared previously for the Texas Aquatic Plant Management Society and Lady Bird Johnson Wildflower Center.

MODERATED DISCUSSION

Developing an Invasive Species List for Texas

Maximum: 45 people.
Location: Northrup Hall 214
Time: 1:00 – 4 PM
Moderator: Norma Fowler, Ph.D. Section of Integrative Biology, College of Natural Sciences, University of Texas at Austin PH: 512-471 1295 email: nfowler@uts.cc.utexas.edu.

An informal, moderated discussion about assembling a non-regulatory watch list of potential, suspected, and definitely invasive plants in Texas. Discussion will include existing lists and systems used to rank invasive species.

About the Moderator: Norma Fowler and her students pursue a variety of questions in several areas of plant population biology and plant ecology. These areas include (1) the dynamics and regulation of plant populations and meta-populations; (2) competitive and facilitative interactions
between plants and their consequences for community structure and for species distributions across their landscape; (3) the effects of herbivory on plant population dynamics, plant-plant interactions, community structure, and landscape-scale distributions. We address these topics using a variety of plant species (grasses, forbs, woody plants) and communities (from natural savanna and woodland to abandoned mines). Field, greenhouse, and garden experiments, descriptive field studies, and theoretical models are among the techniques used.

FIELD TRIP

Eagleland Segment of the San Antonio River Improvements Project

Maximum: 30 people.
Location: Ruth Taylor Recital Hall Foyer
Time: 1:00 – 4 PM
Coordinator: Jim Houser, Texas Forest Service, jhouser@tfs.tamu.edu
Trip Leader: Lee Marlowe, San Antonio River Authority, lmarlower@sara-tx.org

The Eagleland Segment of the San Antonio River Improvements Project aims to restore ecological functions and values to a portion of the river between South Alamo Street and Lone Star Boulevard, just south of downtown San Antonio. The Eagleland Segment consists of approximately 1 mile of river length which has undergone previous channelization to reduce flood damage. The project includes approximately 17 acres of restoration plantings composed primarily of prairie plants with some young native trees and shrubs. It was originally planted in 2005, but numerous disturbances have resulted in a patchwork of plantings at various stages of development including the most recent plantings during Fall 2009. The restoration planting has undergone many challenges including damage by adjacent projects, invasion by non-native as well as native species, extreme drought conditions, and periodic flooding.

The San Antonio River Authority will operate and maintain the Eagleland Segment in perpetuity. Current operation and maintenance of the area involves short and long term management techniques and approaches with the goal of establishing a native plant dominated community within the project area. Various techniques are used to manage the common invasive non-native plants in our region, as well as two very new invaders that may prove to be a challenge for other restoration projects. Lee will discuss the project, focusing on the operation and maintenance completed to date at Eagleland in an effort to manage invasive non-native species, as well as undesirable native species.

About the Trip Leader: Lee received her Bachelor of Science degree in Ecology, Evolution and Behavior from the University of Minnesota, and has over ten years of professional experience on a variety of ecological restoration and management projects large and small.
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Sponsors

Trinity University (web.trinity.edu) – Located in the culturally rich city of San Antonio, Trinity University is one of the nation's top private universities. With 2,600 talented undergraduate and graduate students, the University is known for its stimulating, resourceful, and collaborative environment - in the classroom, on campus, and around the world.

U.S. Forest Service, National Forests and Grasslands in Texas (www.fs.fed.us/r8/texas) – The U.S. Forest Service manages approximately 675,000 acres of public land in Texas. This land is divided into four National Forests in east Texas and the Caddo-Lyndon B. Johnson National Grasslands in northeast Texas. These public lands are administered under multiple-use management to protect and obtain the greatest benefit from all forest resources: recreation, timber, range, fish and wildlife, soil and water and minerals.

Texas Forest Service (txforestservice.tamu.edu) – The Texas Forest Service was created in 1915 as part of The Texas A&M University System. Its mission is to provide statewide leadership and professional assistance to assure that the state's forest, tree, and related natural resources are wisely used, nurtured, protected, and perpetuated for the benefit of all.

Texas Parks and Wildlife (www.tpwd.state.tx.us) – Texas Parks and Wildlife provides outdoor recreational opportunities by managing and protecting fish and wildlife and their habitat and by acquiring and managing parks, historic sites, and wildlife areas. Its mission is to manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.

The Nature Conservancy (www.nature.org) – The Nature Conservancy is a leading international, nonprofit organization dedicated to preserving the diversity of life on Earth. The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

Texas Nursery and Landscape Association (www.tnla.org) – The Texas Nursery and Landscape Association (TNLA) represents growers, landscape maintenance and contracting firms, retail garden centers, and allied suppliers to the nursery/landscape industry, referred to in aggregate as the Texas Green Industry. TNLA's mission is to advance in the broadest sense the interests of the nursery/landscape industry in Texas.

Waste Management (www.wm.com) – Waste Management, Inc. is the leading provider of comprehensive waste and environmental services in North America. Waste Management's environmental initiatives have drawn recognition from organizations such as the U.S. Environmental Protection Agency, the U.S. Department of Energy and the Wildlife Habitat Council.
Magnolia Charitable Trust (www.wt.org/magnoliatrust/index.htm) – The Magnolia Trust is a small, limited–term family foundation that supports non–profit groups working to protect habitat and wildlife in Texas, as well as other environmental topics selected by the trustees.

Exhibitors

Malcolm Pirnie (www.pirnie.com) – For more than a century, Malcolm Pirnie has worked side-by-side with clients to help find the right solutions to their unique environmental and management needs. With a tradition of technical excellence, they solve complex problems and deliver results that help government and industry worldwide.
# AUTHOR INDEX

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archambeault, Alan D.</td>
<td>24</td>
</tr>
<tr>
<td>Bargeron, Charles T.</td>
<td>31</td>
</tr>
<tr>
<td>Beasley, Glenda</td>
<td>34</td>
</tr>
<tr>
<td>Benbow, Amanda</td>
<td>22</td>
</tr>
<tr>
<td>Berezin, Andrew</td>
<td>5, 6</td>
</tr>
<tr>
<td>Bergan, James F.</td>
<td>32, P3</td>
</tr>
<tr>
<td>Bhatkar, Awinash P.</td>
<td>9</td>
</tr>
<tr>
<td>Billings, Ronald F.</td>
<td>35, 39, P1</td>
</tr>
<tr>
<td>Bontempo, Darcy</td>
<td>34</td>
</tr>
<tr>
<td>Brennan, Leonard A.</td>
<td>27, 30</td>
</tr>
<tr>
<td>Bryant, Fred C.</td>
<td>25, 27, 30</td>
</tr>
<tr>
<td>Buelow, Mike</td>
<td>30</td>
</tr>
<tr>
<td>Burrell, Millie</td>
<td>23</td>
</tr>
<tr>
<td>Calixto, Alejandro A.</td>
<td>18</td>
</tr>
<tr>
<td>Campos, Manuel</td>
<td>P2</td>
</tr>
<tr>
<td>Cannon, Brandi C.</td>
<td>24</td>
</tr>
<tr>
<td>Carr, Bill</td>
<td>32</td>
</tr>
<tr>
<td>Cobb, Jimmie</td>
<td>3</td>
</tr>
<tr>
<td>Conway, Warren C.</td>
<td>38</td>
</tr>
<tr>
<td>Davidson, David L.</td>
<td>12</td>
</tr>
<tr>
<td>DeLoach, C. Jack</td>
<td>5, 6</td>
</tr>
<tr>
<td>Dozic, Aleksandar</td>
<td>39</td>
</tr>
<tr>
<td>Draeger, Don</td>
<td>26</td>
</tr>
<tr>
<td>Drees, Bart</td>
<td>18</td>
</tr>
<tr>
<td>Drees, Carly</td>
<td>34</td>
</tr>
<tr>
<td>Elder, Howard</td>
<td>15</td>
</tr>
<tr>
<td>Everitt, James H.</td>
<td>5</td>
</tr>
<tr>
<td>Falk, Anthony</td>
<td>29</td>
</tr>
<tr>
<td>Fulbright, Timothy E.</td>
<td>27, 29</td>
</tr>
<tr>
<td>Gallo, Travis</td>
<td>36</td>
</tr>
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<td>Gilroy, Mary</td>
<td>2</td>
</tr>
<tr>
<td>Gold, Roger</td>
<td>18</td>
</tr>
<tr>
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<td>1</td>
</tr>
<tr>
<td>Grahmann, Eric D.</td>
<td>28</td>
</tr>
<tr>
<td>Grosman, Donald</td>
<td>37</td>
</tr>
<tr>
<td>Hamilton, Cheryl</td>
<td>P6</td>
</tr>
<tr>
<td>Hatler, Will</td>
<td>10</td>
</tr>
<tr>
<td>Hawkins, Angela K.</td>
<td>24, P9</td>
</tr>
<tr>
<td>Keck, Molly</td>
<td>16</td>
</tr>
<tr>
<td>King, Jon R.</td>
<td>38</td>
</tr>
<tr>
<td>Knutson, Allen</td>
<td>14</td>
</tr>
<tr>
<td>Litt, Andrea R.</td>
<td>25, 27</td>
</tr>
<tr>
<td>Ludwig, Scott</td>
<td>17</td>
</tr>
<tr>
<td>Lyons, K.G.</td>
<td>22, P7, P8</td>
</tr>
<tr>
<td>Manhart, James</td>
<td>21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>McDonald, Danny</td>
<td>18</td>
</tr>
<tr>
<td>McGaha, Leslie</td>
<td>8</td>
</tr>
<tr>
<td>Mehrhoff, Les</td>
<td>31</td>
</tr>
<tr>
<td>Merchant, Michael</td>
<td>11</td>
</tr>
<tr>
<td>Mitchell, Greg</td>
<td>P4</td>
</tr>
<tr>
<td>Moran, Patrick J.</td>
<td>5</td>
</tr>
<tr>
<td>Murphrey, Michael</td>
<td>39</td>
</tr>
<tr>
<td>Nesom, Guy L.</td>
<td>33</td>
</tr>
<tr>
<td>Nguyen, H.N.</td>
<td>P8</td>
</tr>
<tr>
<td>Ortega-Santos, Alfonso</td>
<td>27, 28</td>
</tr>
<tr>
<td>Pase, Herbert 'Joe'</td>
<td>39, P1</td>
</tr>
<tr>
<td>Pepper, Alan</td>
<td>21</td>
</tr>
<tr>
<td>Petty, Saul</td>
<td>20</td>
</tr>
<tr>
<td>Philippus, Thomas</td>
<td>7</td>
</tr>
<tr>
<td>Pryor, Jeremy</td>
<td>19</td>
</tr>
<tr>
<td>Racelis, Alex</td>
<td>P5</td>
</tr>
<tr>
<td>Randle, Christopher P.</td>
<td>24</td>
</tr>
<tr>
<td>Rawlins, Karan A.</td>
<td>31</td>
</tr>
<tr>
<td>Rector, Barron</td>
<td>4</td>
</tr>
<tr>
<td>Ritzi, Chris M.</td>
<td>5, 6</td>
</tr>
<tr>
<td>Robbins, Thomas O.</td>
<td>5</td>
</tr>
<tr>
<td>Robinson, T.R.</td>
<td>P7</td>
</tr>
<tr>
<td>Rosen, David J.</td>
<td>38</td>
</tr>
<tr>
<td>Ruckman, E.</td>
<td>P7</td>
</tr>
<tr>
<td>Skoruppa, Mary Kay</td>
<td>13</td>
</tr>
<tr>
<td>Smith, Forrest S.</td>
<td>27, 29, 30</td>
</tr>
<tr>
<td>Swearingen, Jil M.</td>
<td>31</td>
</tr>
<tr>
<td>Tarin, Daniel</td>
<td>21</td>
</tr>
<tr>
<td>Thompson, David C.</td>
<td>5</td>
</tr>
<tr>
<td>Tjelveland, Aaron D.</td>
<td>30</td>
</tr>
<tr>
<td>Tracy, James L.</td>
<td>5, 6</td>
</tr>
<tr>
<td>Waitt, Damon E.</td>
<td>36</td>
</tr>
<tr>
<td>Ward, Kathleen</td>
<td>7</td>
</tr>
<tr>
<td>Williams, Justin K.</td>
<td>24, P9</td>
</tr>
<tr>
<td>Woodin, Marc C.</td>
<td>13</td>
</tr>
</tbody>
</table>
On November 14\textsuperscript{th}, 15\textsuperscript{th} and 16\textsuperscript{th}, 2007, the \textit{Pulling Together Initiative} - a Texas-sized partnership to manage invasive plants - hosted its second statewide invasive plant conference in Texas. The \textit{Pulling Together Initiative} is a collaborative project between the Texas Forest Service, the Forest Health Protection branch of the USDA Forest Service, the Central Southwest Gulf Coast Information Node of the National Biological Information Infrastructure at the Houston Advanced Research Center, and the Lady Bird Johnson Wildflower Center. The conference was held at the Lady Bird Johnson Wildflower Center in Austin, Texas.

The goals of the 2007 conference were to:
- Facilitate communication among the state's invasive plant stakeholders;
- Develop a coordinated response to address invasive plant issues on a statewide level;
- Provide a venue for sharing information about key invasive plant strategies;
- Raise public awareness of the problems posed by invasive plants in Texas; and
- Establish a statewide organization with diverse interests that shares in the common goal to protect Texas from the threat of invasive pests and plants.

\textbf{Conference Program}

\textit{Keynote Speakers} – The conference kicked off with three plenary addresses emphasizing both a statewide and National perspective on invasive species issues. Carter Smith, Texas State Director for The Nature Conservancy spoke about the impact of invasive species on Texas' Natural Heritage. Smith was followed by Linda Drees, Chief Invasive Species Branch for the National Park Service who talked about the National Park Service's Exotic Plant Management Teams and Tony Pernas, also with the National Park Service, who talked about The National Association of Exotic Pest Plant Councils.

\textit{Update on Texas Coalitions} – Earl Chilton with Texas Parks and Wildlife gave participants an update on the status of the Texas Invasive Species Coordinating Committee (TISCC). This committee exists by memorandum of agreement between eight state agencies. Its purpose is to foster cooperation among regulatory agencies in invasive species funding, control and management. Damon Waitt with the Lady Bird Johnson Wildflower Center made the case to establish a multi-stakeholder, statewide council to serve as a professional organization for those working on invasive species issues. Tentatively titled the Texas Invasive Plant and Pest Council (TX-IPPC), the organization would be modeled after other successful councils such as the California Invasive Plant Council and the Florida Exotic Pest Plant Council. Waitt made a motion from the floor to establish said council and received unanimous support from
participants. A petition to join the newly formed council was circulated during the conference and 96 participants signed up to become founding members. In addition, a steering committee was established to develop the organization’s bylaws, work on organizational structure, and organize a general election for officers.

Abstract Presentations – There were 43 abstracts presented (including 3 posters) organized into sessions and based on key strategies from the National Invasive Species Council’s National Management Plan for invasive species: Early Detection & Rapid Response (N=4), Control & Management (N=10), Research (9), Information Management (4), and Education & Public Awareness (4). In addition, there were ten presentations in a specially organized Old World Bluestem Symposium. At the conclusion of the conference, the six session chairs gave an overview of presentations in their sessions and hosted a question and answer discussion. All participants in the conference received a 60-page publication containing the conference program and published abstracts.

Workshops, Field Trips, and List Discussion – In 2007, an extra 1/2 day was added for three special activities: 1) a field trip to the Lower Bear Creek and Onion Creek Management Units hosted by City of Austin Water Quality Protection staff; 2) a lab-based workshop on the Identification of Exotic and Native Species of Aquatic and Wetland Plants by Bob Howells; and 3) a discussion to begin developing an invasive species list for Texas moderated by Norma Fowler. All activities were well received and well attended.

Conference Sponsors
Conference sponsors included the Lady Bird Johnson Wildflower Center, Texas Forest Service, Texas Nursery and Landscape Association, Houston Advanced Research Center, the Magnolia Charitable Trust, Lower Colorado River Authority, Texas Chapter of The Nature Conservancy, Texas Parks and Wildlife Department, U.S. Fish and Wildlife Service and the Native Plant Society of Texas. Five companies exhibited at the conference.

Conference Participation

<table>
<thead>
<tr>
<th>Stakeholder Group</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Agencies (TFS, TPWD, TCE, TDA, TXDOT…etc.)</td>
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</tr>
<tr>
<td>University</td>
<td>26</td>
</tr>
<tr>
<td>Municipalities</td>
<td>19</td>
</tr>
<tr>
<td>Gardens, Parks, and Arboreta</td>
<td>13</td>
</tr>
<tr>
<td>Green Industry</td>
<td>18</td>
</tr>
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<td>Conservation NGOs</td>
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<tr>
<td>Federal Agencies (USDA, NPS, USFWS, US Army…etc.)</td>
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<td>Other</td>
<td>19</td>
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<td><strong>Total</strong></td>
<td><strong>169</strong></td>
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</tbody>
</table>

Summation
Professional presentations, a large number of participants and strong support from planners, sponsors and stakeholders all contributed to the success of the 2007 Invasive Plant Conference. A bit of Texas History was made when participants unanimously approved the formation of a statewide invasive species council for Texas. This council and the conference from which it emerged will provide a strong foundation from which we can address the growing problem of invasive species in Texas.
## TIPPC BOARD OF DIRECTORS

<table>
<thead>
<tr>
<th>Officers</th>
<th>Representatives</th>
<th>At Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>President</td>
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<td>Chris Best</td>
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<td>Texas Parks and Wildlife Dept.</td>
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<td>President-Elect</td>
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<td>The Nature Conservancy</td>
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<td>Secretary</td>
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</tr>
<tr>
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<td>Texas A&amp;M-Corpus Christi</td>
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<td>Treasurer</td>
<td>State or Federal Government</td>
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</tr>
<tr>
<td>TNLA, retired</td>
<td>USDA-NRCS</td>
<td></td>
</tr>
<tr>
<td>Past-President</td>
<td>Green Industry</td>
<td></td>
</tr>
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<td>Vacant</td>
<td>Trey Wyatt</td>
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<td></td>
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</tr>
</tbody>
</table>
TIPPC BUSINESS MEETING

Agenda

Presidents Report
Secretaries Report
Treasurers Report
Recognition of Outgoing Board Members
Election of New Board Members