2007 PROGRAM CO-CHAIRS

Dr. Damon Waitt
Lady Bird Johnson Wildflower Center

Dr. Earl Chilton
Texas Parks and Wildlife Department

PROGRAM SPONSOR

“People who care about wildlife well know the threat posed by invasive plants, and we encourage all interested parties to pull together with us on this one. It will take a large-scale effort involving broad public awareness and support to effectively combat the invasive plant problem. This conference is an outstanding way to kick-start that effort.” Robert L. Cook - Executive Director, Texas Parks and Wildlife Department.
**SCHEDULE OF EVENTS**

**WEDNESDAY • November 14, 2007**

<table>
<thead>
<tr>
<th>TIME</th>
<th>EVENT</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 - 8:45 AM</td>
<td>Check in and Registration</td>
<td>Auditorium Foyer</td>
</tr>
<tr>
<td>8:45 – 9:00 AM</td>
<td>Welcome and Orientation&lt;br&gt;Damon Waitt, LBJWFC.</td>
<td>Auditorium</td>
</tr>
<tr>
<td>9:00 - 9:30 AM</td>
<td>Invasive Species and Texas' Natural Heritage&lt;br&gt;Carter Smith, Texas State Director for The Nature Conservancy.</td>
<td>Auditorium</td>
</tr>
<tr>
<td>9:30 - 10:00 AM</td>
<td>The National Park Service's Exotic Plant Management Teams&lt;br&gt;Linda Drees, Chief, Invasive Species Branch, National Park Service.</td>
<td>Auditorium</td>
</tr>
<tr>
<td>10:00 - 10:30 AM</td>
<td>Break</td>
<td>Visitors Gallery</td>
</tr>
<tr>
<td>10:30 - 11:00 AM</td>
<td>National Association of Exotic Pest Plant Councils&lt;br&gt;Tony Pernas, Chair NA-EPPC.</td>
<td>Auditorium</td>
</tr>
<tr>
<td>11:00 - 12:00 PM</td>
<td>Update on Texas Coalitions&lt;br&gt;Moderator Ron Billings, Texas Forest Service.&lt;br&gt;Texas Invasive Species Coordinating Committee&lt;br&gt;Earl Chilton, TPWD&lt;br&gt;Texas Invasive Pest and Plant Council&lt;br&gt;Damon Waitt, LBJWFC</td>
<td>Auditorium</td>
</tr>
<tr>
<td>12:00 - 1:00 PM</td>
<td>Box Lunch</td>
<td>Visitors Gallery</td>
</tr>
<tr>
<td>1:00 - 3:00 PM</td>
<td>Paper Session I&lt;br&gt;• Research (6)&lt;br&gt;• Information Management (4)</td>
<td>Auditorium Classroom</td>
</tr>
<tr>
<td>3:00 - 3:30 PM</td>
<td>Break, Exhibits, &amp; Posters</td>
<td>Visitors Gallery</td>
</tr>
<tr>
<td>3:30 - 5:00 PM</td>
<td>Paper Session II&lt;br&gt;• Control &amp; Management (5)&lt;br&gt;• Early Detection &amp; Rapid Response (3)</td>
<td>Auditorium Classroom</td>
</tr>
<tr>
<td>5:00 - 7:00 PM</td>
<td>Reception hosted by TNLA</td>
<td>Visitors Gallery</td>
</tr>
<tr>
<td>TIME</td>
<td>EVENT</td>
<td>LOCATION</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>8:00 - 8:30 AM</td>
<td>Check in and Registration</td>
<td>Auditorium Foyer</td>
</tr>
<tr>
<td>8:30 – 10:00 AM</td>
<td>Paper Session III</td>
<td>Classroom</td>
</tr>
<tr>
<td></td>
<td>• Invasive Species Updates (2)</td>
<td>Classroom</td>
</tr>
<tr>
<td></td>
<td>• Old World Bluestem Symposium (3)</td>
<td>Auditorium</td>
</tr>
<tr>
<td>10:00 - 10:30 AM</td>
<td>Break, Exhibits, &amp; Posters</td>
<td>Visitors Gallery</td>
</tr>
<tr>
<td>10:30 - 12:00 PM</td>
<td>Paper Session III cont.</td>
<td>Classroom</td>
</tr>
<tr>
<td></td>
<td>• Education (3)</td>
<td>Classroom</td>
</tr>
<tr>
<td></td>
<td>• Old World Bluestem Symposium (3)</td>
<td>Auditorium</td>
</tr>
<tr>
<td>12:00 - 1:00 PM</td>
<td>Box Lunch</td>
<td>Visitors Gallery</td>
</tr>
<tr>
<td>1:00 - 3:00 PM</td>
<td>Paper Session IV</td>
<td>Visiting Gallery</td>
</tr>
<tr>
<td></td>
<td>• Control &amp; Management (5)</td>
<td>Classroom</td>
</tr>
<tr>
<td></td>
<td>• Old World Bluestem Symposium (4)</td>
<td>Auditorium</td>
</tr>
<tr>
<td>3:00 - 3:30 PM</td>
<td>Break, Exhibits, &amp; Posters</td>
<td>Visitors Gallery</td>
</tr>
<tr>
<td>3:30 - 4:30 PM</td>
<td>Session and Symposium Review with Chairs</td>
<td>Auditorium</td>
</tr>
<tr>
<td>4:30 - 5:00 PM</td>
<td>Texas Invasive Pest and Plant Council</td>
<td>Auditorium</td>
</tr>
<tr>
<td></td>
<td>Organizational Meeting</td>
<td></td>
</tr>
</tbody>
</table>

**FRIDAY • November 16, 2007**

<table>
<thead>
<tr>
<th>TIME</th>
<th>EVENT</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 AM - 1:00 PM</td>
<td>Aquatic Invaders Workshop</td>
<td>Classroom</td>
</tr>
<tr>
<td></td>
<td>Instructor Bob Howells</td>
<td></td>
</tr>
<tr>
<td>8:30 AM - 1:00 PM</td>
<td>Invasive Species List Roundtable</td>
<td>Library</td>
</tr>
<tr>
<td></td>
<td>Moderator Norma Fowler</td>
<td></td>
</tr>
<tr>
<td>8:30 AM - 1:00 PM</td>
<td>Terrestrial Invaders Field Trip</td>
<td>Meet in Courtyard</td>
</tr>
<tr>
<td></td>
<td>Leader Daniel Dietz</td>
<td></td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

About the Pulling Together Initiative 1

Acknowledgements from the Program Chair 3

Welcome from the Executive Director 5

2007 Planning Committee 7

2007 Session Chairs 8

2007 Program Agenda 9

   Plenary Speakers

   Carter Smith 11
   Linda Drees 11
   Tony Pernas 12

Update on Texas Coalitions

   Texas Invasive Species Coordinating Committee 13
   Texas Invasive Pest and Plant Council 13

Paper Sessions

   Paper Session I 15
   Paper Session II 16
   Paper Session III 17
   Paper Session IV 18
   Old World Bluestem Symposium 19
   Poster Session 20

Abstracts 21

Friday Activities - Workshop, Discussion, Field Trip 39

Sponsors & Exhibitors 41

Author Index 43

Appendices

   2005 Texas Invasive Plant Conference Executive Summary 45
   Texas Invasive Species Coordinating Committee MOA 47
   Draft Bylaws Texas Invasive Pest and Plant Council 55

Notes 59
ABOUT THE PULLING TOGETHER INITIATIVE

The 2007 Texas Invasive Plant Conference is a product of the Pulling Together Initiative – a Texas-sized partnership to manage invasive plants. This 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, the U.S. Fish & Wildlife Service and the Lady Bird Johnson Wildflower Center at The University of Texas at Austin.

The goals of the Pulling Together Initiative are to provide information about the identification, detection, control, and management of invasive plants, facilitate information sharing among the state’s stakeholders, and increase public awareness about invasive plant issues. On November 17th and 18th, 2005, the Pulling Together Initiative hosted the first statewide invasive plant conference in Texas. The meeting was attended by a large number of individuals (N=199) representing a wide variety of stakeholders from state and federal agencies, NGOs, academia, and industry. Approximately 25% of those attending actively participated in the conference as presenters, session chairs, or keynote speakers and all participants received a 48-page publication containing the conference program and published abstracts. The Program & Abstracts from 2005 is available from the www.texasinvasives.org website which also serves as the primary resource for information about the initiative.

In 2007, the primary goals of the Texas Invasive Plant Conference are to:

- Establish a statewide organization with diverse interests that shares in the common goal to protect Texas from the threat of invasive plants.
- Facilitate communication among the state’s stakeholders who have a vested interest in invasive plants;
- Provide a venue for sharing information about prevention, early detection, control & management, information management, and research; and
- Raise public awareness of the problems posed by invasive plants in the state of Texas.

To that end, the main program for the conference is organized around key strategies from the National Invasive Species Council's 2001 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.

The *Pulling Together Initiative* seeks to build a coalition of stakeholders interested in working together to achieve its goals. If your agency would like to join in these efforts through a more formal arrangement, please contact Damon Waitt at dwaitt@wildflower.org.
ACKNOWLEDGEMENTS FROM THE PROGRAM CHAIRS

Welcome to the 2007 Texas Invasive Plant 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, state and federal agencies, local governments, and other professionals interested in invasive plant issues, this conference is a professional level meeting with keynotes, concurrent sessions, poster presentations, exhibits and panel discussion.

We would like to begin the acknowledgements with a special thanks to our plenary speakers Carter Smith (Texas State Director for The Nature Conservancy), Linda Drees (Invasive Species Branch Chief for the National Park Service), and Tony Pernas (National Association of Exotic Pest Plant Councils Chair). They have traveled a great distance to share with us their knowledge, experience, and perspective on national and statewide invasive species issues.

Also high on the list of acknowledgements is the Texas Forest Service, Texas Parks and Wildlife Department, Texas Nursery and Landscape Association, Houston Advanced Research Center, Native Plant Society of Texas, Magnolia Trust, The Nature Conservancy, U.S. Fish and Wildlife Service, and the Lower Colorado River Authority. These organizations have generously donated funding and/or provided key support for conference planning and preparation.

We hope you will agree, that we have assembled a robust program for 2007. All told, 42 papers were submitted divided into 38 presentations and 4 posters. In addition, several new features were added to the program including a symposium on old world bluestems, moderated discussions, field trips, 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 and the conference session chairs. This conference would not have been possible without their support.

**Damon Waitt and Earl Chilton**
Program Co-Chairs
2007 Texas Invasive Plant Conference
Dear Conference Participants,

Those of us who care deeply about native plants and habitats understand how important they are to our sense of place – the unique qualities of our own communities and familiar landscapes. But even as we are working to protect our plant heritage from land development and other pressures, native flora across the country – in our backyards, along our roadways, on our farms and ranches, in our parks and natural areas – are facing a less obvious but equally serious threat from invasive plants.

As a native plant organization, the Wildflower Center considers invasive species a serious threat to the conservation of healthy plant communities. Our objective is to determine the scope of the problems caused by invasive plants, raise awareness among public and government leaders, and identify the most effective actions that can be taken to stop the spread of these plants. As both a regional botanic garden and national organization, the Wildflower Center participates in a number of activities at the national, state, and local level to accomplish this objective.

At the national level, our PlantWise partnership with the National Park Service, National Invasive Species Council and The Garden Club of America educates the public and communities about best management practices to prevent harmful invasive plants from invading parklands and natural areas. In 2007, we distributed over 10,000 brochures and 1,000 posters to a wide variety of stakeholders including NGO’s, city, state, and federal agencies.

In Texas, the Wildflower Center is a founding member of the “Pulling Together Initiative”, a partnership between state and federal agencies, non-governmental organizations, academia, the green industry, and other stakeholders to provide information about identification and management of invasive plants. The Invaders of Texas Citizen Science program with more than 240 citizen scientists is part of the Pulling Together Initiative as is the website www.texasinvasives.org, one of the definitive resources for invasive species information in Texas.

In 2005, the Pulling Together Initiative hosted the first statewide conference on invasive plant species at the Lady Bird Johnson Wildflower Center and we welcome you back in 2007.

Sincerely,

Susan K. Rieff, Executive Director
Lady Bird Johnson Wildflower Center
2007 PLANNING COMMITTEE

Program Chairs

Dr. Damon E. Waitt  
Lady Bird Johnson Wildflower Center  
PH: (512) 232-0110  
Email: dwaitt@wildflower.org

Dr. Earl Chilton  
Texas Parks and Wildlife  
PH: (512) 389-4652  
Email: Earl.Chilton@tpwd.state.tx.us

Sponsors and Exhibitors

Gina Dikeman  
Lady Bird Johnson Wildflower Center  
PH: (512) 292-4200  
Email: development@wildflower.org

Marilyn Good  
Texas Nursery & Landscape Association  
PH: (512) 280-5182  
Email: mgood@tnlaonline.org

Public Awareness/Educational Outreach

Stephen Brueggerhoff  
Lady Bird Johnson Wildflower Center  
PH: (512) 232-0112  
Email: sbrueggerhoff@wildflower.org

Moderated Discussion: Developing an Invasive Species List for Texas

Norma Fowler  
University of Texas at Austin  
PH: (512) 471-1295  
Email: nfowler@uts.cc.utexas.edu

Poster Sessions/Continuing Education

Jim Houser  
Texas Forest Service  
PH: (512) 339-4589  
Email: jhouser@tfs.tamu.edu

Field Trip: Terrestrial Invaders of Texas
Daniel Dietz  
City of Austin Wildland Conservation Division  
PH: (512) 263-6443  
Email: Daniel.Dietz@ci.austin.tx.us

Local Arrangements

Cathy White  
Lady Bird Johnson Wildflower Center  
PH: (512) 232-0164  
Email: facilityrentals@wildflower.org

Workshop: Identification of Exotic and Native Species Aquatic and Wetland Plants

Robert G. Howells  
Texas Parks and Wildlife Department (ret.)  
Email: bobhowells@htct.net

Communications

Saralee Tiede  
Lady Bird Johnson Wildflower Center  
PH: (512) 232-0104  
Email: stiede@wildflower.org
2007 SESSION CHAIRS

1. Leadership & Coordination
   Ron Billings
   Texas Forest Service
   PH: (979) 458-6650
   Email: rbillings@tfs.tamu.edu

2. Early Detection & Rapid Response
   Stephen Clarke
   Entomologist, Forest Health Protection, USDA Forest Service
   PH: (936) 639-8545
   Email: sclarke@fs.fed.us

3. Control & Management
   Stephanie Glenn and Lisa Gonzalez
   Research Scientists, Houston Advanced Research Center
   PH: (281) 364-6042
   Email: sglenn@harc.edu, lgonzalez@harc.edu

4. Research
   R. Deborah Overath
   Assistant Professor of Biology, Texas A&M - Corpus Christi
   PH: (361) 825-2467
   Email: Deborah.Overath@tamucc.edu

5. Information Management
   Justin Williams
   Assistant Professor, Sam Houston State University
   PH: (936) 294-1552
   Email: BIO_JKW@shsu.edu

6. Education & Public Awareness
   Flo Oxley
   Director of Education and Conservation, Lady Bird Johnson Wildflower Center
   PH: (512) 232-0160
   Email: oxley@wildflower.org

Symposium on Old World Bluestems
   Chris Best
   State Botanist, U.S. Fish and Wildlife Service
   PH: 512-490-0057 x 225
   Email: chris_best@fws.gov
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 Texas’ Natural Heritage

Carter Smith, Texas State Director, The Nature Conservancy

In the late 1800's the Texas landscape was a far cry from what we see today. Vast areas of the state were unsettled and thus mostly undisturbed except for the "paleo-stewardship" practices of native indians. As settlers were drawn to landscapes of the high plains to the Trans-Pecos to the coastal prairies to the Pineywoods, they brought change and attempts to tame a very diverse and biologically unique region. From the first known introduction of an exotic mammal, the red fox in 1895, to introduction of many species of warm season grasses such as KR bluestem, imported red fire ants, on and on and on, the ecological resiliency of our Texas landscapes continues to be tested with every new invasive species. In 2007, with some exceptions (e.g., salt cedar control) we still lack a comprehensive approach within the ranks of state and federal government and in partnership with private landowners and NGO's to combat the threat of invasives to our natural heritage. Our future generations deserve better and it's up to each and every one of us to develop and invasive species program for Texas that is seamless and includes every aspect from prevention, early detection and rapid response, education, outreach, research, and monitoring.

About Carter Smith - Carter Smith joined The Nature Conservancy of Texas in 1998 as South Texas project director, was promoted to director of conservation programs, and was subsequently named state director in 2004. A native of central Texas, Mr. Smith received his Bachelor of Science degree in wildlife management from Texas Tech University and his Master of Science degree in conservation biology from Yale University. As a wildlife biologist, Mr. Smith has conducted research on a variety of game and non-game wildlife species throughout the U.S., Mexico, and Canada. Prior to joining The Nature Conservancy, he worked as a research scientist in Saskatchewan, Canada, as a private lands specialist for the Texas Parks and Wildlife Department, and later served as the executive director of the Katy Prairie Conservancy, a regional land trust working to protect imperiled farm land, wetlands, and waterfowl habitat on Houston’s western fringe. Mr. Smith’s current job responsibilities include the management of The Nature Conservancy’s Texas Chapter which is comprised of approximately 120 scientists and conservation practitioners working throughout the state. The Nature Conservancy owns 35 Texas nature preserves and manages more than 85 conservation projects through voluntary land-preservation agreements with private landowners. Working with public and private partners, the Conservancy has conserved more than 750,000 acres in Texas.

The National Park Service’s Exotic Plant Management Teams

Linda Drees, Chief, Invasive Species Branch, National Park Service

The National Park Service’s Exotic Plant Management Teams (EPMTs) are an integral part of the invasive species program for the National Park Service. Established to provide a framework and a first response to exotic plant invasions in Parks, the EPMTs deal with many aspects of invasive plant management, including inventory, monitoring,
prevention, treatment, and restoration. In addition, they assist parks in planning and environmental compliance and help train park personnel to identify and manage invasive plants. Teams also assist parks with management plans, vegetation management plans and environmental compliance. The 16 EPMTs are stationed across the country and serve a regional network of parks. Over the last five years they have inventoried over 1,000,000 million acres, treated 300 invasive plant species on over 35,000 acres and worked on more than 200 parks.

**About Linda Drees** - Linda Drees is the Chief of the Invasive Branch of the National Park Service. She has a masters degree in Fisheries and Wildlife from Colorado State University and a law degree from Northwestern School of Law of Lewis and Clark College in Portland, Oregon. She has worked at the local, state and federal level in field of resource management and/or law. Her special passion is advocating for children with special needs.

**The National Association of Exotic Pest Plant Councils**

**Tony Pernas, Chair, National Association of Exotic Pest Plant Councils**

The National Association of Exotic Pest Plant Councils (NAEPPC) was established in October 1995 by the signature of representatives of the first four state and regional Exotic Pest Plant Councils. NAEPPC was established because the Exotic Pest Plant Councils recognized the value of cooperation through a national association of like organizations that share common goals. The preamble of the MOU that established NAEPPC stated that there is power in organization, strength in numbers, and that some problems are national in scope and are most appropriately addressed by a national organization. The National Association of EPPCs, is open to the participation to all non-profit organizations whose primary mission addresses issues of invasive exotic pest plants in natural areas and wildlands as do the Exotic Pest Plant Councils that originally formed NAEPPC. The purpose of participating in NAEPPC is to come together as a national coalition of organizations that speak as one voice on the issue of invasive plants in natural areas and wildlands at the national and continental level.

**About Tony Pernas** - Tony Pernas is the Coordinator for the National Park Service's Florida/Caribbean Exotic Plant Management Team based out of south Florida. The team formed in 2000, assists national park service units with mapping, ecological monitoring and control. Since 1988, Tony has been working on invasive species control, including Mediterranean fruit fly and citrus canker eradication programs for the USDA, invasive plant control programs at Big Cypress National Preserve and Everglades National Park. Tony is the current chair of the National Association of Exotic Pest Plant Council and the president of the Southeast Exotic Pest Plant Council. Tony received his bachelor's degree in Environmental Studies from Florida International University.

Carter Smith - Texas State Director for The Nature Conservancy.
UPDATE on TEXAS COALITIONS

Texas Invasive Species Coordinating Committee (TISCC)

Earl Chilton, Texas Parks and Wildlife Department, Inland Fisheries Division

The TISCC is a multi-agency committee established by Memorandum of Agreement to facilitate cooperation among state agencies and to help prevent, control, and manage invasive species infestations. The purpose and function of TISCC is to: 1) serve as a catalyst for cooperation among state agencies, and 2) serve as a facilitating body for State endeavors aimed at prevention and management of invasive species in Texas. Membership in TISCC is open to representatives of any state agency that is legislatively mandated to address or has a unique interest in controlling invasive species. The state agencies that are part of the TISCC are represented by an Executive Committee that includes the head of each state agency or their designee. In addition, an Advisory Group made up of experts and representatives from non-governmental groups, private industry, and federal, state, tribal, and local entities will provide advice, information, written materials, and oral presentations at TISCC and EC meetings as requested.

Texas Invasive Pest and Plant Council (TX-IPPC)

Damon Waitt, Lady Bird Johnson Wildflower Center

At this 2007 Texas Invasive Plant conference, I propose we found a Texas Invasive Pest and Plant Council (TX-IPPC) to bring together land managers, educators, researchers and other stakeholders working on invasive species issues. Once established, TX-IPPC will serves as a professional organization for those in the field and an outreach organization for public education. Basic functions of TX-IPPC would include an annual or biennial conference, resource and information sharing, publications and an assessment of invasive plants in the state. The object of the organization would be to:

a) To provide a focus for issues and concerns regarding invasive exotic pest plants in native plant communities in Texas;

b) To facilitate communication and the exchange of information regarding all aspects of invasive pest plant control and management;

c) To provide a forum where all interested parties may participate in meetings and share in the benefits from the information generated by this Council;

d) To promote public understanding regarding invasive plants and their control;

e) To serve as an advisory council regarding funding, research, management, and control of invasive plants;

f) To facilitate action campaigns to monitor and control invasive pest plants in Texas;

g) To review incipient and potential pest plant management problems and activities and provide relevant information to interested parties; and

h) To serve as a state chapter of the Southeast Exotic Pest Plant Council.
PAPER SESSION I

Wednesday Afternoon • November 14, 2007

RESEARCH • Auditorium

1:00 PM 1. INVASIVE WETLAND PLANTS IN SOUTHERN ONTARIO: A SUMMARY OF RESEARCH CONDUCTED AND ITS RELEVANCE TO TEXAS AQUATIC PLANT MANAGEMENT. Kevin J Stevens*, University of North Texas, Department of Biological Sciences, Institute of Applied Science, Denton, TX.

1:20 PM 2. DOES HABITAT FRAGMENTATION PREVENT OR PROMOTE THE SPREAD OF KING RANCH BLUESTEM (BOTHRIOCHLOA ISCHAEMUM)? Karen M. Alofs* and Norma L. Fowler, University of Texas at Austin, Austin, TX.

1:40 PM 3. USING MICROSATELLITES TO TRACE THE ORIGIN(S) OF INVASIVE ARUNDO DONAX IN NORTH AMERICA. Daniel Tarin*, James Manhart, Alan Pepper, Texas A&M University, Department of Biology, College Station, TX.

2:00 PM 4. STATUS OF THE SALVINIA WEEVIL (CYRTOBAGOUS SALVINIAE) USED AS A BIOCONTROL OF GIANT SALVINIA (SALVINIA MOLESTA) IN TOLEDO BEND RESERVOIR. Dan Bennett*, Texas Parks and Wildlife Department, Aquatic Habitat Enhancement, Jasper, TX.

2:20 PM 5. EFFECTS OF NONINDIGENOUS PLANT SPECIES ON BIRD COMMUNITIES IN CENTRAL TEXAS PERIURBAN HABITATS. Arlene Kalmbach, Texas Parks and Wildlife Department, Bastrop, TX., Thomas R. Simpson*, Wildlife Ecology Program, Department of Biology, Texas State University-San Marcos, San Marcos, TX., Brian Pierce, Wildlife Ecology Program, Department of Biology, Texas State University-San Marcos, San Marcos, TX., and Kelly Bender, Texas Parks and Wildlife Department, Bastrop, TX.

2:40 PM 6. EFFECTS OF INVASIVE SPECIES ON THE BIODIVERSITY OF FISH ASSEMBLAGES WITHIN THE RIO GRANDE, TEXAS. Justin K. Williams and William I. Lutterschmidt, Sam Houston State University, Huntsville, TX.

INFORMATION MANAGEMENT • Classroom

1:00 PM 7. DEVELOPMENT OF THE CITIZEN SCIENTIST EARLY DETECTION MAPPING APPLICATION USING ARCGIS AND COLDFUSION. Will Alvis*, Houston Advanced Research Center, The Woodlands TX.
1:20 PM 8. A GREEN INDUSTRY PERSPECTIVE ON INVASIVE SPECIES. Bill Brown*, TCNP, Creekside Nursery, Hempstead, TX and Trey Wyatt, Emerald Garden, Austin, TX.

1:40 PM 9. NORTHEAST TEXAS MUNICIPAL WATER DISTRICT'S EFFORTS TO CONTROL GIANT SALVINIA IN CADDO LAKE. Walt Sears*, General Manager Northeast Texas Municipal Water District, Hughes Springs, TX.

2:00 PM 10. INVADERS OF TEXAS: CITIZEN SCIENTISTS COMBAT INVASIVE SPECIES. Damon E. Waitt*, Lady Bird Johnson Wildflower Center, Austin, TX.

PAPER SESSION II

Wednesday Afternoon • November 14, 2007

CONTROL & MANAGEMENT • Auditorium

3:30 PM 11. PROGRESS IN BIOLOGICAL CONTROL OF SALTCEDAR IN TEXAS. C. Jack DeLoach*, United States Department of Agriculture, Agricultural Research Service, Grassland, Soil and Water Research Laboratory, 808 E. Blackland Road, Temple, Texas 76502; Patrick J. Moran, USDA-ARS, Beneficial Insects Research Unit, 2413 E. Highway 83, Weslaco, TX 78596; Allen E. Knutson, Texas A&M University Research & Extension Center, 17360 Coit Road, Dallas, TX 75252; Mark Muegge, Texas A&M University, Texas Agricultural Extension Service, Department of Entomology, Airport Drive, P.O. Box 1298, Fort Stockton, TX 79735; Mark Donet, USDA-NRCS, Chihuahuan Desert RC&D, P.O. Box C-61, Alpine, TX 79832; Tyrus Fain, President, Rio Grande Institute, Box 183, Marathon, TX 79842; James H. Everitt, USDA-ARS, Integrated Farming & Natural Resources Research Unit, 2413 E. Highway 83, Weslaco, TX 78596; James L. Tracy, USDA-ARS, Grassland, Soil and Water Research Laboratory, 808 E. Blackland Road, Temple, Texas 76502 and Thomas O. Robbins, USDA-ARS, Grassland, Soil and Water Research Laboratory, 808 E. Blackland Road, Temple, Texas 76502.

3:50 PM 12. INVASIVE AQUATIC VEGETATION MANAGEMENT IN TEXAS “STRATEGY IN MOTION”. Howard Elder, Texas Parks & Wildlife, Aquatic Habitat Enhancement, Jasper, TX.

4:10 PM 13. LAKE AUSTIN HYDRILLA: A LESSON IN BALANCE. Mary P. Gilroy, City of Austin, Austin, TX.

4:30 PM 14. INITIAL RESPONSE OF BAHIAGRASS TO HERBICIDE APPLICATIONS IN COASTAL PRAIRIE Helen M. Holder*, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas Warren C. Conway, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas David J. Rosen, U.
15. CONTROL AND MANAGEMENT OF THE EXOTIC INVASIVE CYPERUS ENTRERIANUS (CYPERACEAE) IN THE COASTAL PRAIRIE OF TEXAS

EARLY DETECTION & RAPID RESPONSE • Classroom

16. EVALUATING BRUSH MANAGEMENT PRACTICES FOR CONTROL OF NON-NATIVE, INVASIVE SPECIES: JAPANESE CLIMBING FERN (LYGODIUM JAPONICUM) AND CHINESE TALLOW (TRIADICA SEBIFERa) AT THE W. GOODRICH JONES STATE FOREST, CONROE, TEXAS. Jennifer Korn* and Landon Temple, Texas Forest Service, Conroe, TX.

17. FOREST HEALTH PROTECTION’S ROLE IN COMBATING INVASIVE PLANT SPECIES. Saul D. Petty*, USDA Forest Service Forest Health Protection, Pineville, LA, John W. Taylor, USDA Forest Service Forest Health Protection, Atlanta, GA, and Dale A. Starkey, USDA Forest Service Forest Health Protection, Pineville, LA,

18. IDENTIFICATION AND CONTROL OF BRAZILIAN PEPPERTREE (SCHINUS TERE BITHIFOLIUS) ON GALVESTON ISLAND. William J. Schubert*, Texas Parks and Wildlife Department, Coastal Conservation Program, Dickinson, TX and Courtney Miller, Galveston Bay Foundation, Webster, TX.

PAPER SESSION III
Thursday Morning • November 15, 2007

INVASIVE SPECIES UPDATES • Classroom

19. AQUATIC AND RIPARIAN SPECIES. Earl Chilton*. Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, TX 78744.

20. TERRESTRIAL SPECIES. Paul A. Baumann*, Professor and Extension Weed Specialist, Texas A&M University, College Station, TX 77843-2474.
EDUCATION • Classroom

10:30 AM 21. TEXAS INVASIVE SPECIES PLANT LIST. Awinash P. Bhatkar*. Texas Department of Agriculture, Austin, TX.

10:50 AM 22. ECONOMICS, EDUCATION AND ENGAGEMENT AS TOOLS FOR INCREASING PUBLIC LITERACY OF AQUATIC INVASIVE SPECIES AS HAZARDS ON WATER RESOURCES AND ECOSYSTEMS IN TEXAS. T.L. Arsuffi*, Llano River Field Station, Texas Tech University at Junction, Junction, TX, 76849 and Earl Chilton, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, TX 78744.

11:10 AM 23. WHAT IS THE DRIVING FORCE FOR THE EARLY PHASE OF PLANT INVASIONS Edward L. McWilliams*, 1304 Dominik, College Station, TX.

PAPER SESSION IV

Thursday Afternoon • November 15, 2007

CONTROL & MANAGEMENT • Classroom

1:00 PM 24. ARMAND BAYOU NATURE CENTER PRAIRIE RESTORATION AND MANAGEMENT AN INTEGRATED APPROACH Mark Kramer Armand Bayou Nature Center, Pasadena TX.

1:20 PM 25. AMINOPYRALID: A NEW HERBICIDE FOR SELECTIVE BROADLEAF WEED CONTROL AN INTRODUCTION AND EFFICACY SUMMARY. Cassey Mattke, Vernon B. Langston, Pat Burch, Vanelle Peterson, W. N. Kline, M. B. Halstvedt, Dow AgroSciences, LLC. Indianapolis, IN.

1:40 PM 26. EFFECTIVE CONTROL OF TAMARISK (SALT CEDAR) NEAR A SENSITIVE WATER SOURCE Matt McCaw*, Kevin Thuesen, and Willy Conrad Wildland Conservation Division, Austin Water Utility, Austin, TX.

2:00 PM 27. COGONGRASS IN TEXAS. H. A. (Joe) Pase III*, Texas Forest Service, Lufkin, TX, Michael Murphrey, Texas Forest Service, Lufkin, TX, and Ronald Billings, Texas Forest Service, College Station, TX.

OLD WORLD BLUESTEM SYMPOSIUM

Thursday • November 15, 2007 • Auditorium

8:30 AM 29. ECOLOGY OF KING RANCH BLUESTEM. Norma Fowler*, Section of Integrative Biology, University of Texas at Austin, Austin, TX.

9:00 AM 30. “OLD WORLD BLUESTEM” - A TAXONOMIC DILEMMA. Stephan L. Hatch*, S.M. Tracy Herbarium, Department of Ecosystem Science and Management, Texas A & M University, College Station, TX.

9:30 AM 31. POPULATION GENETICS INFORMS INVASIVE SPECIES MANAGEMENT: OLD WORLD BLUESTEMS AS A CASE STUDY. R. Deborah Overath* and Brandi Kutil, Texas A&M University, Corpus Christi, TX and Alice Hempel, Texas A&M University, Kingsville, TX.

10:30 AM 32. A MOLECULAR GENETIC EVALUATION OF KLEBERG BLUESTEM (DICANTHIUM ANNULATUM) POPULATIONS FROM SOUTH TEXAS. Megan Thompson, Destiny Bean and Patrick D. Larkin* Department of Physical & Environmental Sciences Texas A&M University, Corpus Christi, TX.

11:00 AM 33. INVASIVE ECOLOGY OF OLD WORLD BLUESTEMS AND INSIGHTS FOR MANAGEMENT, Marvin E. Ruffner and D. Lynn Drawe*, Rob & Bessie Welder Wildlife Foundation Sinton, TX.

11:30 AM 34. OLD WORLD BLUESTEMS: HISTORY AND ECONOMICS OF USE IN TEXAS. Barron S. Rector*, Texas Cooperative Extension, Colleges Station, TX.

1:00 PM 35. RESEARCH ON INTEGRATING BIOTIC AND ABIOTIC METHODS OF CONTROL FOR THE INVASIVE, C4 GRASS KR BLUESTEM IN A LANDOWNER-INVESTIGATOR COLLABORATION. Kelly G. Lyons*, Department of Biology, Trinity University, San Antonio, TX and David Davidson, Private Landowner, Kendalia, TX.

1:30 PM 36. SELECTIVE AND NON-SELECTIVE CONTROL OF KING RANCH BLUESTEM: THE SHORT-TERM EFFECTS OF GROWING-SEASON PRESCRIBED FIRE, HERBICIDE, AND MOWING IN TEXAS PRAIRIES. Mark T. Simmons* University of Texas at Austin, Landscape Restoration Program, Lady Bird Johnson Wildflower Center,, Austin, TX 78739 Charlotte Reemts The Nature Conservancy Fort Hood Project, Fort Hood, TX, Matt McCaw Austin Water Utility, City of Austin, Steve Windhager University of Texas at Austin, Landscape Restoration Program, Lady Bird Johnson Wildflower Center, Austin, TX 78739, Paula Power U.S. Fish & Wildlife Service. San Marcos National Fish Hatchery and Technology Center, San Marcos, TX 78666. Jason Lott National Park Service, Lyndon B. Johnson National Historic Park, Johnson City, TX 78636 Robert K. Lyons Texas Cooperative Extension, Texas A&M University Agricultural Research &
2:00 PM  37.  ESTABLISHMENT OF NATIVE PLANTS IN HABITATS ONCE DOMINATED BY OLD WORLD BLUESTEMS, Paula Maywald*, South Texas Natives, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville.

2:30 PM  38.  RESTORATION OF NATIVE SUBTROPICAL FOREST IN ABANDONED CROPLAND DOMINATED BY KLEBERG BLUESTEM IN CAMERON COUNTY, TEXAS. Chris Best* and Mick Castillo, U.S. Fish and Wildlife Service.

**POSTER SESSION**

P1. EVALUATION OF TEXAS NATIVE GRASSES FOR HIGHWAY RIGHT OF WAYS. Anna S. Lund*, Timothy E. Fulbright, Allen Rasmussen, J. Alfonso Ortega, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX., and John Lloyd-Reilley, USDA-NRCS Kika de la Garza Plant Materials Center, Kingsville, TX.


P3. IDENTIFICATION OF SEEDS, SEEDLINGS AND JUVENILE PLANTS OF SELECTED INVASIVE AND ADVVENTIVE PLANTS OF AUSTIN. Kathy McWilliams, Austin, TX.

P4. THE CACTUS MOTH-CACTOBLASTIS CACTORUM Laura A. Tyler, National Institute for Invasive Species Science, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO.
ABSTRACTS

1. INVASIVE WETLAND PLANTS IN SOUTHERN ONTARIO: A SUMMARY OF RESEARCH CONDUCTED AND ITS RELEVANCE TO TEXAS AQUATIC PLANT MANAGEMENT. Kevin J Stevens*, University of North Texas, Department of Biological Sciences, Institute of Applied Science, Denton, TX.

In the 1990's, Project Purple, a multidisciplinary group composed of government, industry and university researchers was established to deal with the threat to North American wetlands posed by *Lythrum salicaria*. As part of this group, my role was to determine the potential for vegetative spread through stem and root fragments and identify the mechanisms by which *L. salicaria* survived flooding and drought. This research led to asking the questions "why is *L. salicaria* so special? What does it do that closely related native species do not?" To answer these questions, morphological and anatomical responses to flooding and drought were quantified and compared among *L. salicaria* and the closely related native plants *L. alatum* and *Decodon verticillatum*. This line of questioning was then extended to other families of plants with native and invasive species represented, including Iris spp. (*I. versicolor*, *I. virginica*, *I. pseudoacorus*), Glyceria spp (*G. maxima*, *G. grandis*, *G. striata*), Impatiens spp. (*I. glandulifera*, *I. pallida*, *I. capensis*), and Epilobium spp. (*E. ciliatum*, *E. parviflorum*, *E. hirsutum*, *E. angustifolium*). Highlights of this research will be presented, accompanied by a discussion of the relevance of this to research to invasive plant issues in Texas.

2. DOES HABITAT FRAGMENTATION PREVENT OR PROMOTE THE SPREAD OF KING RANCH BLUESTEM (BOTHRIOCHLOA ISCHAEMUM)? Karen M. Alofs* and Norma L. Fowler, University of Texas at Austin, Austin, TX.

On the eastern Edwards Plateau, woody plant encroachment has produced landscapes which vary in the amount and distribution of herbaceous habitat. King Ranch Bluestem (*Bothriochloa ischaemum*) grows in herbaceous patches throughout this region and is correlated with reduced species diversity. This system allows us to examine the consequences of habitat fragmentation on the spread of an invasive plant. Models suggest that fragmentation should directly limit the spread of invasive plants with limited long distance dispersal. But fragmentation may indirectly promote the spread of invasive plants by reducing diversity. We will discuss work in progress including: (1) an observational study of the relationship between fragmentation and the presence of *B. ischaemum*, (2) experiments to measure the effects of species richness on the establishment of *B. ischaemum* and (3) modeling to examine the effects of fragmentation on the spread of *B. ischaemum* as a function of the species' limited dispersal.

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

*Arundo donax* (L.), giant reed, is an introduced, invasive weed that has become a problem worldwide. *Arundo donax*, a member of the Poaceae, is a large, rhizomatous perennial 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. Mechanical and chemical control of giant reed can be expensive; the best long-term option for control involves importing insects that are known to feed on the plant. Finding the best insects for biological control involves locating the source(s) of the invasive *Arundo*. To do this, genetic markers, such as microsatellites, are required. Because of their codominant nature of inheritance and high mutation rate, microsatellites are ideal genetic markers.
for use in DNA fingerprinting studies. 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 correspond closely to *A. donax* from several locations including the east coast of
Spain.

4. STATUS OF THE SALVINIA WEEVIL (*CYRTOBAGOUS SALVINIAE*) USED AS A BIOCONTROL
OF GIANT SALVINIA (*SALVINIA MOLESTA*) IN TOLEDO BEND RESERVOIR. Dan Bennett*,
Texas Parks and Wildlife Department, Aquatic Habitat Enhancement, Jasper, TX.

Management of giant salvinia, *Salvinia molesta*, requires immediate and aggressive control efforts
utilizing Integrated Pest Management principles. The salvinia weevil, *Cyrtobagous salviniae*, is a
host-specific insect which feeds on salvinia during both larval and adult stages. Introductions of
the salvinia weevil have proven successful in many tropical and sub-tropical countries, where it
has reduced the enormous growth potential of giant salvinia infestations. Salvinia weevils were
first introduced on a large scale in Toledo Bend in 2004 to determine their effectiveness as a
biological control method in Texas. Approximately 350,000 weevils have been introduced at 27
sites on the Texas portion of the reservoir between 2004 and 2006. Established weevil
populations in Toledo Bend will provide support for parallel research at Caddo Lake to determine
over-wintering success and management potential in the reservoir.

5. EFFECTS OF NONINDIGENOUS PLANT SPECIES ON BIRD COMMUNITIES IN CENTRAL
TEXAS PERIURBAN HABITATS. Arlene Kalmbach, Texas Parks and Wildlife Department,
Bastrop, TX., Thomas R. Simpson*, Wildlife Ecology Program, Department of Biology, Texas
State University-San Marcos, San Marcos, TX., Brian Pierce, Wildlife Ecology Program,
Department of Biology, Texas State University-San Marcos, San Marcos, TX., and Kelly Bender,
Texas Parks and Wildlife Department, Bastrop, TX.

Invasive non-indigenous plants pose a significant threat to natural vegetation communities and by
extension to those avian populations dependent upon native flora. Previous research indicates
that non-indigenous plants do not provide native bird populations with the necessary cover,
foraging patches, or nesting resources. This altered habitat also encourages use by non-
indigenous bird species. We investigated the hypothesis that in Austin, Texas, sites invaded by
non-indigenous woody plant species harbor a suite of birds that is significantly lacking in diversity
and abundance when compared to areas unaffected by non-indigenous woody vegetation. We
surveyed the avian community by point count on six study sites within the city limits of Austin,
Texas. Point count locations were classified a priori as unimpacted (< 5% canopy composition by
non-indigenous species) or impacted (>5% canopy composition by non-indigenous species). We
recorded 62 species and 1742 individual bird detections during the 18-month study. Avian species
richness for impacted points was 32 with 448 total detections, while species richness at un-
impacted points was 59 with 1294 total detections. A three factor non-parametric multivariate
analysis of variance (season x habitat x year) revealed significant differences between impact
cover type (P=0.0002) and year (P=0.0002), with no observer x cover (P=0.9508), observer x year
(P=0.3302), or observer x cover x year (P=0.9824) interactions. There was a significant cover x
year interaction (P=0.0156). These results identify differences between cover types and study
years indicating that the presence of non-indigenous plant species has a significant influence on
avian populations.
6. EFFECTS OF INVASIVE SPECIES ON THE BIODIVERSITY OF FISH ASSEMBLAGES WITHIN THE RIO GRANDE, TEXAS. Justin K. Williams and William I. Lutterschmidt, Sam Houston State University, Huntsville, TX.

A three-year study monitoring vegetation, disturbance, and species diversity of fish within and along the southern Texas portion of the Rio Grande indicates that a correlation between human disturbance and a decreased in native biodiversity exists. Results show that an increase in the proportion of disturbed land increases the species richness of invasive plants. In addition, increased disturbance and proportion of impervious surface negatively affects fish diversity, native plant diversity, and water quality. Our study provides evidence that shows the negative cascading effects of human disturbance on the increase in invasive species richness, which subsequently promote a corresponding negative effect on the native biodiversity and health of an important international aquatic system.

7. DEVELOPMENT OF THE CITIZEN SCIENTIST EARLY DETECTION MAPPING APPLICATION USING ARCGIS AND COLDFUSION. Will Alvis*, Houston Advanced Research Center, The Woodlands TX.

An invasive tracking database with an ESRI ArcIMS front-end was developed and implemented to allow qualified citizen scientists to input data and view the validated data in an online mapping application. HARC built a centralized web service based on Active Server Page (ASP) technology to allow citizen scientists to upload and merge data into a SQL Server database. This centralized database of invasive infestations includes metadata attribute information such as dates, observing parties, and other pertinent information. Users will input coordinates using the Texas Invasives data entry portal web page interface. This information is then validated and immediately made available in its native resolution to the general public. The data are available in the form of maps served on an OGIS/ArcIMS internet map server, and in tabular reports and summaries built using Adobe ColdFusion technology. Using the interactive mapping tools, one can zoom, pan or query to get to the location of interest. Using the information tool, all invasives located at a site are displayed, with links to information about particular species. The site is updated routinely with new data, after the validation process has occurred.

8. A GREEN INDUSTRY PERSPECTIVE ON INVASIVE SPECIES. Bill Brown*, TCNP, Creekside Nursery, Hempstead, TX and Trey Wyatt, Emerald Garden, Austin, TX.

The efficient movement of beneficial plants, plant products, biological control organisms, or other articles into, out of, or within the United States is vital to the nation's economy and should be facilitated to the extent possible and reasonable. At the same time, it should be recognized that unregulated movement of organisms can present unacceptable risks. Resources directed at intervention, quarantine, removal, and enforcement of existing federal and state statutes are woefully inadequate. Patchwork approaches across the U.S. weaken the effectiveness of existing regulations and create economic hardship for some while serving as protectionism for others. Successful solutions to the challenge of finding a balance between the needs of urban residents and the management and control of invasive and potentially invasive plants and other organisms must be science-based, takes into account full economic impact of planned actions, and identify plant material fully by genus, species, and variety. Reasoned dialogue, proper identification and inclusion of all stakeholders, public education, and information sharing are essential to finding successful solutions to the problem of invasive species.
9. NORTHEAST TEXAS MUNICIPAL WATER DISTRICT'S EFFORTS TO CONTROL GIANT SALVINIA IN CADDÓ LAKE. Walt Sears*, General Manager Northeast Texas Municipal Water District, Hughes Springs, Texas.

The involvement efforts of TCEQ, and other interested stakeholders, attempt to control Giant Salvinia in Caddo Lake. This coordinated plan involves educating stakeholders of the threat that Giant Salvinia poses to both economical aspects and water quality. The program intends to promote involvement through public meetings and participation of state agencies along with request of assistance from industry and the private sector. The planned actions are stakeholder driven to assure funds are dedicated for actions that meet the committee’s priorities. The Caddo Lake Watershed Protection Plan is essential to promote the effort to restore Caddo Lake, to the extent possible, to its pristine environment.

10. INVADERS OF TEXAS: CITIZEN SCIENTISTS COMBAT INVASIVE SPECIES. Damon E. WaItt*, Lady Bird Johnson Wildflower Center, Austin, TX.

Those of us who care deeply about native plants and habitats understand how important they are to our sense of place. But even as we are working to conserve our plant heritage from land development and other pressures, native flora across the country – in our backyards, along our roadways, on our farms and ranches, in our parks and natural areas – are facing a less obvious but equally serious threat from invasive species. The Wildflower Center has joined with the Texas Forest Service and others to develop a statewide early detection program entitled Invaders of Texas: Citizen Scientists Combat Invasive Species. The Invaders program involves recruiting, training, and providing materials to volunteers who detect and report invasive species in their communities. These volunteers find, track, describe, and photograph invasive species and report occurrences to an online early detection and reporting database. The website also serves as a venue for data validation, data analysis and mapping. The outcomes of this program include a statewide network of volunteers contributing scientific data on the distribution and abundance of invasive species; increased public awareness of the dangers imposed by invasive species; and reduced spread of invasive species through more timely control and eradication responses from regulatory agencies. For more information on the Pulling Together Initiative, visit www.texasinvasives.org.

11. PROGRESS IN BIOLOGICAL CONTROL OF SALTCEDAR IN TEXAS. C. Jack DeLoach*, United States Department of Agriculture, Agricultural Research Service, Grassland, Soil and Water Research Laboratory, 808 E. Blackland Road, Temple, Texas 76502; Patrick J. Moran, USDA-ARS, Beneficial Insects Research Unit, 2413 E. Highway 83, Weslaco, TX 78596; Allen E. Knutson, Texas A&M University Research & Extension Center, 17360 Coit Road, Dallas, TX 75252; Mark Muegge, Texas A&M University, Texas Agricultural Extension Service, Department of Entomology, Airport Drive, P.O. Box 1298, Fort Stockton, TX 79735; Mark Donet, USDA-NRCS, Chihuahuan Desert RC&D, P.O. Box C-61, Alpine, TX 79832; Tyrus Fain, President, Rio Grande Institute, Box 183, Marathon, TX 79842; James H. Everitt, USDA-ARS, Integrated Farming & Natural Resources Research Unit, 2413 E. Highway 83, Weslaco, TX 78596; James L. Tracy, USDA-ARS, Grassland, Soil and Water Research Laboratory, 808 E. Blackland Road, Temple, Texas 76502 and Thomas O. Robbins, USDA-ARS, Grassland, Soil and Water Research Laboratory, 808 E. Blackland Road, Temple, Texas 76502

The invasion of exotic saltcedars (Tamarix spp.), small trees from Asia and the Mediterranean area, introduced in the 1800s, is causing great damage to riparian ecosystems in the western half of Texas, other western states, and northern Mexico. These dense thickets displace native plant communities, degrade wildlife and fish habitat (including that of many endangered and rare species), use large quantities of scarce groundwater and stream flow, increase wildfires and soil salinity and reduce recreational values in parks. Conventional controls are expensive, temporary
and damage many non-target plants. Biological control is a long used and much proven method ideally adapted to control of exotic weeds in natural areas. In 2001, we released a leaf beetle, *Diorhabda* spp., from China and Kazakhstan that has been highly successful in defoliating saltcedar over thousands of acres in 4 states north of the 38th parallel but not south of there in TX, NM and southern CA. In 2001, we found different *Diorhabda* ecotypes from Crete, Greece; Tunisia; Uzbekistan and Turpan, China and tested them at Temple and Albany, CA. We released 500 adults of the Crete ecotype at Big Spring in April 2004 which had defoliated 25 acres of the saltcedar stand within 3 years and by September 2007 had dispersed and defoliated saltcedar for 5 miles along Beals Creek. In the area defoliated 3-4 times annually for 3 years, 20% of the trees have been killed and abundant natural vegetation has returned. These beetles also have been released, and appear to be established and are defoliating saltcedar at other sites from Big Spring to Sweetwater, at Pecos and Imperial, TX and at Artesia, NM and Rumsey, CA. They were released in June 2007 at 7 sites along the Rio Grande of west Texas, and are increasing at some sites.

12. INVASIVE AQUATIC VEGETATION MANAGEMENT IN TEXAS “STRATEGY IN MOTION”. Howard Elder, Texas Parks & Wildlife, Aquatic Habitat Enhancement, Jasper, TX.

Invasive tropical and sub-tropical aquatic species flourish in the fertile waters of Texas. Water hyacinth (*Eichhornia crassipes*) remains the most problematic species and has been since its introduction in 1880. Giant salvinia (*Salvinia molesta*), confirmed in 1998, infested four major public reservoirs and countless private ponds within 2-3 years in southeastern Texas. In spite of every effort, water hyacinth and giant salvinia continue to persist and expand in Texas. Giant salvinia was confirmed on Caddo Lake in 2006. Over 100 concerned citizens and homeowners on Caddo Lake were permitted by Texas Parks & Wildlife Department to physically remove giant salvinia, in addition a barricade designed to prevent giant salvinia from entering Texas waters was constructed independently by the Cypress Valley Navigation District. Fiscal resources and manpower dedicated to the control of invasive aquatic vegetation in Texas remain inadequate to the number of reservoirs requiring attention. Long-term control of invasive aquatic vegetation will require supporting funds through existing state and federal programs to establish dedicated crews, specific to problematic reservoirs.

13. LAKE AUSTIN HYDRILLA: A LESSON IN BALANCE. Mary P. Gilroy, City of Austin, Austin TX.

In July 1999, 23 acres of the non-native aquatic plant hydrilla (*Hydrilla verticillata*) were first documented in Lake Austin, a 1600 acre run-of-the-river reservoir on the Colorado River in Austin, Texas. As a flow-through reservoir that is used for public drinking water as well as contact recreation and sport fishing, Lake Austin presents unique challenges to hydrilla control. By May 2002, the plants covered over 320 surface acres, producing dense mats that presented serious public safety concerns. After a major flood in July 2002 when hydrilla contributed to increased flooding and loss of hydroelectric generation, the City of Austin and other stakeholders (Texas Parks and Wildlife Department, Lower Colorado River Authority and a citizen group, Friends of Lake Austin) developed and implemented an integrated management plan to control the infestation. With the objectives of returning the lake to pre-hydrilla conditions while maintaining a healthy lake ecosystem, the plan included annual winter drawdowns, incidental harvesting and incremental stocking of sterile Asian grass carp. Significant decreases in hydrilla coverage began in 2005 and TPWD’s August 2007 survey showed only 20 acres of hydrilla, with nearly 330 acres of other vegetation. In conjunction with the management plan, the City of Austin and Lewisville Aquatic Ecosystem Research Facility are collaborating on native aquatic vegetation restoration efforts for both Lake Austin and the downstream reservoir, Lady Bird (formerly Town) Lake. The presentation will review the history of this integrated effort including successful management strategies as well as obstacles to success and the outlook for the future.
14. INITIAL RESPONSE OF BAHIAGRASS TO HERBICIDE APPLICATIONS IN COASTAL PRAIRIE


The Coastal Prairie region of Texas and Louisiana historically comprised ca. 3,800,000 ha, but now exists as a network of disjoint and isolated patches in various stages of condition and size. While prairie restoration is a high conservation priority for natural resource agencies in Texas and Louisiana, revegetation efforts often fail on sites dominated by exotic invasive species such as bahiagrass (*Paspalum notatum*). The objectives of this study are to (1) examine the utility of interseeding native prairie seed into existing vegetation and (2) evaluate efficacy of combinations of glyphosate (Journey®) and imazapic (Plateau®) for use in restoration of native tallgrass prairie species in existing bahiagrass pasture. Six experimental blocks measuring 100m x 100m were established at The San Bernard National Wildlife Refuge in Texas, each containing 10 treatment plots measuring 10m x 100m, with 2 replicates per treatment within each block. In February 2007, each block was mowed and in April, 2007, plots were assigned to one of five treatments (i.e., control, interseeding with no herbicide, Journey® 24 oz/ac with interseeding, Plateau® 8 oz/ac with interseeding, and Plateau® 8 oz/ac without interseeding) and herbicides were applied. In July 2007, 10 quadrats, each 1 m², were established within each treatment plot, where the following variables were measured: (1) percent cover for each species within each quadrat, (2) height (cm) of the tallest bahiagrass plant, and (3) presence/absence of bahiagrass inflorescences. Initial herbicide treatments reduced bahiagrass cover compared to control plots; bahiagrass height (i.e., 20-24 cm) was also reduced (P < 0.001) compared to control plots (i.e., 71-82 cm). Similarly, inflorescence frequency was greatly reduced (P < 0.001) in herbicide treatment (i.e., 2-7%) as compared to control plots (i.e., 97-98%). Although not significant, (P >0.05), bahiagrass was generally shorter and possessed fewer inflorescences in plots treated with Journey® as compared to Plateau®. Combined, these initial response data indicate that both Plateau and Journey provide some immediate reduction in bahiagrass growth and seed production. The longevity of herbicide effects as related to seedling emergence and survival will be evaluated over the next two years.

15. CONTROL AND MANAGEMENT OF THE EXOTIC INVASIVE CYPERUS ENTRERIANUS (CYPERACEAE) IN THE COASTAL PRAIRIE OF TEXAS


Due to fragmentation and land-use changes, less than 1% of the vegetation of the coastal prairie of Texas remains in original condition and exotic invasive plants are among the greatest threats to the integrity and function of the remaining coastal prairie ecosystem. Deeprooted sedge (*Cyperus entrerianus Boeck*) is an exotic invasive plant that has rapidly spread throughout the coastal prairie of Texas during the last 20 years. It forms homogenous stands, displaces native plant species, has tremendous seed biomass production with high germination rate, and is effectively altering ecosystem function and stability within the region. Prescribed fire and herbicide treatments, which are key elements of ecosystem maintenance and restoration, are commonly used to control exotic invasive flora. To quantify effects of prescribed fire and herbicide treatments on *C. entrerianus*, 780 permanent 1 m² plots were established in 78 treatments plots, within 13 treatment blocks among three sites in coastal Texas (i.e., The Nature Conservancy of Texas’ Texas City Prairie Preserve (TCPP), Attwater Prairie Chicken National Wildlife Refuge (APCR), and Anahuac National Wildlife Refuge (ANWR)). Plots were established in May 2005, and percent cover data were collected five times (May/June 2005, 2006, 2007 and December/January 2005 and 2006). Herbicide treatments (i.e., Plateau) were randomly applied in April/May 2006 (i.e., early growing season) and August-October 2006 (i.e., late growing season) to treatment plots within blocks. Prescribed fire was applied such that entire blocks were treated at once within the
prescribed fire management program of each site. Percent cover of *C. enterrianus* did vary among treatments (P < 0.001), where a 66% decline was observed in plots treated with herbicides October 2006, and prescribed burns in both February 2006 & 2007. Other treatment combinations did reduce *C. enterrianus* cover. However, plots receiving only prescribed fire treatments during February actually had some increases in *C. enterrianus* cover. It is evident that intensive, repeated management efforts are needed to reduce and control *C. enterrianus*; specifically, late growing season herbicide treatments appear to be central to control efforts. Over time, *C. enterrianus* appears to increase above-ground cover with prescribed fire applications only, but incorporation of late growing season herbicide treatments, singly or in combination with prescribed fire, may work to reduce cover of this aggressive exotic invasive species.

16. **EVALUATING BRUSH MANAGEMENT PRACTICES FOR CONTROL OF NON-NATIVE, INVASIVE SPECIES: JAPANESE CLIMBING FERN (LYGODIUM JAPONICUM) AND CHINESE TALLOW (TRIADICA SEBIFERA) AT THE W. GOODRICH JONES STATE FOREST, CONROE, TEXAS.** Jennifer Korn* and Landon Temple, Texas Forest Service, Conroe, TX.

W. Goodrich Jones State Forest in Conroe, Texas, located just north of Houston has been owned and managed by the Texas Forest Service since 1926 and is home to the federally endangered Red-cockaded woodpecker (*Picoides borealis*). The area is primarily loblolly pine (*Pinus taeda*) forest with woody mid-story growth of yaupon (*Ilex vomitoria*) and sweet gum (*Liquidambar styraciflua*). Recently of concern in the forest is the presence and spread of two non-native, invasive species of plants: Japanese Climbing Fern (*Lygodium japonicum*) and Chinese Tallow (*Triadica sebifera*). Both species alter the structure of the forest and potentially affect the habitat of the woodpecker, as well as increase the risk of wildfire as the fern may act as a ladder fuel.

Since 2005, the Texas Forest Service has implemented brush control management practices to stop the encroachment of woody mid- and understory vegetation as well as to remove or slow the spread of the two invasive plants in question. Control methods have included mulching, spraying of herbicides, prescribed burning and combinations of the three. The purpose of this presentation is to evaluate the results of these methods and to attempt to determine best future practices for the control of invasives.

17. **FOREST HEALTH PROTECTION’S ROLE IN COMBATING INVASIVE PLANT SPECIES.** Saul D. Petty*, USDA Forest Service Forest Health Protection, Pineville, LA, John W. Taylor, USDA Forest Service Forest Health Protection, Atlanta, GA, and Dale A. Starkey, USDA Forest Service Forest Health Protection, Pineville, LA.

USDA Forest Service, Forest Health Protection (FHP) in the Southern Region (R8) is responsible for providing funds and expert assistance to invasive plant programs, including state forestry agencies, departments of agriculture, and non-profit groups. Funds are utilized for education, prevention, detection, and suppression. FHP personnel also provide training in control techniques and species identification. Present funding levels are modest and do not meet the current demand. As invasive plant introductions continue to increase and the areas affected expand, the need for funding and technical assistance will rise.

18. **IDENTIFICATION AND CONTROL OF BRAZILIAN PEPPERTREE (SCHINUS TEREBITHIFOLIUS) ON GALVESTON ISLAND.** William J. Schubert*, Texas Parks and Wildlife Department, Coastal Conservation Program, Dickinson, TX and Courtney Miller, Galveston Bay Foundation, Webster, TX.

In early 2003, Texas Parks & Wildlife Department staff first located populations of Brazilian peppertree (*Schinus terebithifolius*) on Galveston Island. This shrub is a common noxious plant in south Florida, and its status as a noxious plant in coastal south Texas is well established. Texas Parks & Wildlife Department partnered with the Galveston Bay Estuary Program and the Galveston Bay Foundation to attempt to eradicate Brazilian peppertree from Galveston Island.
before populations became widespread. Since the completion of the first eradication effort, additional populations of the shrub have been located and control efforts are ongoing.

19. AQUATIC AND RIPARIAN SPECIES. Earl Chilton*. Texas Parks and Wildlife Department, Inland Fisheries Division, 4200 Smith School Road, Austin, TX.

Giant salvinia, water hyacinth, and hydrilla are three of the most problematic aquatic species in Texas. Over the past two years giant salvinia has spread to at least three more public water bodies including Caddo Lake, Texas’ only natural lake. Currently, a joint management plan is being developed that includes both the Louisiana and Texas portions of the lake. The plan includes both local and federal cooperators. Hydrilla in Lake Austin continues to be controlled with triploid grass carp. Hydrilla coverage has not exceeded 66 acres in nearly three years, being at or below 20 acres during most of the period. Using the same stocking strategy in Lake Conroe has yielded the first reductions in hydrilla coverage since 1996. Additionally, triploid grass carp were used to successfully remove hydrilla from a 100 mile stretch of the Rio Grande. Lake Livingston has developed a growing water hyacinth problem and it is anticipated that several thousand acres may have to be treated during 2008. Water losses as a result of giant reed equal a major portion of the Rio Grande water reserve for industrial and municipal use. Currently, four potential biological controls (insects) are being developed by the USDA, and there is growing support for a demonstration project to test efficacy of available control techniques.

20. TERRESTRIAL SPECIES. Paul Bowen*, Professor and Extension Weed Specialist Texas Cooperative Extension, Texas A&M University, College Station, TX.

One of the more pernicious invasive weeds whose presence has been confirmed in Texas is Tropical Soda Apple (Solanum viarum Dunal). It has been found in four East Texas counties to date and has a potential to spread rapidly to others. Tropical soda apple is a perennial, herbaceous weed whose architecture is particularly deleterious to most pasture forage grasses. In addition, the fruit from this plant, which contains numerous seeds, is consumed by a number of animals which can hasten its’ spread. Control measures for this noxious, invasive plant will be discussed at the conference.

21. TEXAS INVASIVE PLANT LIST. Awinash P. Bhatkar*. Texas Department of Agriculture, Austin, TX.

In 2003, the Texas Legislature authorized the Texas Department of Agriculture (TDA) to publish a list of noxious plant species with a potential to cause a serious economic or ecological harm to the state, in consultation with agricultural industry, horticultural industry, Cooperative Extension, Department of Transportation, Soil and Water Conservation Board, and Parks and Wildlife Department. The statute was amended to include listing of invasive plant species in 2005. Under the statute a person commits an offense (Class C misdemeanor) if the person sells, distributes or imports into the state a noxious or invasive plant species, and a person commits a separate offense for each noxious or invasive plant item or unit sold, distributed, or imported. The current plant list contains 29 species, with 12 aquatic species regulated by the Texas Parks and Wildlife Department, and eight listed as federal noxious weeds. Most of these species are either non-native or exotic. Rule was adopted in June 2007 to list Chinese tallowtree (Triadica sebiferum), kudzu (Pueraria montana var. lobata), saltcedar (Tamarix spp.) and tropical soda apple (Solanum viarum) as invasive species. Special permits were issued for experimental use of Chinese tallow and Arundo donax, a noxious plant species, for biofuel production.
22. ECONOMICS, EDUCATION AND ENGAGEMENT AS TOOLS FOR INCREASING PUBLIC LITERACY OF AQUATIC INVASIVE SPECIES AS HAZARDS ON WATER RESOURCES AND ECOSYSTEMS IN TEXAS. T.L. Arsuffi*, Llano River Field Station, Texas Tech University at Junction, Junction, TX, 76849 and Earl Chilton, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, TX.

Invasions by plants, animals, and pathogens, are regarded by biologists as one of the major threats to biological diversity worldwide and can have major impacts on water resources and economics. Here, we describe basic ecological research on selected aquatic exotic macrophytes in Texas and describe the applied/policy/management implications of that research. The research encompasses spatial and temporal dimensions, population dynamics, trophic studies, tracking and migration, abiotic tolerances, biodiversity and community structure and ecosystem function and conservation biology. The applied and policy implications involve interbasin water transfers, instream flows, sports fisheries, endangered species, water quality, restoration, lawsuits and public education. Direct and indirect economic impacts associated with scientific findings from the studies translate into millions of dollars per year for Texas. Ecological impacts show dramatic changes in aquatic communities, increased threats to biodiversity and altered ecological structure and function. Water losses due to invasive species cost Texas hundreds of thousands of acre-feet of water per year, water unavailable for instream flows, irrigation and other human uses. Innovative, proactive ecological research and public and policy awareness and education initiatives are instrumental to preventing further invasions and managing existing exotic species impacts in Texas aquatic ecosystems. Water saved by curbing invasive species may be critical to future water planning efforts and coping with projected population growth.

23. WHAT IS THE DRIVING FORCE FOR THE EARLY PHASE OF PLANT INVASIONS Edward L. McWilliams*, 1304 Dominik, College Station, TX.

We recognize that the purposeful or inadvertent initial introduction of exotic organisms by man is the root cause of invasions of plants, animals and microbes. But does the role of man suddenly end after a single introduction? Here, we ask if man does not continue to influence the process far beyond the initial introduction. Exotic organisms are dispersal limited by definition. Krivanek et al. (2006) studied plants with long invasion lag phases. Species that were introduced early had a higher probability of escape than those introduced to cultivation later. The search for the biological explanation of how and why invasive species are successful has only been partially successful. Several different theories: the reproductive theory, the escape-from-predators theory and recently, the inhibition-of-mycorrhizae theory, for example, all partially explain why some invasive species are successful. They do not show that there is a unifying theory or driving force for invasive organisms. Studies of the biology of invasive organisms may describe, and even explain, how they out compete natives but such studies do not predict when and where future invasions will occur (Williamson, 2006). Here we suggest that the driving force is not just the initial introduction of a new exotic plant but rather the repeated long distance dispersal and local transport of new exotic plants resulting in multiple introductions and foci of invasive plants. In addition, we show how human-induced environmental, agricultural, and engineering changes further facilitate and accelerate the ongoing invasions of several exotic plants in Texas. Socio-economic activities do not all facilitate invasions. We give examples of how some human activities such as large scale development, slow or set back exotic invasions as much as they damage the native fauna and flora. If man is indeed the driving force for the initial stages of invasions, you would predict that he must similarly impact the migration of dispersal-limited native plants. Man transports both native and exotic, dispersal-limited, preadapted plants to regions outside their historical geographical ranges. Human transport of native plants has resulted in migrations and range expansions of native Texas plants including Acacia, Juniperus, Lupinus, Opuntia, Paspalum, Phlox, Pinus and Tillandsia spp. In animal ecology, the range expansion of native turkeys along power transmission lines is a minor example of the role of man in driving a local migration. Although we emphasize
escapes from cultivation that result in "cultivasions", introduced exotic plants also "escape" from many other sites (Kowarik, 2004). We suggest that multiple transport, multiple introductions resulting in multiple "escapes" from man dominated environments is a unifying concept controlling the initial stage of biological invasions. Multiple introductions, at various spatial scales, then impact each subsequent stage in the whole complex invasive process (Kowarik, 2003). To the degree that the past detailed activities of man, including the planting history (Krivanek et al., 2006) of exotic plants are known, biological invasions should be increasingly predictable.


24. ARMAND BAYOU NATURE CENTER PRAIRIE RESTORATION AND MANAGEMENT AN INTEGRATED APPROACH Mark Kramer Armand Bayou Nature Center, Pasadena, TX.

The Armand Bayou Nature Center (ABNC) is a 2,500 acre wildlife preserve located in southeastern Harris County between Houston and Galveston, Texas. ABNC manages 700 acres of coastal tallgrass prairie making this preserve one of the largest prairie holdings in the Lower Galveston Bay watershed. Of particular concern is the invasion of a number of woody species into these prairies, particularly Chinese tallow (Triadica sebifera). For over ten years ABNC has employed an integrated approach to invasive species management. These techniques include aerial application of herbicide, mechanical removal, prescribed fire, shredding, plant introduction and monitoring. Management activities have resulted in a strong reduction of non-native invading plant species and a noticeable increase in native tallgrass species at the landscape level. The program has been a success in part due to a dedicated team of volunteers. This discussion will focus on the history of the program along with the successes and challenges that ultimately ensue.

- Aerial Application- 300 acres of closed canopy tallow forest controlled with helicopter treatment.
- Mechanical Control- 300 acres of dead standing tallows removed with hydro-ax and Seppi chippers. Additionally, chainsaw crews remove adult trees and apply cut-stump herbicide where plant densities are low.
- Prescribed Fire- 350 acres burned annually with a team of highly trained volunteers within a highly urbanized area.
- Plant Introduction- Locally rare prairie grasses and wildflowers have been salvaged from areas destined for construction. To date, over 17,000 one gallon size propagules have been introduced into ABNC prairie landscapes.
- Shredding- 350 acres mowed annually with ABNC equipment, staff and trained volunteers. Monitoring- Trained volunteers collect data from 32 vegetation transect lines. Eight years of data guides management strategies.

25. AMINOPYRALID: A NEW HERBICIDE FOR SELECTIVE BROADLEAF WEED CONTROL AN INTRODUCTION AND EFFICACY SUMMARY. Cassey Mattke, Vernon B. Langston, Pat Burch, Vanelle Peterson, W. N. Kline, M. B. Halstedt, Dow AgroSciences, LLC. Indianapolis, IN.

Aminopyralid is a new systemic herbicide developed by Dow AgroSciences specifically for use on rangeland, pasture, rights-of-way, such as roadsides for vegetation management, Conservation Reserve Program acres, non-cropland, and natural areas. The herbicide is formulated as a liquid
containing, 240 g a.e./liter of aminopyralid as a salt. The herbicide has post-emergence activity on established broadleaf plants and provides residual control of germinating seeds of susceptible plants. Field research has shown aminopyralid to be effective at rates between 52.5 and 120 g a.e./ha, which is about 1/4 to 1/20 less than use rates of currently registered rangeland and pasture herbicides with the same mode of action including, clopyralid, 2,4-D, dicamba, picloram, and triclopyr. Aminopyralid controls over 40 species of annual, biennial, and perennial broadleaf weeds including *Acroptilon repens*, *Artemisia absinthium*, *Carduus acanthoides*, *Carduus nutans*, *Centaurea diffusa*, *Centaurea maculosa*, *Centaurea solstitialis*, *Chrysanthemum leucanthemum*, *Cirsium arvense*, *Cirsium vulgare*, *Lamium amplexicaule*, *Matricaria inodora*, *Ranunculus bulbosus*, *Rumex crispus*, *Solanum carolinense*, *Solanum viarum*, and *Xanthium strumarium*. Most warm- and cool-season rangeland and pasture grasses are tolerant of aminopyralid applications at proposed rates. Research continues to determine the efficacy of aminopyralid on other key invasive weeds and on the role of aminopyralid in facilitating plant community improvement in land management programs.

26. EFFECTIVE CONTROL OF TAMARISK (SALT CEDAR) NEAR A SENSITIVE WATER SOURCE
Matt McCaw*, Kevin Thuesen, and Willy Conrad Wildland Conservation Division, Austin Water Utility, Austin, TX.

Tamarisk was discovered on a tract of land set aside for the protection of water quality and quantity (City of Austin Water Quality Protection Lands) in March 2003. This was the first confirmed tamarisk infestation in Hays County, Texas. The location is a former rock quarry near Buda, Texas. At some point in the past, the quarrying operation intersected a portion of the Barton Springs segment of the Edwards Aquifer, leaving the aquifer exposed at the surface. This combination of such a highly sensitive environmental feature, a notoriously invasive species such as tamarisk and the nature of being the first known infestation in the county required an approach that would maximize the effectiveness of treatment while minimizing the risk to the exposed aquifer. To further complicate matters, the tamarisk had become established over 30 feet off the ground on the steep quarry walls, as well as in direct contact with the exposed aquifer. To date, it is believed that complete eradication has been achieved on this site, however monitoring will be required over the next five years to detect resprouts or newly established plants. Treatment approach and results of four years of management will be discussed. A tour of the site will be included in the Terrestrial Invaders field trip.

27. COGONGRASS IN TEXAS. H. A. (Joe) Pase III*, Texas Forest Service, Lufkin, TX, Michael Murphrey, Texas Forest Service, Lufkin, TX, and Ronald Billings, Texas Forest Service, College Station, 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. It has escaped into the landscape and has a federal listing as a noxious weed. Cogongrass is an aggressive plant that forms thick mats and grows in full sunlight to partial shade making it capable of invading a wide range of sites. In some southern states, this grass has become a significant problem; however, in Texas, it does not have a large presence at the present time. An area of cogongrass located in Tyler County was established on private lands in the 1950s. It has slowly spread to approximately 2.5 acres in about 50 years. Herbicide treatment of this area of cogongrass on Texas Department of Transportation ROW and adjacent private land was begun in the fall of 2007. Additional treatments will be conducted in the winter of 2007-08 and the spring of 2008 in an attempt to eradicate cogongrass from this site. This presentation will cover some background material about cogongrass and then discuss the treatment of the Tyler county site.
Prior to European settlement, native grasslands were the dominate land feature throughout most of Texas, accounting for approximately 148 million acres. Since then, native grasslands have been steadily disappearing and now account for only about 96 million acres, of which a majority has been severely degraded by overgrazing and encroachment of brush. The significant reduction in quantity and quality of native grasslands throughout Texas has had significant impacts on many wildlife species that rely on healthy native grassland communities to meet yearly, or seasonal, habitat requirements. Although there are several factors that have contributed to the mass reduction of native grasslands in Texas, one of the more notable causes has been the conversion to non-native pasture grasses, particularly coastal bermudagrass. Coastal bermudagrass is a dense mat forming grass that is typically managed as a monoculture thereby eliminating plant species diversity and habitat quality for many grassland wildlife species, particularly upland birds such as the northern bobwhite (Colinus virginianus). To combat this increasing threat to grassland wildlife species, the Texas Parks and Wildlife Department instituted the Pastures for Upland Birds Program (PUB) in 1999. The primary goal of the PUB program was to research cost effective methods for re-establishing native grasses and forbs into bermudagrass pastures, establish demonstration sites on private lands, and provide technical and financial assistance to private landowners interested in converting bermudagrass pastures to native grassland. Since its inception in 1999, the PUB program has assisted 42 landowners in 13 different counties in converting approximately 1,000 acres of coastal bermudagrass pastures and hayfields to native grasses and forbs. In 2006 and 2007 the PUB program enrolled five new landowners, totaling close to 160 acres, who are currently in the process of converting their coastal bermudagrass pastures back to native grasslands.

A study of Bothriochloa ischaemum (King Ranch bluestem) at several sites on the eastern Edwards Plateau in central Texas found that this grass has a very wide ecological amplitude in this region. Abundance of this species was independent of grazing intensity, fire history, soil type, and slope. It was more abundant nearer roads, probably because roads facilitate dispersal. It was not found under dense woody canopies. Where B. ischaemum was abundant, native plant diversity was low. A survey of herbarium records suggested that this species was introduced to Texas at several locations in the 1930's.

One of the ultimate goals of taxonomy is the identification of species. Names, common or scientific, are what we use to communicate knowledge concerning any given species. "Old world bluestem" as a common name applies to several Bothriochloa and Dichanthium species from the old world. These were released as a blend or mix. Bothriochloa species of that mix included B. caucasica, B. ischaemum var. ischaemum, B. ischaemum var. songarica, and B. bladhii. Dichanthium aristatum, and D. annulatum represented the other genus. Most Bothriochloa can be placed in the genus because of a grooved pedicel and a first glume that narrows at the apex. Dichanthium species do not have a grooved pedicel and the first glume is widest near the apex. Spikelets and pedicels examined from "old world bluestem" planting for the last 30 years were sent to the Tracy Herbarium for identification. Who knows what part of that blend may persist on
any given land?

31. POPULATION GENETICS INFORMS INVASIVE SPECIES MANAGEMENT: OLD WORLD BLUESTEMS AS A CASE STUDY. R. Deborah Overath* and Brandi Kutil, Texas A&M University - Corpus Christi, TX and Alice Hempel, Texas A&M University, Kingsville, TX.

Recent invasive species theory suggests that invasiveness develops via one of three scenarios: changes in migration allowing species to reach an area for which they are pre-adapted, changes in the environment allowing a naturalized species to become invasive, and evolutionary changes promoting invasiveness after reaching a new area. Many invasive species show a lag in the time between introduction and invasiveness, indicating that environmental or evolutionary changes are more likely explanations for invasiveness. Thus, knowledge of evolutionary processes is crucial to understanding abundance and distribution, developing effective controls, and preventing future invasions. Evolutionary changes that could account for such a lag include changes in mating system and hybridization forming new gene complexes. Old World Bluestems were introduced from Eurasia for range forage and erosion control in the last 50-80 years. Although both apomixis (the asexual production of seeds) and hybridization have been documented in the native range of some of these species, we know nothing about how either may have contributed to their current invasiveness. We will discuss how molecular markers and population genetics can address these issues with illustrations from our current work on King Ranch bluestem and our plans for Old World Bluestems.

32. A MOLECULAR GENETIC EVALUATION OF KLEBERG BLUESTEM (DICHANTHIUM ANNULATUM) POPULATIONS FROM SOUTH TEXAS. Megan Thompson, Destiny Bean and Patrick D. Larkin* Department of Physical & Environmental Sciences Texas A&M University, Corpus Christi, TX.

Over the past century the spread of non-native plant species has changed the natural environment in many parts of the world. In particular, the introduction of "Old World" bluestem species such as Dichanthium annulatum (Kleberg Bluestem) as forages and for erosion control purposes has altered the structure and function of native habitats throughout Texas. We have developed a molecular genetic approach to examine population structure in Dichanthium annulatum. A polymerase chain reaction (PCR) method has been used to screen 27 DNA microsatellite markers from 10 population samples that cover a range of south Texas locations and habitats. While little molecular polymorphism appears to be present, one marker is able to distinguish variants among the populations.

33. INVASIVE ECOLOGY OF OLD WORLD BLUESTEMS AND INSIGHTS FOR MANAGEMENT, Marvin E. Ruffner and D. Lynn Drawe*, Rob & Bessie Welder Wildlife Foundation Sinton, TX.

Old World bluestems (OWB) (Bothriochloa and Dichanthium spp.) are C4 perennial grasses introduced to the southern Great Plains, USA from subtropical regions of Asia and Africa in the early 20th century. These non-indigenous grasses were promoted over native species for soil erosion control and as livestock forage because of their ease of establishment, forage productivity, and tolerance of drought and intensive grazing. Despite their agronomic benefits, natural resource stakeholders and professionals are concerned because OWB are spreading rapidly across south Texas, degrading wildlife habitats and threatening the diversity of native plant communities. The objectives of this study are to: 1) develop effective management regime(s) to control OWB; 2) evaluate the response of native flora to management of OWB; 3) evaluate methods to convert OWB-infested coastal prairies back to native grasses; and 4) determine if interspecific competition is 1 mechanism by which OWBs invade coastal prairies of south Texas. Results indicate herbicide treatments alone provide only short-term control of OWB and native grass recruitment is generally poor; i.e., OWBs recolonized both herbicide treatment plots in ≤ 4 months. Glyphosate (RoundUp Pro®) was equally effective at controlling OWB as imazapyr (Arsenal®). In contrast, sequential
glyphosate treatments provided significantly (P < 0.05) longer OWB control. Disking followed by herbicide treatments provided the most effective long-term control of OWB. An intensive management strategy seems necessary for control of OWB in south Texas. Interspecific competition and OWB conversion to native grass experiments are currently in progress in a controlled, greenhouse study. Hopefully, results of our studies will give further insight into coastal prairie restoration in south Texas and the invasive ecology of OWB.

34. OLD WORLD BLUESTEMS: HISTORY AND ECONOMICS OF USE IN TEXAS. Barron S. Rector*, Texas Cooperative Extension, College Station, TX.

The term "Old World bluestem" has commonly been used to designate introduced grasses which are Asiatic or European in origin. Only one variety release from the USDA Plant Materials Center has actually been named "Old World Bluestem" and this release was a blend of 22 accessions of grasses in the genera *Bothriochloa* and *Dichanthium* and was labeled as a composite from the Near East. These two grass genera make up the bulk of grass species and releases which have been used in Texas to date. Old World bluestems were found for reseeding use in Texas and adjoining states when a need for primarily soil and water conservation was paramount after the dust bowl years of the 1930's. When grass seed sources were evaluated, no grasses were commercially available to meet the needs of planting on played out farmlands or rangelands which had been abused. Grasses available for planting represented the top successional stage grasses such as switchgrass, yellow Indiangrass or sideoats grama. Much of the seed available was not from the gene pool of Texas and did not represent the extremely variable rainfall patterns, soil types and temperatures regimes present in such a large state. Native grasses from other regions and states did not perform at the desired level to solve wind and water erosion. Foreign grasses were found to act like weeds when planted, insuring that a plant cover could be produced that would eliminate or reduce the noted wind and water erosion of the era. Perennial grasses were selected to bring quick cover to the often open and weedy landscapes of central Texas and the panhandle area and not be subject to drought as annual grasses would be. The grasses selected had to be able to survive on lands that were now depleted of many soil nutrients, had a poor water cycle, capped soil surfaces, high summer soil surface temperatures and a much reduced soil organic carbon content. The grasses selected had to have seed that would be easy to harvest with current equipment and technology and provide a high proportion of viable seed. The grasses selected had to be part of a conservation plan that would bring about success. The characteristics of these weedy grass species are now understood to have the same characteristics of successful invasive plant species found in the State of Texas. These Old World bluestems also have the trait of not staying where man has planted them for soil and water conservation. Because of the continued management which creates around the year disturbances on the rangelands and other types of human managed land, Old World bluestems are seen as common roadside, bar-ditch, park, vacant lot weeds. To understand where future management decisions are to be made, Texans must understand the history and value of these Old World bluestems and where they have played an important role where no native grass was available to meet the need. Many of the later year releases of Old World bluestems have gone beyond the need of soil and water conservation and included characteristics for livestock grazing and have allowed many landowners to remain a part of the agricultural complex. Old World bluestems have been extensively used in the Conservation Reserve Program where approximately 1.62 million ha have been planted and established in northwest Texas. The Old World bluestems have been planted as monocultures as well as in seed mixtures with native grasses. Current research is available to show and compare the nutritive value of these grasses and the role they have played in livestock agriculture.
35. RESEARCH ON INTEGRATING BIOTIC AND ABIOTIC METHODS OF CONTROL FOR THE INVASIVE, C4 GRASS KR BLUESTEM IN A LANDOWNER-INVESTIGATOR COLLABORATION. Kelly G. Lyons*, Department of Biology, Trinity University, San Antonio, TX and David Davidson, Private Landowner, Kendalia, TX.

Throughout much of central Texas, the non-indigenous, C4 grass, KR Bluestem (*Bothriochloa ischaemum*) is now widely recognized as an invasive species that reduces native biodiversity. In a Texas Hill Country grassland dominated by KR Bluestem, experimental plots were established to make preliminary assessments of KR Bluestem control methods. Through a landowner-researcher collaboration we are using information from this preliminary study, along with others in the region, to investigate the combined effects of standard control methods and native species restoration on KR Bluestem control. An important point of this study is its emphasis on methods that can be utilized by landowners with limited equipment, materials and labor. In this talk we will discuss the preliminary study, the experimental design for the current study, and the value of local landowner observations in the scientific process.


Conservation of North American grasslands is hampered by the impact of invasive herbaceous species. Selective control of these plants, although desirable, is complicated by the shared physiology and phenology of the invader and the native components of the invaded plant community. Fortunately, there is evidence that some management practices, such as prescribed fire, herbicide, and mowing, can cause differential responses in native and invasive grassland species. However, timing of treatment is critical and fire has been shown to increase rates of invasion when implemented during the dormant season. *Bothriochloa ischaemum*, an introduced C4 Eurasian grass is an increasing problem in grasslands, particularly in southern and central regions of North America. To date, there has been little success in effective selective control. Four different invaded grassland sites, representative of Blackland Prairie and Edwards Plateau ecoregions were subjected to growing-season prescribed fire at different scales. Growing-season fire was effective at reducing the abundance of *B. ischaemum*, with other co-dominant species responding either negatively to herbicide, or neutrally or positively to fire. The vulnerability of *B. ischaemum* to growing-season fire may be associated with the ecology of its native range. The negative growth response to growing-season fire, combined with its lower implementation costs, indicate that this method warrants further investigation as a selective management tool for other problematic species in invaded grasslands.
37. ESTABLISHMENT OF NATIVE PLANTS IN HABITATS ONCE DOMINATED BY OLD WORLD BLUESTEMS, Paula Maywald*, South Texas Natives, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville.

Changing landowner and land manager objectives have sparked an interest in converting rangelands dominated by monocultures of exotic grasses such as Old world bluestems to more diverse rangelands dominated by native grasses and forbs increasing the desirable habitat for wildlife species. South Texas Natives along with our partner the USDA-NRCS E. “Kika” de la Garza Plant Materials Center are working to develop seed sources of native species that will effectively establish and compete with exotic species. STN has planted seeding demonstration projects to look at the seedling emergence and establishment of multiple native species. Based on previous findings it is our opinion that seedling vigor is the most limiting factor that prevents the establishment of native grasses from seed in habitats previously dominated by Old world bluestems. Our current research shows that several species of early and mid-successional grasses will persist in areas once dominated by Old world bluestems.

38. RESTORATION OF NATIVE SUBTROPICAL FOREST IN ABANDONED CROPLAND DOMINATED BY KLEBERG BLUESTEM IN CAMERON COUNTY, TEXAS. Chris Best* and Mick Castillo, U.S. Fish and Wildlife Service.

The 418-ac Boscaje de la Palma tract, southeast of Brownsville in Cameron County, Texas, was acquired for Lower Rio Grande Valley NWR in 1981. Most of the tract is former irrigated cropland that was abandoned, and has been dominated by introduced invasive grasses since that time. Numerous large wildfires at Boscaje have greatly suppressed the spontaneous regeneration of native woody vegetation, and have threatened adjacent residential developments. The management objective for Boscaje is restoration of diverse, subtropical forest dominated by sabal palm (Sabal mexicana), Texas ebony (Chloroleucon ebano) and anacua (Sideroxylon cestreninum). This is contingent on successful control of the invasive grasses, primarily Kleberg Bluestem (Dichanthium annulatum). Several long-term trials were initiated at Boscaje in 2004, consisting of multiple aerial applications of Fusilade DX, multiple ground applications of glyphosate herbicide, and multiple disk-harrowing followed by multiple ground-applications of glyphosate. Two years after the last treatment, the most effective treatment has been diskin followed by 1 year of glyphosate treatment. Aerial Fusilade application had little effect. Native trees, shrubs and understory plants were planted on glyphosate-treated blocks in 2005, and are establishing rapidly. The sites will be monitored annually to determine effectiveness of native plants at limiting future recolonization by Kleberg bluestem and resistance to wildfire.

POSTERS

P1. EVALUATION OF TEXAS NATIVE GRASSES FOR HIGHWAY RIGHT OF WAYS. Anna S. Lund*, Timothy E. Fulbright, Allen Rasmussen, J. Alfonso Ortega, Caesar Kleberg Wildlife Research Institute, Texas A&M University-Kingsville, Kingsville, TX., and John Lloyd-Reilley, USDA-NRCS Kika de la Garza Plant Materials Center, Kingsville, TX.

Introduced plant species are commonly seeded along Texas roadsides to reduce soil erosion. Introduced species such as bermudagrass (Cynodon dactylon) and King Ranch bluestem (Bothriochloa ischaemum) are often preferred over natives in roadside plantings because they are easier to establish and maintain. The USDA-NRCS, Kika de la Garza Plant Materials Center along with South Texas Natives at Texas A&M University-Kingsville have been developing native grasses to serve as alternatives for introduced species in roadside plantings. Research has focused on two grasses that are native to Texas: hooded windmillgrass (WMG) and shortspike...
WMG. Both grasses possess characteristics making them well adapted to roadside plantings. In addition, these species have characteristics that may enable them to compete with introduced species. The objective of this study is to compare establishment of 4 accessions (hooded WMG: 9085301 and 9085313, and shortspike WMG: 9085260 and 9085283) with the establishment of bermudagrass during a 2 year period. The experiment is being conducted along roadsides in Andrews, Kleberg, and Baylor counties. The point intercept method will be used to evaluate canopy cover of each plot at 30, 60, and 90 days after planting. Information from this research will help to provide information that will enable the Texas Department of Transportation and other agencies to make decisions about the efficacy of using native grass species versus introduced grasses in roadside plantings.


*Helianthus argophyllus and *H. annuus are the main species of sunflowers in Nueces County, Texas. While *H. argophyllus is endemic to the coastal bend and *H. annuus is native to the state, the latter species is currently increasing its range into South Texas. Understanding this range expansion and interactions between *H. annuus and endemics, such as *H. argophyllus, may provide insight into the distribution of invasive species. In a previous study, *H. argophyllus was restricted to sandy sites, and *H. annuus was nearly restricted to clay sites. To determine if the germination phase plays a role in this distribution, we germinated locally collected seed of *H. annuus and *H. argophyllus on sand and clay soils. Although each species germinated on both soil types, percent germination on the preferred soil type was significantly higher. Because the sandy soils on which *H. argophyllus is found include dunes near saline environments, we compared germination of these two species in sand-filled Petri dishes at four salinity levels: 0% (distilled water), 5%, 10%, and 15% salt. ANOVA revealed a significant interaction between salt concentration and species. Inspection of the data indicated that germination for *H. argophyllus declined more steeply across the salinity gradient. This result is contrary to our expectations based on field distributions of these species. Consequently, although germination may indeed play a role in distribution of these species, differences in salinity tolerance during germination do not appear to explain these differences. Further studies of these species and what controls their distributions may provide a model system for studying the interaction of endemics and more widely-ranging species such as invasive plants.

P3. IDENTIFICATION OF SEEDS, SEEDLINGS AND JUVENILE PLANTS OF SELECTED INVASIVE AND ADVENTIVE PLANTS OF AUSTIN. Kathy McWilliams, Austin, TX.

The earliest indication of invasive plants is often their seedlings. This poster will illustrate and describe selected seedlings occurring in the Austin area, including members of the Araceae, Acanthaceae, Anacardiaceae, Berberidaceae, Commelinaceae, Euphorbiaceae, Meliaceae, Moraceae, Oleaceae, Sterculiaceae, Simaroubaceae and Rosaceae. Identification of seedlings is difficult. The characteristics of the cotyledons and the earliest true leaves as well as attached seeds or fruits are generally used for seedling identifications. In some cases seedling color or aroma can be beneficial. Locating nearby mature plants that may have produced the seeds and seedlings can assist in correctly determining the species. Seeds and propagules are dispersed in many ways. Consideration of the various mechanisms that allow invasive plants to reproduce and thrive in the environment can help with the identification of their seedlings.
The invasive cactus moth threatens to devastate the *Opuntia* populations throughout Texas. This poster presents information about the current location, control, the danger to Texas and the need for continued educational outreach and survey.
WORKSHOP

Identification of Exotic and Native Species: Aquatic and Wetland Plants

Maximum: 45 people.
Location: Wildflower Center Classroom
Time: 8:30 AM – 1 PM
Coordinator: Robert G. Howells (bobhowells@hctc.net), 160 Bearskin Trail, Kerrville, TX 78028, PH: 830-367-5940

This workshop covers identification of exotic and native aquatic and wetland plants found in Texas, with special focus on invasive forms and additional comments on species in the aquarium and water-garden trade. Introductory topics will address basic invasive species terms and concepts as well as sources, pathways, and ecological impacts of non-native plants. The workshop will cover floating, emergent, submersed, and wetland-riparian species and includes a vast number of photographs, illustrations, and actual specimens.

About the instructor - Bob Howells is a fisheries scientist/aquatic ecologist with experience with exotic plants, fishes, and shellfishes and freshwater mussels, in addition to basic freshwater and marine fisheries research. His work history has included natural history museum staff, environmental consulting firm studies (10 years), and fisheries research with Texas Parks and Wildlife Department (22 years), as well numerous lectures and training classes on these topics. Howells retired from TPWD in mid-2006 and works as a consultant (BioStudies) from his Kerrville home. His publications have included several books, scientific journal articles, technical reports, and educational materials. This current workshop is a modification of the aquatic plant training class and CD prepared for the Texas Aquatic Plant Management Society (updated several times and now containing over 180 slides).

MODERATED DISCUSSION

Developing an Invasive Species List for Texas

Maximum: 30 people.
Location: Wildflower Center Library
Time: 8:30 AM – 1 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

Terrestrial Invaders Field Trip: City of Austin Water Quality Protection Lands

Maximum: 30 people.
Location: Meet in Wildflower Center Courtyard
Time: 8:30 AM – 1 PM
Coordinator: Daniel Dietz (Daniel.Dietz@ci.austin.tx.us), Environmental Conservation Information Specialist, City of Austin - Wildland Conservation Division, 3635 RR 620S, Austin, TX, 512-263-6443.
Escort: Matt McCaw (Matt.McCaw@ci.austin.tx.us) will meet the participants at the Wildflower Center and escort them to the first location.
Transportation: Vans depart Wildflower Center Courtyard at 8:30 AM.

The Water Quality Protection Lands are made up of over 20,000 acres located in the Barton Springs contributing and recharge zone. The lands were acquired in both fee simple and conservation easements by bonds approved by the citizens of Austin. The Program’s objective is to produce the optimum level of clean, high quality water from project lands to recharge the Barton Springs segment of the Edwards Aquifer. There will be slightly to moderately strenuous hikes with a fair amount of travel time in vehicles. Sturdy hiking boots, long pants, sunscreen, hat and water are recommended; expect grassy, rocky and uneven terrain. Be prepared for changing weather conditions. The tour will visit two of our western-most lands in the recharge zone.

1. Lower Bear Creek Management Unit – Located near Buda, Texas in Hays County, salt cedar or tamarisk (Tamarix sp.) was discovered on a portion of this property in March 2003. This was the first confirmed salt cedar infestation in Hays County. The location is a former rock quarry. At some point in the past, the quarrying operation intersected a portion of the Barton Springs segment of the Edwards Aquifer, leaving the aquifer exposed at the surface. This combination of such a highly sensitive environmental feature, a notoriously invasive species such as salt cedar, and the nature of being the first known infestation in the county required an approach that would maximize the effectiveness of treatment while minimizing the risk to the exposed aquifer. To further complicate matters, many plants had become established over 30-50 ft off the ground on the steep quarry walls, as well as in direct contact with the exposed aquifer. To date, treatment and management efforts over 4 years have resulted in near eradication.

2. Onion Creek Management Unit – Located between Driftwood and Kyle, Texas, the Water Quality Protections Lands program is actively restoring native prairie and savanna to the site for the purposes of improved quality and quantity of water recharging to the Barton Springs segment of the Edwards Aquifer (over 4,500 acres protected at this site). The tour will focus on strategies for invasive species management as part of the overall restoration program, such as removal of Ashe juniper, mesquite treatment, prescribed fire, and native grass seeding, and will highlight research aimed at quantifying the response of the invasive exotic grass King Ranch bluestem and the rest of the herbaceous plant community to prescribed summer fire and native grass seeding treatments.
SPONSORS AND EXHIBITORS

Gold Sponsors

Texas Forest Service ([txforestservice.tamu.edu](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 Nursery and Landscape Association ([www.txnla.org](www.txnla.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.

HARC/NBII/CSWGCIN ([www.harc.edu/](www.harc.edu/)) – The National Biological Information Infrastructure (NBII) is a collaborative program to provide increased access to information on the nation's biological resources. CSWGCIN is the Central Southwest/Gulf Coast Information Node of NBII and is the gateway to biological information for Arkansas, Louisiana, Oklahoma, Texas, and the Gulf of Mexico. Founded in 1982, the Houston Advanced Research Center (HARC) is a nonprofit organization based in The Woodlands, Texas and is the home of CSWGCIN.

Magnolia Charitable Trust ([www.wt.org/magnoliatrust/index.htm](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.

Texas Parks and Wildlife ([www.tpwd.state.tx.us](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.

Native Plant Society of Texas ([www.npsot.org](www.npsot.org)) – The purpose of the Native Plant Society of Texas (NPSOT) is to promote the conservation, research and utilization of the native plants and plant habitats of Texas, through education, outreach and example. NPSOT was founded in 1980 and currently has over 1,800 members in 32 Chapters. NPSOT hosts two annual conferences, one of which is traditionally held at the Wildflower Center.

Lady Bird Johnson Wildflower Center ([www.wildflower.org](www.wildflower.org)) – Founded in 1982 by Lady Bird Johnson and Helen Hayes, the Lady Bird Johnson Wildflower Center is dedicated to protecting and preserving North America's native plants and natural landscapes. Their mission is to increase the sustainable use and conservation of native wildflowers, plants and landscapes.
Silver Sponsors

**U.S. Fish and Wildlife Service** ([www.fws.gov](http://www.fws.gov)) – The US Fish and Wildlife Service is a bureau within the Department of the Interior. Their mission is to work with others to conserve, protect and enhance fish, wildlife and plants and their habitats for the continuing benefit of the American people.

**Lower Colorado River Authority** ([www.lcra.org](http://www.lcra.org)) – The LCRA is a conservation and reclamation district created by the Texas Legislature in 1934. LCRA provides energy, water and community services to the people of Texas.

**The Nature Conservancy** ([www.nature.org](http://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.

Exhibitors

- DOW AgroSciences ([www.dowagro.com](http://www.dowagro.com))
- Go Texan ([www.gotexan.org](http://www.gotexan.org))
- Jenson Technologies Development Corporation ([www.lakemower.com](http://www.lakemower.com))
- Native American Seed ([www.seedsource.com](http://www.seedsource.com))
## AUTHOR INDEX

<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>ABSTRACT</th>
<th>AUTHOR</th>
<th>ABSTRACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aguilar, Hector G.</td>
<td>P2</td>
<td>Lyons, Kelly G.</td>
<td>35</td>
</tr>
<tr>
<td>Allain, Larry</td>
<td>14</td>
<td>Lyons, Robert K.</td>
<td>36</td>
</tr>
<tr>
<td>Alofs, Karen M.</td>
<td>2</td>
<td>Manhart, James</td>
<td>3</td>
</tr>
<tr>
<td>Alvis, Will</td>
<td>7</td>
<td>Mattke, Cassey</td>
<td>25</td>
</tr>
<tr>
<td>Arsuffi, T.L.</td>
<td>22</td>
<td>Maywald, Paula</td>
<td>37</td>
</tr>
<tr>
<td>Baumann, Paul A.</td>
<td>20</td>
<td>McCaw, Matt</td>
<td>26, 36</td>
</tr>
<tr>
<td>Bean, Destiny</td>
<td>32</td>
<td>McWilliams, Edward L.</td>
<td>23</td>
</tr>
<tr>
<td>Bender, Kelly</td>
<td>5</td>
<td>McWilliams, Kathy</td>
<td>P3</td>
</tr>
<tr>
<td>Bennett, Dan</td>
<td>4</td>
<td>Miller, Courtney</td>
<td>18</td>
</tr>
<tr>
<td>Bergan, James</td>
<td>3</td>
<td>Moran, Patrick J.</td>
<td>11</td>
</tr>
<tr>
<td>Best, Chris</td>
<td>38</td>
<td>Muegge, Mark</td>
<td>11</td>
</tr>
<tr>
<td>Bhatkar, Awinash P.</td>
<td>21</td>
<td>Murphrey, Michael</td>
<td>27</td>
</tr>
<tr>
<td>Billings, Ron</td>
<td>27</td>
<td>Ortega, J. Alfonso</td>
<td>P1</td>
</tr>
<tr>
<td>Brown, Bill</td>
<td>8</td>
<td>Overath, R. Deborah</td>
<td>31, P2</td>
</tr>
<tr>
<td>Burch, Pat</td>
<td>25</td>
<td>Pase III, H. A. (Joe)</td>
<td>27</td>
</tr>
<tr>
<td>Castillo, Mick</td>
<td>38</td>
<td>Pepper, Alan</td>
<td>3</td>
</tr>
<tr>
<td>Chilton, Earl</td>
<td>19, 22</td>
<td>Peterson, Vanelle</td>
<td>25</td>
</tr>
<tr>
<td>Conrad, Willy</td>
<td>26</td>
<td>Petty, Saul D.</td>
<td>17</td>
</tr>
<tr>
<td>Conway, Warren C.</td>
<td>14, 15</td>
<td>Pierce, Brian</td>
<td>5</td>
</tr>
<tr>
<td>Daniel Tarin</td>
<td>3</td>
<td>Power, Paula</td>
<td>36</td>
</tr>
<tr>
<td>Davidson, David</td>
<td>35</td>
<td>Rasmussen, Allen</td>
<td>P1</td>
</tr>
<tr>
<td>DeLoach, Jack</td>
<td>11</td>
<td>Rector, Barron S.</td>
<td>34</td>
</tr>
<tr>
<td>Donet, Mark</td>
<td>11</td>
<td>Reemts, Charlotte</td>
<td>36</td>
</tr>
<tr>
<td>Drew, D. Lynn</td>
<td>33</td>
<td>Robbins, Thomas O.</td>
<td>11</td>
</tr>
<tr>
<td>Elder, Howard</td>
<td>12</td>
<td>Rosen, David J.</td>
<td>14, 15</td>
</tr>
<tr>
<td>Everitt, James H.</td>
<td>11</td>
<td>Ruffner, Marvin E.</td>
<td>33</td>
</tr>
<tr>
<td>Fain, Tyrus</td>
<td>11</td>
<td>Schubert, William J.</td>
<td>18</td>
</tr>
<tr>
<td>Fowler, Norma</td>
<td>2, 29</td>
<td>Schwoppe, Carl</td>
<td>36</td>
</tr>
<tr>
<td>Fulbright, Timothy E.</td>
<td>P1</td>
<td>Sears, Walt</td>
<td>9</td>
</tr>
<tr>
<td>Gilroy, Mary P.</td>
<td>13</td>
<td>Simmons, Mark T.</td>
<td>36</td>
</tr>
<tr>
<td>Grisé, David J.</td>
<td>P2</td>
<td>Simpson, Thomas R.</td>
<td>5</td>
</tr>
<tr>
<td>Halstvedt, M. B.</td>
<td>25</td>
<td>Starkey, Dale A.</td>
<td>17</td>
</tr>
<tr>
<td>Hatch, Stephan L.</td>
<td>30</td>
<td>Stevens, Kevin</td>
<td>1</td>
</tr>
<tr>
<td>Holder, Helen M.</td>
<td>14</td>
<td>Taylor, John W.</td>
<td>17</td>
</tr>
<tr>
<td>Kalmbach, Arlene</td>
<td>5</td>
<td>Temple, Landon</td>
<td>16</td>
</tr>
<tr>
<td>King, Jon R.</td>
<td>15</td>
<td>Thompson, Megan</td>
<td>32</td>
</tr>
<tr>
<td>Kline, W. N.</td>
<td>25</td>
<td>Thompson, Sean M.</td>
<td>P2</td>
</tr>
<tr>
<td>Knutson, Allen E.</td>
<td>11</td>
<td>Thuesen, Kevin</td>
<td>26</td>
</tr>
<tr>
<td>Korn, Jennifer</td>
<td>16</td>
<td>Tracy, James L.</td>
<td>11</td>
</tr>
<tr>
<td>Kramer, Mark</td>
<td>24</td>
<td>Tyler, Laura A.</td>
<td>P4</td>
</tr>
<tr>
<td>Langston, Vernon B.</td>
<td>25</td>
<td>Waitt, Damon E.</td>
<td>10</td>
</tr>
<tr>
<td>Larkin, Patrick D.</td>
<td>32</td>
<td>Whiteside, Jay D.</td>
<td>28</td>
</tr>
<tr>
<td>Lloyd-Reilley, John</td>
<td>P1</td>
<td>Williams, Justin K.</td>
<td>6</td>
</tr>
<tr>
<td>Lott, Jason</td>
<td>36</td>
<td>Windhager, Steve</td>
<td>36</td>
</tr>
<tr>
<td>Lund, Anna S.</td>
<td>P1</td>
<td>Wyatt, Trey</td>
<td>8</td>
</tr>
<tr>
<td>Luttersschmidt, William I.</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

2005 Texas Invasive Plant Conference

On November 17th and 18th, 2005, the Pulling Together Initiative - a Texas-sized partnership to manage invasive plants - hosted the first statewide invasive plant conference in Texas. The 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.

Organized and conducted as an objective of a FY 2005 USFS Forest Health Protection invasive plant partnership grant to the Lady Bird Johnson Wildflower Center and the Texas Forest Service, the goals of the 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; and
- Raise public awareness of the problems posed by invasive plants in Texas.

Conference Program

Keynote Speakers – There were three keynote addresses emphasizing a National perspective on invasive species issues including Lori Williams, Executive Director of the National Invasive Species Council, Department of the Interior, Washington, D.C., Jim Miller, Research Ecologist and Invasive Plant Authority with the USDA Forest Service, Auburn, AL., and Tom Stohlgren, Science Director and Invasive Species Branch Chief with the USGS National Institute of Invasive Species, Fort Collins, CO.

Invasive Species Overviews – A broad look at aquatic, riparian, and terrestrial invasive plant issues was presented by Texas Parks and Wildlife Department staff Earl Chilton, Bob Howells, and Kelly Conrad Bender.
**Abstract Presentations** – There were 47 abstracts presented (including 12 posters) organized around key strategies from the National Invasive Species Council’s National Management Plan for invasive species: Leadership & Coordination (4), Early Detection & Rapid Response (9), Control & Management (12), Research (15), Information Management (4), and Education & Public Awareness (3).

**Panel Discussion** – At the conclusion of the conference, six session chairs gave an overview of presentations in their sessions and hosted a question and answer discussion. The majority of the questions were centered about the emerging Texas Invasive Species Council.

All participants in the conference received a 48-page publication containing the conference program and published abstracts. The Program & Abstracts document is available as a downloadable PDF from the [www.texasinvasives.org](http://www.texasinvasives.org) website which also served as the main resource for publicizing the conference.

**Sponsors & Exhibitors**

Conference sponsors included the Texas Nursery and Landscape Association, the Magnolia Charitable Trust, the Lower Colorado River Authority, and the Texas Chapter of The Nature conservancy. Texas Parks and Wildlife Department donated printing services for the conference brochure and program and six companies rented exhibit space.

**Conference Participation**

The meeting was attended by a large number of individuals (N=199) representing a wide variety of stakeholder groups. Approximately 25% of those attending actively participated in the conference as presenters, session chairs, keynote speakers, or on the planning committee.

<table>
<thead>
<tr>
<th>Stakeholder Group</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Agencies (TFS, TPWD, TCE, TDA, TXDOT…etc.)</td>
<td>50</td>
</tr>
<tr>
<td>University</td>
<td>16</td>
</tr>
<tr>
<td>Municipalities</td>
<td>23</td>
</tr>
<tr>
<td>Gardens, Parks, and Arboreta</td>
<td>25</td>
</tr>
<tr>
<td>Green Industry</td>
<td>15</td>
</tr>
<tr>
<td>Conservation NGOs</td>
<td>21</td>
</tr>
<tr>
<td>Federal Agencies (USDA, NPS, USFWS, US Army…etc.)</td>
<td>33</td>
</tr>
<tr>
<td>Other</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>199</strong></td>
</tr>
</tbody>
</table>

**Summation**

The diversity and quality of the presentations, the interest in the subject, and the large number of participants from a wide number of stakeholder groups at the first statewide conference on invasive plant species were impressive. The conference was deemed a success by all in attendance and provided the foundation for a broad approach to the increasing problem of invasive plants. A post-conference survey of participants will be administered electronically to evaluate the experience and help determine the frequency and content of future conferences.

**Damon Waitt, Ph.D. - Program Chair, 2005 Texas Invasive Plant Conference**
Texas Invasive Species Coordinating Committee
Memorandum of Agreement

Whereas, Texas Parks and Wildlife Department (TPWD), Texas Department of Agriculture (TDA), Texas Cooperative Extension (TCE), Texas State Soil and Water Conservation Board (TSSWCB), Texas Forest Service (TFS), Texas Commission on Environmental Quality (TCEQ), Texas Department of Transportation (TxDOT), and Texas Water Development Board (TWDB) (collectively, the Agencies) share a commitment to protect and manage the natural, cultural, recreational, agricultural, and economic resources of Texas and enter into this Memorandum of Agreement and agree to cooperate, coordinate their efforts, and share information to accomplish their mutual goals; and

Whereas, a variety of invasive species negatively impact water availability, water quality, outdoor recreational opportunities, agricultural crops, ecosystem health, and human health resources; and whereas under US Executive Order 13112, an "invasive species" is defined as a species 1) that is non-native (or alien) to the ecosystem under consideration, and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health; and

Whereas, the Agencies are currently engaged in and have interdependent interests in coordinating the flow of information, avoiding duplication of effort, and increasing public awareness regarding the economic and environmental impacts of invasive species; and

Whereas, invasive species for the purposes of this Agreement do not include humans, domestic livestock, or non-harmful exotic organisms; and

Whereas, the Agencies recognize the mutual benefit to be achieved through cooperative information sharing and planning;

Let it therefore be established, that in order to help prevent, control, and manage invasive species infestations, the Agencies intend to create the Texas Invasive Species Coordinating Committee (TISCC).

The purpose and function of TISCC shall be to: 1) serve as a catalyst for cooperation among state agencies, and 2) serve as a facilitating body for State endeavors aimed at prevention and management of invasive species in Texas.

I. Committee Membership and Basic Structure and Operations

1. Membership in TISCC is open to representatives of any state agency that is legislatively mandated to address or has a unique interest in controlling invasive species. Eight state agencies will initially have official representation. Others may be added upon request, unanimous agreement of the original parties to this MOA, and signing of the most current version of this MOA. The original eight agencies include:

- Texas Parks and Wildlife Department (TPWD)
- Texas Department of Agriculture (TDA)
- Texas Cooperative Extension (TCE)
Texas State Soil and Water Conservation Board (TSSWCB)
Texas Forest Service (TFS)
Texas Commission on Environmental Quality (TCEQ)
Texas Department of Transportation (TxDOT)
Texas Water Development Board (TWDB)

2. A separate Executive Committee (EC) will oversee TISCC and include the head of each state agency or a designee. The Executive Committee will meet on an as-needed basis to achieve consensus and direct TISCC.

3. An Advisory Group (AG) made up of experts and representatives from non-governmental groups, private industry, and federal, state, tribal, and local entities will provide advice, information, written materials, and oral presentations at TISCC and EC meetings as requested. Additionally, the AG may bring matters of interest or concern to the attention of TISCC membership. AG membership will be limited to 60 persons. Twenty members will be replaced every year. Each person will serve a three year term, with the exception of initial members who’s terms may vary in order to stagger the number of new members each year. AG members, potential members, TISCC members, the EC may all nominate members who have expertise in invasive species related issues. Nominations will consist of a nomination letter, two letters of recommendation, and a CV or resume. The TISCC will review nominations and select AG members by consensus if possible, or simple majority vote if necessary. The EC shall review TISCC selections for the AG before nominees are officially appointed.

   a. Initially, the TISCC Chair will conduct an election among AG members approved by TISCC to select a Chair and Vice-chair for the group. Once elected officers are in place the AG will be responsible for developing its organizational structure.

4. TISCC serves as a scientific, technical and information sharing body. TISCC has no authority to accept or expend funds.

5. TISCC will meet regularly for routine operations. Except for the initial meeting, the schedule of regular meetings for a given year shall be set by TISCC during the last regular meeting of the prior calendar year.

6. Member agencies will each designate one individual (with one alternate) to serve as its representative to TISCC. Each member agency will inform TISCC, in writing, of the name and position of its representative and alternate, and of any changes.

7. This Memorandum of Agreement will serve as working rules or bylaws for TISCC.

8. The presiding officer of TISCC shall be the Chair who is elected from amongst the TISCC member representatives. Each chair shall serve a two-year term. The agency whose member is the Chair shall have its alternate serve as the official member for TISCC representing that agency. No agency can hold the Chair position for more than two consecutive two-year terms. At least two months prior to the expiration of the elected Chair’s term, TISCC agency representatives will elect a new chair.
9. When a member agency’s TISCC member and alternate are both absent, that agency may send a substitute.

10. In general, only the Chair will represent TISCC in public forums. However, other representatives may represent TISCC on particular issues in public forums when specifically authorized to do so by the Chair.

11. TISCC shall meet three times per year with AG representation present during at least one of the meetings. Additional or fewer meetings may be scheduled as agreed upon by TISCC, and may include meetings at field locations. A quorum of members is two-thirds. Unless restricted by law, the Chair’s agency’s administrative staff shall be responsible for providing meeting locations, recording and maintaining minutes, and other administrative details needed to conduct TISCC business and shall bear all reasonable costs.

12. Members of the TISCC may vote to approve or disapprove any action of the Chair related to the formation, disbandment, reorganization, or specific tasking of an advisory group, work group, or task force, as well as any advice, recommendation or opinion that is expressed on behalf of the TISCC. Only one person from each agency member may vote at any single meeting. Only the official representative of each agency or, if the official representative does not attend a meeting, the alternate may vote on TISCC matters. If neither the official representative nor an alternate is available to attend a particular meeting, the agency’s substitute may vote. The Chair shall have no vote during voting procedures unless there is a tie, when he or she will then cast the deciding vote.

13. The Chair may form, disband, reorganize, and specifically task advisory groups, work groups, and task forces with the approval of a majority of the TISCC. Committees, work groups, and task forces may be composed of experts from non-governmental groups, private industry, federal, state, tribal, and local entities, and may provide advice, information, written materials, and oral presentations at TISCC and EC meetings as requested. Additionally, committees, work groups, and task forces may bring matters of interest or concern to the attention of TISCC membership. The EC will appoint members who have expertise in TISCC related areas.

14. Committees, work groups, and task forces of TISCC will report regularly to TISCC on their deliberations, including planning, coordination, facilitation, and implementation of actions recommended or developed by the committees or working group.

II. TISCC Member Responsibilities

TISCC member agencies agree to cooperate through an orderly exchange of information, jointly held meetings, and the appointment of committees and working groups to facilitate development of effective and timely responses to invasive species and to make recommendations to the leadership of state departments and agencies on research, technology transfer, and management actions related to invasive species.

TISCC member agencies agree to:

1. Facilitate information exchange such that all member agencies are informed of TISCC plans, recommendations, and proposals for research, education, and implementation of
activities to prevent, detect, assess, monitor, contain, and control or eradicate invasive species, and to reduce environmental and economic threats and threats to human health from invasive species;

2. Coordinate activities with the TISCC and relevant bodies such as the National Invasive Species Council and its Invasive Species Advisory Committee;

3. Provide a forum for developing coordinated inter-agency invasive species strategies and policies;

4. Share technical expertise related to invasive plants, animals, and microorganisms, and facilitate cooperation among TISCC members and their partners and stakeholders;

5. Provide technical information and input for regional and national coordination efforts such as the National Invasive Species Management Plan;

6. Advise other member agencies and the TISCC of invasive species threats to natural and agricultural resources;

7. Facilitate reviews by specialists and stakeholder representatives of TISCC technical decisions and work products;

8. Report as needed to the Governor, Lieutenant Governor and Speaker of the House (through proper channels) on TISCC plans, work products, and accomplishments;

9. Cooperate, as permitted by applicable law and regulation, in funding initiatives to obtain appropriations or grants; and

10. Provide administrative support to agency staff that are members of TISCC or any TISCC committee, as permitted by applicable laws and regulations.

III. Other TISCC Operations:

1. Voting will be by TISCC member representatives only. However, meetings will be open to the public, allow for public comment, and be given appropriate public notice.

2. Specific work projects or activities that involve the transfer of funds, services, or property between the member agencies or necessitate legislative action will require the execution of separate agreements or contracts, contingent upon each member’s statutory authority and the availability of funds. Each subsequent agreement or arrangement involving the transfer of funds, services, or property among the members of TISCC must comply with all applicable statutes and regulations, including those statutes and regulations applicable to procurement activities, and must be independently authorized by appropriate statutory authority.

3. Membership in TISCC does not restrict the agencies from participating in similar activities or arrangements with other public or private agencies, organizations, or individuals.

4. This MOA defines in general terms the basis on which the member agencies will cooperate and does not constitute a basis for financial obligations or expenditures. Each
agency will handle and expend its own funds. Any and all expenditures from State funds made in conformity with the plans outlined in this MOA must be according to the rules and regulations of each member agency and in each instance based upon appropriate fiscal and legal authority.

5. Member agencies may furnish equipment, manpower, supplies, etc. as may be needed under this MOA, and in accordance with state laws and regulations in place at the time. Equipment provided by any agency shall remain the property of that agency subject to its removal or other disposition at any time.

6. Unless terminated or amended under the terms herein, this MOA will remain in full force and effect for a period of five years after the date on which the last initial member agency signs. This MOA may be renewed by the member agencies.

7. Copies of all correspondence and documentation concerning this MOA shall be sent by the originating party to all other member agencies as appropriate.

8. This MOA does not modify the responsibilities of any agency’s representative from his/her existing reporting relationships.

9. After initial TISCC formation any state agency wishing to become part of TISCC must petition the TISCC in writing. A new member agency must submit a copy of this MOA, signed by the agency’s head or other agency official authorized to contractually bind the agency, to the TISCC Chair prior to participation as a member.

IV. Standing Committees of TISCC

The TISCC Chair may create standing committees that will serve to facilitate discussions on specific issues. Membership is by invitation of TISCC and these committees serve in an advisory capacity. Membership may include TISCC members, AG members, and outside experts.

**Standing Committees** shall meet as needed and meeting dates are decided by the Chair of that committee who is elected by members of that committee. These committees can initiate actions that must then be approved by TISCC. Stakeholders are encouraged to serve on these committees, as these committees are advisory to TISCC. Any interested stakeholder group can petition TISCC in writing to serve on a standing committee and will then be accepted or denied based on a vote of TISCC members. Acceptance or denial of this petition shall be primarily based on the relevance of the stakeholder group’s mission and the absence or presence already on the committee of a similar group.

There is no restriction on who can be the chair of standing committees or how long they can serve, as long as they are members of that committee.

**Working Groups** are internal bodies of the committees formed to work on particular projects. These are ad hoc groups composed of members of a standing committee. Working groups, at their discretion, may invite members of other committees to be part of the group, but for organization purposes, a working group will be under only one standing committee.
and report primarily to it. TISCC can also form working groups composed of its own members to work separately on special projects and report back to TISCC. A working group of TISCC itself can invite other experts not on TISCC to sit on the working group, but the additional experts have no membership or vote in TISCC. Actions or initiatives of TISCC working groups must be approved by a majority of TISCC.

**Task forces** may be created by standing committees or TISCC and can be composed of TISCC or Committee members, as well as invited participants from outside TISCC. These task forces are also ad hoc and exist until such time as they are deemed unnecessary by the standing committee or TISCC that formed the task force.

The Texas Invasive Species Coordinating Committee Memorandum of Agreement is made and entered into as of the date on which the last initial member agency signs.
IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed and delivered as of the day and year first above written.

TEXAS PARKS & WILDLIFE DEPARTMENT

By: __________________________
    Robert Cook
    Executive Director

Date: __________________________

TEXAS DEPARTMENT OF AGRICULTURE

By: __________________________
    Todd Staples
    Commissioner

Date: __________________________

TEXAS COOPERATIVE EXTENSION CONSERVATION

By: __________________________
    Dr. Edward Smith
    Director

Date: __________________________

TEXAS STATE SOIL & WATER BOARD

By: __________________________
    Rex Isom
    Executive Director

Date: __________________________

TEXAS FOREST SERVICE QUALITY

By: __________________________
    Jim Hull
    Director and State Forester

Date: __________________________

COMMISSION ON ENVIRONMENTAL QUALITY

By: __________________________
    Glenn Shankle
    Executive Director

Date: __________________________

TEXAS DEPARTMENT OF TRANSPORTATION

By: __________________________
    Michael W. Behrens, P.E.
    Executive Director

Date: __________________________

TEXAS WATER DEVELOPMENT BOARD

By: __________________________
    Kevin Ward
    Executive Administrator

Date: __________________________
DRAFT BYLAWS

Texas Invasive Pest and Plant Council
(Derived from CAL-IPC Bylaws)

The Texas Invasive Pest and Plant Council (TX-IPPC) was founded in 2007 to bring together land managers, educators, researchers and other stakeholders working on invasive species issues. TX-IPPC serves as a professional organization for those in the field and an outreach organization for public education. Basic functions of TX-IPPC include an annual conference, resource and information sharing, publications and an online assessment of invasive plants in the state.

Article I. Name

The name of this organization shall be Texas Invasive Pest and Plant Council.

Article II. Object

The object of this organization shall be:

i) To provide a focus for issues and concerns regarding invasive exotic pest plants in native plant communities in Texas;

j) To facilitate communication and the exchange of information regarding all aspects of invasive exotic pest plant control and management;

k) To provide a forum where all interested parties may participate in meetings and share in the benefits from the information generated by this Council;

l) To promote public understanding regarding invasive plants and their control;

m) To serve as an advisory council regarding funding, research, management, and control of invasive plants;

n) To facilitate action campaigns to monitor and control invasive exotic pest plants in Texas;

o) To review incipient and potential pest plant management problems and activities and provide relevant information to interested parties; and

p) To serve as a state chapter of the Southeast Exotic Pest Plant Council.

Article III. Members

Section 1. Any individual or institution shall be eligible for membership provided that such prospective member pays the required membership fee and provides all requested background information necessary to ascertain consistency with the membership categories listed below in Article III, Section 2.

Individual members: Any person interested in or involved in exotic pest plant management, research, regulation, consulting, or other related management support programs. Individual members are allowed to vote and hold office.

Institutional members: Any accredited institution of learning, botanical garden, research institute, corporation, company, association, organization, interest group, partnership, public agency or governmental body that joins the Council under their institutional name. Institutional members are allowed one vote per institution.
Section 2. Membership type shall consist of the following categories:
a) Student members: Any individual member enrolled at an accredited university, college or junior college, as a full or part time student who has an interest in exotic pest plant issues. Student members are non-voting and ineligible to hold office.

b) General members: Any individual or institutional member who has an interest in exotic pest plant issues and who is committed to support the goals and purpose of the Invasive Plant Council.

c) Contributing, Donor, and Patron members: Any individual or institutional member who demonstrates a strong commitment to the goals and purpose of the Invasive Plant Council through their increased financial contribution, pursuant to Article X Section 4.

d) Honorary members: Individuals and institutions who have provided extraordinary support and assistance toward accomplishing the goals and objectives of the Council. Honorary members must be designated by a unanimous vote of the Board of Directors. Honorary members are allowed to vote and hold office.

Section 3. Any member desiring to resign from the Council shall not be entitled to a refund of their membership fee.

Section 4. Members are in good standing provided all required membership fees are paid. Members who are delinquent in fees for more than three months shall be dropped from membership rolls.

Section 5. A member of this corporation is not, as such, personally liable for the debts, liabilities, or obligations of the corporation.

Article IV. Officers

Section 1. The officers of the Council shall be President, Vice President, Secretary, and Treasurer. These officers shall perform the duties prescribed by these Bylaws and by the parliamentary authority adopted by the Council.

Section 2. All officers shall be nominated from the standing membership. Elections shall be held at the annual Spring meeting of the Board of Directors. The candidate for each position receiving the most votes shall be elected.

Section 3. All officers shall serve two-year terms of office, which shall begin at the close of the Board of Directors meeting following the election.

Article V. Board of Directors

Section 1. The Board of Directors shall consist of the four (4) officers, the immediate past president, and ten (10) voting members elected at large.

Section 2. The members at large shall be nominated and elected by the Board.

Section 3. Members at large shall serve for two-year terms. Vacancies on the Board of Directors shall exist (1) on the death, resignation or removal of any Director, and (2) whenever the number of authorized Directors is increased. Any Director may resign by giving written
notice to the President, the Secretary, or the Board of Directors. A Director may be removed from office, with or without cause, as permitted by and in accordance with the laws of this state. Vacancies on the Board may be filled by the Board of Directors. If the number of Directors then in office is less than a quorum, a vacancy on the Board may be filled by approval of a majority of the Directors then in office or by a sole remaining Director. A person elected to fill a vacancy on the Board shall hold office until the next election of the Board of Directors or until his or her death, resignation or removal from office.

Section 4. The Board of Directors is empowered to conduct business of the Council between business meetings. Actions and decisions of the Board of Directors as recorded in the minutes shall be made available to the Council at each business meeting.

Section 5. A simple majority of the current board members or their proxies constitute a quorum of the Board of Directors.

Section 6. The Board of Directors shall meet at least two times per year. Between meetings the Board can make decisions by mail or by electronic means.

Section 7. Special meetings or conferences of the Board may be called by the President and shall be called upon written request of three standing members of the Board. Two weeks prior notice shall be required before all special meetings or conferences.

Section 8. The Directors shall not be personally liable for the debts, liabilities, or other obligations of the corporation.

Section 9. The Directors and officers of the corporation shall be indemnified by the corporation to the fullest extent permissible under the laws of this state.

Section 10. Directors who fail to attend 3 consecutive board meetings will be automatically removed from the board.

Article VI. Meeting of the Council

Section 1. Business meetings shall be scheduled and held as deemed necessary by the President.

Section 2. Written notice of business meetings shall be sent to standing members at least 60 days prior to such meetings.

Section 3. Meeting agenda and format shall be coordinated by the President.

Section 4. A two-thirds vote of voting members who are present shall be required to allow the introduction of a motion that falls outside the Council's object as outlined in Article II.

Article VII. Committees

Section 1. The Board of Directors may, by a majority vote of its members, designate an Executive Committee consisting of three (3) Board members and may delegate to such committee the powers and authority of the Board in the management of the business and affairs of the corporation, to the extent permitted, and except as may otherwise be provided, by provisions of law. By a majority vote of its members, the Board may at any time revoke or
modify any or all of the Executive Committee authority so delegated, increase or decrease but not below two (2) the number of members of the Executive Committee, and fill vacancies on the Executive Committee from the members of the Board. The Executive Committee shall keep regular minutes of its proceedings, cause them to be filed with the corporate records, and report the same to the Board from time to time as the Board may require.

**Section 2.** The corporation shall have such other committees as may from time to time be designated by resolution of the Board of Directors. These committees may consist of persons who are not also members of the Board and shall act in an advisory capacity to the Board. The President shall be an ex officio member of all committees.

**Article VIII. Parliamentary Authority**

The rules contained in Robert's Rules of Order Newly Revised shall govern the Council in all cases to which they are applicable and in which they are not inconsistent with these Bylaws and any special rules or order the Council may adopt.

**Article IX. Amendment of Bylaws**

The voting members may, at any meeting of the Board of Directors, amend the corporation's Bylaws by a two-thirds vote of those present.

**Article X. Finances**

**Section 1.** The collection and accounting of funds shall be the responsibility of the Treasurer.

**Section 2.** The Treasurer shall maintain all records of funds collected and dispersed by the Council. Such records shall be available for review by any individual upon adequate notice. Reasonable fees may be charged to reimburse expenses incurred for making copies of documents. A financial report shall be given at each Board of Directors meeting and Council business meeting.

**Section 3.** The signature of the Treasurer or the signature of one other individual designated by the Board of Directors shall be required for the disbursement of funds of the Council.

**Section 4.** The Board of Directors shall establish a membership fee schedule for each of the membership categories in accordance with the provisions of Article V. The Board may, at its discretion, amend or revise the membership fee schedule from time to time. Membership fees are due annually.

**Section 5.** The Board may solicit voluntary contributions, in-kind services, grants, or donations to augment membership fees in order to pay for the activities and functions of the Council.
<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Activity</th>
<th>Auditorium</th>
<th>Classroom</th>
<th>Gallery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday</td>
<td>8:00-8:45 AM</td>
<td>Check in and Registration</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8:45-9:00 AM</td>
<td>Welcome and Orientation</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9:00-9:30 AM</td>
<td>Keynote (Smith)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9:30-10:00 AM</td>
<td>Plenary (Drees)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10:00-10:30 AM</td>
<td>Break</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10:30-11:00 PM</td>
<td>Plenary (Pernas)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11:00-12:00 PM</td>
<td>Update on Texas Coalitions</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12:00-1:00 PM</td>
<td>Lunch</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1:00-3:00 PM</td>
<td>Paper Session I</td>
<td>RES (6)</td>
<td>IM (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:00-3:30 PM</td>
<td>Break</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:30-5:00 PM</td>
<td>Paper Session II</td>
<td>CM (5)</td>
<td>EDRR (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5:00-7:00 PM</td>
<td>Reception</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>8:00-8:30 AM</td>
<td>Check in and Registration</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8:30-10:00 AM</td>
<td>Paper Session III</td>
<td>OWB (3)</td>
<td>ISU (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10:00-10:30 AM</td>
<td>Break</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10:30-12:00 PM</td>
<td>Paper Session III cont.</td>
<td>OWB (3)</td>
<td>EDUC (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12:00-1:00 PM</td>
<td>Lunch</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1:00-3:00 PM</td>
<td>Paper Session IV</td>
<td>OWB (4)</td>
<td>CM (5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:00-3:30 PM</td>
<td>Break</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:30-4:30 PM</td>
<td>Session Review</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4:30-5:00 PM</td>
<td>Organizational Meeting</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>