

2016 Accomplishments of the Thicket of Diversity

By Mary C. Johnston

Ten years ago the Big Thicket Association's Thicket of Diversity was established to implement vital species monitoring and to promote scientific research on the biodiversity of the Big Thicket. The program has successfully collected environmental data that is used by resource managers in critical decision-making. Non-native species are identified so plans can be developed to manage those that serve as the greatest threats to Big Thicket resources. Rare species are monitored with the hopes of expanding recovery efforts in protected areas. All information collected helps to determine the effects of climate change, a major threat identified by the National Park Service (NPS) in their Climate Change Response Strategy, 2010.

As of April 2016, the Thicket of Diversity inventoried 2914 species in an All Taxa Biodiversity Inventory. These include 378 *New to the Preserve*, 133 *New to the State* and 14 *New to Science*. In 2016 extensive Lepidoptera (butterflies and moths) data listing 1326 species was added. Partial nematode (worm) data was submitted and mussel data finalized. From a multiyear project by Dr. Neil Ford 861 mussel specimens were collected of which 6 of the 23 species are considered *State Threatened*. Information is cataloged in IRMA, Integration of Resource Management Applications. IRMA is a portfolio of tools and applications where one can search for, view, and download documents, reports, publications, data sets, and park species lists. One can also get information on park visitor numbers, park projects, and apply for a park research permit.

The Thicket of Diversity, a labor intensive effort, is accomplished by national and international researchers and service volunteers who are accommodated for overnight stays at the Big Thicket National Preserve's Field Research Station (FRS) in Saratoga. The facility, with its dormitory, kitchen, lab and classroom, offers comfortable housing and study space. The FRS serves as a home base for visiting scientists and as a meeting place for educational activities for the public and partner organizations.

In January 2016 Texas State University- San Marcos conducted mist netting of birds to look for ticks, ectoparasite loads and trapping of small mammals for research. Volunteers from St. Michael's College and The Nature Conservancy's fire team used the facility as did Dallas Zoo volunteers who contributed time planting trees in the Big Thicket National Preserve's Centennial Forest.

In February/March the NPS used the facility for day use. An ecology class was conducted for University of Central Oklahoma students. Houston Zoo volunteers planted trees. The Lady Bird Johnson Wildflower Center inventoried invasive plants. The University of Texas conducted air quality monitoring.

In April/May a graduate level field trip to study wetlands was hosted by Tarleton State University. Sam Houston State University offered a herpetology field trip. Members of the Gulf Coast Bird Observatory counted birds.

In the summer months, the Gulf Coast Bird Observatory and Sam Houston State University continued research. The Wetlands and Aquatic Research Center studied cypress trees in swamp lands. Colorado State University students booked an extended stay at the FRS to perform service in the Preserve and conduct a vegetation inventory. The facility was also used by the Big Thicket National Preserve and the

Big Thicket Association for day meetings. In August the ToD Director submitted a request for a funding extension to Texas Parks and Wildlife earmarked for publication of the proceedings of the *2015 Big Thicket Science Conference: Biodiversity and Ecology of the West Gulf Coastal Plain Landscape*. It was accepted and selected papers on Big Thicket research will be available for viewing online.

In September/October US Fish and Wildlife and BTNP staff and ToD researchers assisted Rice University students in a mini-bioblitz. The Big Thicket Association (BTA) moved its office location from Saratoga to Beaumont and the Thicket of Director moved her office into the FRS to be closer to the scientists.

In November/December Texas A& M Corpus Christi stayed at the FRS and volunteered their services in the preserve. Some FRS reservations were cancelled due to heavy rains.

The Thicket of Diversity is committed to complementing the National Park Service's goal to promote the preserve as a learning laboratory and to develop greater public commitment to the preservation and restoration of the Big Thicket National Preserve and the larger environment on which it depends. The ToD offered numerous interpretive programs for the public and through partnership approaches.

The ToD sponsors science cafes annually. Leta Parker, a retired Big Thicket National Preserve (BTNP) employee, shared, "Science Cafes were fashioned after international science cafes. It was to make science available in a casual environment and to make science available to more people." In March a science café on crawfish by Dr. Zachary Loughman of West Virginia University was hosted at the Logon Café in Beaumont. It reached an audience of approximately 35.

The Gulf States Mycological Society participated with the ToD to offer two mushroom forays led by their president, David Lewis, who also guided a walk on the Watson Rare Plant Reserve. Lewis facilitated involvement by international researcher Dr. Bart Buyck of France whose inventory project on mushrooms was completed in 2016. Buyck is a world authority on the genus *Cantharellus* and described 5 new species of chanterelles from East Texas, including *Cantharellus texensis*, a species that was originally described from the Lance Rosier Unit of the Big Thicket National Preserve. *Cantharellus* is a worldwide genus of mushrooms known for their edibility.

An informative invasive plant walk led by Eddie Realzola of Sam Houston University was hosted for the public on the Kirby Nature Trail. It attracted 12-15 hikers.

In October a mini-bioblitz was jointly conducted by Dr. Scott Solomon's Rice University students as part of his *Biological Diversity* course and inaturalists trekked from all over to participate in species identification primarily capturing observations using cell phones. Says an epost, "I don't know what was mini about it! Making the observations and hanging out with all our inat friends is the exquisite fun of a bioblitz. Now comes the hard part, the uploads and identification and corrections and discussion and cussin'. It's fun in its own way- what a tremendous learning experience even well after the field effort- but we all know it can be an intellectual, mental and physical challenge." Using the app inaturalist, approximately 32 volunteer citizen scientists connected with experts and collected data. They snapped pictures, took sound recordings and uploaded them to the cloud. The mini-bioblitz resulted in 3839 observations and the identification of 846 species. (<http://www.inaturalist.org/projects/2016-national-parks-bioblitz-big-thicket-mini-bioblitz>)

2016 National Parks Bioblitz
Big Thicket Mini-BioBlitz
October 13-16, 201



The Thicket of Diversity also partnered with Kountze High School. Building trade students constructed a bat house and presented it to the Park Service as part of Bat Conservation International's Bat Awareness Week. Kountze ISD provided a school bus to enable 23 middle and high school students to assist in the Centennial tree planting in partnership with chaperones from the Big Thicket Natural Heritage Trust. 11,000 long leaf pine seedlings were planted in a single day by a total of 103 volunteers. At the high school, Dr. Jonathan Hook, a keynote speaker at the 2016 Paris Climate Change Conference and author of *The Alabama Coushatta Indians*, made 5 presentations to approximately 250 students. He shared a strong message about the importance of community and relationships and a holistic approach to understanding the needs of Mother Earth from an Indian perspective.



City of Kountze Mayor Fred Williams
and Dr. Jonathan Hook



Program at Kountze High School



Centennial Tree Planting- Kountze High School and Partners



The following day, Dr. Hook presented another program and participated in a book signing at the BTA's Big Thicket Day, NPS Centennial Celebration at the Big Thicket National Preserve Visitor Center. The event included the sharing of awards and a wide variety of activities by authors, exhibitors, musicians and dancing by the Alabama Coushatta Indians. The Thicket of Diversity developed an informative booth with a new canopy and banner manned by ToD Director Mona Halvorsen to enlighten the public on the ToD's goals and accomplishments. Big Thicket Day had an outreach of approximately 350.



Mona Halvorsen, Director of Thicket of Diversity, earns *Adopt Your Big Thicket* Award

2016 funding for the Thicket of Diversity was made possible by the Brown Foundation, Dr. Carl Knight, Carol Pierce and individual donations. It was performed in part with penalty monies from a Texas Commission on Environmental Quality (TCEQ) enforcement action. The FRS is managed by the ToD under an agreement between the Big Thicket Association and the Big Thicket National Preserve. The in-kind value of the NPS contribution for FRS operations is \$13,558 annually. The BTNP also provided financial support to Rice University for the mini-bioblitz and for the cataloging of historical aquatic data produced under Dr. Richard Harrel of Lamar University.

Research projects that were completed in 2016 include:

Dr. Scott Solomon, Rice University, *Student Investigations of Biological Diversity in the Big Thicket*

Dr. Neil Ford, University of Texas at Tyler, *Surveys of freshwater mussels in 9 units of the Big Thicket Preserve*

Dr. Paul Tinerella, Research Entomologist MN, *Continued Biotic Survey: Aquatic True Bugs (Insecta: Heteroptera: Nepomorpha, Gerromorpha, Leptopodomorpha) and Aquatic Beetles (Insecta: Coleoptera) of Big Thicket National Preserve, Texas, USA*

Dr. Bart Buyck, Muséum National d'Histoire Naturelle, Paris, France, *Root symbiotic fungi : key players in the forest ecosystems of the Big Thicket.*

Dr. Thomas Powers, University of Nebraska- Lincoln, *Baseline Inventory of Freelifving and Plant-Parasitic Nematodes of the Big Thicket National Preserve*

Active TCEQ projects in 2016 are:

Eddie Realzola, Sam Houston State University, *Survey and Inventory of Gyrinids in Big Thicket Wetlands (Continued Survey)*

Dr. Zachary Loughman, West Virginia University, *Crayfish Surveys of Big Thicket National Preserve*

Dr. Thomas Powers, University of Nebraska- Lincoln, *New Species Descriptions from Big Thicket National Preserve*

Dr. Scott Solomon, Rice University, *Ant Community Dynamics in the Big Thicket National Preserve*

Dr. Daniel J. Bennett & Dr. John Pascarella, Stephen F. Austin State University, *Bees of the Big Thicket National Preserve (Insecta: Hymenoptera: Apoidea)*



Ant- Dr. Scott Solomon



Crawfish- Dr. Zachary Loughman

The Big Thicket Association has TCEQ funds available for new research projects. The Request for Proposals can be found at <http://www.thicketofdiversity.org/science/information-for-scientists/>.

The Thicket of Diversity wishes to express appreciation to outgoing President Dr. Paul Tinerella, outgoing Science Chair Dr. Katie Winsett and the services of BTNP's Ken Hyde, Herbert Young and Mary Kay Manning.

The ToD project is an excellent partnership that develops avenues for knowledge sharing, research and monitoring, education and training and participatory decision-making. To ensure the sustainability of the Big Thicket's biodiversity, biological inventories will continue to be a vital tool worthy of extended support.



**Crayfish Survey
Dr. Zachary Loughman
2016**



Species	Total Collected	Beaumont	Beaumont-Houseman Tract	Beech Creek	Big Sandy	Canyonlands	Hickory Creek	Lance Rosier	Little Pine Island	Lobiolly	Neches Bottom & Jack Gore Baygall	Turkey Creek	Upper Neches River Corridor	Village Creek
<i>Cambarellus puer</i>	167	2	4	16	10	12	16	43		43	10	6	5	
<i>Cambarellus shufeldtii</i>	45	1			15	6	4	2	1	1	3	10		2
<i>Cambarus ludovicianus</i>	55									55				
<i>Fallicambarus fodiens</i>	129	10		40	1	5	8	7		10	20	28		
<i>Fallicambarus kountzeae</i>	23			17	1	2	1	1			1			
<i>Orconectes lancifer</i>	14							1			11	2		
<i>Orconectes texanus</i>	16				7		3				6			
<i>Procambarus acutus</i>	111	1	1					46		40	23			
<i>Procambarus clarkii</i>	15	1	2							2	10			
<i>Procambarus depratzi</i>	35	7	11		1			1		3	10			2
<i>Procambarus henei</i>	1									1				
<i>Procambarus kensleyi</i>	40	11	8							18	1	2		
<i>Procambarus zonangulus</i>	13	1	1							11				
13	664	34	27	73	35	25	32	101	1	184	95	48	5	4



Table prepared by Mona A. Halvorsen, 03/17/2016



Thicket of Diversity TAXA Tally

April 15, 2016



Kingdom	Research Group	Description	Species Count	Total Collected Observed	New to Science	POTENTIAL New to Science	New to Park	New to State	POTENTIAL New to State	New to U.S.
Animalia	Herpetofauna	Amphibians & Snakes	58	250						
Animalia	Formicidae	Ants	38	64				2		
Animalia	Lepidoptera	Butterflies, Moths	63	623						
Animalia	Odonata	Dragonflies, Damselflies	34	9843						
Fungi	Lichens	Dual organism-fungus & algae (green or blue-green)	137	1089				2		
Animalia	Pseudoscorpions	False scorpion	6	6			6			
Animalia	Ichthyofauna	Freshwater Fish	62	89572			9			
Animalia	Unionoida	Freshwater Mussels	32	3515						
Fungi	Sordariomycetes (Pyrenomycetes)	Fungi with tough texture	65	120	6					1
Animalia	Acrididae	Grasshoppers	23	47		1				
Animalia	Gastropoda	Land Snails								
Plantae	Bryophyta	Mosses, Hornworts, Liverworts	179	2081					13	
Fungi	Macro Fungi	Mushrooms	400	1339	3	25	190	99		
Plantae	Orchidaceae	Orchid	24	489						
Animalia	Noctuoidea	Owlet Moths	53	292				7		
Animalia	Trematoda	Parasites of Aquatic Ectotherms (fish, etc.)	30	236	4	1	2			
Animalia	Nematode	Roundworms, Freelifving & Plant Parasitic	111	139			111			
Protozoa	Myxomycetes	Slime Molds	93	858			51	7		
Animalia	Astacidea	True Lobsters & Crayfish	13	664	1					
Animalia	Mordellidae	Tumbling Flower Beetles	17	108						
Plantae	Tracheophytes	Vascular Plants	1396	6079			1			
Animalia	Gyrinidae	Water beetle	8	789		1	8			
Animalia	Heteroptera	Water striders, water scorpions and etc.	64	1337		2		16		
Animalia	Tardigrada	Waterbears or Moss Piglets	8	15						
			2914	119555	14	30	378	133	13	1

Created/Edited by Mona A. Halvorsen 04/15/2016