



The NREM Newsletter

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Dr. Owen's Departmental Update

Ice storms in December and spring-like temperatures in January are similar to weather patterns experienced across the country. NREM has several research and Extension projects that are determining how plants and animals are responding to these rapid shifts, and possible long-term management issues.

NREM has seen a lot of changes over the last five years. Undergraduate student enrollment is up 33%, graduate student enrollment is up 24%, student credit hours are up 37%, and research expenditures are up 42%. NREM Extension programs are very active and funding has remained stable. NREM faculty members have done an incredible job increasing our research funding. In a time of decreasing federal budgets, we have actually increased the number and amount of competitive federal grants the department has received. Total expenditures for research in 2013 was well over \$5.6 million.

INSIDE THIS ISSUE

**Chip Leslie Elected to
Board of the AIBS - 2**

**Daily Water Use of
Redcedars - 2**

Gone with the Flow - 3

**Ongoing Bobwhite
Research in Oklahoma - 4**

Burn Plan Importance - 5

Dr. Sue Fairbanks and Dr. Scott Loss, started with NREM in the Fall and hit the ground running. Sue has several projects working with black bears in eastern Oklahoma and Scott has started quail research in eastern Oklahoma. Scott also has a project supported by the Department of Defense that extends his dissertation work to the west coast. They are also both teaching this semester.

Dr. Craig McKinley, forestry Extension specialist, and Dr. Don Turton, forest hydrology, have recently retired. Several faculty members have stepped up and are teaching the courses taught by Craig and Don, but both positions have been requested to be re-filled to fulfill the Extension and research programs.

The NREM annual Awards Banquet will be April 15, 2014, and provides an opportunity to celebrate student success. Our scholarship program continues to grow and we are very appreciative of the support.

Chip Leslie Elected to Board of the American Institute of Biological Sciences

Chip Leslie, Leader of the Oklahoma Cooperative Fish and Wildlife Research Unit and Natural Resource Ecology and Management adjunct professor, was elected to the Board of the American Institute of Biological Sciences (AIBS) for a 3-year term beginning in January 2014. He currently serves AIBS as a member of the editorial board of BioScience and on the AIBS publications committee. Representing nearly 160 member organizations, AIBS is dedicated to advancing biological research and education for the welfare of society. AIBS works to ensure that the public, legislators, funders, and biologists have access to and use information that will guide them in making informed decisions about matters that require biological knowledge. AIBS was founded in 1947 as part of the National Academy of Science and became an independent voice of the biological sciences in the 1950s. Additional information at: http://www.aibs.org/about-aibs/aibs_announces_new_board_of_directors_for_2014.html#033608

Daily Water Use of REDCEDARS

By - Sean Hubbard

The sneeze-causing, water-guzzling, fire hazard eastern redcedar is no stranger to Oklahoma. Landowners have been fighting the seemingly never-ending war against the invasive species for years with no end in sight. An often-quoted value is 30 gallons a day for how much water a redcedar tree actually uses. However, researchers in the Division of Agricultural Sciences and Natural Resources at Oklahoma State University say that number is not exactly accurate after measuring daily water use of 19 redcedar trees growing on upland sites in north-central Oklahoma for an entire year. “Redcedar trees can use more water than prairie vegetation because the evergreen redcedar uses water all year and has greater quantities of leaf biomass which releases water to the atmosphere,” said Rod Will, silviculture professor in OSU’s Department of Natural Resource Ecology and Management.



Eastern redcedar encroachment.

With funding from the US Geological Survey and the Oklahoma Agricultural Experiment Station, the researchers found that, on average, redcedar trees used 6 gallons of water per day. However, the issue is much more complicated than a single value because water use depended on many factors. “Water use increased with tree stem diameter, tree canopy size, air temperature and soil moisture,” Will said.

For example, they found a 12-inch diameter tree used a maximum of 42 gallons on a day with high temperature and ample soil moisture, but only 1 gallon on a day during a dry period in winter. In contrast, a 2-inch diameter tree used a maximum of 7 gallons per day and a minimum of 0.2 gallons per day. “When the water use of individual trees was scaled up to the stand level, we calculated that dense redcedar woodlands have the potential to cycle almost all incoming precipitation back to the atmosphere,” Will said. “Therefore, we likely will have less water in our streams if the invasion by redcedar is allowed to continue.” And, the battle continues.

GONE WITH THE FLOW: How a Little Fish Is Emblematic of Big Problems in Great Plains Rivers

By - Dr. Shannon Brewer

Declines in aquatic habitat quality and quantity have resulted in the endangerment of approximately 40% of North American fish species. This pattern is particularly evident in the Great Plains where a once diverse fish fauna is rapidly disappearing, most notably, in a unique group of minnows collectively referred to as pelagic broadcast-spawning cyprinids. These fishes reproduce through semi-buoyant eggs released directly into the water column. This strategy is rare in freshwater fishes and is thought to be an adaptation to the harsh conditions of Great Plains rivers. The drifting eggs are kept safe from shifting sand substrates, but potentially require substantial uninterrupted lengths of river to successfully complete development in suspension.

Arkansas River shiner is among the better studied of these fish. However, the species is believed to have been eliminated from most of its range prompting federal protection. Dr. Shannon Brewer, Oklahoma State University, and Dr. Tim Grabowski, Texas Tech University, are working to assess how the interaction between reproductive strategy and landscape-level environmental change has impacted Arkansas River shiner distribution. They developed species-distribution models demonstrating that annual discharge, stream size, and precipitation seasonality determined the historical range of Arkansas River shiner. Although the potential historical range of the species identified by the models included vast expanses of the Arkansas River Basin, the models indicated that only two primary refuge areas capable of supporting Arkansas River shiner remain, both in the South Canadian River. The models reveal this reduction is related to landscape fragmentation and changes in the annual flow regime.

Flow protection for these refugia may maintain the sustainability of these remaining populations. However, laboratory studies document changes in the buoyancy and development rate of egg and larval stages due to elevated suspended and dissolved solids in rivers, a response to landscape change that may make restoring Arkansas River shiner a challenging, but not impossible, task. The Great Plains fish assemblage, once considered tolerant of environmental extremes, is being pushed to new limits. Integrating additional aspects of water quality and more specific measures of habitat quantity that can sustain these aquatic systems would add to the conservation and management options available for Great Plains fishes.



The shallow rivers in the Great Plains are important for many native fish species.

BOB-BOB-WHITE

Ongoing Bobwhite Research in Oklahoma

By - Matt Carroll

Northern bobwhite (*Colinus virginianus*) are popular among hunters, birders, and the general public, who have become accustomed to hearing the melodic call of bobwhite during spring and summer in Oklahoma. Bobwhite hunting also has a very rich and historical tradition in Oklahoma. However, bobwhite populations have been experiencing a range-wide decline for at least 40-50 years. The decline has been attributed to many long-term causes (e.g., land use changes and fire suppression), and short term causes (e.g., drought and high heat). Oklahoma is located in the western portion of the bobwhite range and has also been experiencing a decline in bobwhite numbers, albeit not as severe as many other states.



A male bobwhite just after being fitted with a radio-collar at the Packsaddle Wildlife Management Area in western Oklahoma.

Oklahoma State University (OSU) has partnered with the Oklahoma Department of Wildlife Conservation (ODWC) in conducting a multi-year research project at the Packsaddle and Beaver River Wildlife Management Areas in western Oklahoma to address bobwhite decline.

This partnership has and will continue to result in a long-term commitment to bobwhite research in Oklahoma. One major component of the partnership between OSU and the ODWC, centers on examining the influence of management applications, primarily prescribed fire and grazing, on bobwhites and their habitat. For example, the ODWC has conducted prescribed burns on approximately 7,413 acres at the Packsaddle WMA during the first 2 years of this study (2012 and 2013), and this has provided an experimental framework from which to assess bobwhite response to management. Research topics at each site include habitat use, dispersal and movement, survival, nest success, brood habitat, and temperature constraints on bobwhites. Thus far, radio-collars have been attached to over 800 bobwhites with the project approaching its third year. While a large amount of data has already been collected, this long-term commitment to quail research in Oklahoma will continue for several years in order to answer important questions about bobwhite ecology and the habitat needs of bobwhites in Oklahoma.

ANNOUNCEMENTS

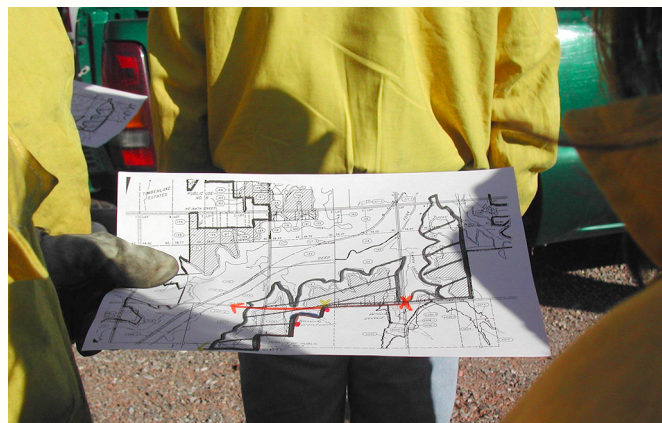
- The 17th annual Great Backyard Bird Count, February 14–17, 2014.
 - Invasive Species Meeting, March 25, 2014, Wyndham Hotel, OKC, Okla. Contact Karen Hickman for more information.
 - Deer Management Workshop, Okmulgee County fairgrounds, May 1, 2014, Okmulgee, Okla. Contact Dwayne Elmore for more information.
 - Burn Workshop, The Noble Foundation, June, 25-26, 2014, Marietta, Okla. Contact John Weir for more information.
 - Wildlife Forest & Range Field Day, October 7, 2014, Pushmataha, Okla. Contact John Weir for more information.
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The Importance of Burn Plans

By - John Weir

A burn plan helps determine the safest and easiest way to complete tasks before, during, and after a prescribed burn. The most important reason for having a burn plan is to thoroughly think about each action before striking the match. A burn plan will help determine where the burn should be conducted, what type of management is required before burning, how to conduct the burn, when to burn, and what should be done after the burn.

A burn plan is a written prescription for the prescribed fire including critical elements such as the weather conditions under which the burn will be conducted, number of personnel and duties of each; and the type, amount, and placement of equipment needed to safely conduct the burn. All of this information allows the fireboss to consider all actions prior to the burn, reducing many problems and complications. A burn plan also helps the fireboss consider any social impacts of the burn including smoke management concerns, traffic patterns or problems, how to contact neighbors and fire departments, and other public safety issues. In rural areas many of these issues may not be of concern, but in areas associated with urban sprawl, it can be a major problem.



Burn crew looking over burn plan prior to lighting the prescribed fire.

A well-written burn plan can help reduce liability risk, which is a major concern for most people conducting prescribed burns. A burn plan can be used to show the amount of diligence and care used in planning and conducting the burn if some type of liability issue occurs.

No burn plan is perfect and no two are alike because each burn is different. Each burn plan may require different information or planning, with some requiring more information about a specific topic than others. A burn plan should be written to meet local needs and be adapted to the region. The more experience a person has preparing plans, the easier it will become to write good ones. When preparing a burn plan, it is important not to limit implementation by being too specific with details or prescriptions. For example using weather conditions with a range that is too narrow and cannot be followed for the duration of the burn is not a prescription for success. Be sure to include all necessary information, but do not clutter a plan with pointless information that could cause confusion, prevent the execution of a burn, and potentially increase liability. A new fact sheet on burn plans has been added and can be found at, <http://pods.dasnr.okstate.edu/docushare/dsweb/Get/Document-9043/NREM-2893web.pdf>

AWARDS & RECOGNITIONS

Torre Hovick won Best Graduate Presentation and Best Graduate Poster, Fidel Atuo and Emily Sinnott tied for second place in the Best Graduate Presentation Competition at the Annual Meeting of the Oklahoma Ornithological Society

- Dr. Craig Davis' new book *Wetland Techniques* was just published
- Ashley Unger won the best student paper presentation at the Southeastern Association of Fish and Wildlife Agencies annual meeting
- Congratulations to Liz Condit and her 25 years of service to Oklahoma State University.
