

POSTER ABSTRACTS

Estimating Historic Biological Integrity in Wadeable Streams of the Central Plains – a Disturbance Gradient Approach.

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The Central Plains Center for BioAssessment (CPCB) modeled biological condition gradients (BCGs) for wadeable streams in 6 ecoregions of the Central Plains using a dataset of fish and macroinvertebrates collected 1984 - 1993 in Nebraska, Kansas, Iowa, and Missouri (USEPA Region 7). BCGs provide a means of recognizing the continuum of aquatic communities that structurally and functionally differ as anthropogenic disturbances change (Davies and Jackson 2006). CPCB used this concept to create BCGs based on indicators of biological integrity (e.g. fish and macroinvertebrates). We examined two variations of BCGs, one that extrapolates the historic stream condition in an ecoregion based on the median values of the reference and nonreference sites, and one in which the 75th percentile of the reference sites is compared to the 25th percentile of all the sites (USEPA 2000). Indicators of reference condition for various ecoregions are shown relative to the disturbance gradients developed for each ecoregion based on the historic change in cultivated land, livestock, and human population. The resulting series of graphs depicts BCGs for various indicator variables that managers, scientists, and others can examine to better understand shifting biological conditions in streams in specific ecoregions.

Format: Poster

Student Wildlife Contest: No

Presentation Title: Sources of Sediment Within the Cheney Lake Watershed: Results of CEAP Special Emphasis Watershed Research.

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The purpose of the Cheney Lake Watershed CEAP study was to estimate the benefits of U.S. Department of Agriculture (USDA) conservation programs that have been implemented in this watershed. The study began by synthesizing and reporting information from previous assessments that were completed between 1994 and 2004. These assessments were based on land use data and conservation practices implemented within that time frame. The primary emphasis of the current study was to complete additional modeling using the Annualized Agricultural Non-Point Source (AnnAGNPS) computer model to estimate the effects of conservation practices with regard to: (1) all types of erosion (i.e., sheet & rill, ephemeral gully, and bed & bank) including irrigated cropland; and (2) associated nutrients. Model results show a 20% sediment contribution from streambanks, 39% from sheet and rill erosion, and 41% contribution from ephemeral gullies. In addition this research was able to identify 20% of the watershed land area that contributes 74% of the sediment load to the reservoir. The results of this study will be used by: (1) USDA in evaluating the effectiveness of conservation programs; and (2) the Cheney Lake Watershed and the City of Wichita to implement practices that address sedimentation and water quality in Cheney Reservoir.

A Recent Survey of Land Snails in Selected Areas in Kansas.

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Land snails are an understudied faunal group in Kansas and important in terrestrial ecosystems. A new limited survey of land snails in Kansas was begun in fall 2007 and continued to summer 2009. The locales sampled included: Schermerhorn Park (Crawford Co.), three properties of the Southeast Kansas Biological Station (Monahan Outdoor Education Center, Natural History Reserve, and Sperry Home; Crawford Co.), Wilderness Park (Crawford Co.), Chisholm Creek Park (Sedgwick Co.), and Tuttle Creek State Park (Riley and Pottawatomie Co.). Habitats sampled were all wooded with varying degrees of slope and organic debris (woody or leafy). Snails were collected by hand-picking and sieving of surface soil and organic debris. Over 40 taxa were identified. Three taxa were most widely distributed: *Zonitoides arboreus*, *Glyphyalinia indentata*, and *Strobilops labyrinthicus*. Many further locales and seasonal collections are needed to better document the distribution of land snails in Kansas.

Format: Poster

Student Wildlife Contest: No

Comparing Spectral Characteristics of Caucasian Bluestem and Native Tallgrass Prairie Over A Growing Season.

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Caucasian bluestem (*Bothriochloa bladhii*) is an introduced warm season grass from Europe and Asia. Commonly referred to as Old World Bluestem (OWB), it was first introduced in 1919 from Russia as a forage crop in the Great Plains. Because of its tolerance of drought and grazing pressure, and fecundity, OWB can out-compete native prairie species. Research has shown that OWB, when compared to native tallgrass species in the Flint Hills of Kansas causes decreased cattle weight gains because of its poor forage quality relative to tallgrass prairies. Use of remotely sensed data to map and monitor the distribution and spread of this plant could prove useful in the control of this aggressive invader. Spectroradiometer data were collected over much of the 2009 growing season to determine if and when OWB was spectrally unique from native prairie species. Observations were made from mid May through October when the plants began to senesce. Reflectance data were measured approximately every two weeks or when sky cover permitted. Statistical analyses for differences in spectral characteristics were conducted to determine the optimal spectral bands and timing for detection of OWB. Preliminary findings show OWB to be spectrally unique from native prairie species in mid spring.

Format: Poster

Student Wildlife Contest: No

Biomass Yield and Adaptation of an Annual Tropical Legume (*Crotalaria juncea* L.) in Manhattan, Kansas.

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The Manhattan Plant Materials Center (PMC) was one of the 24 locations across the U.S. testing 'Topic Sun' sunn hemp for use as a cover crop and green manure. Tropic Sun was released by the Hawaii PMC and is reported to produce high organic matter yields while fixing large amounts of nitrogen. The Manhattan planting (50 pounds/acre rate on seven inch row spacing) was made on May 21st and forage heights and yields were recorded at thirty day intervals after planting (DAP). Plant heights in inches and biomass production on 4, ½ meter square plots were recorded at thirty DAP. Mean plant heights at 30, 60, and 90 days were 7.7, 70.7, and 111.1 inches, respectively. Mean biomass yields in pounds per acre

at 30, 60, and 90 days were 329.8, 5,716.3 and 12,282.5, respectively. Final biomass and height measurements were recorded after the first frost of the fall season. Plants from each harvest interval were retained after drying and sent to the PMC in Nacogdoches, Texas for forage analysis. Additional studies with sunn hemp are planned in the future.

Format: Poster

Student Wildlife Contest: No

A Statewide Forest Resource Assessment and Strategy for Kansas.

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The 2008 Farm Bill required each State to complete a statewide forest resource assessment and strategy to identify, describe, and spatially define the forest landscape areas where the State's forestry programs will be emphasized. This poster presentation has two objectives: (1) to describe the GIS methodology for the statewide resource assessment, including the delineation of priority areas and; (2) to provide an introduction to the resource strategies for investing state, federal, and other resources to manage priority landscapes in Kansas, focusing where federal investment can most effectively stimulate or leverage desired action and engage multiple partners. The GIS analysis involved a multi-layer weighted raster analysis guided by three National Themes: Conserve working forest lands; Protect forests from harm; Enhance public benefits from trees and forests. A long-term comprehensive resource strategy or plan is currently being written based on the assessment. The strategy will identify issues across program areas, suggest how the Kansas Forest Service, partners and stakeholders will invest federal funding, how outcomes will be monitored and identify proposed activities that will accomplish themes and objectives and respond to criteria and indicators. The strategy will also explain how to incorporate existing plans like the Comprehensive Wildlife Conservation Plan into the framework.

Format: Poster

Student Wildlife Contest: No

Kansas Healthy Yards and Communities: Reducing Nonpoint Source Pollution Through Consumer Education.

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Only 41 percent of Americans have any idea what the term watershed means and just 22 percent are aware that storm water runoff is the most common source of pollution of streams, rivers, and oceans (Roper survey, EPA). Kansans need education about best management practices, conservation of natural resources, waste management, integrated pest management, and identification and selection of proper plant materials for healthy people, plants, and the environment. Kansas Healthy Yards and Communities (KHYC), a new environmental initiative of Kansas State University, targets homeowners, municipalities, and the horticulture industry to reduce stormwater runoff through awareness of best management practices. KHYC uses a variety of methods to educate consumers including an interactive website, lawn and landscape assessments, and educational sessions.

Format: Oral and Poster
Student Wildlife Contest: No

Fish Community Structure in Natural and Engineered Habitats in the Kansas River.

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We investigated fish assemblage structure in rip rap and natural habitats (log jams and mud banks) in the Kansas River to determine if natural structures had higher abundance and diversity of fishes at a local scale. A total of 439 randomly selected sites were electrofished from May to August 2005 and 2006. Mean species diversity and richness were significantly higher in rip rap than in log jams and mud banks. Mean relative abundance (CPUE; number of fish collected per hour electrofishing) of 6 of the 15 most common fishes were most abundant in rip rap, two were most abundant in log jams, and none in mud banks. Rip rap had the highest relative abundance of fluvial specialist and macrohabitat generalists. Although a discriminant function analysis indicated that nine size classes (eight species) discriminated among three habitat types, the high misclassification rate (38%) suggested a high degree of fish assemblage overlap among the habitats. Although previous work has suggested that rip rap and urbanization are linked to reduced biotic diversity or reduced growth of fish species, our results suggest that at a local scale rip rap may not have the same negative impacts on fish assemblages.

Format: poster
Student Wildlife Contest: Yes

Chemical Control of Saltcedar in Southwest Kansas.

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Saltcedar is an invasive woody tree found primarily along the Arkansas and Cimarron rivers in Kansas. A study was conducted in 2008 at the Cimarron National Grassland to compare the efficacy of herbicides applied as cut-stump or foliar treatments for saltcedar control. Trees were cut in July 2008 with herbicide treatments applied on July 31, 2008. Cut-stump treatments including glyphosate (50% v/v), imazapyr (10% v/v), glyphosate + imazapyr (5 + 5% v/v), triclopyr (10 and 25% v/v in diesel), and triclopyr + fluroxypyr (18.75 + 6.25% v/v in diesel) all provided 100% control of saltcedar 2 months after treatment (MAT) and \geq 80% mortality 12 MAT. Foliar treatments of imazapyr as 0.5 and 1% solutions in water provided 35 to 48% defoliation of saltcedar 2 MAT. The combination of imazapyr + glyphosate at 0.5 + 1% v/v in water was more effective providing 68% defoliation 2 MAT. By 12 MAT the three foliar treatments provided 56 to 73% mortality of saltcedar.

Format: Poster
Student Wildlife Contest: No

Conserving Water and Improving Water Quality in Urban Watersheds: Survey of Residential Homeowners in Wichita, Olathe, and Salina about Lawn Irrigation.

Kenton Peterson*, Dale Bremer, Jacob Domenghini, Jack Fry, Steve Keeley, Cathie Lavis, Rodney St. John, and Laura Moley. Department of Horticulture, Forestry and Recreation Resources, Kansas State University, Manhattan, KS.

The area of land covered with turfgrasses is increasing with urbanization, which may have significant implications for water quantity and quality. Excessive irrigation may waste limited water resources and increase the potential for leaching or runoff. Residential lawns represent the largest sector of turfgrass cover and the greatest opportunity for reducing water waste and deleterious impacts on water quality in urban watersheds. A survey was conducted in Wichita, Olathe, and Salina to investigate residential homeowners' expectations for lawn appearance, knowledge of lawn water requirements, and lawn-irrigation practices. Results revealed that 48 to 63% of homeowners felt it was moderately to very important that their lawn look green all the time, regardless of weather conditions. About 62% of homeowners indicated they did not know how much water their lawns required and 71 to 77% did not measure the water applied to their lawns. Nevertheless, 59 to 72% of homeowners thought it was important to keep their water bills from getting too high, and 64 to 79% indicated they were concerned about water conservation. Results indicate that while most homeowners are concerned about water use and conservation, they need additional information about lawn water requirements and how to accurately apply correct amounts.

Format: Poster

Student Wildlife Contest: No

Riparian Forestry Assessment in the Delaware River Watershed.

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Federal reservoirs in Kansas are the major sources of municipal and industrial water for two thirds of the state's population. Reservoirs naturally act as settling basins for sediment supplied by streams and rivers, reducing their capacity to store water to meet our needs. Human activities related to land use conversion, such as urbanization, agriculture, and alteration of riparian and wetland habitats, have changed flow regimes and increased sediment loading to streams and rivers. In the Delaware River watershed, excessive sedimentation has reduced the storage capacity of Perry Reservoir by more than 25%. Sediment is also a pollutant which carries phosphorus, pesticide, bacteria and trace metals, with potential adverse effects on humans, wildlife and ecosystem health and function. Properly functioning riparian areas, especially forested floodplains, are generally considered highly effective at stabilizing streambanks and reducing erosion during high water events, and can slow flows resulting in sediment deposition and pollutant bioremediation in the riparian area, rather than being delivered to rivers and lakes. We are developing riparian assessment methods using historical archives, GIS and remote sensing to assess changes in riparian condition since settlement and identify riparian areas in need of protection and restoration in the Delaware River watershed.

Water Issues in the Lawn and Landscape: A New Online Course Examining Critical Water Issues Related to Irrigation in Urban Watersheds.

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The area of land covered with turfgrasses is increasing with urbanization, which may have significant implications for water quantity and quality in urban watersheds. A new online lawn-and-landscape irrigation course is being developed at Kansas State University to examine critical water issues related to irrigation in urbanizing watersheds, with an emphasis on water quality and quantity. The course is

designed for students and professionals in industry who want to enhance their knowledge and careers through distance education. Participants will learn about the interrelatedness of correct irrigation practices and water quality and quantity, and how to protect water resources through application of science-based irrigation practices. Seven topical modules will be presented in developmental order: homeowner perceptions; water availability and quality; relationship between irrigation practices and water quality; weather-based irrigation decision making; low-water-use-lawns and landscapes; auditing irrigation systems; and changing water users' habits. Because class participants will be primarily students and professionals in the turfgrass industry, they will be in ideal positions to collectively improve irrigation practices by residential homeowners. These professionals could communicate to homeowners the importance of sustainable irrigation practices in their lawns by using knowledge and communication skills gained through their coursework. The first course offering is spring, 2010.

Format: Poster

Student Wildlife Contest: No

The 2005 Kansas Land Use/Land Cover Mapping Initiative.

Dana Peterson*, Jerry Whistler, Chris Bishop, Stephen Egbert, and Ed Martinko. Research Assistant, Kansas Applied Remote Sensing Program, University of Kansas, Lawrence, KS. dpete@ku.edu.

The Kansas Biological Survey recently completed the Kansas Next-Generation Land Cover Mapping Initiative, a project co-funded by the Kansas State GIS Policy Board and the NSF EPSCoR Program. The mapping endeavor used a hybrid, hierarchical classification of multi-temporal, multi-resolution imagery (Landsat TM and MODIS NDVI time-series) from the 2005 growing season to develop a series of digital land cover inventories (modified Anderson Level I through Anderson Level IV) of Kansas. The Anderson Level I land cover digital map contains eleven land use/land cover (LULC) classes and was designed to be comparable to an Anderson Level I map produced in 1990. The Anderson Level II through IV maps expand upon the grassland and cropland classes in Level I map to provide more detailed grassland and cropland subclasses. The Anderson Level II map contains fifteen map classes, including cool- and warm-season grasslands. The Level Anderson III map contains seventeen map classes, including the dominant crop types, Corn, Soybean, Sorghum and Winter Wheat. The Anderson Level IV map contains nineteen map classes, including crop irrigation status. A formal accuracy assessment reports the Level I through Level IV maps to have overall accuracy levels of 90.7%, 86.3%, 82.0%, and 74.3%, respectively.

Seasonal Stockpiling of Prairie Stream Fishes Below Road Crossings in the Flinthills of Kansas.

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Stream road crossings may act as barriers to seasonal upstream fish migration in the Flinthills of Kansas. Blocking of migration by roadcrossings can occur by perching of the outlet, velocities exceeding maximum swim speed, and insufficient flow through the crossing. These barriers may cause reduced species abundance, habitat fragmentation, and species extirpation. Most specifically this analysis was meant to examine the potential effect of stockpiling that these roadcrossings may have on the pools immediately downstream. The term stockpiling is used to describe the increase in fish density (# of fish/m²) in the experimental pool due to the blocking of upstream migration. In May 2007, 12 stream road crossings sites were sampled. These sites consisted of five box culvert crossings, five low water crossings, and two corrugated culvert crossings. At each site an experimental pool was selected immediately downstream of the crossing and a control pool was selected approximately 200 meters downstream of the experimental pool. Month to month densities for experimental and control pools

were found by depletion seining and a ratio (experimental pool density: control pool density) was calculated to estimate stockpiling. Ratios at each crossing type were found to not be significant from month to month but a general trend in ratios >1 supports the hypothesis that stockpiling may be occurring.

Format: Poster

Student Wildlife Contest: Yes

Population Characteristics of Channel Catfish in the Kansas River.

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The Kansas River and its watershed have been altered by humans in recent years, including riparian land use changes such as increased agriculture and urbanization. These changes, along with alterations to the natural flow regime of the Kansas River, may limit the availability of preferred habitat for adult and juvenile fishes in the river. Capture data of *Ictalurus punctatus* (channel catfish) on the Kansas River indicate that there is a disproportionately greater abundance of juveniles than adults. We tested the hypothesis that the skewed juvenile to adult ratio in the Kansas River is a consequence of habitat limitations resulting from the anthropogenic changes to the river. Channel catfish were collected at six sites of the Kansas River with electrofishing and benthic trawls during 28 bi-monthly sampling trips from May 2004 to September 2009. Adult channel catfish were significantly more abundant in deep pools above Bowersock Dam in Lawrence than at all other sites ($p < 0.01$). No significant differences were observed among sampling sites for juvenile channel catfish ($p = 0.22$); however, among all sites, juveniles were significantly more abundant in shallow habitats with sand substrate than all other habitats ($p < 0.01$). Our results indicate that adult and juvenile channel catfish are using different habitats on the Kansas River. As a result, it may be necessary to preserve a variety of habitats on the Kansas River to sustain channel catfish and other native fish populations in the river.

Format: Poster

Student Wildlife Contest: Yes

Cut Surface & Basal Spray Herbicide Treatment of Black Walnut Stumps.

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Plantations of black walnut need to be thinned starting at a young age to provide growing space for the remaining trees to grow. Most broadleaf species produce numerous stump sprouts after cutting. Often calf-high stumps are made to facilitate easy sawing. While sprouts may be left for wildlife, it is usually best to deaden the entire stump of the tree. Thus herbicides are applied. We applied 5 chemicals at two levels in early April on 18-inch high stumps at the ground line or the cut-surface (top) and treated 60 days later with a common garden sprayer. We achieved complete sprout control when applied at the base of the stump using 3% IMAZAPYR, 10% FLUROXYPYOR, or 5% TRICLOPYR. When applied to the top of the trunk, only IMAZAPYR gave very good control.

Establishing Different Legumes in Grass: an On-farm Research Trial.

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Adding legumes to smooth bromegrass pasture can potentially reduce the amount of commercial fertilizer needed to attain optimal forage production and could extend the summer grazing season by increasing the quantity and quality of forage produced, improve animal weight gain and profitability potential, and reduce animal methane production. However, almost no data is available on seeding legumes into pastures west of US Highway 81 in Kansas. We performed an on-farm trial in Mitchell County to assess the ability of 8 legumes to establish in smooth bromegrass pasture on both upland and lowland pasture sites. In the late winter of 2009, we seeded purple flowered alfalfa, yellow flowered alfalfa, yellow sweetclover, birdsfoot trefoil, white clover, Korean lespedeza, cicer milkvetch, and hairy vetch into 2 paddocks of a 12 paddock rotationally grazed, smooth bromegrass system. The legumes were also seeded across fertilized strips (40 lb N/acre) to allow us to test establishment differences for each legume based on the landscape position and the presence or absence of nitrogen fertilizer. Analysis of these data indicated the following: 1) Four of the legumes (purple flowered alfalfa, yellow flowered alfalfa, yellow sweetclover, and Korean lespedeza) established at acceptable plant densities, 2) Legume establishment was greater on unfertilized versus fertilized strips, 3) Legume establishment was greater on uplands versus lowlands, and 4) Stand densities improved from June to September.