

RIVER SIZE AND FISH ASSEMBLAGES IN SOUTHWESTERN SOUTH DAKOTA

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ABSTRACT—We studied relations between river size, fish species diversity, and fish species composition along four major rivers in the Great Plains of southwestern South Dakota to assess patterns of species diversity and composition. We expected diversity to increase with river size and fish composition to change via species addition downstream. Previous surveys of 52 sampling stations provided fish assemblage data, and we used the Geographic Information System (GIS) to determine watershed area by station. Watershed area did not predict species richness or species diversity (Fisher's α), so species richness of 12 ± 3.5 SD species and Fisher's α of 2.3 ± 0.87 SD characterized species diversity in the study area. Cluster analysis of faunal similarity (Sørensen's Index) among the 52 sampling stations identified two geographically distinct faunal divisions, so species composition was variable within the study area, but changed via species replacements among faunas rather than species additions downstream. Nonnative species were a minor component of all faunas. Uniform species diversity may be a recent phenomenon caused by impacts of Missouri River dams on native large-river fishes and the unsuitability of rivers in the Great Plains for nonnative species. Variation in faunal composition may also be recent because it was affected by dams.

Key Words: Bad River, Belle Fourche River, Cheyenne River, longitudinal succession, White River

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CLIMATE AND HABITAT FACTORS RELATED TO A LOCALIZED EXTIRPATION OF GIZZARD SHAD (*DOROSOMA CEPEDIANUM*)

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ABSTRACT—Gizzard shad are a riverine species commonly transplanted into manmade reservoir systems to provide prey for predatory game fish. Thermally limited, the range of their native distribution extends into the midwestern Great Plains. Following the harsh winter conditions of 2000-2001, numerous incidents of extensive gizzard shad die-offs were reported in eastern Nebraska during spring ice-out. In an effort to determine the breadth and extent of mortality, statewide fish population surveys conducted between 1994 and 2004 were examined, and it was found that gizzard shad were extirpated from seven flood-control reservoirs in a localized area of eastern Nebraska. Meteorological data confirmed that extreme cold and windy conditions were prevalent in the area during early December 2000, and may have been correlated to this unique extirpation event. Hydrologic connection to groundwater and wind sheltering may have protected smaller waterbodies from extirpation.

Key Words: climate conditions, extirpation, gizzard shad, habitat factors, winterkill

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ARSENIC IN GROUNDWATER AND RURAL PUBLIC WATER SUPPLIES IN NEBRASKA, U.S.A.

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ABSTRACT—The highest concentrations of arsenic in groundwater are found in the Nebraska Panhandle, southwestern Nebraska, and the Republican River valley. Data from 33 public water supply wells indicate that significant variability in arsenic concentrations did not occur over a one-year study. The general absence of temporal variability in arsenic concentrations suggests that the collection of one sample per year from most wells will adequately characterize the arsenic concentrations to which the population drinking this water will be exposed. The collection of additional samples is strongly recommended if the reported arsenic concentrations are at, or slightly above, 10 µg/L in order to verify that the average arsenic concentration is above the maximum contaminant level. Short-term (4 to 24 hours) sampling experiments indicate that arsenic concentrations may increase, decrease, or remain relatively constant during the first 30 to 60 minutes after a well is turned on. The potential for these changes need to be considered when collecting samples for regulatory purposes. It is recommended that the sampling scheme be designed around the operational history of the individual wells within a system. This will provide a more realistic assessment of the arsenic concentration to which the consumers of the water are exposed.

Key Words: arsenic, groundwater, Nebraska, public water supplies, water sampling

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FIRE HISTORY AT THE EASTERN GREAT PLAINS MARGIN, MISSOURI RIVER LOESS HILLS

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ABSTRACT—The purpose of this paper is to provide quantitative fire history information for a geographically unique region, the Loess Hills of northwest Missouri. We sampled 33 bur oak (*Quercus macrocarpa* Michx.), chinkapin oak (*Q. muehlenbergii* Engelm.), and black oak (*Q. velutina* Lam.) trees from the Brickyard Hill Conservation Area in northwest Missouri. The period of tree-ring record ranged in calendar years from 1671 to 2004 and fire-scar dates ($n = 97$) ranged from 1672 to 1980. Fire intervals for individual trees ranged from 1 to 87 years. The mean fire interval was 6.6 years for the pre-Euro-American settlement period (1672-1820), and 5.2 years for the entire record (1672-1980). A period of more frequent fire (mean fire interval = 1.6 for 1825 to 1850) coincided with Euro-American settlement of the area. The average percentage of trees scarred at the site was 16.8%, or about 1 in 7 trees sampled per fire. No significant relationship between fire years and drought conditions was found; however, events prior to 1820 may have been associated with wet to dry mode transitions.

Key Words: bur oak, fire history, Great Plains, Loess Hills, *Quercus*

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FIRE HISTORY AT THE SOUTHWESTERN GREAT PLAINS MARGIN, CAPULIN VOLCANO NATIONAL MONUMENT

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ABSTRACT—This study documents historic fire events at Capulin Volcano National Monument over the last four centuries using dendrochronologically dated fire scars at two sites: the lower volcano lava flows (the Boca) and the adjacent canyon slopes (Morrow Ranch). The mean fire interval (MFI) was 12 years at the Boca site (before 1890) and 5.4 years (1600-1750) and 19.1 years (1751-1890) at the Morrow Ranch site. Data from the Boca and Morrow Ranch sites combined with the extremely pyrogenic landscape position of the volcano slopes indicate that the volcano slopes likely burned more frequently (e.g., MFI <5 yr). Around 1750, the fire regime appeared to transition to longer fire intervals, greater temporal synchrony among fire-scarred trees, and a higher proportion of trees scarred in fire years. Temporal variability in the fire regime at Capulin Volcano may reflect changes in human populations, climate, and land use.

Key Words: dendrochronology, fire scars, New Mexico, *Pinus edulis*, *Pinus ponderosa*

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SEED BANK VIABILITY OF INLAND SALINE WETLAND SITES IN AGRO-ECOSYSTEMS

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ABSTRACT—Wetland restoration typically includes modifications to soils, flora, and hydrology. Will the return of wetland hydrology to former saline wetlands create conditions suitable for wetland taxa, especially saline wetland indicator species? To answer this question we evaluated the potential restoration efficacy of historical saline wetland soils by re-exposing them to wetland hydrological conditions simulated in a greenhouse. Agricultural lands contained no saline indicator plants and limited wetland species, likely due to significant and long-term land alteration. Restored wetlands showed only a few additional wetland taxa, and seeds of saline wetland plants emerged from soils of only one restored site. Because land alteration threatens the seed bank status of current saline wetlands, potential restoration sites, and even historical saline wetlands under agricultural production in Nebraska, preservation of existing sites that currently have saline dynamics and affluent seed banks may be the only means for continued restoration.

Key Words: hydrology, inland saline wetland, Nebraska Eastern Saline Wetlands, seed bank, wetland restoration assessment

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LAND USE AND TRANSFER PLANS IN THE U.S. GREAT PLAINS

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ABSTRACT—In the next decades, aging farmers in the United States will make decisions that affect almost 1 billion acres of land. The future of this land will become more uncertain as farm transfer becomes more difficult, potentially changing the structure of agriculture through farm consolidation, changes in farm ownership and management, or taking land out of production. The Great Plains Population and Environment Project interviewed farmers and their spouses between 1997 and 1999. Farm Family Survey participants were ambiguous about their plans to leave farming, transfer land to others, and even long-term land use, largely due to concerns about the continued economic viability of farming. Participants living far from metropolitan areas expected to sell or rent to other farmers, while those near residential real-estate markets expected to sell to developers. Delays in planning for retirement and succession were common, further threatening the success of intergenerational transitions.

Key Words: land use, land transfer, farm succession, farm exit, agriculture, retirement

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ARE ANTI-SPIT TOBACCO CAMPAIGNS STRIKING OUT? A SURVEY OF IOWA AND NEBRASKA COLLEGE BASEBALL PLAYERS

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ABSTRACT—Anti-spit tobacco information is replete with fear appeals, including firsthand accounts of death and debilitation, to make users aware of the health risks and dangers. Those dangers, however, are well known by baseball players whose association with spit tobacco is historic. A survey of 217 Iowa and Nebraska college players showed that despite their awareness of spit tobacco's dangers, the players use spit tobacco to relax and focus on the field. This study supports other research showing that fear appeals may not be the most appropriate approach for anti-tobacco advertising campaigns. The study suggests that campaigns should promote relaxation and stress reduction techniques as alternatives to spit tobacco.

Key Words: advertising, baseball, college, fear appeals, relaxation, spit tobacco

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