Annual Meeting
AAG, Great Plains-Rocky Mountain Division
ASPRS, Upper Midwest Chapter

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Lee Okeson
UND Geography Alumnus
Welcome!

Welcome to the Red River Valley, City of Grand Forks, University of North Dakota, and the 2008 meetings of the Great Plains-Rocky Mountain Division of the AAG and Upper Midwest Chapter of the ASPRS. The UND Department of Geography is excited to host this event, and we are pleased that you have decided to join us for what we hope will be a pleasant and productive conference. Many deserve sincere thanks, including our sponsors, conference planning committee, local arrangements group, field trip leaders, GPRM officers, UMC officers, UND Geography students, the Psi Chapter of Gamma Theta Upsilon, featured speakers, session moderators, Geography Bowl participants, paper/poster competition judges, and paper/poster presenters. We have developed a program that highlights our home on the Northern Great Plains, and we hope that you take pleasure in your stay. We are especially happy with the excellent line-up of featured speakers and paper and poster presentations that showcase the significant accomplishments of student and faculty researchers in our region. Enjoy!

-Brad Rundquist, GPRM Chair/UMC President and Conference Organizer

Conference Planning Committee:
UND Department of Geography
Brad Rundquist, Chair
Devon Hansen
Jin-Kyu Jung
Douglas Munski
Cindy Purpur
Paul Todhunter
Gregory Vandeberg
Enru Wang, Paper/Poster Competition Chair

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Ofer Bieeri

Texas State University Department of Geography
Kevin Romig

Local Arrangements:
UND Office of Conference Services
Debbie Vance, Gretchen Schatz, Robin von Ruden

UND Memorial Union
Cindy Knudson

Greater Grand Forks Convention and Visitors Bureau

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Annual Meeting
AAG, Great Plains-Rocky Mountain Division
ASPRS, Upper Midwest Chapter

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Featured Speaker
John C. Hudson, Program in Geography, Northwestern University
“Yes, North Dakota”

Although North Dakota often is regarded as having a declining population, the state’s total population has remained fairly constant, fluctuating in the range 650,000 ± 30,000, since 1920. Urban population growth has roughly compensated for open-country population loss. Population densities lower than two persons per square mile were confined largely to the rugged lands of western North Dakota in 1920 and covered only about 5% of the state, but by 2000 densities this low accounted for 71% of the state’s area. A recent photo essay in National Geographic Magazine, “The Emptied Prairie,” (January, 2008), drew sharp criticism from North Dakotans and provoked a response from the state’s governor who cited statistics on manufacturing employment growth in cities like Fargo to give a more balanced view. Changes in the agricultural sector that result in greater productivity of labor and increasing returns to scale have led to an increase in the average size of farm, a decrease in the number of farms, and hence a decrease in rural population. The estimated annual rate of change in North Dakota’s rural population density between 1920 and 2000 ($\alpha = -.015$) is identical to three decimal places with the estimated rate of decrease in farms per square mile. Between 1920 and 2002, the number of farms per square mile remained a constant fraction of the number of rural dwellers, even as both experienced declines of nearly 70%. Some relatively new developments in North Dakota’s agricultural economy are worthy of the geographer’s attention. Corn and soybean production have continued their long established northward march. Both crops are now well established in the Red River Valley and are moving west. U.S. grain exports to Asia place the eastern Dakotas and western Minnesota in the front line of supply in this valuable trade. High crop prices, developing international markets, and advances in grain transportation technology have contributed to a new strategic significance for northern Plains agriculture even as rural depopulation continues.

Brief History of Geography at UND
Geography courses have been taught at the University of North Dakota since the opening of the University in 1883. University Vice President Henry Montgomery, a professor of Natural Science, taught basic geographic concepts. By 1885, physical geography, map drawing, and meteorology courses were offered by the Geology Department. The first master’s thesis in Geography, titled The Economic Geography of the Lignite Coal of North Dakota, was completed in 1920 by Julia Bertine Rue. Geology offered a minor in Physiography in 1923. That term was replaced by Geography in 1925. That same year a Geography major was added to the Geology curriculum. Geography was added to the Geology Department’s name in 1932 (Department of Geology and Geography).

The Department of Geography was established as separate from Geology in 1942, with Vernice Margaret Aldrich acting head. The first master’s thesis in the independent Department of Geography was in 1947 (Melvin E. Kazeeck, Audio-Visual Aids for the Modern High School). UND's Phi Chapter of Gamma Theta Upsilon was founded in 1948, with Dr. Bernt Lloyd Wills serving as faculty advisor. The Institute for Remote Sensing was founded by Roland D. Mower and Gary E. Johnson in 1973. The Institute sponsored the Innovations in Land Use Management Conference, held in 1976 and 1978 in Grand Forks. Conference proceedings were published. The Institute has evolved into the Department’s current Geographic Analysis and Remote Sensing Laboratory. The Department’s forum series, The Forum for Contemporary Geographic Issues, was initiated in 1974 by Gary E. Johnson. It continues today. The Bernt Lloyd Wills Memorial Scholarship, which provides a stipend each semester to an outstanding undergraduate Geography major, was established in 1985 shortly after Wills’ death. The UND Department of Geography sponsored the 1979 annual meeting of the Great Plains / Rocky Mountain Division of the AAG, which was held in Grand Forks, ND, and co-sponsored the 1995 annual meeting held in Rapid City, SD, with South Dakota State University. UND Geography will again host the GPRM AAG in 2008 in Grand Forks. The Department also sponsored annual meetings of the Prairie Division of the Canadian Association of Geographers in 1982, 1988, and 1994, all held in Minot; the 2000 meeting, held in Devils Lake, and the 2006 meeting in Rugby, with proceedings published for each meeting.

The Department has moved several times. Moves since 1970 include from Merrifield Hall to Babcock Hall (circa 1971), Babcock Hall to Gillette Hall (circa 1977), from Gillette Hall to Clifford Hall (1992), and from Clifford Hall to Ireland/O'Kelly Hall in 2004. A Graduate Certificate in Geographic Information Sciences (GISc) was implemented in Fall 2002, and an on-line version of the program was first offered in 2006. A seventh permanent faculty position was added in 2003. UND Geography currently offers B.S., M.A., and M.S. degrees, as well as the Graduate Certificate in GISc.
Lance D. Yarbrough, Department of Geology and Geological Engineering, University of North Dakota, Grand Forks, North Dakota, 58202, lance.yarbrough@und.edu. Recent Research Efforts using the Next-Generation NASA Global Precipitation Measure (GPM) Proxy Data.

The Global Precipitation Measurement (GPM) satellite is an extension of the Tropical Rainfall Measuring Mission (TRMM) observations of precipitation to higher latitudes, with more frequent sampling, and with focused research on providing a more complete understanding of the global hydrological cycle. GPM when launched in 2013 will be capable of measuring rain rates to an accuracy of ±0.25mm per hour every 4 hours for much of the Earth’s surface. The availability of these data is anticipated to be within 3 hours of collection time. The mission has wide ranging benefits for society and the scientific community. As computers and models are adapted to ingest there large spatiotemporal dataset, the ability to forecast in near-real time or now-cast will become a reality. With global coverage, emergency managers will not need to relay on data from neighboring counties to make decisions for their citizens. By using the current NASA TRMM Multi-Satellite Precipitation Analysis Real-Time (TMPA-RT) data products, we can make assumptions about the future GPM system. We can test this concept based on our current progress in satellite rainfall estimation at higher resolutions (sub-daily and sub-degree scales). An ongoing NASA sponsored experiment is discussed as an example for using the forthcoming GPA satellite-derived data. This project focuses on assessing the use of next-generation satellite precipitation data for creating precipitation and run-off estimations within the popular and well used hydrologic model, HEC-HMS. This proposed experiment is limited to the HEC-HMS output to FEMA’s Hazards U.S. Multi-Hazard (HAZUS-MH) DSS. However, other Decision Support Systems depend on similar models that require gridded precipitation data like those of HEC-HMS.

Xiaodong Zhang, Craig Helgason, and George Seielstad, Northern Great Plains Center for People and the Environment, University of North Dakota, Grand Forks, ND 58202, and Lijian Shi, Ocean Remote Sensing Institute, Ocean University of China, Qingdao, China, zhang@umac.org. Zone Mapping Application for Precision-farming: A Decision Support Tool for Variable Rate Application.

We have developed a web-based decision support tool, Zone Mapping Application for Precision Farming (ZoneMAP, http://zonemap.umac.org), which can automatically determine the optimal number of management zones and delineate them using satellite imagery and field survey data provided by users. Application rates, say for fertilizer, can be prescribed for each zone and downloaded in a variety of formats to ensure compatibility with GPS-enabled farming applicators. ZoneMAP is linked to Digital Northern Great Plains, a web-based application which hosts a rich archive of satellite imagery from Landsat, MODIS, and ASTER, as well as high resolution airborne imagery from AeroCam and AgCam. ZoneMAP transparently handles projection conversion, grid resampling, and spatial subsetting for data from a variety of sources. We used an unsupervised clustering method, Fuzzy C mean (FCM), for classification. We tested two cluster estimation algorithms and found that the diagonal distance algorithm gives more consistent results than Mahalanobis distance. We also evaluated efficacy of ZoneMAP using real field data provided by end users. Management zones created by ZoneMAP mapped natural variation of the soil organic matter and other nutrients relatively well, and are consistent with zone maps created by the users. The results demonstrated that ZoneMAP can serve as an effective yet easy-to-use tool for those who want to practice precision agriculture.
Field Trip Descriptions

Field Trip 1 - Friday, September 12, 2008
9 a.m. to 4 p.m. - Box Lunch Provided

The Intensive Agriculture of the Red River Valley
Participants staying at the Ramada Inn are asked to take the 8:30 shuttle to the Canad Inn. The field trip will depart from the Canad Inn lobby at 9 a.m. A return shuttle will be provided for those staying at the Ramada.

Led by Paul Todhunter, UND Geography Department: The Red River Valley of the North is among the most intensively farmed dryland agricultural regions in the United States, with a history that extends back to the bonanza wheat farms of the late 19th Century. Farming in the Valley consists of a mixed rotation of row crops and small grains centered around the cultivation of potatoes and sugar beets. Farming is quite dynamic, however, and producers continue to innovate in order to remain competitive. The trip will begin with a drive north to Grafton, North Dakota, to visit Tri Campbell Farms, a BIG, modern, family-owned potato farm operation. After a tour of the farm and a Q&A session, we will return to Grand Forks to see the North Dakota Mill, the nation’s only state-owned mill, and to visit the American Crystal Sugar Company plant in East Grand Forks, Minnesota.

Field Trip 2 - Friday, September 12, 2008
9 a.m. to 4 p.m. - Box Lunch Provided

The Glacial and Fluvial Geomorphology of the Drift Prairie Region
Participants staying at the Ramada Inn are asked to take the 8:30 shuttle to the Canad Inn. The field trip will depart from the Canad Inn lobby at 9 a.m. A return shuttle will be provided for those at the Ramada.

Led by Gregory Vandeberg, UND Geography Department: This field trip examines some of the landforms and features of the Lake Agassiz Basin and adjacent drift plains. The trip will first investigate saline lakes in the area and their impact on soils and water quality of the Red River of the North. Discharges from the underlying aquifer are saline, and have produced extensive wetlands in the area. The trip will continue across several strandlines and beach ridges associated with the former Glacial Lake Agassiz. We will examine the characteristics of some of these beach ridges, as well as the geomorphology of local rivers as they cut through them. The trip will continue out of the lake basin onto the drift prairie to the west. We will examine ice marginal features such as the Elk Valley delta as well as the Edenburg and Lankin moraines. We will also look at the Dahlen Esker, and examine ice marginal environments. Finally, we will examine characteristics of tills in the area.

Field Trip 3 - Friday, September 12, 2008
12:30 to 4 p.m. - Lunch NOT Provided

Grand Forks Area Recovery Since the 1997 Flood
Participants staying at the Ramada Inn are asked to take the noon shuttle to the Canad Inn. The field trip will depart from the Canad Inn lobby at 12:30 p.m. A return shuttle will be provided for those at the Ramada.

Led by Ryan Brooks, City of Grand Forks, and Devon Hansen and Enru Wang, UND Department of Geography: The Red River Valley Flood of April 1997 has been called the “Flood of the Century,” and was the most severe flood since 1826. While most of the cities along the Red River in North Dakota, Minnesota, and southern Manitoba were affected, the Greater Grand Forks Metropolitan Area (Grand Forks, North Dakota, and East Grand Forks, Minnesota) were hardest hit. The flood damaged more than 75 percent of the homes, forced the evacuation of 90 percent of the population, and led to nearly $2 billion in direct economic losses. After 11 years, the metropolitan area has experienced impressive recovery. This field trip offers insight into the impact of the flood on urban development and the response of local governments and citizens. The field trip begins with a presentation of background information describing important events before, during, and after the 1997 Flood, and will be followed by a tour of the recently completed $413-million flood protection project, and new residential and commercial developments.

Field Trip 4 - Saturday, September 13, 2008
9 a.m. to 4 p.m. - Box Lunch Provided

The Intensive Agriculture of the Red River Valley
Participants staying at the Ramada Inn are asked to take the 8:30 shuttle to the Canad Inn. The field trip will depart from the Canad Inn lobby at 9 a.m. A return shuttle will be provided for those staying at the Ramada.

Led by Paul Todhunter, UND Geography Department: The Red River Valley of the North is among the most intensively farmed dryland agricultural regions in the United States, with a history that extends back to the bonanza wheat farms of the late 19th Century. Farming in the Valley consists of a mixed rotation of row crops and small grains centered around the cultivation of potatoes and sugar beets. Farming is quite dynamic, however, and producers continue to innovate in order to remain competitive. The trip will begin with a drive north to Grafton, North Dakota, to visit Tri Campbell Farms, a BIG, modern, family-owned potato farm operation. After a tour of the farm and a Q&A session, we will return to Grand Forks to see the North Dakota Mill, the nation’s only state-owned mill, and to visit the American Crystal Sugar Company plant in East Grand Forks, Minnesota.

Field Trip 5 - Saturday, September 13, 2008
9 a.m. to 4 p.m. - Box Lunch Provided

The Glacial and Fluvial Geomorphology of the Drift Prairie Region
Participants staying at the Ramada Inn are asked to take the 8:30 shuttle to the Canad Inn. The field trip will depart from the Canad Inn lobby at 9 a.m. A return shuttle will be provided for those at the Ramada.

Led by Gregory Vandeberg, UND Geography Department: This field trip examines some of the landforms and features of the Lake Agassiz Basin and adjacent drift plains. The trip will first investigate saline lakes in the area and their impact on soils and water quality of the Red River of the North. Discharges from the underlying aquifer are saline, and have produced extensive wetlands in the area. The trip will continue across several strandlines and beach ridges associated with the former Glacial Lake Agassiz. We will examine the characteristics of some of these beach ridges, as well as the geomorphology of local rivers as they cut through them. The trip will continue out of the lake basin onto the drift prairie to the west. We will examine ice marginal features such as the Elk Valley delta as well as the Edenburg and Lankin moraines. We will also look at the Dahlen Esker, and examine ice marginal environments. Finally, we will examine characteristics of tills in the area.

Field Trip 6 - Saturday, September 13, 2008
12:30 to 4 p.m. - Lunch NOT Provided

Grand Forks Area Recovery Since the 1997 Flood
Participants staying at the Ramada Inn are asked to take the noon shuttle to the Canad Inn. The field trip will depart from the Canad Inn lobby at 12:30 p.m. A return shuttle will be provided for those at the Ramada.

Led by Ryan Brooks, City of Grand Forks, and Devon Hansen and Enru Wang, UND Department of Geography: The Red River Valley Flood of April 1997 has been called the “Flood of the Century,” and was the most severe flood since 1826. While most of the cities along the Red River in North Dakota, Minnesota, and southern Manitoba were affected, the Greater Grand Forks Metropolitan Area (Grand Forks, North Dakota, and East Grand Forks, Minnesota) were hardest hit. The flood damaged more than 75 percent of the homes, forced the evacuation of 90 percent of the population, and led to nearly $2 billion in direct economic losses. After 11 years, the metropolitan area has experienced impressive recovery. This field trip offers insight into the impact of the flood on urban development and the response of local governments and citizens. The field trip begins with a presentation of background information describing important events before, during, and after the 1997 Flood, and will be followed by a tour of the recently completed $413-million flood protection project, and new residential and commercial developments.

Nicolie Wayant and Doug Goodin, Department of Geography, and Diego Maldonado, Department Mathematics, Kansas State University, Manhattan, KS 66506, nwayant@ksu.edu. Malaria Occurrences in Paraguay: Correlating Malaria and Normalized Difference Vegetation Index.

Malaria is a disease that has several different species of mosquitoes as its vector. The disease is most prevalent in tropical and sub-tropical regions of the world. Although not immediately deadly, if left untreated, malaria can cause complications leading to severe incapacitation or death. Because of the high disease prevalence in the tropics and subtropics, there is a general assumption that malaria is related to precipitation. Precipitation is also linked to phenological cycles in vegetation, implying that observation of greenness cycles in vegetation might provide surrogate information about malaria. We therefore hypothesize that occurrence of malaria is linked to cycles of vegetation greenness. To test this hypothesis, NDVI and malaria occurrence data for two departments in Paraguay were correlated. However, before the correlation tests could be run, both data sets were denoised using Fourier Transform. After the data had been denoised, the malaria rates were correlated on a pixel by pixel basis to the NDVI data throughout time. The ultimate goal of this project is to discover a relationship between vegetation and malaria that can be used to predict malaria outbreaks.

Ryan D. Weichelt, Department of History and Geography, University of Central Oklahoma, Edmond, OK 73003, rweichelt@ucok.edu. A County Level Analysis of Hispanic Election Patterns in Texas: 1952 – 2006.

The history of South Texas provides a foundation for understanding electoral patterns for presidential, U.S. senatorial, and Texas gubernatorial elections over the past fifty years. Stemming from an early misunderstanding of Texas' original border, South Texas has developed as a traditional homeland for Hispanic populations in Texas. The presence of largely Hispanic counties has equated into a distinct electoral region that differs greatly from the rest of Texas. This paper will examine electoral patterns of Texas counties using both T-mode Factor Analysis and multiple regression analysis that illustrate counties with larger proportions of Hispanic populations display differing voting patterns compared to counties with larger proportions of non-Hispanic voters.

William A. Wetherholt and Bradley C. Rundquist, Department of Geography, University of North Dakota, Grand Forks, ND, 58202. Barriers to the Inclusion of Ethics in Remote Sensing Education.

Remote sensing’s original intent to satisfy military intelligence has since evolved to incorporate an expanding and diverse user-base for a multitude of applications. A large concern discussed in scientific literature pertaining to remote sensing technology is that its current policies were not crafted with the foresight to incorporate today’s increasing spatial resolution and the various sectors (civil, commercial, and private) that utilize this tool. One solution proposed to mitigate undesired uses is the incorporation of ethics in the education of remote sensing users. If authors of remote sensing literature view education as one solution to address this concern, then the question is “are educators practicing these ‘self-regulating’ techniques in the classroom?” A comprehensive internet survey ( surveymonkey.com) was conducted. Educators noting “remote sensing” as a specialty in the 2006 – 2007 Association of American Geographers Handbook and Directory of Geographers were selected. 63.2% of those polled agree or strongly agree that ethical discussions applied to remote sensing is an important part of remote sensing education; 42.5% do not include any ethical discussions, and the largest barrier identified (by 21.25%) is “not enough time.” A qualitative analysis of remote sensing textbooks for ethical material revealed that minor information to no information exists on ethics. A wider inclusion of ethics in future editions of remote sensing texts may better address the call by professionals to incorporate ethics into educational circles for the purpose of mitigating undesired remote sensing utilizations.
Gina K. Thornburg, Department of Geography, Kansas State University, Manhattan, KS 66506, gkt@ksu.edu.

Processes of Assimilation and Persistent Residential Segregation of Hispanics in Hutchinson, Kansas.

Rapid growth of the Hispanic population is reshaping the social, economic, and cultural landscapes at a variety of scales throughout the Great Plains, from remote rural villages to midsize cities. Between 1990 and 2000, Hispanic population growth was higher in nonmetropolitan than in metropolitan areas, while the Hispanic population grew 112.8% in the Midwest. In some small towns and cities along railroad lines in Kansas, long-established Hispanic populations welcome newcomers from their ancestral home countries, mainly Mexicans who migrate directly from Mexico or by way of other U.S. towns. This demographic trend involving Hispanic-Americans and newcomers among them provides a microcosm in which to examine spatiotemporal processes of residential assimilation and segregation. This mixed-methods project uses spatial statistics to calculate the index of dissimilarity for Hispanics versus whites in Hutchinson, Kansas, and uses qualitative data collected through participant observation, interviews, and archival research to analyze the discourse pertaining to (1) how Hispanics in Hutchinson view their experiences of assimilation and/or segregation within the native-born, non-Hispanic community and (2) how native-born residents of Hutchinson view Hispanics, both longtime residents and newcomers, in their midst. This paper aims to contribute knowledge of the various ways in which inhabitants interpret the residential spatial patterns of their community. It argues for the importance of understanding historical processes of social, economic, and residential discrimination in the establishment of communities of immigrant workers in rural America and points toward ongoing place-level socioeconomic changes that will be associated with growing Hispanic communities in the years to come.

Gregory S. Vandeberg, Mark Blore and Brooks Hansen, Department of Geography, University of North Dakota, Grand Forks, ND 58202, and Cami Dixon and Brian Vose, U.S. Fish and Wildlife Service, Devils Lake, ND, 58301, gregory.vandeberg@und.nodak.edu. 

Surface Water Quality in the Vicinity of Lake Alice National Wildlife Refuge, North Dakota.

This investigation compares the spatial and temporal nature of water quality parameters for the Lake Alice National Wildlife Refuge. Lake Alice is part of the Chain of Lakes drainage that is within the Devils Lake watershed. Land use surrounding the refuge is primarily agricultural, ranging from row and small grain crop production to large scale hog feeding operations (concentrated animal feeding operations). Surface water samples were collected from 5-7 locations within the watershed on a monthly basis from June through October, 2007 and May through September, 2008. The water samples were analyzed for nitrate as nitrogen, nitrite as nitrogen, ammonia as nitrogen and total Kjeldahl nitrogen, total phosphorus, trace elements such as arsenic, mercury and selenium, pH, conductivity, dissolved oxygen and hardness. The results of the study along with comparisons between sample locations and collection times will be presented.

Fawn C. Wasin Zi and Brett J. Goodwin, Department of Biology, University of North Dakota, Grand Forks, ND 58202, fawn.wasin.zi@und.edu. 

Wetland Function of On- and Off-Site Mitigation Wetlands in the Prairie Pothole Region of North Dakota.

Road construction in the Prairie Pothole Region of North Dakota invariably impacts wetlands requiring mitigation. On- and off-site mitigation wetlands have been constructed in North Dakota for decades yet their effectiveness is unclear. We compared on- and off-site mitigation wetlands to pristine prairie wetlands using a hydrogeomorphic model calibrated for pristine prairie wetlands in ND. We also compared invertebrates between the on- and off-site wetlands. In 2007 we surveyed surrounding landuse, hydrogeomorphology, soils, vegetation, and invertebrates at 12 on-site and 12 off-site mitigation wetlands. Neither type of mitigation wetland completely replicated pristine conditions according to the hydrogeomorphic model, though off-site wetlands were closer. Within 1 mile, off-site wetlands had marginally more wetland basins (t=1.33, p=0.1979) and significantly less upland fragmentation (t=12.4, p=0.0001) than on-site wetlands. Morphologically, off-site wetlands were more like pristine wetlands due to significantly greater catchment to wetland ratio (t=4.02, p=0.0006) but less like pristine wetlands due to marginally more regular shorelines (t=1.48, p=0.1527). Off-site wetland soils had significantly more organic matter (t=3.23, p=0.0039), significantly higher quality scores (t=2.27, p=0.0335) and marginally less sediment deposition (t=1.10, p=0.2833) than on-site wetlands. Compared to on-site wetlands, off-site wetlands had marginally higher wetland plant diversity (t=0.11, p=0.1149) and significantly more perennial cover in the low prairie zone (t=-5.27, p=0.00003). Preliminary analysis of invertebrate samples suggest that off-site wetlands support greater invertebrate biomass. Our results suggest that off-site mitigation wetlands are more like the pristine prairie wetlands they are meant to replace.

Saturday, September 13, 2008 - Memorial Union, University of North Dakota

7:00 - 9:00 a.m. Registration and Coffee, Second Floor Lobby

8:00 a.m. - 3:40 p.m. Posters and Exhibits on display, North Ballroom

(Poster presenters should be in attendance at 9:40-10:00 a.m. and 3:20-3:40 p.m.)

Mark Blore and Gregory Vandeberg, Department of Geography, University of North Dakota. Concentrated Animal Feeding Operations in the Devils Lake Basin, ND and their Effect on Water Quality.

Erik Bowles, Department of Geography, Kansas State University. Preliminary Results for Classifying Heat Waves in the U.S.

Mark D. Coté and Ulrike M. Hardenbicker, Department of Geography, University of Regina. Solar Radiation Income and its Influence in Slope Development in the Aanvole Badlands, Southern Saskatchewan.

Changyong Dou, Xiaodong Zhang, and Doug Olson, Northern Great Plains Center for People and Environment, University of North Dakota. Geolocation Algorithms for a Remote Sensing Sensor - AgCam.

Matthew J. Gerike, Department of Geography, University of Missouri-Columbia, and Michael Dulin and John Harrington, Jr., Department of Geography, Kansas State University. Visualizing Geographical Practices.

Brooks E. Hansen and Gregory S. Vandeberg, Department of Geography, University of North Dakota. Land Cover and Land Use In the Vicinity of Lake Alice National Wildlife Refuge.

Scott Headrick and Savvi Neuffer, Department of Geography, University of Wyoming. Fire and Climate Relationships in the Black Hills of South Dakota.

Michael W. Hernandez, Department of Geosciences, Weber State University. A User Friendly GIS Based Graphic Process Model for Multiple Natural Hazard Assessment.

Michael Hill and Rebecca J. Romsdahl, Northern Great Plains Center for People and the Environment, University of North Dakota. Regional Analysis of Social Data for Climate Change Decision-making: A Case Study of North Dakota.

Lianbo Hu and Xiaodong Zhang, Northern Great Plains Center for People and the Environment. An Atmospheric Correction Algorithm for AgCam.


Kendra K. Mclauchlan, Elias J. Martinson, Iris E. Wilson, and John Harrington, Jr., Department of Geography, Kansas State University. Trees as Sentinels of Environmental Change: A Tool for Ecological Forecasting.

Jordan L. Neau, Department of Geography, University of North Dakota. Success of Renaissance Zone Program in Northeastern North Dakota Communities.

Sandhya Nepal and Andrei Kirilenko, Department of Earth System Science and Policy, University of North Dakota. Projections of Climate Change for the Northern Great Plains.

Kevin Sliva, Ulrike M. Hardenbicker, and Alec H. Paul, Department of Geography, University of Regina. Local Floods in Southern Saskatchewan - Trigger and Causes in Four Case Studies.
Linnea C. Sando, Department of Geography, Kansas State University, Manhattan, KS 66502, lcsando@ksstate.edu.

Finnish Saunas in Hamlin County, South Dakota.

The sauna is a dominant trait of Finnish culture. When Finnish immigrants began migrating to Hamlin County, South Dakota in the latter part of the 19th Century, they brought the sauna with them. With a large, concentrated population of Finnish residents in Hamlin County, saunas continue to be built on homesteads throughout the region. Because saunas have such a distinguishable impact on the landscape, they can be used as an index to Finnish settlement. This paper addresses how a sauna is used, the social value of using a sauna, and how its functions have changed over time.

Tala Shokri, Navid Nemati and Iraj P. Mamaghani, Department of Civil Engineering, University of North Dakota, Grand Forks, ND 58202, tala.shokri@und.nodak.edu Querying Moving Objects Databases under Uncertainty Conditions.

Geospatial information systems (GIS) have been applied in modeling environmental and ecological systems. 3D Moving objects are spatio-temporal objects whose location and/or extent change over time, and they are among those recent evolutions that emerged to fulfill some of the new requirements for (GI) community. Moving object databases appear in numerous applications such as emergency services, navigational and military services, flight management and tracking, m-commerce, and various location based services as fleet management, vehicle tracking, and mobile advertisements. Many of the earlier works were based on the assumption that exact trajectory information was available (or could be obtained) at every time instant. Unfortunately, this assumption cannot be guaranteed in real applications where trajectory information is associated inherently with uncertainty and lack of complete and precise knowledge. In this paper, we explore how a trajectory is influenced by uncertainty. Then we study the nature of 3D moving object trajectories in the presence of uncertainty and we introduce four data models for uncertain trajectories that are used to represent moving objects. By using this model in a case study, we obtain the most probable answer where we consider a 3D moving object path under uncertain conditions and lack of knowledge.

Kevin Silva, Ulrike M. Hardenbicker, and Alec H. Paul, Department of Geography, University of Regina, Regina, Saskatchewan, S4S0A2, Canada, ulrike.hardenbicker@uregina.ca Local Floods in Southern Saskatchewan - Trigger and Causes in Four Case Studies.

Local floods in southern Saskatchewan are generally triggered by hydrometeorological events such as thunderstorms or snowmelt in combination with rainfall. The causes of such floods are a variety of factors tied to the geomorphic, hydrologic and pedologic setting. For southern Saskatchewan these include low relief and poorly developed drainage patterns in combination with high runoff coefficients, antecedent soil moisture and soil temperature. Many floods in Saskatchewan often occur at the local scale and as a result many are unreported or lack detailed data at the local and regional scale. The trigger and causes of four flood events from southern Saskatchewan during the period 1973 to 2000 are examined through climatic records, stream discharge and the characteristics and conditions of the catchment area. The four flood events are Oyama Regional Park 1973, Regina 1975, Regina 1996 and Vanguard 2000.

Sharmistha Swain, Sunil Narumalani, and Brian Wardlow, Faculty of Geography, University of Nebraska-Lincoln, Tsegaye Tadesse, National Drought Mitigation Center, University of Nebraska-Lincoln. An Assessment of Vegetation Response to Drought in Nebraska Using Terra-MODIS Land Surface Temperature and Normalized Difference Vegetation Index.

Terra-MODIS derived Normalized Difference Vegetation Index (NDVI) and Land Surface Temperature (LST) were used to identify the subtle differences in the thermal and spectral response patterns of different vegetation classes for the growing seasons (late March through October) of 2002 (drought year) and 2004 (normal year). NDVI is responsive to changes in the amount of green biomass and chlorophyll in the vegetation canopy, while LST is sensitive to the variations in available soil moisture which is a major contributor for overall growth and vigor of vegetation. Time-series analysis of NDVI and LST for 35 pixels representing irrigated and non-irrigated cropland, and grassland cover types located across various eco-regions of Nebraska was performed. Statistical analyses (paired t-test) revealed that 18 pixels (five irrigated, three non-irrigated cropland and ten grassland) experienced significantly higher mean LST as well as lower NDVI during the growing season in the drought year when compared to the “normal” year (α = .05). The results showed that LST combined with NDVI aids in identifying drought-induced stress on vegetation and perform a relative comparison of drought severity across the eco-regions.
Search and rescue refers to an operation mounted by emergency services to help locate those believed to be lost, ill, injured, or under distress. Mt. Rainier is a popular outdoor recreation destination that has been the site for many high profile search and rescue incidents over the past few decades. This study examines all search and rescue operations in Mt. Rainier National Park over a 3-year period and identifies trends related to the demographics and activities of those requiring search and rescue assistance, the nature and severity of their injuries, and the human and environmental factors contributing to the search and rescue incident. It also identifies seasonal trends in search and rescue operations, rescue methods, and notification methods such as the use of cell phones.

Doug Ramsey, Department of Rural Development, Brandon University, Brandon, Manitoba, R7A 6A9, ramsey@brandonu.ca. The End of an Era: The Demise of Flue-cured Tobacco Farming in Canada.

From a tornado in 1979 to a third quota buy-out in 2008, flue-cured tobacco farming has gone from the most profitable (legal) crop grown in Canada to a shadow of its former self. Once grown commercially in four Canadian provinces, the last remaining growers are concentrated in pockets of four counties in Southern Ontario. In 2007, farmers grew without a minimum selling price guarantee for the first time since the establishment of a marketing board in 1957. A final quota buy-out package announced by the Federal Government in July 2008 most certainly spells the end to the Ontario Flue-cured Tobacco Growers’ Marketing Board. This paper traces the important periods of restructuring, including: the establishment of a series of marketing agencies and associations between 1953 and 1957, expansion and industrialization of tobacco production in the 1960s and 1970s, retrenchment in the 1980s and early 1990s, recovery in the late 1990s and early 2000s, to the virtual elimination of the sector by 2008 – including tobacco farming and cigarette manufacturing. The paper concludes by outlining future prospects and development within what remains as the four-county, core tobacco-belt in Ontario.

Lesli M. Rawlings, Faculty of Geography, School of Natural Resources, University of Nebraska, Lincoln, NE 68583, lawlings2@unl.edu. The Modifiable Areal Unit Quandary and Omaha Public Schools’ Quest for a “Citywide” District.

Metropolitan public school districts across the United States are confronted with inadequate funding and socioeconomic segregation. Many urban public school districts attempt to ameliorate these problems by annexing territory from contiguous school districts. Nebraska’s most populous school district, Omaha Public Schools (OPS), has become faced with a decreasing tax base and an increasingly poor and minority student population. After failing to acquire additional state funding in 2005, OPS cited an 1891 law in an attempt to annex suburban school district territory inside Omaha City limits. OPS suggested its “one city, one school district” initiative would generate tax revenue and reduce poverty and minority student proportions in its district. However, suburban school district officials threatened by the proposed annexation argued that OPS would still have socioeconomic segregation at the elementary attendance zone scale. The purpose of this paper is to depict how the modifiable areal unit problem (MAUP) is present within school districts. The MAUP exists when data change with the selection of different areal unit boundaries. The expected percentages of non-white students and those eligible for free or reduced priced meals were mapped using a geographic information system at the school district and elementary school zone scales before and after a proposed OPS annexation. The results indicated that OPS’s proposed annexation would substantially increase its tax base and reduce the student poverty and minority proportions, but only at the district scale.

Kevin Romig, Department of Geography, Texas State University, San Marcos, TX 78666 Kevin_Romig@txstate.edu. Adapting Floodways as Commodity Corridors.

This research explores the application of using floodways and river features as important tourist corridors meant to attract sightseeing through development and marketing of retail and service-sector built environments. The foci of the study are the River Walk in San Antonio, Texas and Bricktown in Oklahoma City, Oklahoma which use flood control devices to simulate natural flowing waterways enhancing an urban redevelopment project. Landscape Appraisal is used to determine the unique values of both of these unnatural locales. The goal of this research is to aid in thinking more broadly about “nature” and “rivers” as subjective entities within the postmodern discourse. This paradigm will likely continue to be adopted based on the Oklahoma City venture’s success.
The Dimensions of Social Exclusion: How are Children's After-School Activity Opportunities Limited by the Transportation System?

This study investigates current and potentially desirable opportunities available for children’s afterschool activities in the Buffalo metropolitan area. The main objective is to find out if there are any social factors, such as the transportation system, that can limit children’s afterschool activity opportunities. A key concept discussed is ‘social exclusion,’ particularly children’s transport social exclusion. This issue has been newly received more attention by geographers as well as social scientists in general. This research involves identifying the geographical constraints children have in their everyday life, and questioning whether these constraints will limit their various learning opportunities. The result of this research will determine if it is possible that such constraints can exclude children from society today and in the future. To investigate children’s afterschool activity opportunities and its limitations, a survey is designed to be conducted for the young children ages 7 to 13. The survey has been conducted so far at two geographically and socially different settings in Buffalo, NY (i.e. urban vs. suburban areas and white vs. black neighborhoods): four community centers in the city of Buffalo and two afterschool activity centers in the suburbs. The influence of social factors in children’s mobility limitations will be examined based on previous literature review, census data analysis, and spatial analysis using transportation network. Locations of children’s activity places, types of activities, desired activities, and their mobility will be analyzed and then visualized through space-time analysis using GIS. A comparison based on various social factors of the study areas will also be presented.

Tyra A. Olstad, Department of Geography, Kansas State University, Manhattan, KS 66503, tolstad@ksu.edu.

Cultivating Space, Place, and Beauty on the Great Plains.

Although landscape aesthetics are a crucial part of a place’s identity, the intangibility and subjectivity of beauty make scenic vistas difficult to interpret and thus overtly value. The distant horizons and infinite skies of the Great Plains are particularly challenging to convey through small, flat images and the limited language of defined words; thus discussions of the region often overlook the defining sense of spaciousness to focus instead on more traditional physical and/or cultural dimensions. Chafed by increasingly negative reports of economic and demographic “emptying” that exacerbate pejorative perceptions of an “empty” landscape, however, inhabitants of the Great Plains have recently shown an eagerness to assert the breathtaking beauty of the region, experienced in dramatic moments as well as through subtle rhythms. Drawing on academic theory, local management policies and promotional brochures, newspaper and magazine articles, group manifestoes, and individual testimonies, this paper will explore the notion that aesthetic appreciation for spacious Great Plains landscapes is ripe for cultivation.

Tyra A. Olstad, Department of Geography, Kansas State University, Manhattan, KS 66503, tolstad@ksu.edu.

Wind Energy Siting in the Northern Great Plains.

Bimal K. Paul and Sohini Dutt, Department of Geography, Kansas State University, Manhattan, KS 66506, bkp@ksu.edu. Hazard Warning and Response to Evacuation Orders: The Case of Bangladesh’s Cyclone Sidr.

Cyclone Sidr, a Category IV storm, struck the southwestern coast of Bangladesh on November 15, 2007. Despite providing early cyclone warnings and issuing of emergency evacuation orders for coastal residents, thousands of individuals stayed at their homes. This study examines the Sidr warning dissemination process, assesses coastal residents’ responses to warnings and evacuation orders, and explores the factors which would explain why Sidr victims did or did not comply with the orders. Based on survey data collected from 257 Sidr survivors living in four most severely impacted coastal districts, this study found that more than 75% of all respondents were aware of the cyclone warnings and evacuation orders before the Sidr’s landfall. Despite efforts of the Bangladesh government, there were lapses in cyclone warnings and evacuation procedures. Field data also reveal several reasons cited by respondents for not complying with evacuation orders. Bivariate analysis of survey data shows that trust on warning message was the most important determinant in the decision to seek refuge in safer shelters, followed by distance to shelter, annual household income, occupation, and cattle ownership. Several recommendations have been made to improve cyclone warnings and the use of public shelters for similar future events.

Cyclone Sidr, a Category IV storm, struck the southwestern coast of Bangladesh on November 15, 2007. Despite providing early cyclone warnings and issuing of emergency evacuation orders for coastal residents, thousands of individuals stayed at their homes. This study examines the Sidr warning dissemination process, assesses coastal residents’ responses to warnings and evacuation orders, and explores the factors which would explain why Sidr victims did or did not comply with the orders. Based on survey data collected from 257 Sidr survivors living in four most severely impacted coastal districts, this study found that more than 75% of all respondents were aware of the cyclone warnings and evacuation orders before the Sidr’s landfall. Despite efforts of the Bangladesh government, there were lapses in cyclone warnings and evacuation procedures. Field data also reveal several reasons cited by respondents for not complying with evacuation orders. Bivariate analysis of survey data shows that trust on warning message was the most important determinant in the decision to seek refuge in safer shelters, followed by distance to shelter, annual household income, occupation, and cattle ownership. Several recommendations have been made to improve cyclone warnings and the use of public shelters for similar future events.

Bimal K. Paul and Sohini Dutt, Department of Geography, Kansas State University, Manhattan, KS 66506, bkp@ksu.edu. Hazard Warning and Response to Evacuation Orders: The Case of Bangladesh’s Cyclone Sidr.
During this century, the hypothesized climate change is expected to impact both the economy and environment of the Northern Great Plains (NGP). Any projection of these impacts is inherently uncertain due to our inability to predict the anthropogenic and natural factors, driving climate. An accurate analysis of these impacts requires (1) considering a variety of scenarios of climate drivers; (2) analyzing an ensemble of GCM projections. We present multiple projections of NGP regional climate for three different time periods (2020s, 2050s and 2080s). The climate parameters include winter, summer and annual temperature and precipitation, as projected by an ensemble of seven GCMs, downscaled to a uniform grid of 2.5’. We used the GCM databases from WORLCLIM and Tyndall Centre for Climate Change. The model simulation results will be presented for four IPCC SRES emission scenarios: a scenario from A1 group, A2, B1, and B2.

For North Dakota, our multi-model analysis returns very diverse results. The annual precipitation may increase by up to 21 mm by 2020s and 56 mm by 2050s. These estimates vary dramatically, depending on the GCM and the GHG emission scenarios such as A1FI correspond to very substantial annual temperature increase (8 °C by 2080s). Other scenarios with less emissions lead to considerably smaller warming (2-5 °C in B1). The 2020s warming is 1 - 2 °C, and 2050s warming is 2-5 °C. Temperature increase affects potential evapotranspiration (up by 10-180 mm at 2020s).

Geospatial stochastic and deterministic land-cover models have been successfully used in empirical modeling of transition potentials that is the likelihood that current land use would change from one cover type to another, based on suitability of land for the transition in question and the presence of driving forces of change. The rudiments of a land-cover model serve as a testbed for understanding the driving forces and the dynamics of land-cover change, as a platform to understand future economic and environmental implications of current conversion processes, and to serve as a means of projecting the impact of policy changes to the current trajectory. Markov chains have been widely used to model transition potentials at different spatial scales. This study was initially conceived as a geospatial analysis study to assess forest stewardship areas in North Dakota and model conversion processes that may influence subtle or significant changes in forest canopy cover. Here we have assumed land use change as a finite first-order Markov chain with stationary transition probabilities, and different categories as the states of a chain. Time homogeneity (time stationary) and Markov property (time independence) were tested using Pearson χ² goodness-of-fit tests. In our study we present key information concerning not only forest resource potential and vulnerability, but also the extent of professional management occurring around a given tract and offer new opportunities to complement federal management and easement activities already begun in key geographic areas within North Dakota.
1:40 - 3:20 p.m. Paper Session III

Session III-A  Challenges to Living in Cities and the Countryside (Lecture Bowl)
Moderator: Kenneth B. Beesley, Brandon University

1:40 - 2:00 p.m.  Kenneth N. French, Faculty of Geography, University of Nebraska-Lincoln. Segregation Levels of American Metropolitan Areas.

2:00 - 2:20 p.m.  Lesli M. Rawlings, Faculty of Geography, University of Nebraska, Lincoln. The Modifiable Areal Unit Quandary and Omaha Public Schools’ Quest for a “Citywide” District.

2:20 - 2:40 p.m.  Gunwha Oh, Department of Geography, State University of New York at Buffalo. The Dimensions of Social Exclusion: How are Children’s After-school Activity Opportunities Limited by the Transportation System?

2:40 - 3:00 p.m.  Gina K. Thornburg, Department of Geography, Kansas State University. Processes of Assimilation and Persistent Residential Spatial Segregation of Hispanics in Hutchinson, Kansas.

3:00 - 3:20 p.m.  Kenneth B. Beesley, Department of Rural Development, Brandon University. The Rural-Urban Fringe: Selected Development Issues.

Session III-B  Environmental Applications of Geospatial Technologies (River Valley)
Moderator: Lance D. Yarbrough, University of North Dakota

1:40 - 2:00 p.m.  Soizik Laguette and Michael Hill, Department of Earth System Science and Policy, University of North Dakota. Identifying and Mapping Potential Land for Switchgrass Production in North Dakota.

2:00 - 2:20 p.m.  Janet H. Gritzner and Bruce Millett, Department of Geography, South Dakota State University. Modeling Depressional Wetlands with IFSAR DTMs and ORIs.


2:40 - 3:00 p.m.  Peter G. Oduor, Department of Geosciences, North Dakota State University, et al. Critical Assessment of Temporal Dynamics on Stewardship-designated Areas using Geospatial Stochastic Processes.

3:00 - 3:20 p.m.  Lance D. Yarbrough, Department of Geology and Geological Engineering, University of North Dakota. Recent Research Efforts using the Next-Generation NASA Global Precipitation Measure (GPM) Proxy Data.

Saturday, September 13, 2008 - Memorial Union, University of North Dakota

1:40 - 3:20 p.m. Paper Session III

The management of natural resources have attracted significant federal focus due to past overexploitation of these limited resources over time and increased awareness of environmental impacts arising from these past practices. The Cooperative Forestry Assistance Act of 1978 authorized the Forest Stewardship Program (FSP) to provide technical assistance to Non-Industrial Private Forest (NIPF) landowners through State forestry agencies to encourage active long-term forest management. This study was undertaken to analyze NIPF landowners’ characteristics and behavior in order to develop new forest reprioritization strategies. The landowners’ characteristics and behavioral variables affect participation decision in forestry assistance programs offered by the North Dakota Forest Service, whose premier goal is socio-economic and resource development within the state of North Dakota and increased responsible public utility of managed areas. Multiple logistic regression models and two-way contingency table analysis were used to assess participatory characteristics of respondents from thirty-one counties in North Dakota. Based on the analysis, alternative prioritization strategies were introduced involving locational economic rent and geospatial analyses in a Geographic Information System (GIS). The alternative prioritization strategies scaled potential forest stewardship priorities into smaller manageable classes reducing aerial redundancy and helped improve best management practices. In this study, we also offer suggestions on future forest stewardship survey building blocks for better public awareness campaigns.

Darrell Napton, Department of Geography, South Dakota State University, Brookings, SD 57006 and USGS EROS, Darrell.Napton@sdstate.edu. Geography of Per Capita Developed Land Demands in the Eastern United States.

The 20 eastern ecoregions of the United States account for 20 percent of the nation’s conterminous land area. Three-fifths of the East is forested and one-quarter is devoted to some type of agriculture. The East also includes substantial metropolitan areas. In 1970, the region’s population was 93 million and it increased to 124 million by 2000. As a result of the population increase and driving forces that encouraged low density growth at city edges and in rural areas, forested and agricultural land cover declined during the 1973 to 2000 study period. Accommodating the East’s 31 million new residents took 3.7 million hectares (9.1 million acres) of land. The ecoregion per capita demand for developed lands varied from 0.02 to 0.39 hectares in 1980. The highest land demand was in the South where land ownership and country living are strong cultural values. High per capita land demands also were common in sparsely populated ecoregions that attracted retirees and second home purchasers. After 1980, per capita land consumption for development land decreased in half of the ecoregions. Those that had the greatest per capita land use also showed the most substantial decreases. Meanwhile, land consumption rates increased in much of the Northeast, including northern Megalopolis. Forest and agriculture land uses competed with each other because of changing land demands and driving forces, but the most competitive land demand was for housing and associated developed uses.

Jordan L. Neau, Department of Geography, University of North Dakota, Grand Forks, ND 58202. Jordan.neau@und.nodak.edu. Success of Renaissance Zone Program in Northeastern North Dakota Communities.

North Dakota has had the Renaissance Zone Program available to qualified North Dakota communities for a little more than a decade. This study will look at the success of North Dakota’s Renaissance Zone Program in Northeastern North Dakota communities. A survey is being used as the main research method. Renaissance Zone Coordinators from each of the seven Renaissance Zone communities located in Northeastern North Dakota will be interviewed. Results from the survey are expected to show the degree of success each community has had with its Renaissance Zone Program, the driving forces behind involvement in the program, the types of projects resulting from enrollment in the program, and the number/type of jobs/economic gain to the community created by these projects. The research is expected to show that the communities in Northeastern North Dakota enrolled in the Renaissance Zone Program have had success with the program and have increased community economic development/revitalization.
Roger P. Miller, Department of History and Social Science, Black Hills State University, Spearfish, SD 57799, rogermiller@bhsu.edu. A Case Study of Geography Teaching in Three Countries.

Three Geography classes were filmed in Australia, Japan, and the United States in order to ascertain whether there were significant differences in the respective teaching methods. The conclusions will only apply to those instructors surveyed in person. Language and technology considerations made the study more difficult but previous teaching experience and visits to higher education institutions within each country assisted the researcher with his final observations and inferences. Permission was required from those target students in Australia and the United States but not from their Japanese counterparts. Extracts from each of the chosen lessons will be shown during the presentation prior to synthesis. Discussion will focus on a comparative analysis of different pedagogical techniques.

Benjamin M. Munro, Department of Geography, Kansas State University, Manhattan, KS 66506, bmunro@ksu.edu. Geopolitics of Wheat Farming in North Dakota: 1862 – 2002.

Historical accounts of the development of large-scale industrial agriculture in the U.S. are dominated by standard economic and free market-capitalist perspectives. Using a political ecology framework, this paper analyzes a case study of the emergence of wheat-based agriculture in North Dakota. It finds local, national and global interdependencies in the patterns of settlement and economic growth in the northern Great Plains, and suggests that political ecology can help explain regional particularities within global relations of agricultural production and trade.

Laura B. Munski, Dakota Science Center, Grand Forks, ND 58201 and William Wetherholt, Douglas C. Munski, and Ben Prusa, Department of Geography, University of North Dakota, Grand Forks, ND 58202, douglas_munski@und.nodak.edu. Reflections on NDView Geographic Education Programming for the Summer of 2008.

Geographic education partnerships are most effective when PVO/NGOs work with universities to provide K-12 outreach activities for teachers and their students. The Dakota Science Center of Grand Forks, North Dakota, and the University of North Dakota’s Department of Geography have such a partnership by working through NDView, a USGS-funded program for general dissemination of remote sensing, GPS, and GIS materials statewide. Ending Year Three of a programming cycle begun in 2006, this project continued in its mission to existing and new constituencies in eastern North Dakota and northwestern Minnesota. The 2008 program was multi-pronged. Phase One was a half-day of geo-caching at the Grand Forks campus on July 28 for students in grades 5-8. Phase Two was a two-day, K-12 teacher workshop on July 30-31 in the Department of Geography focused upon fundamentals of GPS, GIS, and remote sensing by using Google Earth. Phase Three was a presentation to a North Dakota Forest Service-based traveling workshop visiting Grand Forks on August 4-5. Phase Four, another two-day workshop on campus for K-12 teachers, was held on August 6-7 and emphasized a standard model to introduce GIS to people unfamiliar with geospatial technologies. The overall 2008 summer program results indicated sufficient success to justify continuation of planning outreach activities for the 2009 summer. Consequently, this consortium is moving ahead with its three-year programmatic cycle and seeking new venues and partners, e.g., Bottineau and the North Dakota Forest Service, to promote geospatial technologies as an aspect of geographic education in the future.

Laura B. Munski, Dakota Science Center, Grand Forks, ND 58201 and William Wetherholt, Douglas C. Munski, and Ben Prusa, Department of Geography, University of North Dakota, Grand Forks, ND 58202, douglas_munski@und.nodak.edu. Reflections on NDView Geographic Education Programming for the Summer of 2008.

Saturday, September 13, 2008 - Memorial Union, University of North Dakota

1:40 - 2:00 p.m. Paper Session III

Session III-C Dynamic Economic and Social Transformations of Political Landscapes (Badlands)

Moderator: Ashley J. Barnett, University of Nebraska-Lincoln

1:40 - 2:00 p.m.  Steven Jennings, Department of Geography and Environmental Studies, University of Colorado at Colorado Springs. Soviet Monuments in a Post-Soviet World, a Case Study from Estonia and Latvia.

2:00 - 2:20 p.m.  Andrew G. Allen, Department of Geography, University of Kansas. Do Theories of Territorial Compactness Apply to Sub-Saharan Africa?


2:40 - 3:00 p.m.  Benjamin M. Munro, Department of Geography, Kansas State University. Geopolitics of Wheat Farming in North Dakota: 1862 – 2002.

3:00 - 3:20 p.m.  Ashley J. Barnett, Department of Geography, University of Nebraska-Lincoln. In Spite of Topographic Advantage: Archaeological Insights into Syria’s 1967 Defeat in the Golan Heights.

Session III-D North Dakota View Program (Prairie)

Session Organizer: Bradley C. Rundquist, University of North Dakota

Moderator: Douglas Munski, University of North Dakota

1:40 - 2:00 p.m.  Amanda L. Gearhart, Hettinger Research Extension Center, North Dakota State University. NDView Scholarship/Use of Very Large Scale Aerial Imagery for Rangeland Survey.

2:00 - 2:20 p.m.  Fawn C. Wasin Zi and Brett J. Goodwin. Wetland Function of On- and Off-Site Mitigation Wetlands in the Prairie Pothole Region of North Dakota.


2:40 - 3:00 p.m.  Stacie Blue, Environmental Science Coordinator, Turtle Mountain Community College, and Bradley C. Rundquist, Department of Geography, University of North Dakota. Development of the Turtle Mountain Field Station: An NSF-Sponsored Project to Strengthen Geospatial Technologies Education.

3:00 - 3:20 p.m.  Laura B. Munski, Dakota Science Center, and William Wetherholt, Douglas C. Munski, and Benjamin Prusa, Department of Geography, University of North Dakota. Reflections on NDView Geographic Education Programming for the Summer of 2008.

3:20 - 3:40 p.m. Poster Session / Exhibits / Refreshment Break (North Ballroom)
Psi Chapter of GTU to Celebrate 60th Anniversary in 2008!
Chartered on November 19, 1948, the Psi Chapter of Gamma Theta Upsilon celebrates its 60th year of continuous operation as the local chapter of the geography discipline’s international honor society in the Department of Geography at the University of North Dakota. Established under the leadership of Dr. Bernt Lloyd Wills, members of the initial class included individuals such as Prof. Melvin Kazeck and Prof. Henry Ragaz who were prominent in promoting geography as a discipline in the universities and state colleges of North Dakota during the 1950s through 1970s. Future classes of pledges to the Psi Chapter would help to diffuse geography as a field of study in regional and national higher education settings during the 1960s through the present but also would be found working as geographers in the private sector and all levels of government. Alumni of the Psi Chapter were prominent in national activities of Gamma Theta Upsilon during the 1970s through 1990s and included Dr. Gary Johnson (currently UND’s Vice President for Research) becoming International President from 1984-1986 with past chapter advisors such as Dr. William A. Dando and Dr. Douglas C. Munski having various national responsibilities on the executive board of the organization. Although less prominent in representation at the national level since turn of the 21st Century, the chapter has maintained a strong presence on the local campus and continues to promote undergraduate and graduate student participation in the professional development such as regional and national meetings of the Association of American Geographers. It is with much pride and excitement that it current members, its alumni members, and its current and past chapter advisors welcome fellow geographers to the University of North Dakota where our discipline has been present in some fashion throughout the 125 years of this institution of higher education and at which we strive to go from being excellent to exemplar as we enter the era of the 11th president of our campus, Dr. Robert Kelley, who is being inaugurated on September 12, 2008. You also are invited to return to Grand Forks on November 19, 2008, when the Psi Chapter celebrates it 60th anniversary as we move from tradition to tomorrow!

Kendra K. McLauchlan, Elias J. Martinson, Iris E. Wilson, and John Harrington, Jr., Department of Geography, Kansas State University, Manhattan, KS 66506, iewilson@ksu.edu. Trees as Sentinels of Environmental Change: A Tool for Ecological Forecasting
Natural environmental variation and human-induced change can influence ecosystem functioning. The chemical composition and incremental growth of wood from living trees have the potential to provide several indicators of environmental conditions. In areas with temperate climate, annual rings record growth conditions, especially if the tree is located in a site sensitive to environmental stressors. To assess the impact of climate variation and local anthropogenic changes in the Flint Hills grasslands, we accessed this high-temporal resolution paleorecord of environmental change. Wood from burr oak trees (Quercus macrocarpa) in the King’s Creek watershed of Konza Prairie Biological Station in Kansas was analyzed for ring width, nitrogen concentration, and isotopic composition of nitrogen. We demonstrate the types of information contained in these records, using an example of a 140-year-old tree whose growth correlated with land use changes during the 20th century. Local changes in burn regime and grazing frequency are likely at least as important as global changes such as elevated atmospheric carbon dioxide concentration and nitrogen deposition. Information on how burr oak trees respond to the complex interplay of natural and human-induced variation will greatly assist efforts to forecast 21st Century changes in ecosystem services. Benjamin K. Meade, Mark A. Gossard, and Richard A. Marston, Department of Geography, Kansas State University, Manhattan, KS 66502, meade@ksu.edu. The Spatial Extent and Causes of Channel Incision in the Black Vermillion Watershed of Northeastern Kansas
The Black Vermillion River (BVR) drains a watershed (1310 square kilometers) of predominantly agricultural land in northeastern Kansas. The surficial geology of the watershed is comprised almost entirely of windblown loess deposits during the late stages of Wisconsinan glaciation (Luttenegger, 1987) and glacial till that was deposited during the waning stages of the earlier Pleistocene-age Kansan glaciation (Merriam, 2003). These deposits have been noted for their susceptibility to severe erosion. Previous studies in the Midwest have documented the combination of erodible soils and human disturbance as leading to highly unstable stream channels (Simon and Rinaldi, 2000). In this study, a BVR watershed-wide survey of channel cross sections at 129 locations throughout the watershed was completed in 2008. These were compared to a set of channel cross sections that were measured by the Soil Conservation Service in 1963. We measured the difference in channel incision between the cross sections from 1963-2008 throughout the BVR watershed. Our aim was to identify areas of the watershed where incision and instability are more prevalent and to identify potential causes of that incision and instability. This study is a section of a larger project that is aiming to identify sources of sediment throughout the BVR watershed in attempts to understand sediment input into Tuttle Creek Lake, a large federal reservoir (volume=327 million cubic meters) northeast of Manhattan, Kansas that is predicted to completely fill with sediment by 2023 (Zeigler and Juracek, 2006).
In 2007, 2.1 million ring-necked pheasants were harvested in South Dakota by some 181,000 hunters. This brought in over $219 million to state and local economies, reinforcing South Dakota’s claim as the Pheasant Capital of the World.

Over the past century, pheasant populations have fluctuated dramatically, with most of the changes driven by human decisions that affect land use change and amplified, either positively or negatively, by weather and climate. This concept will be evaluated and other hypotheses will be provided to explain the vast differences between these two neighbors.

Israel’s 1967 Six Day War, though short in duration, created major geopolitical ramifications for Israel and the surrounding Arab states. Though remains of the conflict do not fall within the traditional realm of Israeli archaeology, I contend that archaeological investigations of sites from this conflict may provide additional information about Syrian experiences in the conflict, something which is rarely publicized in the West. I outline the historical background of the conflict and possible remains from the war, focusing primarily on the Golan Heights, and offer a theoretical research proposal for the archaeological investigation of the Six Day War in the Golan Heights.

The rural-urban fringe is an environment where competition for land is high, where conflict involving different land uses, a space for larger urban-related recreational-tourist land uses, and a place for more urban development. Almost all mapped area, which provides visual context and contrast, is a Great Plains region which is demarcated following criteria used for the Encyclopedia of the Great Plains (David Wishart, ed.; University of Nebraska Press, 2004) to include 593 U.S. counties and 40 Canadian census divisions. So demarcated, the Great Plains contains about 25.4 million people (2006 estimate), or 7.7% of the total population of Canada and the U.S., and covers about 962,000 square miles, or 13.9% of the total land area of Canada and the U.S. The goal of the Atlas of the Great Plains is to communicate to readers the substantial geographic diversity of the region, and in doing so, counter notions about the lack of place-to-place variations in the human environment and the Great Plains. The Atlas of the Great Plains will be organized as follows: Reference Maps; Land and Environment; History; Population; Rural Settlement and Agriculture; Urban Settlement and Economy; Politics and Government; Services and Recreation; and Social Indicators. Examples of maps from each section of the Atlas will be shown.

Montana’s game species were at one time brought to near extinction through exploitation and the myth of superabundance. Today they are seen as one of the state’s most prized possessions with millions of dollars spent annually on their sustainability through the management efforts of Montana Fish, Wildlife and Parks. Funding for Montana Fish, Wildlife, and Parks is provided through a hunter and manufacturer sponsored excise equipment tax known as the Federal Aid in Wildlife Restoration Program, or more commonly, the Pittman-Robertson Act, as well as state hunter license revenues. Conservation efforts provided through these funds are directly and indirectly responsible for increased harvest numbers and hunter participation, as well as the expansion of lands conserved to sustain these populations. By providing a healthy and diverse variety of game species, the state of Montana is able to continually increase the number of hunters to the state. This increases hunter expenditures that fund additional conservation efforts, while at the same time contributing to local economies via food, lodging, equipment, and transportation expenditures. Hunting related expenditures, hunter participation, and game species harvest data was collected from Montana Fish, Wildlife and Parks in conjunction with the U.S. National Survey of Fishing, Hunting and Wildlife-associated Recreation to determine if there exists a positive spatial and temporal coincidence between hunter-related expenditures, harvest numbers, hunter participation numbers, and community economies.
Mark Blore and Gregory Vandenberg, Department of Geography, University of North Dakota, Grand Forks, ND 58202, Mark.Blore@und.nodak.edu. Concentrated Animal Feeding Operations in the Devils Lake Basin, ND, and their Effect on Water Quality.

In the state of North Dakota, a large Concentrated Animal Feeding Operation (CAFO) is defined as having more than 2500 swine weighing greater than 55 pounds. Large concentrations of other types of livestock can also be designated as CAFO’s. Typically, CAFO’s will store waste in a lagoon for later use on fields as fertilizer. The storage lagoon and the field application of waste can lead to contamination of both surface and ground water. The purpose of this study is to determine what effect, if any, a CAFO has on surface water quality, versus a similar watershed with no CAFO’s. The study area includes the Mauvais Coulee and the Edmore Coulee in the Devils Lake Basin. The Mauvais Coulee watershed has three swine CAFO’s that may contain as many as 47,000 animals at one time. Small grains, row crops and hay crops are the predominant land use in the area. The Edmore Coulee has similar land uses, but no CAFO’s. Water sampling is currently underway in the Mauvais Coulee watershed. Data from the current sampling, along with data collected from USGS water quality monitoring stations will be compared with data from the nearby Upper and Lower Edmore Coulee’s, which have no CAFO’s in their operations.

Stacie Blue, Environmental Science Coordinator, Turtle Mountain Community College, Belcourt, ND 58316, and Bradley C. Rundquist, Department of Geography, University of North Dakota, Grand Forks, ND 58202, stacie.blue@tm.edu. Development of the Turtle Mountain Field Station: An NSF-Sponsored Project to Strengthen Geospatial Technologies Education.

The Turtle Mountain Community College (TMCC) located in Belcourt, North Dakota, and the University of North Dakota (UND) located in Grand Forks, are collaborating to develop a strong foundation for a geospatial technologies program enhancing the STEM programs within TMCC and regional secondary schools through development of the Turtle Mountain Field Station (TMFS), which will serve as a geospatial technologies hub located within the TMCC campus. Geospatial technologies include Geographic Information System (GIS), the Global Positioning System (GPS), and Remote Sensing. The union of these technologies creates a myriad of possibilities in research that will support the goal of the TMFS to provide greater STEM opportunities to the communities in the north-central region of North Dakota. The TMFS will involve Native American college students, tribal community educators, tribal environmental specialists, rural secondary school teachers, and rural secondary school computer technicians in establishing and expanding educational geospatial technologies programs for students of rural secondary and post-secondary schools in North Dakota.

Andrews Boateng, Donald C. Rundquist, Center for Advanced Land Management Information Technologies, School of Natural Resources, and Walter Schacht, Department of Agronomy and Horticulture, University of Nebraska-Lincoln, Lincoln, NE 68583,aboateng2@unl.edu. Non-Destructive Estimation of Above-ground Biomass from Airborne Hyperspectral Data in Rangeland Environment.

Accurate estimation of above-ground biomass is of great importance in range management. It is a key variable for assessing ecosystem productivity and structure across grassland landscapes. The traditional measurement approach makes use of destructive sampling and weighing of clipped material. The objectives of this study were to test the utility of hyperspectral data acquired by an Airborne Imaging Spectrometer for Applications (AISA Eagle) for remote estimation of above-ground biomass in a rangeland environment and to determine which spectral-vegetation indices provided the best estimates. Results suggest that the AISA-Eagle data are useful in predicting above-ground biomass in rangeland conditions such as the Nebraska Sandhills. The Red Edge Index (REI) and the Soil Adjusted Vegetation Index (SAVI) were the best predictors (R² = 0.88 and 0.77 respectively, at p<0.05), when compared to the Normalized Difference Vegetation Index (NDVI) and the Enhanced Vegetation Index (EVI).

Steven Jennings, Department of Geography and Environmental Studies, University of Colorado at Colorado Springs, Colorado Springs, CO 80933, sjennings@uccs.edu. Soviet Monuments in a Post-Soviet World, a Case Study from Estonia and Latvia.

The disintegration of the Soviet Union in the late 1980s brought wholesale changes to the geography of Eastern Europe. One change in the landscape of the newly emerging independent countries of the region was the removal of Soviet monuments. Statues of Lenin quickly disappeared from the post-Soviet landscape, but more intractable are monuments which memorialize the sacrifices of the Soviet military in the liberation of Eastern Europe from the Nazis at the end of World War II. Their removal is called for by nationalist factions while their preservation is espoused by pro-Russian groups. As a result these monuments are a source of civil unrest because they serve as the focal point for these competing ideologies. A comparison is made between the Bronze Soldier Monument in Tallinn, Estonia, and the Victory Monument in Riga, Latvia. Each has distinctive geographic and cultural attributes which influence the role that they play in the societies of their respective countries. Location within the city, age of construction, and type of memorial all have an influence on the role that these monuments play in each city. The Bronze Soldier Monument has proven to be more problematic when compared to the Victory Monument which can be attributed to a variety of factors.

Jin-Kyu Jung, Department of Geography, University of North Dakota, Grand Forks, ND, 58202, jinkyu.jung@und.edu. Where is Qualitative Data in GIS?: Extending Qualitative Capabilities in GIS.

There has been increasing attention across GIScience research for ways of incorporating qualitative spatial analysis in a GIS environment. For example, the issues like cognitive mapping and spatial and temporal reasoning are interested in the representation of qualitative spatial expressions and spatial analysis that uses qualitative spatial reasoning. On the other hand, there have been equally impressive efforts by critical human geographers who try to find a way to combine GIS with qualitative research as a way of mixed-method research. Both groups have similar interests in terms of engaging GIS with the ‘qualitative’ data, which are often more subjective and descriptive. However, their respective methodologies seemed to be very different each other. This research begins with discussing various meaning of the ‘qualitative’ data in GIS, and pull together diverse practices of engaging qualitative capabilities in GIS: how GIScientists treat ‘qualitative’ data and implement this notion to GIS structure, and how well-grounded contextual qualitative data could be included in GIS by human geographers. Then, I would present new systematic design and methodology in GIS: Computer-Aided Qualitative GIS (CAQ-GIS). This approach will suggest the GIS structures that users can use for storing, retrieving and analyzing qualitative data in GIS, and, particularly, capable of linking to qualitative data analysis software for grounded theory analysis. I suggest the qualitative capabilities in GIS have led to the growing forms of repertoire of GIS, and this paper is a partial response to this new trend.

Sozik Laguette and Michael Hill, Department of Earth System Science and Policy, University of North Dakota, Grand Forks, ND 58202, Laguette@aoer.und.edu. Identifying and Mapping Potential Land for Switchgrass Production in North Dakota.

Switchgrass (Panicum virgatum L.) a native, perennial, warm-season C4 grass, is a potential renewable bioenergy crop for North Dakota. Switchgrass biomass can be burned directly to generate electricity or heat space, or can be converted into biofuel products. In addition, switchgrass production has distinct environmental advantages and is valuable for wildlife habitat. The adoption of switchgrass into the traditional cropping system depends on its productivity and economic returns for producers. Economic returns depend, in part, on the sustained break-even yield of switchgrass. Sustained yield threshold is site specific and depends on agrometeorological parameters, such as maximum or minimum temperature, precipitation, and growing degree day, and species and cultivar characteristics, as well as management practices. This research examines the potential for identifying areas for optimal production of switchgrass in North Dakota, using a decision‐tree classification model for exploration of scenarios based on different environmental thresholds. The study was conducted for the State of North Dakota. Only agrometeorological and soil data was considered. All data were gridded at 2.50 arcmin (4km) spatial resolution for analysis. The classification is consistent with North Dakota climate and land-use patterns. The eastern part of the State, under intensive agriculture use, is mainly classified as Potentially Suitable, while a distinct south-central region is classified as Unlikely Suitable. This region is characterized by significant fluctuation in precipitation received throughout the growing season. The results give a first map of the potential zones for switchgrass production in North Dakota. However, the research still needs to be deepened and refined.
Erik Bowles, Department of Geography, Kansas State University, Manhattan, KS 66506. Preliminary Results for Classifying Heat Waves in the U.S.

There has been a considerable amount of work done focusing on individual heat wave events and the effects of extreme heat on human sensitivity. However, there has not been a broad-scale attempt at identifying heat stress exposure spatially and temporally. This study presents the early results of classifying heat waves on a 1-5 scale. A previously-designed model classifying heat stress for agriculture was used as a foundation for the design of the system applied in this research. Hourly temperature and humidity values were combined to create a heat index value, which was then accumulated daily to obtain a heat stress accumulation value from 0 to 5. The event of at least three consecutive days classified as a Category 1 or higher was considered a heat wave hazard. Tables and maps are provided as a basis for heat stress analysis in the United States from 1980 – 2001. The new system has proven to be applicable to all 70 weather stations in this research with normalized categories allowing for direct and objective comparisons of heat wave events across the U.S.

Lindsay R. Bressler, Department of Geography, South Dakota State University, Brookings, SD, 57006, Lindsay.Bressler@sdstate.edu. Wind Energy Siting in the Northern Great Plains.

The global dependence on fossil fuels has opened the eyes of the world to the importance of renewable energy. Energy harnessed from the wind has already begun to alleviate these dependencies, providing clean, renewable electricity to countries around the world. United States wind energy production is ever increasing and is accompanied by a conscious effort to maximize production by developing in regions with the greatest wind resources. One such region is the Northern Great Plains Ecoregion, located in the Central Northwest. This region’s growing emphasis on renewable energy (i.e. wind), has potential to undergo significant changes in the landscape due to wind energy siting. Unfortunately, the geographic locations of wind farms and their physical structures (i.e. turbines) may negatively impact wildlife and their habitats (e.g. collision mortality, disturbance displacement, and habitat loss). As both of these elements (i.e. renewable energy and wind) are important to the future of the Northern Great Plains Ecoregion, research quantifying the potential wildlife friendly areas is necessary. This research will use Geographic Information Systems (GIS) to develop maps illustrating areas of high wind potential and wildlife concentrations through suitability modeling. This research will focus on three species native to the Northern Great Plains Ecoregion; Black-tailed Prairie Dogs (Cynomys ludovicianus), Greater Sage-Grouse (Centrocercus urophasianus), and Pronghorn (Antilocapra americana). Characteristics of potential wind farm sites will be evaluated and potential guidelines will be presented. The objective of this research is to identify areas suitable for wind farms with low concentrations of wildlife to minimize their negative impacts.

Rebecca A. Buller, Faculty of Geography, University of Nebraska- Lincoln, Lincoln, NE 68583-0962, rbuller1@bigred.unl.edu. Intersections of Entertainment and Place in Long Pine.

During the Roaring Twenties, visitors to the rural north-central Nebraska community of Long Pine were introduced to the wide variety of entertainment possibilities that the place had to offer. A day could be spent tubing down the cool waters of the natural spring fed creek, swinging for a hole in one, whooshing down the slide at The Plunge, canoeing across the tranquil waters of the mill pond, meeting friends for drinks and a steak, catching the latest flick at the theater, spending a quiet evening reading in a rented cabin, or dancing the night away at the Pavilion. As European Americans developed the settlement of Long Pine in the late 19th and early 20th centuries, newcomers began to consume the space, establishing a place full of entertainment opportunities. From chaunautqua to The Tourist Park to Hidden Paradise, an examination of modes of entertainment reveal the place of Long Pine—including place development, place consumption, sense of place, and place attachment. Furthermore, the social historical geography of the area reflects the ways in which activities replicated hegemonic relations of race, ethnicity, gender, and class. For the study, qualitative methods were utilized to query data sources such as newspapers, hotel ledgers, tourism advertisements, and land records. Humanistic, feminist, and post-colonial theoretical frameworks helped to guide the narrative. Further research will determine the extent to which Long Pine is indicative of entertainment in rural areas of Nebraska in the late 19th and early 20th centuries.
Rows of corn and soybeans that stretch on for miles are a common sight in southern Minnesota today. In the last century, there have been some remarkable changes in farming that have modified the way the landscape looks. These changes in farming correspond not only with changes in the landscape, but also with changes in population. Brown County, Minnesota, clearly exhibits these changes and is a prime example of a rural county in which the farm population has coupled with exposed locations as a function of slope and aspect.

Automated sensors (HOBOs from the Onset Solstice) recorded air temperatures every ten minutes over a diurnal cycle in June of 2007, close to the Summer Solstice. Quantitative results show the highest air temperatures are experienced near the bottom of the canyon, but this may not reveal the best location for the new rest house. Qualitative observations, along with analysis of terrain in ArcGIS 9.2, reveal ideal locations may exist at higher elevations than at the absolute bottom (riverside).

From Cocoa to “Commesse:” the Development of Underdevelopment

Johnny Coomansingh, Department of Geography, Division of Social Science, Minot State University, Minot, ND 58701, johnny.coomansingh@minotstateu.edu. From Coca to “Commesse:” the Development of Underdevelopment in Sangre Grande, Trinidad.

Up the surge of fortunes emerging from the windfalls of hydrocarbon exploits in Trinidad during the mid-1970s to the early 1980s, and more recently, the rise in prices of petroleum products on the world market, many of the smaller towns of the country saw unprecedented population growth coupled with uncontrolled “development.” The northeastern town of Sangre Grande, otherwise known as Cunapo, is one such place. Concomitant with the trickle-down of “petro-dollars,” small business enterprises, and processing plants. In terms of population, Cunapo is growing exponentially but has remained unchanged with regard to its primary infrastructure with one exception, the termination of the British-built rail transport system. There seems to be development in terms of the amount of personal vehicles on the road but this trend sits itself down to entropy. Sangre Grande is now experiencing the odium of underdevelopment.

Badlands are characterized by high erosion rates, involving different proportions of rain splash, overland flow, sheet wash, concentrated flow and pipe flow as significant developmental processes. Climatic, as well as lithologic conditions are important factors for natural badland development. Amongst these, the influence of solar radiation income on the dissipation of poorly drained organic material in these landscapes is of great influence on all weathering and erosional processes yet remains insufficiently studied. In the Avonlea Badlands, 60 km south east of Regina, Saskatchewan Canada we studied three different representative badlands surfaces: a basal pediment surface, a mid-slope on bentonite mudstone with typical popcorn surface, and an upper slope with mud cemented sandstone. These surfaces present distinctly different slope, aspect, texture, and albedo characters that interact in different ways to the income of broadband solar radiation – an important determinant of many badland slope processes. It is shown how these factors influence the magnitude of many key components of slope development, including the desiccation of surficial material and the exacerbation of freeze-thaw cycles. The latter is of particular importance during the winter when the different badland surfaces engender conditions that occur during this otherwise dormant period. Bratt’s Lake Observatory, a Baseline Surface Radiation Network (BSRN) station of the World Climate Research Programme is located within the Avonlea Badlands. This proximity allows climatic data, especially those describing solar radiation, to be used to model and describe the environmental conditions of the region.

Michael D. Heitshusen, Department of Economics and Geosciences, United States Air Force Academy, USAF Academy, CO 80840, william.heitshusen@usafa.edu. Search for Optimal Rest House Location along Grand Canyon National Park's South Bright Angel Trail. This project addresses the search for an optimal location to place a new rest house along the South Bright Angel Trail, Grand Canyon National Park, AZ. “Optimal” location is in part defined as a function of increasing air temperatures coupled with exposed locations as a function of slope and aspect. Automated sensors (HOBOs from the Onset Corporation) recorded air temperatures every ten minutes over a diurnal cycle in June of 2007, close to the Summer Solstice. Quantitative results show the highest air temperatures are experienced near the bottom of the canyon, but this may not reveal the best location for the new rest house. Qualitative observations, along with analysis of terrain in ArcGIS 9.2, reveal ideal locations may exist at higher elevations than at the absolute bottom (riverside).

A User Friendly GIS Based Graphical Process Model for Multiple Natural Hazard Assessment.

A Multiple Natural Hazard Assessment (MNHA) procedural model was developed to provide a comprehensive view of natural hazards across communities in the form of different individual and composite hazard geospatial layers. The hazards are integrated with natural landform units called geomorphic terrain units, a defining characteristic of this model. The original cell based model was built using map algebra statements within ArcGIS Desktop, making it difficult for users to quickly run the model without assistance. The focus of this project was to develop a simple, flexible and robust graphic model using ModelBuilder within ArcGIS Desktop, as well as clear documentation on the construction, implementation, and interpretation of the model. The graphic model was first constructed as a series of smaller sequential operations, representing key tasks associated with the different phases of the MNHA model. Specific model parameters, such as input by users were added to each model diagram. The complete model was tested and stored with the earlier subset operations in a toolbox, allowing users to access any component or the complete model. Testing was done using multiple hazards data from southern Davis County, Utah. Specific natural hazards included surface fault rupture, liquefaction potential, rock fall, landslide susceptibility, flooding, and debris flow. Preliminary results were encouraging. The model provides a more efficient workflow and semi-automation along with the flexibility to easily edit the process elements and parameters. The results from an independent review of the graphic model documentation are forthcoming and will be presented at the meeting.

William D. Heitshusen, Department of Economics and Geosciences, United States Air Force Academy, USAF Academy, CO 80840, william.heitshusen@usafa.edu. Search for Optimal Rest House Location along Grand Canyon National Park's South Bright Angel Trail. This project addresses the search for an optimal location to place a new rest house along the South Bright Angel Trail, Grand Canyon National Park, AZ. “Optimal” location is in part defined as a function of increasing air temperatures coupled with exposed locations as a function of slope and aspect. Automated sensors (HOBOs from the Onset Corporation) recorded air temperatures every ten minutes over a diurnal cycle in June of 2007, close to the Summer Solstice.
In 1917, Henrietta Hull convinced her editor at the El Paso Times to send her to France to report on the “Great War”. While Hull, or Peggy as she was known to her readers, was not the only woman who traveled to Europe during the “Great War”, she was one of the first American female war correspondents to travel there. Her experience helped pave the way for women journalists to occupy positions as war correspondents. The events of World War I provided American women new opportunities of spatial and social mobility which had previously been unavailable to most. Hull’s position as the first female war correspondent symbolized the changing social roles open to women in American society. This paper will explore journalist Peggy Hull’s life and experience as indicative of the spatial and social mobility newly available to women at the outset of the “Great War”. The paper will include a short biography of Peggy Hull and contextualize her experience in the larger movement of changing mobilities for women.

Scott Headrick and Savvi Neuber, Department of Geography, University of Wyoming, Laramie, WY 82071. Fire and Climate Relationships in the Black Hills of South Dakota.

We examine connections between fires in the Black Hills of South Dakota and climate during 1979 – 2002. Fire years were selected from the Black Hills National Forest Service database determined by acreage burned (>1000 acres) and ignition source (e.g. natural cause). Climate anomalies were calculated for May, June, and July of the selected fires years (1980, 1985, 1991, 2000, 2001), using the 32-km gridded North American Regional Reanalysis (NARR) data set from the National Center for Environmental Prediction (NCEP) National Center Atmospheric Research (NCAR). Climate – anomaly maps were created to illustrate the surface and atmospheric conditions at the beginning of the fire seasons. The climate variables considered include those that represent surface conditions (soil moisture, surface precipitation and temperature) and atmospheric conditions (atmospheric pressure at 500 mb, specific humidity at 850 mb, and vertical velocity at 500 mb). Our results show that during the selected fire seasons lower-than-average soil moisture, lower-than-average precipitation, and higher-than-average surface temperatures dominate the region. Large – scale circulation (atmospheric pressure at the 500mb level) composite anomalies indicate the presence of an enhanced ridge with an axis centered on the Dakotas, Nebraska, and Kansas. Additionally, during the selected fire years the composite – anomaly maps of specific humidity indicate drier – than – normal conditions coupled with enhanced sinking motions (vertical velocity) indicating both a lack of moisture availability and a mechanism for suppression of precipitation. Considerations of multiple climate variables that encompass surface conditions as well as mechanisms that suppress precipitation provide a detailed perspective on fire vulnerability.

Travis W. Hoggie, Recreation & Tourism Studies Program, University of North Dakota, Grand Forks, ND, 58202-7116, travis.hoggie@und.edu. Search & Rescue Operations in Alaska’s National Parks.

As increasing numbers of outdoor users turn to the wilderness for recreation, the medical community and search and rescue (SAR) organizations are contending with a growing number of lost, ill, and injured persons. Many of these incidents can have a significant impact on local medical and SAR organization resources. The U.S. National Park Service (NPS) typically spends between $4 – 8 million each year on SAR operations. Following some high profile and expensive SAR incidents on Mt. McKinley in the mid-1990s, the NPS began raising the question of who should bear the financial cost of SAR operations. Seeking to recover the cost of SAR operations from mountaineering parties and other climbing groups has met fierce resistance. This paper examines SAR operations in all NPS units in Alaska and identifies the activities and demographics of persons requiring SAR assistance. It further examines the nature and severity of their injuries and illnesses, the human and environmental factors contributing to the incidents, and the cost of the SAR operations. The paper concludes by providing recommendations for SAR cost recovery efforts in Alaska’s National Parks.

Gary Cummisk, Department of Geography, Dickinson State University, Dickinson, ND 58601, Gary.Cummisk@dickinsonstate.edu. Making Geographic Streaming Video.

Today’s digital cameras and easy access software, such as Windows Movie Maker, have allowed video production to fall within the purview of the average person. This tool has implications for geographic education. Video shorts can enhance standard and online classroom instruction. Classes can even participate in the gathering of digital material, research, writing, and editing. I will demonstrate the essentials of getting started in video production and show a brief educational video that I produced as an example.

Gia Cummisk, Department of Agriculture, Dickinson State University, Dickinson, ND 58601, gia.cummisk@hotmail.com. Trailing the Past.

This presentation will cover the creation of the Centennial Map of Dunn County, North Dakota. It will discuss the evolution of the project, problems encountered, and the finished product utilizing GIS. Using electronic General Land Office survey maps, I was able to rediscover some of the old trails that crisscrossed Dunn County before the present day County Road system that follows the section lines was constructed. Throughout the project, bits of history revealed themselves so that the finished product reveals a compilation of developmental history. The Dunn County Centennial Commission is selling the map to promote the Centennial year of the County. Available at www.dunncountycentennial.com

Kenneth Dagel, Department of History, Philosophy, and Geography. Missouri Western State University. Landscape Appreciation through an Interdisciplinary Lens.

The Outdoor Semester Program at Missouri Western State University provides an ideal opportunity for students to interact with the physical environment and study how that environment influenced people in the past and continues to do so today. Through physical geography, students learn to understand the environmental tableau upon which all human experiences occur. It provides students with, not only a technical understanding of the various Earth systems, but also how those systems influence peoples’ lives. The novel Fools Crow simultaneously introduces them to Blackfeet culture at a significant point in Plains Indian history. The natural world is powerful and powerful, laden with historical and sacred meaning, and inextricably tied to the welfare of the human beings who ignore it at their own peril. The fieldtrip provides the student an intimate experience with the natural world. They enter the landscape of the novel they have just read by traveling through Montana and canoeing down the upper- Missouri, camping at sites known to Lewis and Clark while reading from their journals. Students receive the widest possible coverage of the Outdoor Semester theme, “Lewis and Clark and the Westward Expansion.” Such a broad topic is difficult to comprehend from a single perspective, but comes into much sharper focus when looking through a multi-disciplinary lens. Completing one part without the other results in a less than perfect understanding of this daring and pivotal undertaking in the history of the United States.

Changyong Dou, Xiaodong Zhang, and Doug Olson, The Northern Great Plains Center for People and the Environment, University of North Dakota, Grand Forks, ND, 58202, changyong.dou@und.nodak.edu. Geolocation Algorithms for a Remote Sensing Sensor - AgCam.

One of the major applications of Agriculture Camera (AgCam), developed by the University of North Dakota, is precision farming. With a designed spatial resolution of ~18 m on the ground and expected turn-around time of 24 hours, an accurate and forward geolocation algorithm is important for near-real time delivery of images that can be used immediately. One feature of AgCam is its tilting capability in cross-track direction so that a wide area can be covered. At a relatively low altitude, the International Space Station (ISS), where the AgCam will be hosted, experiences a large variation in attitude (defined as pitch, roll, and yaw). Also, the optics window on ISS where the AgCam will see through is not at the center of mass of the ISS. All these factors need to be considered in the geolocation algorithm. To obtain a position on the ground, the look vector of the AgCam defined in the body-fixed coordinate system needs to be transformed to in sequence the Local Vertical Local Horizontal (LVLH) coordinate system, and Conventional Terrrestrial Reference System (CTRS). Our test showed that only 64 anchor points along a scan line are needed for an entire image with negligible errors in location.
Visualizing Geographical Practices

Missing Women is a phrase coined by Nobel laureate Amartya Sen which refers to the women whose right to live was snatched away from them by society. In India, the sex ratio clearly shows that there is a dominance of men. The cause of worry is the high number of sex-selective abortions, feticides and infanticides that are being carried out despite the laws to protect the girl child. Contrary to the popular belief that the scenario would be better in the urban areas where the masses are educated and seemingly better off, it can be seen that access to modern technology helps in early identification of sex of the fetus and thus often results in abortion. Such a sex ratio with greater dominance of males has wide ranging implications on society directly affecting the status of women and crimes against women. This is thus a qualitative study of the sex ratio in urban areas in India, its causes and its implications on society.

Istvan Egresi, Department of Geography and Geology, University of Nebraska at Omaha, NE 68182, igresi@mail.unomaha.edu. The Impact of FDI on Economic Development and the Transformation of the Economic Sectors in Romania.

Romania has since 2003 been one of the most dynamic among the Central and Eastern European economies. Annual FDI flows have also been among the highest in the region for the last five years. The largest FDI deals are privatization-related, resulting from the sale of Romania’s “crown jewel” companies, although an important percentage of the total FDI has also been in the form of greenfield investments, mainly in the automotive, retailing, telecommunications and real estate sectors. However, the distribution of FDI has been very uneven within the country’s eight development regions and 42 counties and has been concentrated in just a few economic hotspots. The purpose of this paper is to examine the effects of FDI on national and regional economies as well as on different economic sectors.

Kenneth N. French, Faculty of Geography, University of Nebraska-Lincoln, Lincoln, NE 68583, kfrench@unlnotes.unl.edu. Segregation Levels of American Metropolitan Areas.

Where are the most and least ethnically segregated cities in the United States? Are cities in one region more or less segregated than cities in another region? This paper analyzes the spatial distribution of segregation, as measured by the dissimilarity index, between Whites, African Americans, Hispanics and Asians in 331 American cities. As geographers know, the creation of regions can be a difficult and contested endeavor that involves the use of selected criteria to define these areas. The regionalization methodology this study employs statistically compares five different regionalizations: two from the U.S. Census and three defined by the researcher. The research questions the selection of the “best” regionalization that divides American cities on the basis of ethnic residential segregation. Utilizing the “best” regionalization levels statistical differences are significant differences exist between cities in the Northeast, Southeast, and West. Future research can benefit by employing the regionalization identified in this paper to add a regional component to their analysis.

Amanda L. Gearhart, Hettinger Research Extension Center, North Dakota State University, Hettinger, ND 58639, amanda.gearhart@ndsu.edu. NDView Scholarship/Use of Very Large Scale Aerial Imagery for Rangeland Survey.

This presentation will cover two facets of academic; extension and research. The first part of the presentation will give an overview of the use of the scholarship funds and the second part of the presentation will provide an introduction to the research using very large scale aerial (VLSA) imagery for rangeland surveys being conducted on the Grand River National Grasslands. Ground-based monitoring methods provide a detailed description of ecological systems, but have only a limited area they can provide coverage and thus suffer from inaccuracies due to inadequate sample size, distribution, and significant phenological changes throughout the collection period. Many different satellited and high-altitude sensors providing aerial coverage have been used to monitor the mixed grass prairie, but the resolution is too coarse for detailed descriptions of the community composition. In this study, we used a lightweight aircraft flying at 72 km/h and an altitude of 100 to 516 images on the Grand River National Grasslands located in southwestern South Dakota. The images will be analyzed for canopy composition, bare ground, and litter cover. On-the-ground macroplot locations were selected along the flightline and ecological sites (species composition, canopy and basal cover, structure, production measurements and range health evaluations) were performed for each macroplot. The model for linear regression analysis in SAS will use ground measurements as the dependent variable and aerial image measurements as the independent variable to determine an adjusted R².

Matthew J. Gerike, Geographic Resources Center, Department of Geography, University of Missouri, Columbia, MO 65211, and Michael Dulin and John Harrington, Jr., Department of Geography, Kansas State University, Manhattan, KS 66506, gerikem@missouri.edu. Visualizing Geographical Practices.

Geographers have a long tradition of using diagrams to visualize and provide conceptual arguments for the discipline of geography. Such diagrams appear in Association of American Geographers presidential addresses, journal articles, National Academies publications, and textbooks. We believe that diagrams have the potential to improve knowledge communication by helping the reader conceptualize and visualize other dimensions and forms of geographical practice as varied as the discipline itself. Working towards this goal, we offer three diagrams that visualize a particular geographical subject or problem. First, a Venn diagram depicts multiple components of global change that help us better understand the complexities of human and natural systems. Second, a flow chart shows the multidisciplinary subjects and methodological aspects used in an applied forest stewardship project. Third, a concept maps reveals the intersections of memory, place, and landscape in the study of monuments, memorials, and markers. Each visualization uses a different visual form to better represent the problem, project, or approach at hand. We conclude with a synthesis diagram that visualizes and integrates the many subjects, locations, approaches, and methods that construct the contemporary practices of geography. Rather than excluding types and forms of geography, we offer a diagram that gives all geography a place.

Janet H. Gritzner and Bruce Millet, Department of Geography, South Dakota State University, Brookings, SD 57007, janet.gritzner@sdstate.edu. Modeling Depressional Wetlands with IFSAR DTMs and ORIs.

The Prairie Pothole Region (PPR) of the US and Canada is characterized by thousands of shallow, water-filled depressions with sizes ranging from a fraction of a hectare to several square kilometers. The purpose of this work is to apply GIS hydrologic modeling techniques to further understanding of surface-flow characteristics of the PPR. High resolution digital elevation models are required to resolve subtle depressions in the landscape. Interferometric Synthetic Aperture Radar (IFSAR) is an active imaging technique that has been developed for capturing digital terrain data. Research has shown that IFSAR can generate high resolution and low cost, IFSAR compares well with other methods to identify and map depressional wetlands. This research uses an IFSAR-derived digital terrain model (DTM) and orthorectified radar imagery (ORI) for modeling the glaciated landscapes in Eastern South Dakota. Study areas are two surveyed and closely monitored wetland complexes, Crystal Springs and Orchard Meadows in Deuel County, SD. The work first assesses an IFSAR DTM from May 2005 for vertical accuracy and ability to resolve depressional features in the study areas. Detailed survey data is integrated into the IFSAR DTM to improve model’s accuracy. The research next uses GIS geoprocessing, ORIs as well as National Agriculture Imagery Program (NAIP) imagery to evaluate depressional features of the modified IFSAR DTM to determine if the depressions are indeed wetlands. Results include calculations for depression area, depth, volume, and drainage area as well as comparisons of size and extent with known wetland features.

Brooks E. Hansen and Gregory S. Vandeberg, Department of Geography, University of North Dakota, Grand Forks, ND 58202, brooks.hansen@und.edu. Land Cover and Land Use In the Vicinity of Lake Alice National Wildlife Refuge.

Land cover and land use in the vicinity of Lake Alice National Wildlife Refuge near Devils Lake, ND was investigated as part of a water quality study of the area. Land cover types were identified using 2 meter resolution color aerial photos from the National Agriculture Inventory Program collected in 2006. ESRI ArcGIS 9.2 software was used to construct polygons of the various land cover types. The land covers were classified into 21 classes such as small grains, emergent herbaceous wetlands, and low intensity residential. The resultant data shows that a majority of the land (34.47%) can be classified as small grains. The largest was the second largest at 16.42%, along with pasture/hay and emergent herbaceous wetlands at 15.41% and 12.24% respectively. Future work associated with this research includes an error assessment and a comparison with USGS land cover sets. Furthermore, this data will be used in a watershed runoff model of the area.

John Patrick Hartly, Department of Geography, University of Wyoming, Laramie, WY 82071, jhartly@uwyo.edu. Glory Days!: Remembering the Small Town High School.

Local landscapes are intricately interwoven into our memories and sense of belonging. Although there are many landscapes that one becomes attached to over the course of a lifetime, small town high schools offer a common collective experience for local residents that is especially strong. When such landscapes are altered, removed, or destroyed, deep emotions can surface as if a part of a person’s very being has been lost. This research examines the emotional connection associated with the loss of small town high schools landscapes.

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