34th Annual Conference &
Annual General Meeting

Program and Abstracts

September 24 - 26, 2010
Tropical Inn, North Battleford, SK

Source: thecanadianprairies.blogspot.com
Conference Agenda

Friday September 24th
5:30-8:30 p.m. Registration and Icebreaker
8:30 p.m. PCAG Executive Meeting

Saturday, September 25th
7:30-8:20 a.m. Breakfast
Presentation sessions
8:30-10:00 a.m. Concurrent Papers Session-I
10:00-10:30 a.m. Nutrition Break and Poster Session - Ballroom
10:30 a.m.-12:00 p.m. Concurrent Papers Session-II
Field trip
12:15-1:15 p.m. Bus, BBQ at Fort Battleford
1:15-5:00 p.m. Visit: - Fort Battleford,
- Allen Sapp Gallery, and
- Western Development Museum
Banquet Room
5:30-6:30 p.m. Social
6:30 p.m. Banquet Dinner - Ballroom
7:30 p.m. Guest Speaker
Doug Cuthand, Freelance writer
Member of Little Pine First Nation
Topic: “A First Nations Perspective on 1885”
8:30 p.m. Slide Show Competition

Sunday, September 26th
Tropical Inn
8:30 a.m. Breakfast
9:30 a.m. AGM
Saturday, September 25th

CONCURRENT PAPER SESSION #1

Applications of Social and Spatial Technologies in Geography

Room: 1  Session Chair: Arun Govind

8:30-8:50 a.m. Developing an iPhone “App”lication for Collecting Pointing Task Data
Scott Bell\textsuperscript{1} and Vijayan Kumaran\textsuperscript{2}, \textsuperscript{1}Geography and Planning, and \textsuperscript{2}Computer Science, University of Saskatchewan

8:50–9:10 a.m. The Importance of Building a Reliable Database for WiFi-based Positioning Systems
Wook Rak Jung and Scott Bell, Geography and Planning, University of Saskatchewan

9:10–9:30 a.m. Undergraduates using multimedia to present how climate and land use are interrelated: An overview of the Communicating Climate Change program at the University of North Dakota
Munski, Dr. Laura\textsuperscript{1}, A. Kirilenko, F. Remer, G. Mullendore, and M. Baker, Dakota Science Center, North Dakota.

9:30–9:50 a.m. A Novel Way of Seeing the Past: Data Visualization Using Historic GIS Modeling
Louise Buck, Geography, Brandon University

9:50–10:10 a.m. Digital Youth in Rural Canada: The Case of Southwestern Manitoba
Michelle Lemoine, Geography, Brandon University
**CONCURRENT PAPER SESSION #2**

**Remote Sensing: Grassland I**

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<th>Time</th>
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<tr>
<td>8:30-8:50 a.m.</td>
<td>Leaf Area Index Calibration of RapidEye Satellite Imagery</td>
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<td><strong>Joseph Piwowar</strong>, Geography, University of Regina</td>
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<tr>
<td>8:50–9:10 a.m.</td>
<td>Application of an Unmanned Aerial Vehicle for the Detection and Monitoring of Leafy Spurge</td>
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<tr>
<td></td>
<td><strong>Dr. Dion J. Wiseman</strong>(^1), <strong>Dr. Terrence McGonigle</strong>(^2), and <strong>Mr. Nick Cairns</strong>(^2), (^1)Geography and (^2)Biology, Brandon University</td>
</tr>
<tr>
<td>9:10–9:30 a.m.</td>
<td>Biophysical and Spectral Responses to Various Burn Treatments in the Northern Mixed-Grass Prairie</td>
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<td><strong>Erica Kovach, Xulin Guo, Xiaohui Yang</strong>, Geography and Planning, University of Saskatchewan,</td>
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<tr>
<td>9:30–9:50 a.m.</td>
<td>Reconstructing a 37 year fire history of the Grasslands National Park region of Southern Saskatchewan by using multiple image analysis techniques from Landsat archive data: A Proposal</td>
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<td></td>
<td><strong>Shayne MacDonald and Joseph Piwowar</strong>, Geography, University of Regina</td>
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Saturday, September 25th

CONCURRENT PAPER SESSION #3

Physical Geography: Aquatic Habitats and Processes

Room: 3  Session Chair: Alec Aitken

8:30-8:50 a.m.  Movements of Northern Pike (Esox lucius L.) with Respect to Small Weirs Located in Riding Mountain National Park, Manitoba

Tim Town\textsuperscript{1}, Chris Malcolm\textsuperscript{1}, and Tim Sallows\textsuperscript{2}, \textsuperscript{1}Geography, Brandon University, and \textsuperscript{2}Riding Mountain National Park, Wasagaming, Manitoba

8:50–9:10 a.m.  Identification of northern pike spawning sites in South Lake, Riding Mountain National Park, using VHF telemetry

Kendelle Fawcett\textsuperscript{1}, Christopher Malcolm\textsuperscript{1}, Tim Sallows\textsuperscript{2}, \textsuperscript{1}Geography, Brandon University, and \textsuperscript{2}Riding Mountain National Park, Wasagaming, Manitoba

9:10–9:30 a.m.  Impacts of Summer Cottage Use and Recreational Activity on the Limnology and Nutrient Regime in a Large Pothole Lake, Riding Mountain Uplands, Manitoba.

J.R Hamilton, L. Buck, and R.A. McGinn, Geography, Brandon University

9:30–9:50 a.m.  Critical Erosion Velocity for Natural Shale Gravels: An Empirical Study

R.A. McGinn and E.L Blais, Geography, Brandon University
## CONCURRENT PAPER SESSION #4

### Environmental Studies

**Room: 4  **

**Session Chair: Patricia Fitzpatrick**

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<tr>
<td>8:30-8:50 a.m.</td>
<td>Waste Management’s Impact on Residential Quality of Life: A Case Study of Puerto Vallarta Mexico</td>
<td>D. Tousignant and D. Eberts, Geography, Brandon University</td>
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<tr>
<td>8:50–9:10 a.m.</td>
<td>Agricultural Pesticide Use Trends in Manitoba (1996-2006)</td>
<td>Janna Shymko, Annemieke Farenhorst, and Ross McQueen, Geography, University of Manitoba</td>
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<tr>
<td>9:10–9:30 a.m.</td>
<td>The Redevelopment of the Saskatoon City Yards</td>
<td>Pamela Larson, Regional &amp; Urban Planning Program, University of Saskatchewan</td>
</tr>
<tr>
<td>9:30–10:10 a.m.</td>
<td>Around Mystery Mountain with Phyllis Munday</td>
<td>Dan Smith, Geography, University of Victoria</td>
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Saturday, September 25th

POSTER SESSION

Ballroom

10:00-10:30 a.m.

(Posters on display all day in the Ballroom)

1. Lakeshore Development as a Factor in Minnesotan Micropolitan Expansion
   Aldritt, Peter, and Douglas C. Munski, Geography, University of North Dakota

2. Developing an iPhone “App”lication for Collecting Pointing Task Data
   Bell, Scott and Vijayan Kumaran, Geography and Planning, and Computer Science, University of Saskatchewan

3. Investigating Current Issues of Youth Out-migration from Grafton, North Dakota
   Benidt, Kristen, Devon Hansen, Douglas C. Munski, Geography, University of North Dakota

4. The use of UAV collected imagery in habitat classification for the endangered northern prairie skink (*Plestiodon septentrionalis*)
   Cairns, Nicholas A., Dr. Dion Wiseman, Dr. Pamela Rutherford, and Dr. Terry McGonigle, Geography and Biology, Brandon University

5. The Redevelopment of the Saskatoon City Yards
   Larson, Pamela, Regional & Urban Planning Program, University of Saskatchewan

6. The Study of Removing Heavy Cloud and Shadow from Landsat TM
Saturday, September 25th
POSTER SESSION
Ballroom
10:00-10:30 a.m.
(Posters on display all day in the Ballroom)

Ma, Zhangbao and Xulin Guo, Geography and Planning, University of Saskatchewan

7. Movement patterns of common snapping turtles (*Chelydra serpentina*) in southwestern Manitoba

Meadows, Kali S. ¹, Christopher D. Malcolm², Pamela L. Rutherford³, ¹Environmental Science Program, ²Geography, and ³Biology, Brandon University

8. Water was our first medicine: First Nations perspectives for water management

Miller, Jessica E., Geography and Planning, University of Saskatchewan

9. Introducing the Use of Waypointing in a Geographic Education Methods Course

Munski, Douglas C., Geography, University of North Dakota


Thomas, Randi ¹, Chris Malcolm¹, and Tim Sallows², ¹Geography, Brandon University, and ²Riding Mountain National Park, Wasagaming, Manitoba

11. Using Near-Real-Time Volcano Monitoring Data in the Classroom

West, Dr. Kim, The Gwenna Moss Centre for Teaching Effectiveness and Professional Affiliate, Geography and Planning, University of Saskatchewan
**Saturday, September 25th**

**CONCURRENT PAPER SESSION #5**

**Human Geography**

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<tr>
<td>10:30-10:50 a.m.</td>
<td>Spiritual Tourism and UNESCO’s International Year for the Rapprochement of Cultures and International Year of Biodiversity</td>
<td>Daniel H. Olsen(^1) and John R. Brodie(^2),(^\dagger) Geography and (^2)Science Centre, Brandon University</td>
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<tr>
<td>10:50-11:10 a.m.</td>
<td>School Mapping In Education Micro-Planning: A Case Study Of Union Council Chak 84-15I, District Khanewal, Pakistan</td>
<td>Tayyab I. Shah and Scott Bell, Geography and Planning, University of Saskatchewan</td>
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<td>11:10-11:30 a.m.</td>
<td>Newcomers in a New Land: Immigration and Affordable Housing Policy</td>
<td>Tom Carter, Geography, University of Winnipeg</td>
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<td>11:30-11:50 a.m.</td>
<td>Polish and Ukrainian Cemeteries in Manitoba as Markers of Identity and Assimilation</td>
<td>John C. Lehr(^1) and Lukasz Albanski(^2),(^\dagger)University of Winnipeg, and (^2)Uniwersytet Jagielloński, Krakow, Poland</td>
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<tr>
<td>11:50 a.m.- 12:10 p.m.</td>
<td>Closer settlement revisited: Kendenup, Western Australia</td>
<td>John Selwood(^1), Matthew Tonts(^2), and Roy Jones(^3),(^\dagger)University of Winnipeg, (^2)University of Western Australia,(^3)Curtin University, Western Australia</td>
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### Saturday, September 25th

**CONCURRENT PAPER SESSION #6**

**Remote Sensing: Grassland II**

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<th>Session Chair: Scott Bell</th>
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<td><strong>10:30-10:50 a.m.</strong></td>
<td>Spatial habitat characterization for a threatened prairie plant</td>
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<td>S. Lowe $^1$, X. Guo $^1$, and D. Henderson $^2$, $^1$Geography and Planning, University of Saskatchewan and $^2$Canadian Wildlife Service</td>
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**10:50–11:0 a.m.** | Spatial scale and spatial variation of plant biophysical properties along topographical gradients in the northern mixed prairie |
| Arun Govind and Scott M. Bell, Geography and Planning, University of Saskatchewan |

**11:10–11:30 a.m.** | Using remote sensing image texture to study vegetation spatial heterogeneity under different grazing managements in mixed grassland |
| Xiaohui Yang and Xulin Guo, Geography and Planning, University of Saskatchewan |

**11:30–11:50 a.m.** | Evaluation of Remote Sensing Approaches to Monitor Crop Conditions under Specific Input Levels and Cropping Diversity |
| Xulin Guo, Geography and Planning, University of Saskatchewan |
### Saturday, September 25th

**CONCURRENT PAPER SESSION #7**

*Remote Sensing: Woodlands and Forests*

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<tr>
<td>10:30-10:50 a.m.</td>
<td>Object-based change detection of woody and herbaceous covers in northern semi-arid mixed grassland</td>
<td>Zhaoqin Li and Xulin Guo</td>
<td>Geography and Planning, University of Saskatchewan</td>
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<tr>
<td>10:50–11:10 a.m.</td>
<td>The Impact of Texture Analysis on Object-Based Classification of Shelterbelts</td>
<td>Joey Pankiw and Joseph Piwowar</td>
<td>Geography, University of Regina</td>
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<tr>
<td>11:10–11:30 a.m.</td>
<td>Review on the methods of understanding boreal forest phenology</td>
<td>Quazi K. Hassan and Navdeep S. Sekhon</td>
<td>Geomatics Engineering, University of Calgary</td>
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<td>11:30–11:50 a.m.</td>
<td>Review on the methods of understanding boreal forest phenology</td>
<td>Quazi K. Hassan and Navdeep S. Sekhon</td>
<td>Geomatics Engineering, University of Calgary</td>
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### CONCURRENT PAPER SESSION #8

**Resource Management**

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<td>10:30-10:50 a.m.</td>
<td>Local Capacity Building for Source Water Protection in the South Saskatchewan Watershed</td>
<td>Franny Rawlyk and Robert Patrick. Geography and Planning, University of Saskatchewan</td>
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<tr>
<td>10:50–11:10 a.m.</td>
<td>Source water protection plan implementation in First Nations communities in Saskatchewan</td>
<td>Jessica E. Miller and Robert Patrick. Geography and Planning, University of Saskatchewan</td>
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<tr>
<td>11:10–11:30 a.m.</td>
<td>Watershed cumulative effects assessment and management</td>
<td>Bram Noble and Robert Patrick, Geography and Planning, University of Saskatchewan</td>
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<td>11:30–11:50 a.m.</td>
<td>Who is regulating the regulators? The role of independent oversight in resource management</td>
<td>Patricia Fitzpatrick, Geography, University of Winnipeg</td>
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Lakeshore Development as a Factor in Minnesotan Micropolitan Expansion

Aldritt, Peter and Douglas C. Munski. Department of Geography, University of North Dakota

Minnesotans always have prized lakeshore property. During the past several decades, population in southern Minnesota’s Twin Cities region has been expanding northward beyond the traditional and newer suburbs of the Minneapolis-St. Paul metropolitan area. Counties within Minnesota’s “Lakes Country” which are reasonably close to major Twin Cities population centers are prime destinations for this lakeshore-oriented urban sprawl. Converting lakeshore natural environments into increasingly intensive cultural landscapes often is favored by local businesses and governments. Yet, the increased retail income and higher tax revenues come at a high cost in environmental concerns. Still, the degrading water quality caused from overflowing septic tanks in overcrowded lakeshore areas and shoreline erosion triggered by poor construction practices are accepted as trade-offs for reaching the dream of many Minnesotans to have a “lakeshore place”. Crow Wing County and Cass County are two areas of the state that are becoming micropolitan areas of significance. Whether the impact of the recessionary economy of 2009 to present will slow-down micropolitan expansion in “Outstate Minnesota” it is safe to assume that the demand for lakeshore frontage will remain high. Such conditions will require more focused community development to maintain the quality of life associated with “Lakes Country”.

Keywords: Migration, community development, recreation.

Developing an iPhone “App”lication for Collecting Pointing Task Data

Bell, Scott¹ and Vijayan Kumaran². ¹Geography and Planning, ²Computer Science, University of Saskatchewan

Researchers from a variety of fields conduct experiments on topics germane to human spatial behaviour. In such experiments it is common to have human participants point between pairs of locations. Understanding how we orient ourselves in different environments and how this orientation is related to the acquisition, storage, and use of spatial knowledge is fundamental to developing intelligent systems in support of human navigation and wayfinding, user interfaces for spatial information, transportation planning, etc. Beyond the applied benefits of such research there is a longstanding interest in the basic structures that support our ability to integrate what we already know with newly or just experienced information; furthermore, researchers are also interested in how this knowledge is used in the resolution of geographic problems and decision making. Developing a reliable technology-based method for collecting such pointing data will increase its reliability. Using the technology included in the iPhone and iPad we have developed an environmental pointing device that can support pointing between locations across many scales (local to global) as well as collecting data about current locations and locations visited in the past.

Keywords: environmental pointing, spatial behaviour, technology enhanced; APP
Investigating Current Issues of Youth Out-migration from Grafton, North Dakota

Benidt, Kristen; Devon Hansen; and Douglas C. Munski. Department of Geography, University of North Dakota

Continuing rural and small town youth out-migration throughout the Great Plains is a key regional concern of economic developers and government officials. General preferences of these youth regarding location amenities, post-secondary education, and employment opportunities are crucial factors explaining why so many young people leave rather than remain in their home communities upon high school graduation. Grafton, North Dakota, is a small town in the Red River Valley of the North experiencing such youth out-migration, so a case study was conducted of place preferences, educational interests, and employment goals of high school juniors and seniors during 2009-10. Seeking post-secondary education and employment opportunities, the desire for different life experiences, and even the need to escape the perceived stifling environment they feel from living in a small community are among the preliminary findings for Grafton’s youth. However, place-specific reasons for such out-migration also exist, including military enlistment as an option, and place-specific reasons for remaining, e.g., student perceptions of a caring, supportive home community which helps account for 27% of respondents indicating desires to enter the local workforce. Overall, this case study further reveals of the importance of geographical perspectives to a key local community development issue with regional implications.

Keywords: Migration, place preferences, community development.

A Novel Way of Seeing the Past: Data Visualization Using Historic GIS Modeling

Buck, Louise. Department of Geography, Brandon University, Brandon, Manitoba

The importance of the St. Marys River as a historic geographic feature has resulted in the large scale mapping of the river morphology near Sault Ste. Marie, ON since the late 18th Century. However, today’s digitally visual society finds that historical geography is easier to perceive with vivid graphic representations. Using ESRI ArcGIS software, a historical GIS database was established as a means of manipulating international maps of various sizes, scales and areal coverage. The demands placed by GIS on historic data were taken into consideration during the georectification and digitizing steps. In this database, the bathymetry recorded on 19th Century navigation charts was interpolated to accurately reconstruct the physical structure of the riverbed, providing time series data over nearly two centuries. Data visualization techniques such as TIN models provide options for making old maps appealing to a contemporary audience. Plan and oblique views, temporal series, and 3D modeling enhance the historical depiction of underwater topography, of the building of the canals and locks, and other landscape representations. The results obtained by applying the tools of GIS to historical research show that historic maps can contribute to contemporary research and can make history appealing.

Keywords: St. Mary’s River, Data Visualization, Temporal
The use of UAV collected imagery in habitat classification for the endangered northern prairie skink (Plestiodon septentrionalis)

Cairns, Nicholas A. 1; Dr. Dion Wiseman1; Dr. Pamela Rutherford2 and Dr. Terry McGonigle2

1Geography Department, and 2Biology Department, Brandon University

The northern prairie skink is Manitoba’s only lizard and an endangered species. The designation of critical habitat is a key element to this species’ recovery strategy but, because of its cryptic nature, determining the importance of natural habitat can be difficult using classical survey methods. The objective of this project was to determine if the use of aerial imagery and GIS based analysis can be used as a viable alternative for the determination of critical habitat. An autonomous, unmanned aerial vehicle (AUV) equipped with two digital cameras collecting standard RGB and NIR energy was used to collect 8 cm resolution images of five sites at CFB Shilo. This image was then subjected to an unsupervised classification to identify the variety of land cover classes present. The classification used appears to separate a wide variety of land cover classes quite effectively with a total of 27 different land covers identified based primarily on vegetation diversity and density. Large homogeneous land cover classes were more easily separable than more diffuse or heterogeneous ones. To this point the only the collection of imagery and initial habitat classification have been completed. In following field seasons ground based field work will be used to test these methods.

Keywords: Geomatics, Habitat-classification, SARA

Identification of northern pike spawning sites in South Lake, Riding Mountain National Park, using VHF telemetry

Fawcett, Kendelle1; Christopher Malcolm1; Tim Sallows2

1Department of Geography, Brandon University, and 2Riding Mountain National Park, Wasagaming, Manitoba

We examined spawning habitat selection by northern pike (Esox lucius) in Clear and South Lakes, Riding Mountain National Park, Manitoba. Clear Lake is a 29.22 km² mesotrophic lake, while South Lake is a 2.03 km², eutrophic lake. The two lakes are separated by a sand isthmus which is often breached during the spring melt, providing a temporary corridor between the lakes, and reforms later in the season. To determine whether pike spawn in South Lake, and to identify spawning habitat selection, we attached external VHF transmitters to 19 female pike at the end of March, 2010. We also inserted a micro-transmitter into the oviduct of each fish, with the intention that it would be expelled during spawning. Fish were tracked throughout April to determine where each micro-transmitter was deposited. Fifteen of nineteen micro-transmitters were located, all in South Lake. In May we sampled for eggs at five of the transmitter deposition sites and five random sites. Habitat analysis was also conducted. Eggs were found at 8 out of 22 samples at transmitter sites and 1 out of 20 samples at random sites. Habitat analysis indicated that transmitter sites differed from random sites in depth, type of vegetation, and proximity to reed beds. South Lake is an important spawning area and most likely an important nursery.

Keywords: Northern Pike, Spawning, VHF telemetry
Who is regulating the regulators? The role of independent oversight in resource management

Fitzpatrick, Patricia. Department of Geography, University of Winnipeg

As environmental problems become increasingly characterized by uncertainty, complexity and conflict, there is growing interest in how to manage resource-based activities in ways considered to be ecological sound, socially responsible, and fiscally prudent. Dissatisfaction with traditional methods of government accountability has led, in increasing frequency, to the creation of independent oversight agencies. The purpose of this research is to examine the conditions under which independent oversight agencies are created, and contrast the logistical organization of different agencies. Research design employs a comparative case study of nine agencies currently operating in North America.

Findings indicate that independent oversight is strongly driven by four elements: local experience with the industry, historical interaction with government, severity of the resource problem and scale of the potential environmental impact. Second, a focused, clear mandate is essential for success; agencies which focus on technical review or public communication are more successful than those which try to address both elements. Results suggest that calls for independent oversight in large resource development (e.g. the Mackenzie Gas Project, the Giant Mine Remediation, the Conawapa Hydro-Electric Development) have merit.

Key words: independent oversight, resource management, government accountability

Spatial scale and spatial variation of plant biophysical properties along topographical gradients in the northern mixed prairie

Govind, Arun and Scott M. Bell. Department of Geography and Planning, University of Saskatchewan

Most ecological or ecosystem processes and patterns are scale dependent, and a multi-scale study approach has been suggested. To achieve the objectives, remotely sensed data was obtained for the northern mixed prairie at four spatial scales through field- and satellite-remote sensing [SPOT-5 (10 m); SPOT-4 (20 m); and Landsat-5 (30 m)]. Field estimates such as plant cover; leaf area index (LAI); and canopy spectral reflectance data were also collected from 41 sites and along 3 transects in the West Block of Grasslands National Park of Canada in 2006 and 2007. Correlation analysis was used to analyze the relationship of vegetation indices (VI), computed from remotely sensed data at multiple spatial scales, to field estimates of plant cover and LAI. Semivariogram analysis was used to identify the dominant spatial scale of plant biophysical variables. Results show that similar to other field vegetation estimates, remotely-sensed data also successfully captured the spatial variation of plant biophysical properties along topographical gradients. Vegetation indices derived from remotely sensed data at all spatial scales showed significant relationships ($r = 0.5-0.7$, $p = 0.01$) to field estimates, however VI obtained at finer spatial scales showed higher relationships. The dominant spatial scale of plant biophysical properties varied from 30-100 m.

Keywords: Mixed prairie; plant biophysical properties; spatial scale
Evaluation of Remote Sensing Approaches to Monitor Crop Conditions under Specific Input Levels and Cropping Diversity

Guo, Xulin. Department of Geography and Planning, University of Saskatchewan

This study was conducted at the Alternative Cropping Systems (ACS) experiment site at Scott, Saskatchewan. The 18 year study was initiated in 1995 to evaluate the sustainability of nine arable crop production systems. The nine cropping systems, derived from combinations of three input levels (organic, reduced, and high) and three cropping diversity levels (low, diversified annual grains, and diversified annual perennials), were designed to monitor and assess alternative input use and cropping strategies for arable crop production on the Canadian Prairies. Field data including leaf area index (LAI) and spectral reflectance were collected three times during the growing season of 2003 and 2004: early growing season (June), mid growing season (July) and late growing season (August). LAI was measured with an LAI-2000 plant canopy analyzer. The spectral measurements were made with a handheld ADS spectroradiometer, which covers wavelengths from 350 nm to 2500 nm with 2151 bands. Results showed that remote sensing can be used to indicate different crop conditions. The spectral and LAI differences among input levels were significant at early to mid growing seasons. Mid July was the best season and the red over near infrared spectral ratio as well as the normalized difference vegetation index based on these two bands were the best vegetation indices to use for crop vigour monitoring.

Keywords: crops, input and diversity levels, leaf area index (LAI), hyperspectral remote sensing, vegetation indices (VIs)
Impacts of Summer Cottage Use and Recreational Activity on the Limnology and Nutrient Regime in a Large Pothole Lake, Riding Mountain Uplands, Manitoba

Hamilton, J.R.; L. Buck; and R.A. McGinn. Brandon University

This study examines the limnological and nutrient regimes of Gertrude Lake, a “permanent lake” in the “Prairie Pothole Lake Region” of southwestern Manitoba. Gertrude Lake drains an area of approximately 898.8 ha. The surface area is estimated to be 100.4 ha with a mean depth of 3.66 m. Aerial photographs indicate two discernable intermittent first order inlet streams and an outlet channel. The lake has become a favourite recreational locale, accommodating over 200 seasonal cottages along a 3600 m shoreline.

On-site instruments recorded seasonal trends in temperature, pH, dissolved oxygen, electrical conductivity and total dissolved solids. Epilimnion samples were collected for laboratory analysis. Three macronutrient parameters were analyzed in the laboratory; total ammonia nitrogen, nitrate nitrogen and orthophosphate phosphorus. Unionize ammonia nitrogen concentration was calculated from the total ammonia-temperature-pH equilibrium.

Seasonal observations suggest that an accumulation of macronutrients and organic biomass (macrophytes) accompanied by increased levels of productivity occurs in Gertrude Lake. Nitrogen and phosphorus concentrations decline throughout the summer months as the algal and macrophyte biomass increases. By late August macronutrient concentrations begin to increase. There was no apparent spike in nitrate, ammonium or reactive phosphorus concentrations associated with the arrival in July of a large population of cottagers and intensive recreational use. Water quality and fish habitat conditions in Gertrude Lake meet the recommendations for stocking of walleye pickerel. However, high concentrations of soluble reactive phosphorus could result in the growth of toxic algal blooms during heat spells.

Keywords: limnology, nutrient regimes, pothole lakes
Review on the methods of understanding boreal forest phenology

Hassan, Quazi K. and Navdeep S. Sekhon. Department of Geomatics Engineering, University of Calgary

The understanding of the vegetation phenology in relation to boreal ecosystems is critical in forest management activities. Here, we provide a review on the methods commonly used in delineating the various phenological stages (e.g., snow stages, conifer/deciduous stages, and understory stages among others). There are three major methods involved: (i) ground-based observations; (ii) modelling of the phenological phases; and (iii) remote sensing-based approaches. The ground-based observations are the most accurate one, while these are unable to delineate the spatial dynamics. The modelling of the phenological phases determines the phase of interest as a function of climatic variables (e.g., temperature, soil water content, and incident radiation among others). This method may able to provide information about the spatial variability if we may able to generate the reliable maps for the input variables of interest. The remote sensing-based approaches, are, in general, better in delineating the phenological stages because of their extensive spatio-temporal coverage of the earth surface. The remote sensing-based indices (e.g., normalized difference vegetation index, enhanced vegetation index, leaf area index and normalized difference water index) are commonly used ones to determine various phenological stages. Upon reviewing, we suggest that the integration of the above mentioned three methods would enhance our knowledge about the phenology.

Keywords: spatio-temporal dynamics, modelling, remote sensing

The Importance of Building a Reliable Database for WiFi-based Positioning Systems

Jung, Wook Rak and Scott Bell. Department of Geography and Planning, University of Saskatchewan

WiFi-based positioning systems (WPS) are designed to support the acquisition of accurate location information using the strengths of various wireless technologies other than the Global Positioning System (GPS). These systems have the potential to supplement GPS where GPS is unreliable, specifically, indoor environments. Recently, Location Based Services (LBS) have become increasingly popular for many smartphone users. These new smartphones include various wireless technologies, such as WiFi, A-GPS, Bluetooth, and GSM. Each of these technologies contributes to the integration and development of LBS but WiFi has been widely employed as an alternative positioning service. While these services enhance the accuracy of location information outdoors, most services fail to increase location certainty from indoors. The problem of location uncertainty stems from utilizing an unreliable database for wireless router locations and received signal strength. Furthermore, database information is often collected using unreliable and unsecure methods. The purpose of this study is to validate the advantages of using a reliable database for WPS from indoor environments. This research has been implemented within two multi-floor buildings in the University of Saskatchewan. The results of the location finding service test with WPS show that using a reliable database for WPS significantly increased location certainty from indoors.

Keywords: WLAN coverage, WiFi mapping, WiFi-based positioning system
Biophysical and Spectral Responses to Various Burn Treatments in the Northern Mixed-Grass Prairie

Kovach, Erica; Xulin Guo; Xiaohui Yang. Department of Geography and Planning, University of Saskatchewan,

Over the past century, environmental managers worked to suppress fire throughout various biomes. Today, burning is generally considered beneficial to many ecosystems, though precise effects aren’t entirely understood. This research aims to further our understanding of the biophysical effects of fire in C3 dominated mixed-grass prairies, and to find an effective SPOT5 multispectral band for differentiating between burn treatments in late spring. Two sites with known burn history were visited in Grasslands National Park, Canada. One site contained two treatments, once burned, and twice burned, both with additional cattle grazing. A second site contained a once burned treatment, ungrazed by cattle. Each site contained control plots for comparison. Results show that burning alone was insufficient at reducing total biomass. Compositional responses were varied and post-burn structure is thought to depend on uncontrolled factors in this study. Soil temperature was significantly higher in burned plots than in the control when bare ground was more dominant than moss cover. Lastly, findings show SPOT5 multispectral band 3 was most effective at distinguishing between burn treatments. Band 3 additionally outperformed the normalized difference vegetation index (NDVI) and the normalized difference water index (NDWI) at recognizing significant variations in spectral reflectance of the treatments.

Keywords: mixed-grass prairie, prescribed fire, spectral reflectance

The Redevelopment of the Saskatoon City Yards

Larson, Pamela. Regional and Urban Planning Program, University of Saskatchewan

Brownfield development offers economic and environmental benefits to the urban realm. The central industrial area in Saskatoon, known as City Yards, is an ideal site for brownfield development. Currently, the site is used by Canadian Pacific and Canadian National Railway. This paper identifies opportunities for the city of Saskatoon to convert existing industrial lands into a vibrant urban neighbourhood. In order to increase density downtown, and connect 1st Avenue and Idylwyld Drive, we propose to divert rail activity away from the downtown core and out of the city. Increasing core density reduces the costly effects of urban sprawl. The proposed development will offer commercial outlets, office space, and vibrant public spaces that will facilitate existing and new residents with their everyday needs. Case studies indicate that brownfield sites have negative economic and social effects by isolating areas within a city. This presentation highlights two Canadian cities that have successfully redeveloped railway yards into viable commercial and residential areas and provides a proposal for the application of brownfield development in Saskatoon.

Key Words: brownfield, railway yards, redevelopment
Polish and Ukrainian Cemeteries in Manitoba as Markers of Identity and Assimilation

Lehr, John C. ¹ and Lukasz Albanski². ¹University of Winnipeg, and ²Uniwersytet Jagielloński, Krakow

The rituals of death and burial are central to the cultures of most societies. They are deeply bound to notions of self-identity, ethnicity and nationality. Cemeteries are recognised as repositories of geographical, demographic and historical information embedded in headstone designs and inscriptions. This study examines the cemeteries in the mixed Polish/Ukrainian communities of Ladywood, Cooks Creek, Hadashville, and Prawda in south-eastern Manitoba. In central Europe ethnicity was a product of religious affiliation: Poles were Roman Catholic and Ukrainians either Eastern Rite Catholics or Greek Orthodox. In Canada, the choice of cemetery by the deceased’s family indicated religious affiliation and hence ethnic identity. The changing language used on headstones also reflected shifting allegiances, declining fluency in the ancestral language and levels of assimilation, while the retention of certain invocations inscribed on grave markers may be interpreted as resistance to the homogeneity of modernity. The cemetery thus provides information beyond that given in more conventional documentary sources.

Key words: Cemeteries, Identity, Assimilation.

Digital Youth in Rural Canada: The Case of Southwestern Manitoba

Lemoine, Michelle. Brandon University

The notion of a digital divide between urban and rural regions has been of some interest in the social sciences in recent years. As technology becomes more advanced, communities are becoming more dependent upon it. Whether rural or urban, the internet, along with cellular technology, is a part of life not only for business but also for personal use. The purpose of this study was to measure the use of information and communication technologies (ICT’s) by youth in rural communities in western Manitoba. Based on a survey conducted in February 2010 (n=73), several objectives within the research were pursued, including: identifying how much time youth spend interacting through ICT’s, whether they feel they are at a disadvantage with ICT’s based on their rural residence, what the students intended career path may be (if they had one) and whether students planned to continue their rural residence after graduation and/or possible post-secondary education.

Key words: Digital Youth, Manitoba
Object-based change detection of woody and herbaceous covers in northern semi-arid mixed grassland

Li, Zhaoqin and Xulin Guo. Department of Geography and Planning, University of Saskatchewan

The exchanges of carbon and energy between the land surface and the atmosphere layer are sensitive to the partition of vegetation structure of woody cover and herbaceous cover. Besides, woody cover, herbaceous cover, and their configuration of are also of importance for providing habitat for wildlife, such as loggerhead shrike in Grasslands National Park (GNP), Saskatchewan, Canada. GNP is characterized by a northern semi-arid mixed prairie, and is one of important gene pools in North America. Our previous research found that Normalized Difference Vegetation Index (NDVI) derived from Advanced Very High Resolution Radiometer (AVHRR) in GNP demonstrated an increase trend from 1985 to 2007. But whether the increase in NDVI is from the increased vegetation vigour or from extended shrub or tree covers were not answered. This study, therefore, aims to detect the change of woody and herbaceous covers in GNP based on the object-oriented classification of Landsat TM and ETM+ images. Results indicate that the change of woody and herbaceous covers is obvious.

Keywords: change detection; woody and herbaceous cover; object-oriented classification

Spatial habitat characterization for a threatened prairie plant

Lowe, S. 1; X. Guo 1; and D. Henderson 2. 1University of Saskatchewan, 2Canadian Wildlife Service

Hairy prairie-clover (Dalea villosa var. villosa (Nutt.) Spreng.) was listed as threatened under Canada’s Species at Risk Act in 2004 making identification of suitable habitat a necessary first step towards federal conservation efforts. The objective of this study is to determine how habitat area and configuration are correlated with the hairy prairie-clover metapopulation within the Dundurn PFRA community pasture located south of Saskatoon, Saskatchewan, Canada. A multi-temporal, multi-resolution land cover classification using object-oriented methods was carried out with SPOT5 imagery acquired in 2007 and 2009. Potential sand dune habitat identified in the classification was analyzed using patch scale metrics for area, shape, and proximity to identify which components of spatial configuration were best correlated with hairy prairie-clover occurrences. Air photos from 1944 were subsequently analyzed for the study area using the above methods. Results show that 24% of the variation in sand dune patch occupancy can be explained by the current area, shape, and proximity of sand dune patches. At the class and landscape scale there was no significant difference between the area and shape of occupied sand dunes from 1944 to current, but there was a significant difference between the proximity measure.

Keywords: habitat, classification, sand dunes
The Study of Removing Heavy Cloud and Shadow from Landsat TM

Ma, Zhangbao and Xulin Guo. Department of Geography and Planning, University of Saskatchewan

In this paper, a new algorithm for cloud removal using multi-temporal Landsat TM image data based on spectral characteristics analysis is proposed. By the spectral characteristics analysis of the heavy cloud region and its shadow region, the heavy cloud and its shadow identification models were designed. Using image regression, unsupervised classification and pixel replacing techniques as well as above models, the influence of heavy clouds and its shadows can be eliminated or reduced in the Landsat TM images. The result shows that the algorithm can eliminate or significantly reduce the cloud influence from Landsat TM image data.

Keywords: cloud and shadow; spectral analysis; cloud removal

Reconstructing a 37 year fire history of the Grasslands National Park region of Southern Saskatchewan by using multiple image analysis techniques from Landsat archive data: A Proposal

MacDonald, Shayne and Joseph Piwowar. Department of Geography, University of Regina

Fires play an important role in the prairie ecosystem by maintaining the integrity of the natural plant communities. Fires can rejuvenate grasses by clearing away dead plant material as well as provide ash fertilizer for new plants to grow. However, detecting the occurrence of grassland fires is extremely difficult due to the climatic and phenological conditions present within the mixed-grass prairie ecosystem that encourage rapid re-growth of prairie vegetation. Nonetheless, grassland fire scars may be detectable in remote sensing imagery acquired shortly after a burn. By using various techniques drawn from single-image and multi-temporal analysis of the 37-year image archive of Landsat data I will attempt to reconstruct a fire history for this region.

The analysis of the images will require adaptive reasoning; no fixed thresholds will likely apply because of the high level of vegetation variability. Instead, a mixture of techniques and methods will be applied to attempt to extrapolate the fire history of this region. Techniques which are applied will be tested for their abilities to differentiate between burned and un-burned surfaces. Those bands which show the highest level of discriminating power will be selected and used to extrapolate the fire history for the Grasslands region.
Critical Erosion Velocity for Natural Shale Gravels: An Empirical Study

McGinn, R.A. and Blais, E.L. Brandon University

The objective of this study is to compare critical erosion velocity power function models \( V^*_c = cD^n \) derived for gravel size bed material (spheroids with a specific gravity equal to 2.65), to one derived for naturally occurring shale bed material which is atypical in shape and specific gravity. The saturated specific gravity of the shale was found to be 1.80. On the basis of the mean triaxial dimensions the shale gravels can be described as oblate/discoid (Zingg 1935) or by \( C/AB^{0.5} \) Corey shape factor of 0.20 (Corey 1949). The flume used in this study was 11.5m long, 30.7cm wide, with a maximum depth of 30.0cm. Seven bed samples were prepared and categorized according to mean particle size (D). A known discharge (Q) was passed through the flume and flow depth (d) gradually decreased until velocities were sufficient to initiate particle movement. Critical erosion velocity \( (V_{mc}) \) was operationally defined as the mean cross sectional velocity \( (Q/AX) \) causing sufficient particle motion such that the bed packing arrangement failed and the bed became mobile.

The result of each run was plotted. A curvilinear relationship between critical erosion velocity \( (V_{mc}) \) and grain size (D) was noted. Data were subsequently transformed to logarithms and the least squares regression line calculated to be \( V_{mc} = 0.29D^{0.5} \).

In natural shale gravels the compensating effects of low specific gravity and atypical shape result in a critical erosion velocity function similar to those produced by other studies.

Keywords: Critical erosion velocity, shale gravels.

Movement patterns of common snapping turtles (Chelydra serpentina) in southwestern Manitoba

Meadows, Kali S.1; Christopher D. Malcolm2; Pamela L. Rutherford3. 1Environmental Science Program, 2Department of Geography, and 3Department of Biology, Brandon University

Common snapping turtles (Chelydra serpentina) are Canada’s largest freshwater turtle. The species is federally listed as Special Concern, due to high levels of juvenile mortality and nest predation rates, and ranked as S3 in Manitoba. For these reasons, the common snapping turtle is of conservation concern. The preferred habitat of common snapping turtles is generally characterized by slow-moving water with soft muddy bottoms and dense aquatic vegetation. In Ontario, they are active from early May to mid October, with nesting occurring in mid June. Habitat use and activity patterns are not known for Manitoba populations. The objective of this study is to determine movement patterns of common snapping turtles in the Little Saskatchewan River in southwestern Manitoba. In May and June, adult turtles (N=9) were captured by net in a marsh area and oxbow near the main river channel. Each turtle was measured and fitted with a VHF radio transmitter. Each week the location and behaviour of each turtle was recorded. By August, all turtles had moved into the main river channel. Several individuals exhibited large movements within the river (both upstream and downstream) throughout the summer. In the future, we will use knowledge of their movement patterns to locate nest sites, determine nest predation rates, and juvenile mortality.

Keywords: Snapping turtle, VHF telemetry, habitat use
Source water protection plan implementation in First Nations communities in Saskatchewan

Miller, Jessica E. and Robert Patrick. Geography and Planning, University of Saskatchewan

In Canada, uneven access to safe drinking water in First Nations communities continues to be problematic. Boil water advisories for First Nations communities are 2.5 times higher than non-First Nations communities. Some First Nations have recently developed source water protection plans with the assistance of the First Nations Agricultural Council of Saskatchewan and the North Saskatchewan River Basin Council. The purpose of these plans is to identify specific action statements that will enhance the integrity of the drinking water as well as prevent drinking water contamination. The water resource literature has identified the importance of local capacity enhancement to not only develop source water protection plans but also to implement these plans. The goal of this research is to identify the necessary capacity enhancement requirements to support effective source water protection plans, including the implementation of those plans. This research is conducted under the principles of Ownership Control Access and Possession and involves two First Nation case study communities as well as key actors within the water governance structure in Saskatchewan. The knowledge gained from this research is applicable to other First Nation communities outside Saskatchewan. This presentation introduces a summary of results so far and describes some of the opportunities and challenges to implementing source water protection plans.

Keywords: source water protection, First Nations, capacity enhancement

Water was our first medicine: First Nations perspectives for water management

Miller, Jessica E., Geography and Planning, University of Saskatchewan

Water is generally taken for granted in North America. In Canada, over-use and mega resource projects threaten the quality and quantity of water yet our North American perspective dictates that as long as our short term health remains unaffected, there is no need to focus on preventing water and health crises. A ‘megaproject psychology’ approach to water management in Canada has had severe consequences for both aboriginal people and the environment. This poster presents a call for more collaborative approaches to managing water resources. If we are to manage water resources in Canada in sustainable ways both now and into the future, we must be able to integrate perspectives on water that include aboriginal interests and understandings. Water is consistently described in the literature on First Nations perspectives as a function of an all-pervasive life-force both in a physical sense and in a spiritual sense. Both local and international forums on water have limited participation of Aboriginal voices and governments have a tradition of being aversive to native interests. However, Integrated Water Resource Management may be an opportunity for integrating aboriginal interests as it emphasizes collective participation for managing water resources.

Keywords: Integrated Water Resource Management, 7th generation principle
Introducing the Use of Waypointing in a Geographic Education Methods Course

Munski, Douglas C., Department of Geography, University of North Dakota

Geocaching increasingly is used to introduce K-12 students, pre-service educators, and teachers to the basics of geospatial technologies for land navigation. Yet, many locations are off-limits for placing caches. The alternative is to undertake the use of waypoints. A waypoint is a form of a virtual geocache in that the orienteering individual uses a map and compass or a GPS unit to go from site to site but instead of opening a cache, the person learns about each location similar to reading a field guide entry. The advantages of this pedagogy is that it can be used to help K-12 students become more cognizant of their surroundings while on field trips plus it encourages them to conduct research for highlighting various aspects of geography. Waypoints especially can be created to present materials from historical geography, physical geography, cultural geography, economic geography, and land use planning. As part of collaborations between the Dakota Science Center of Grand Forks, North Dakota, and the University of North Dakota’s Department of Geography, pre-service educators are being introduced the use of waypointing. This poster emphasizes how a local campus publication, Sites 2C at UND, is utilized to promote geospatial technologies for K-12 classroom teaching.

Keywords: Waypointing, pedagogy, pre-service

Undergraduates using multimedia to present how climate and land use are interrelated: An overview of the Communicating Climate Change program at the University of North Dakota

Munski, Dr. Laura¹; A. Kirilenko, F. Remer; G. Mullendore, and M. Baker. Dakota Science Center, North Dakota.

The University of North Dakota has implemented the Communicating Climate Change program funded by the NASA Global Climate Change Education program. Funding provided summer internships for regional undergraduates to learn the fundamentals of climate change and to complete research using GIS data and weather modeling. The 2010 internship participants were primarily from non-research-intensive universities with a wide array of majors, and included both women and Native American students. Pre/post-assessment activities demonstrated significant increases in their understanding of how climate and environment influence one another. The second phase of this program, beginning fall 2010, involves the development of lesson plans to complement the undergraduate-produced webcasts to be used in regional middle school classrooms. These lesson plans will provide students with an opportunity to study local land use change and its affect on the environment, especially in western North Dakota and how climate has affected land use in the Devils Lake Basin of North Dakota. The educational module consisting of the web casts, lesson plans, and inquire based activities will be disseminated via the Internet as well as a teacher workshop and the existing Dakota Science Center PowerOn! program that provides hands-on STEM modules to rural schools in the region.
Watershed cumulative effects assessment and management

Noble, Bram and Robert Patrick. Department of Geography & Planning, University of Saskatchewan

Canada’s watersheds are under increasing stress from the cumulative effects of development, but the current project-by-project approach to cumulative effects assessment and management (CEAM) has been doing more harm than good. Several CEAM initiatives in Canada’s watersheds over the past fifteen years have achieved only mixed success. There is now general consensus that CEAM should move beyond the individual project to the broader regional, and in this case, watershed scale. The science of how to do watershed-based CEAM is advancing, but there is limited understanding of the institutional arrangements and capacity requirements necessary to implement and sustain watershed-based CEAM. In this presentation we examine the ‘science’ and ‘management’ of watershed-based CEAM, including the institutional requirements for its implementation. The results are part of a larger comparative analysis of CEAM experiences and institutional arrangements across four Canadian watersheds with the purpose to advance the practice and theoretical understanding of watershed-based CEAM.

Keywords: cumulative effects assessment; watersheds

Spiritual Tourism and UNESCO’s International Year for the Rapprochement of Cultures and International Year of Biodiversity

Olsen, Daniel H. ¹ and John R. Brodie², ¹Department of Geography, Brandon University, and ²Science Centre, Brandon

2010 is UNESCO’s International Year for the Rapprochement of Cultures and International Year of Biodiversity. As Irina Bokova, Director-General of UNESCO, has stated, the goal of this International Year is “to help dissipate any confusion stemming from ignorance, prejudice and exclusion that create tension, insecurity, violence and conflict...exchange and dialogue between cultures are the best tools for building peace." The purpose of this paper is to discuss the role and potential of religious and spiritual travel as a way of furthering the goal of this International Year and UNESCO’s commitment to peace. In doing so, particular attention will be given to examples in which religious and spiritual travel can lead to both inter-cultural peace and inter-cultural conflict.

Keywords: Spiritual Tourism, UNESCO
The Impact of Texture Analysis on Object-Based Classification of Shelterbelts

Pankiw, Joey and Joseph Piwowar. Department of Geography, University of Regina

In previous research it was indicated that using SPOT-5 2.5 metre panchromatic imagery and object based classification provides an effective resource to identify Prairie shelterbelts. Using spatial features as the basis for classification provided a classification accuracy of slightly over 80%. Despite the effective classification of shelterbelts using these features to classify objects, accuracy was compromised by the lack of spectral data, due to the panchromatic imagery, as result causing the lack of ability to differentiate between shelterbelts and the surrounding landscape. As a result of the lack of contrast between the trees and the surrounding landscape a high number of objects were falsely classified. A solution to this problem is the use of texture features as means to separate non shelterbelt objects from shelterbelt objects. It is thought that due to the high homogeneity of the surrounding landscape compared to shelterbelts that classification accuracy might become greater than previous classification procedures using mainly spectral data. The objective of this study is to use both spatial features and texture features using SPOT 5 2.5 metre panchromatic images to compare and contrast the two different features to determine differences in classification accuracy.

Keywords: Shelterbelts, Object-based Classification, Texture Analysis

Leaf Area Index Calibration of RapidEye Satellite Imagery

Piwowar, Joseph M., Department of Geography, University of Regina

The leaf area index (LAI) is a measure of the total leaf area per unit land area within a crop canopy. It is a primary variable used by agricultural researchers and modellers for estimating foliage cover. There has also been some interest in applying LAI to forecast crop growth and yield. Ground-based LAI data was collected throughout the 2009 growing season for canola, spring wheat, barley, oat, field pea, and flax fields near Indian Head, SK. This data was used to create LAI maps from RapidEye remote sensing images. This report describes the RapidEye LAI calibration method and assesses the utility of the resulting images.
Local Capacity Building for Source Water Protection in the South Saskatchewan Watershed

Rawlyk, Franny and Robert Patrick. Geography and Planning, University of Saskatchewan

Following a number of waterborne disease outbreaks in Canada, the water resource management literature has directed attention to source water protection (SWP). Source water protection is a drinking water management approach that attempts to improve drinking water quality by preventing contamination of untreated water at its source. The drinking water resources literature has identified methods for SWP; however, rates of implementation are variable and dependent on local capacity factors. Through key informant interviews, this study identifies factors that facilitate and constrain local capacity for implementation of a source water protection plan in the South Saskatchewan Watershed. Results are discussed according to the four identified capacity areas for SWP: technical, institutional, financial, and social capacity. Capacity areas in need of improvement included access to data in particular on groundwater and aquifers, training and educational opportunities for non-governmental organizations, greater enforcement of government legislation and regulations, financial security, community awareness and finally greater linkages and networks between organizations with similar objectives. Respondents thought that there was adequate stakeholder involvement in the planning process, that funding was available although not always reliable, and that there was a lot of information on sources of drinking water and possible contamination sources. This research adds to the critical assessment of local uptake of SWP plans.

Keywords: source water protection; Saskatchewan; capacity building

Determining conifer needle flushing stage in Alberta

Sekhon, Navdeep S. and Quazi K. Hassan. Department of Geomatics Engineering, University of Calgary

The study of vegetation phenology is very important in many forestry-related phenomena that include yield and growth, carbon exchange, and wildfire among others. In this paper, our aim was to determine the phenological stage of conifer needle flushing [i.e., related to white spruce (Picea glauca) and/or black spruce (Picea mariana)] over the five forest-dominant natural sub-regions in Alberta. The methods consisted of: (i) converting MODIS-based 8-day instantaneous surface temperature into mean air temperature ($T_a$); (ii) calculating the growing degree days (GDD: favourable temperature regime for needle flushing) with a base temperature of 5 °C as a function of mean $T_a$; (iii) determining the accumulated GDD threshold-value at sub-region scale by averaging the ground-based values of the needle flushing at the lookout tower-sites of the Department of Alberta Sustainable Resource Development during 2006; and (iv) implementing the determined GDD threshold and comparing them with the ground data during the period 2007-2008. We found that an accumulated GDD-value of 200 was required for needle flushing with a reasonable accuracy (i.e., within ±8 days for all of the sub-regions). The determined GDD threshold-value was then applied in 2007-2008 period and found to have same accuracy with compare to the calibration phase.

Keywords: Vegetation phenology, MODIS data, growing degree days
Closer settlement revisited: Kendenup, Western Australia

Selwood, John $^{1}$, Matthew Tonts$^{2}$, and Roy Jones$^{3}$. $^{1}$University of Winnipeg, $^{2}$University of Western Australia, and $^{3}$Curtin University, Western Australia

In the early 1920s a South Australian entrepreneur, C. J. (Jack) De Garis, purchased a large estate at Kendenup in the south-west of Western Australia where he established a comprehensive settlement scheme based on his earlier experiences in Mildura, South Australia. Prior to the purchase, the property had been run by the Hassell family as a sheep station for almost a century before falling into disuse in the hands of the estate’s executors. De Garis’ plan was to found a model community based on intensive production from the more than 1000 blocks he had subdivided and marketed to buyers throughout Australia and overseas. He also laid out a townsite, installed infrastructure and built a dehydration plant to process and market products from the farms. But the scheme failed, resulting in much of the land lying idle for decades. However, the properties have recently been ‘rediscovered’ and marketed as a less costly alternative for people seeking smaller, country holdings than available in the higher amenity locations nearer the coast. This paper discusses the original settlement scheme then explains the more recent land development activities and their implications for future planning.

Key words: rural settlement, planning, development

School Mapping In Education Micro-Planning: A Case Study Of Union Council Chak 84-15l, District Khanewal, Pakistan

Shah, Tayyab I. and Scott Bell. Department of Geography and Planning, University of Saskatchewan

This research took place in the Union council Chak 84-15L, Khanewal District, Pakistan. Pakistan is a developing country with a large and rapidly growing population; it faces many challenges and as a result socio-economic indicators tend not to show positive trends. In developing countries school mapping (SM), a normative approach to the micro-planning of school locations is often used to create the necessary conditions for achieving universal primary and secondary education (UPE and USE). With the introduction of anew local government system, development planning is carried out by the district governments with a focus on local priorities and needs. The objective of this research was to identify the potential school sites at local level by mapping and analyzing the existing inequalities in access and distribution of existing schools based on reliable spatial and aspatial baseline data. Community maps were updated to identify the scattered population sites and school locations with the help of internet resources (Google earth, Wikimapia) and by community participation. A household survey was conducted to gather the baseline data including out of school children and illiterate population. The results provide some practical guidelines for the identification of locations where schools are to be opened.

Keywords: School Mapping, Universal primary education, Education micro-planning

Shymko, Janna, Annemieke Farenhorst, and Ross McQueen. University of Manitoba

Approximately 80% of crops grown in Manitoba are insured through the Manitoba Agricultural Services Corporation (MASC). In order to obtain crop insurance, producers must supply MASC with the type of crop, the township in which the crop was grown, the area seeded to each crop, the area of each crop treated with pesticide, and the commercial pesticide product(s) used on each crop. The objective of this study is to describe agricultural pesticide use trends in Manitoba using eleven years of MASC pesticide use data.

On average, herbicides account for 84% of all pesticides applied to crops. Since 1996, area treated by herbicide has varied from a low of 4,512,071 ha in 1991 to a high 5,579,691 ha in 2003. Fungicide and insecticide use remain relatively low, averaging 13% and 3% of all pesticides applied, respectively. Over the 11-year period, a total of 316 different products were used on Manitoba crops. Given that available and credible pesticide use statistics are lacking in Canada, this dataset addresses a critical gap in pesticide use trends.

Key Words: Agriculture, Pesticide, Trends

Around Mystery Mountain with Phyllis Munday

Dan Smith, Geography, University of Victoria

It was a clear day on top of Mount Arrowsmith on southern Vancouver Island when Phyllis first spotted the mountain that would hold her and Don's attention for years to come. They nicknamed the peak “Mystery Mountain”, until it officially became Mount Waddington in 1928. The mountain stood at 4019 metres and was the highest in the coastal range. In the eleven expeditions the two took to the Mount Waddington area, the closest they would ever come to actually reaching the top was in 1928 when they quit within a tempting eighteen metres of its summit. In her lifetime, Phyl received many awards, medals, and honours attesting to her merit as an influential and outstanding woman, but she remained decidedly independent through all the admiration. Phyllis Beatrice Munday died nearly a half-century after her husband, in 1990, at the age of 95.
An initial assessment of northern pike movements in Clear and South Lakes, Riding Mountain National Park, using VHF telemetry.

Thomas, Randi \(^1\), Chris Malcolm\(^1\), and Tim Sallows\(^2\). \(^1\)Department of Geography, Brandon University, and \(^2\)Riding Mountain National Park, Manitoba

Northern pike (\textit{Esox lucius}) are a native, top trophic predator in Clear and South Lakes, Riding Mountain National Park, Manitoba. They are therefore an important indicator of the lakes’ aquatic health. Clear Lake is a 29.22 km\(^2\), mesotrophic lake, while South Lake is a shallow, 2.03 km\(^2\), eutrophic lake. The two lakes are separated by a sand isthmus which is often breached during the spring melt, providing a temporary corridor between the lakes. In late March, 2010, 40 northern pike were captured in Clear Lake, north of the isthmus, and fitted with ATS F2050 external VHF transmitters. The purpose of the study is to track movements in the lakes to identify important habitat. The pike were then tracked on a weekly basis, throughout the spring and summer. During April, 35 of the 40 pike moved into South Lake, though the temporary isthmus corridor. By the end of May, 28 pike remained in South Lake; 19 remained by the end of June, and 3 by the end of July. In mid-August, 4 pike were recorded in South Lake; however, late in the month 8 pike returned to South Lake. The isthmus was closed by August 26\(^{th}\), trapping 12 pike in South Lake. These pike will be monitored to assess whether they can survive the winter.

Keywords: northern pike, telemetry, Riding Mountain National Park

Newcomers in a New Land: Immigration and Affordable Housing Policy

Carter, Tom. Department of Geography, The University of Winnipeg

Over the past decade immigration to the Province of Manitoba, Canada, has increased close to three hundred percent. This has placed considerable pressure on housing markets, contributing to price increases in both the rental and ownership sectors in centres throughout the Province. Many newcomers, particularly low income working immigrants and refugees, face significant affordability problems. Current housing policy is poorly structured to address these problems. Immigrants and refugees have employed various coping strategies, the private sector has experimented with more affordable approaches to housing and governments are adjusting policy approaches. Still housing remains unaffordable for many. Research on newcomers’ housing experiences and trajectories helps identify other policy changes that are required.

Key words: immigrants, refugees, housing policy
Waste Management’s Impact on Residential Quality of Life: A Case Study of Puerto Vallarta Mexico

Tousignant, D. and D. Eberts. Department of Geography, Brandon University

While tourism in Mexico remains a significant economic sector, the waste generated from the thousands of tourists has inevitably put stress on several communities’ waste management systems. In the case of Puerto Vallarta, Mexico, tourism, along with other contributing factors, has created a waste management situation that undoubtedly has an impact on the lives of local residents. This paper will attempt to examine the impact that 350 tons of garbage that is processed and scavenged through daily at a former city dump located within city parameters, has on four neighbourhoods in the surrounding area. The results from a survey done on four neighbourhoods at differing proximities from the dump, a qualitative questionnaire with ten dump workers, and key informant interviews, may in fact suggest a negative relationship between the city’s waste management system and its residents’ quality of life. However, it is debatable whether this waste burden due to tourism is just that, a burden, or perhaps an economic opportunity for the city’s informal recyclers.

Keywords: Quality of Life, Garbage, Tourism

Movements of Northern Pike (Esox lucius L.) with Respect to Small Weirs Located in Riding Mountain National Park, Manitoba

Town, Tim ¹; Chris Malcolm¹; and Tim Sallows². ¹Department of Geography, Brandon University, ²Riding Mountain National Park, Wasagaming, Manitoba

In cooperation with Riding Mountain National Park, the movements of northern pike (Esox lucius) were monitored with respect to two small weirs at Lake Audy and Whirlpool Lake. At Lake Audy a small, rock ramp fishway exists adjacent to the weir, while there is no fishway at the Whirlpool Lake site. A total of 50 northern pike were outfitted with external VHF transmitters and tracked at Lake Audy between May 9, 2008 and June 3, 2009, and at Whirlpool Lake between May 14, 2009 and December 23, 2009. At Lake Audy, pike are able to navigate through the weir between the Little Saskatchewan River and Lake Audy. In some cases, pike moved back and forth through the weir several times during the tracking period. Analysis of pike movements in the Whirlpool system indicated that pike can not negotiate the weir between Whirlpool Lake and the Whirlpool River. All pike outfitted with radio transmitters below the weir in the Whirlpool River were confirmed deceased by August 5th, 2009, most likely due to predation, as three transmitters were found directly adjacent to pike remains. Management recommendations include continued maintenance of the fishway at Lake Audy, as well as research to determine whether other species are able to use the structure, and the construction of a multi-species fishway at Whirlpool Lake.

Keywords: fishway, telemetry, pike.
Using Near-Real-Time Volcano Monitoring Data in the Classroom

West, Dr. Kim. The Gwenna Moss Centre for Teaching Effectiveness and Professional Affiliate, Department of Geography and Planning, University of Saskatchewan

The Volcanoes Exploration Project: Pu’u ‘O’o (VEPP) is a website designed for geoscience educators by the US Geological Survey (Hawaiian Volcano Observatory), NASA, and the University of Hawai’i, Manoa. The website provides access, in near-real-time, to geodetic and seismic data, episodic kinematic GPS campaigns, lava flow field maps, and archived Webcam images from Pu’u ‘O’o crater. The goal of the site is to help geoscience educators plan and use inquiry-based classroom activities that incorporate the use of near-real-time volcano monitoring data, available through the VEPP website.

The author contributed to a site that contains 20 brand new teaching activities, available at the VEPP Workshop section of the Science Education Resource Center (SERC) web site (http://www.nagt.org/nagt/vepp/index.html). The activities were developed for use in college and university classrooms, in large introductory major and non-major courses, upper-year courses, and graduate-level seminars. Along with providing examples of the teaching activities, the author will discuss her rationale for creating two of the online teaching activities and the potential strengths of using near-real-time data in the classroom.

Keywords: near-real-time data, volcano monitoring, teaching

Application of an Unmanned Aerial Vehicle for the Detection and Monitoring of Leafy Spurge

Wiseman, Dr. Dion J. 1; Dr. Terrence McGonigle2 and Mr. Nick Cairns2, 1Department of Geography, and 2Department of Biology, Brandon University

Leafy spurge is an invasive perennial common across the Northern Plains. Infestations reduce the value and productivity of agricultural land, displace native plant species, and impact critical habitat for threatened or endangered species. While a variety of chemical and biological controls have proved promising in some environments, efforts continue to monitor patch dynamics and the density and distribution of spurge. The objective of this research was to assess the utility of a UAV, as a possible alternative to ground-based surveys, for monitoring leafy spurge. UAV imagery was acquired for four experimental plots at Canadian Forces Base Shilo in late June and early July, 2010. A two-camera system was used to acquire 8-cm resolution imagery in the blue, green, red, and near infrared portions of the electromagnetic spectrum. An unsupervised classification was used to generate a comprehensive vegetation map of each site that was then compared to a ground-based survey. Preliminary results suggest that the image-based classifications accurately delineated the extent of flowering spurge at densities greater than 25 stems m\(^{-2}\) and that variation in density above this threshold could be detected. However, spurge could not be reliably differentiated at lower densities, because the spectral signature was similar to a variety of native prairie species.

Keywords: remote sensing, vegetation mapping, UAV
Using remote sensing image texture to study vegetation spatial heterogeneity under different grazing managements in mixed grassland

Yang, Xiaohui and Xulin Guo. Department of Geography and Planning, University of Saskatchewan

Vegetation heterogeneity is an important term in ecology which is directly related to wildlife habitat and is one of the most important indicators for biodiversity. Grasslands in Great Plains were historical evolved with disturbance including fire and grazing. Grazing can alter the spatial heterogeneity of vegetation to different extent depending on the grazing time, intensity, frequency and grazed herbivore. Monitoring how vegetation spatial heterogeneity changed with different grazing managements applied is crucial for conserving wildlife habitat and ecological integrity. Texture information derived from remote sensing provides a potential tool for measuring vegetation heterogeneity at multi-spatial and temporal scales quickly, efficiently, and at low cost. The goal of this study was to investigate the impacts of applied grazing managements on vegetation heterogeneity spatially and the feasibility of using texture information derived from remote sensing to monitor the identified impacts. The study area was located in Grasslands National Park and surrounding provincial community pastures. Field data were collected in 2009 growing season. SPOT5 multispectral and panchromatic images acquired in the same year were used to derive the texture information. The expect results are that vegetation heterogeneity is increased at site with light to moderate grazing intensity and texture parameters can be used to monitor the changes.

Keywords: Vegetation spatial heterogeneity, Texture measures, Grazing