15:20 Using GPS technology to predict elk birth site selection and calf survival

Changes in movement behavior can be used to infer reproductive success remotely. Cow elk (Cervus elaphus) isolate themselves from the herd to give birth and calves follow a "hider" strategy where calves remain stationary to avoid predators during the initial period after birth. We illustrate a method (DeMars et al. 2013) that uses changes in fine-scale movement rates of cow elk to identify parturition and survival of elk calves through a change point analysis. We assessed the movement of GPS-collared elk on the eastern slopes of west-central Alberta over the period 2002-2012 and tested it with known fates of intensively-monitored calves in the field in 2013. We expanded the approach to compare the reproductive rates of migrant and resident elk, and selection of birth sites, during a period when there has been a loss of migratory behavior in the population and to determine whether calf loss is related to the habitats used by the migratory and residential herd segments.

Ms. Berg focuses on landscape-level processes, including predator-prey dynamics and human influences on wildlife. She received her BSc from Northland College in Wisconsin, and her MSc from the University of Montana, where she researched prey availability and selection by a carnivore assemblage in Patagonia, Argentina.

15:40 Investigating ecological patterns and processes in tropical forests using GIS and remote sensing

Biogeographers and ecologists have a long-standing interest in the distribution of biodiversity over different spatial and temporal scales. This interest has been driven either by the necessity to understand the basic ecological principles that govern patterns of species diversity or by the urgency to establish protected areas that preserve the majority of species in a region in the face of the global biodiversity crisis. Since GIS software and airborne/spaceborne remote sensing data has become readily available for public and scientific use, there has been an increased interest from remote sensing researchers to measure and model ecosystem variables from space. The talk will explain the current use of GIS and remote sensing tools to measure ecosystem patterns and processes within the conceptual framework of biodiversity science as seen by ecologists and biogeographers. I will introduce some of the innovations in deforestation monitoring and ecosystem mapping currently in the published scientific literature and the challenges for the future.

Dr. Portillo-Quintero is a biologist from Venezuela who joined the University of Alberta as a PhD student in 2005. He obtained his PhD in Earth and Atmospheric Sciences performing an integral assessment of the Conservation Status of Neotropical Dry Forests using Geographic Information Systems & Remote Sensing. His work includes land cover and land use mapping, tropical forest cover change detection and deforestation rate estimation, and monitoring ecosystem dynamics using GIS and remote sensing. He is currently a postdoctoral research fellow at the Center for Earth Observation Sciences at UofA, where he works in the implementation of wireless sensor networks for hypervital monitoring of ecosystem dynamics.

Thank you to:

Department of Biological Sciences
Geospatial Information and Technology Association (GITA) Alberta Chapter
Urban and Regional Information Systems (URISA) Alberta Chapter
ESRI Canada
GeoAlberta

www.gisday.com
13:10 Digital bonebeds: Turning field maps into a searchable digital platform, using the Danek Bonebed (Edmonton, Alberta) as an example

The Danek Bonebed was first excavated in 1989, and again in 1991, by the Royal Tyrrell Museum of Palaeontology (TMP), and then by the University of Alberta Laboratory for Vertebrate Palaeontology (UALVP) starting in 2008. It is the largest non-marine bonebed from the Late Cretaceous period, predominantly Investigators of the bonebed are using ArcMap 10.1 to transformed into a searchable platform. Each element is tagged with its catalogue number, identification, family, and quarry information. Although some specimens lack some information because of the bonebed for the catalogue number, or for all elements of one kind by using a term such as “humerus” to locate all humeri within the bonebed. Additionally, users can click on an element within the map and all known information for the element will appear. A searchable bonebed map can aid researchers by allowing information to be visible that may not be obvious in regular hand-drawn maps.

Ms. Bramble is in her final year of an undergraduate degree at the University of Alberta, where she is working on an honors in Paleontology. So far, much of her research has revolved around the study of dinosaur bonebeds in Alberta.

13:30 Habitat factors influencing the movements of female Arctic grizzly bears (Ursus arctos) after den emergence

With few studies providing descriptive details of Arctic grizzly bear movements, this study will provide a baseline for examining behavioural responses to changes in the landscape related to climate change and increasing oil and gas development. The main goal of our study was to examine factors influencing the temporal and spatial movements of female grizzly bears of different reproductive classes in the early active season in the Mackenzie Delta region of the Northwest Territories, in Canada’s western Arctic. Reproductive classes included females with cubs < 1 year old, females with cubs > 1 year old, and solitary females. We ran a stepwise conditional fixed effects logistic regression to determine what habitat characteristics the bears were selecting for their steps, the straight line path between two consecutive GPS fixes. Variables included were different topographic, terrestrial vegetation and vegetation diversity characteristics. During the early active season grizzly bears of different reproductive classes moved to similar patterns, but the routes they took to get there differed slightly, as females with cubs chose to move along areas of different topographic characteristics, and all three reproductive classes selected slightly different terrestrial vegetation characteristics to move along.

Ms. Krawchuk is a MSc student in the Department of Biological Sciences. She is currently studying the niche separation of cougars and wolves in the Rocky Mountains with her supervisor Dr. Evelyn Merrill. The grizzly bear movement study fulfilled the requirements for a Biology 499 research project, a course offered at the University of Alberta designed to allow students to develop research skills in an independent project. Krawchuk has been conducting her study throughout the early active season of grizzly bears in the Northwest Territories, and has been tracking three different groups of bears using GPS collars.

15:00 Modeling the impacts of long-term warming trends on ecosystem productivity across North America

Ecosystem productivity is driven by many factors, including temperature and precipitation. To understand how these factors will affect productivity in the future, we need to model the responses of ecosystems to climate change. This study aims to develop a model that can predict how ecosystem productivity will change in response to warming over the next century.

Ms. McGetrick is completing a Master of Science in Public Health at the University of Alberta focused on the use of Geographic Information Systems (GIS) in health communication with indigenous and aboriginal people facing natural resource development in the circumpolar region. McGetrick is also a researcher in the Community Environments (PLACE) research lab, where she currently helping to lead a GIS analysis of micro-scale community observation data collected as part of the Community Health in the Built Environment (CHBE) project.

In conclusion, our study highlights the importance of understanding the complex interactions between climate change and ecosystems, and provides valuable insights for developing adaptive management strategies.

14:10 Geographic Information Systems: Finding the spatial parameters of public health

Public health consists of population-level efforts to prevent disease, promote health, reduce inequity, and increase quality of life. Recently, Geographic Information Systems (GIS) have extended public health capacity in its spatial dimensions of research, disease surveillance, risk analysis, health care planning and policy, demographics, and public outreach communication. The presentation will provide an overview of advancements in public health GIS, current challenges, the institutions, and the academic literature contributing to the field. Community-based participatory research will be highlighted as an important area of development in public health GIS.

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