

Brent Smith, BSc Biology, MSc Geography

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COMPETENCIES

Experience

- Permaculture design (2014-2015). Involved in the design of 7 permaculture projects including hydrological modelling, soils interpretation, and geospatial analysis using Geographic Information Systems (GIS). Established a fruit orchard on my own property (2003 to present), including cherry, pear, apple, saskatoon, grapes, and kiwi. Currently designing a diverse 1 acre tree nursery, 10 km west of Medicine Hat Alberta (Zone 3b-4). The nursery project consists of water catchment and swales, and includes cherry, apple, pear, bitter orange, saskatoon, wolf willow, and grape production
- Cumulative Effects Assessment (CEA) of military training, oil and gas development, and cattle grazing at Canadian Forces Base (CFB) Suffield, Alberta (2001-2014). Analysis incorporates geospatial datasets, combined with ground-based monitoring, and spatial/non-spatial models to assess and predict land cover and land use change over time, and to infer impacts to native prairie, wildlife, and Species at Risk (SAR). CEA at CFB Suffield has employed land cover and human footprint (derived from a variety of data sources including Landsat, EO-1, MODIS, Alberta Biodiversity Monitoring Institute land cover/ABMI), land use data (derived from British Army Training Unit Suffield/BATUS, Alberta Energy Regulator, ABMI human footprint, industry surveys, cattle stocking information)
- Experience in producing (2005-2014) and participating in Environmental Assessments (Expert Witness in 2007 CFB Suffield National Wildlife Area Shallow Gas Infill Project Joint Review Panel), as well as reviewing and assessing large-scale industrial projects for environmental impact
- Manager of ecological studies including CFB Suffield rangeland reference monitoring (grazing baseline; 2005-2014) areas, long-term soil and vegetation monitoring (2001-2014), and military range and training area management (RTAM; 2002-present)
- Remote sensing analysis of native prairie including change detection, multi- and hyper-temporal image analysis, standard classification techniques, smoothing, filters, and accuracy assessment (2001-2014). Responsible for training Alberta Biodiversity Monitoring Institute (ABMI) field crews on remote sensing classification of prairie land cover types (2012)

- Experience in experimental design, compilation, manipulation and interpretation of ecological data, including univariate, repeated measures, multivariate, ordination (De-trended Correspondence Analysis, Nonmetric Multidimensional Scaling), and non-parametric analysis (logistic regression, probit regression, X^2) (2005-2014)
- Extensive experience in GIS (ArcGIS 3.x, 8.x, 9.x, 10.x, IDRISI, ENVI, PCI Geomatica, GRASS, QGIS) data creation and analysis, including the creation and maintenance of geodatabases for endangered species, soils, vegetation, range fires, unexploded ordnance, oil and gas infrastructure, three-dimensional modelling, water flow modelling, soil erosion (Revised Universal Soil Loss Equation—RUSLE, Wind Erosion Equation, WEQ) modelling, and GPS surveying using raw and differential correction systems (1998-2014)
- Experience in spatial and non-spatial ecological modelling (2009-2014), including Vegetation Dynamics Development Tool (VDDT), Path Landscape Model, Geospatial Modelling Environment, and Tool for Exploratory Landscape Scenario Analyses (TELSA). Model development has included parameterization, calibration, sensitivity analysis, and “validation” with past and current datasets
- Experience in providing scientific and technical advice regarding land use research findings, data collection, monitoring, and conservation of species at risk, native plant reclamation, and range/riparian health at CFB Suffield (2001-2014)
- Experience in successfully obtaining funding for research projects (e.g., NSERC, Interdepartmental Recovery Fund/IRF for endangered species; 2003-2014)
- Endangered species surveys including Burrowing owl, Swift fox, Ferruginous hawk (2003-2014), and creation of habitat models (Resource Selection Function via logistic regression and accuracy assessment; 2009-2014)
- Instructor (Medicine Hat College) of industrial reclamation practices in Alberta (2014-present). Responsible for teaching all phases of hydrocarbon development, from project surveys to end-of-life abandonment
- Experience in conducting vegetation assessment and rangeland health assessment for riparian, dry mixedgrass, mixedgrass, and aspen parkland ecosystems (2001-2014)
- Experience in restoration and reclamation of dry mixedgrass and mixedgrass native species, including the largest restoration of plain’s rough fescue grassland in Saskatchewan (70 acres of *Festuca hallii* prairie at the Last Mountain Lake National Wildlife Area; 2000)
- Experience in developing reclamation criteria, evaluation of reclamation success, design of reclamation programs including seed mix design, mechanical seeding, and erosion control measures (1998-2014)
- Experience in identifying, processing, cleaning, and archiving native seed materials (1998-2014)

- Experience in collaborating with other federal, provincial and non-governmental agencies, including Environment Canada, Agriculture Canada, Alberta Environment and Sustainable Resource Development, Alberta Public Lands, Alberta Environment, University of Calgary, University of Lethbridge, University of Alberta, Prairie Conservation Forum (2001-2014)
- Experience in endangered species recovery team membership and processes (former co-chair—Alberta Provincial Ord’s Kangaroo Rat Recovery team, and former member of federal Burrowing Owl Recovery, and federal Plants at Risk in Prairie Canada teams (2001-2014)
- Experience in working in rigid, politically-charged, and time-demanding environments (1998-2014)
- Experience in the management of multiple priorities and financial resources, supervision of employees and summer students, and achieving desired results (2001-2014)
- Experience in oral and written communication, and giving concise briefings to volatile and hostile audiences (2001-2014)
- Experience in cost-benefit analysis and risk analysis (2007-2014)

Knowledge

- As part of job requirements with CFB Suffield, in-depth knowledge of legislation including: Species at Risk Act (Canada, Alberta), Fisheries Act, Wildlife Act (Canada, Alberta), Migratory Bird Convention Act, Alberta Environmental Protection and Enhancement Act, Alberta Native Re-Vegetation Guidelines, Alberta Reclamation Criteria, Alberta Energy Utility Board Guidelines (now Alberta Energy Regulator) and Regulations, Alberta Land-use Framework
- Extensive knowledge and identification of native and non-native flora and fauna of Alberta and Saskatchewan, including grass, forb, shrub, tree, mammal, avian, amphibian, and fish species
- Detailed knowledge and understanding of prairie ecology and interactions between terrestrial and aquatic systems
- Detailed knowledge of all aspects of reclamation and restoration (seed collection, seed processing, seed application and shrub/tree planting, weed control, assessment of success)
- Knowledge of theoretical and applied range management practices and principles, including the development of grazing and land use management plans
- Extensive knowledge of the Philosophy of Science, including the scientific method and statistical analysis

- Extensive knowledge of GIS and its application to ecology, and range and ecosystem management
- Extensive knowledge of soils and geology of Alberta and Saskatchewan
- Design of appropriate permaculture guilds for growing zones 2-4, using agronomic and native species

Skills and Abilities

- Demonstrated ability to manage multiple and conflicting priorities
- Ability to manage and administer financial resources (up to \$1,000,000)
- Ability to hire and supervise permanent, term, casual, coop, and summer student staff, and contractors
- Ability to use office computer applications, including Outlook, PowerPoint, Excel, Dbase, WordPerfect, Word, Lotus 123, and Access
- Ability to use science-based computer applications including Systat, R, PC Ord, and SPSS
- Strong GIS abilities, including the creation of automated and semi-automated workflows which process remote sensing, land use, and ecological information to develop management plans
- Ability to use hard-copy aerial photography for navigation and photo interpretation
- Ability to use GPS, differentially corrected GPS, and integrate GPS data into GIS
- Ability to use office communications including fax and email
- Strong critical thinking and problem-solving skills

EDUCATION

Bachelor of Science in Biology, University of Regina, 1998

Master of Science in Geography, University of Calgary, 2013

Supervisor: Gregory McDermid

Thesis: Multi-temporal Remote Sensing of Rangeland Vegetation for Investigation of Fire-related Ecology at Canadian Forces Base Suffield, Alberta

<http://hdl.handle.net/11023/735>

Permaculture Design Course, Verge Permaculture, Calgary, 2014

PUBLICATIONS

Brent Smith and Gregory J. McDermid. 2014. Examination of Fire-Related Succession Within the Dry Mixed-Grass Subregion of Alberta With the Use of MODIS and Landsat. *Rangeland Ecology & Management* 67(3): 307-317.

W. McInnis, McDermid, G. J., Smith, B. 2015. Discriminating Native and Non-native Grasses in the Dry Mixedgrass Prairie with MODIS NDVI Time Series. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS)* 99: 1-9.

SELECTED PRESENTATIONS

Canadian Forces Base Suffield Range Condition Assessment (RCA). 18 August 2011. 2nd International US Army Training Support System (Dallas, TX).

Multi-temporal Remote Sensing of Rangeland Vegetation for Investigation of Fire-related Ecology at Canadian Forces Base Suffield, Alberta. 22 June 2012. 33rd Canadian Remote Sensing Symposium (Ottawa, ON).

Examination of fire-related plant succession within the dry mixedgrass subregion of Alberta using MODIS and Landsat imagery. 25 June 2013. 7th International Workshop on the Analysis of Multi-Temporal Remote Sensing Images (Banff, AB).

Examination of fire-related plant succession within the dry mixedgrass subregion of Alberta using MODIS and Landsat imagery. 23 January 2014. Alberta Biodiversity Monitoring Institute Workshop “Remote Sensing of Alberta’s Dynamic Landscapes” (Edmonton, AB).
<http://www.ucalgary.ca/f3gisci/node/161>

WORK HISTORY

Owner: Paper Street Permaculture Ltd., Medicine Hat, Alberta
Permaculture design and GIS analysis
January 3, 2015 - present

Employer Contact: Major Hugh Atwell
Position: Range Biologist, CFB Suffield (BI-03)
Box 6000, Stn Main
Medicine Hat, AB
T1A 8K8
(403) 544-4011
May 15, 2001- January 2, 2015

Employer Contact: Cathy Linowski
Position: Seasonal Instructor, Medicine Hat College
299 College Drive SE
Medicine Hat, AB
T1A 3Y6
(403) 529-3811
September 1, 2014-present

Employer Contact: Dean Nernberg, Grassland Ecologist
Position: Prairie Restoration Technician (EG-04)
Last Mountain Lake National Wildlife Area
Canadian Wildlife Service/Mixed Grass Prairie Habitat Restoration Project under auspices of
North American Waterfowl Management Plan
Box 280, Simpson, Sask.
S0G 4M0
(306) 836-2022
September 7, 1998-May 14, 2001

INTERESTS AND HOBBIES

Ecological/biophysical economics

Permaculture and native species for use in xeriscaping

Fishing

Canoeing

Camping

Green Party of Canada candidate for Medicine Hat-Warner-Cardston (2015)