

Fields of Competence

- Environmental Soil Science
- Soil Survey and Landscape Analysis
- Soil, Water, Plant Interactions
- Saline/Sodic Water - Soil Relations
- GIS, Remote Sensing, Geospatial Databases
- Spatial Analysis and Modeling
- Soil Reclamation and Mitigation
- Technical Writing and Editing

Education

- M.S. in Land Resources and Environmental Sciences – Montana State University, Bozeman, Montana. Emphasis in soil science.
- B.S. in Political Science – Ohio State University, Columbus, Ohio. Emphasis in Natural Resource Policy.

Professional Summary

Brian Kozar is a board certified professional soil scientist (CPSS #327896) with ten years of project experience in both the public and private sector. Brian has a master's degree in environmental science from Montana State University with emphasis in soil science and landscape analysis. His research at MSU integrated soil analysis, digital elevation models, global positioning and geographic information systems (GPS/GIS), relational databases, and statistical analysis to map soils and model soil water flow and distribution of plant-available soil water.

Brian's technical strengths include soil assessment and soil survey, soil-plant-water interface interactions, soil reclamation and mitigation, assessment and development of soil limitations and interpretations for various purposes, management and analysis of large environmental data sets, and use of GPS and GIS technologies. Brian's recent project experience has included soil mapping and assessment towards development of EIS, soil and vegetation assessment for the NRCS Natural Resource Inventory (NRI) program, soil mapping and monitoring for purposes of CBM water management, and analysis of soils and vegetation for environmental assessment and reclamation activities. His projects routinely incorporate on-site field soil assessment, soil/landscape analysis, spatial modeling techniques, GIS, interpretation of remotely sensed imagery, and statistical analysis to assess and map vegetation and soil physical, chemical and biological properties.

As a technical writer, Mr. Kozar has been involved in the preparation of several technical reports and refereed journal articles. He has prepared numerous technical project reports for public review.

Representative Projects and Experience

- **Otter Creek Soils Baseline EIS, Westech Environmental Services, Inc., Rosebud County, Montana.** Sampled, characterized, surveyed, and documented soils for the Otter Creek Tract 1 coal mine development area (approximately 8,000 acres). This work included identification and delineation of unique soil-geologic-landscape map units within the project area and characterization of soils within these units, with a focus of identifying and mapping suitable topsoil sources for mine reclamation.
- **ExxonMobil Billings Refinery East Land Treatment Unit Closure Certification, Hydrometrics, Inc., Billings, Montana.** Conducted an independent review of closure documentation and related activities for ExxonMobil Billings Refinery's East Land Treatment Units (ELTUs). Served as certification that the hazardous waste management unit had been closed in accordance with Montana Hazardous Waste Permit Number MTHWP-99-02 and to the specifications in the approved closure plan. Included review of all relevant closure documentation and activities, analytical data including groundwater, soil, and vegetation quality monitoring, and a site visit and review.
- **Soil Scientist and Survey Services, USDA NRCS, Utah.** Contract soil scientist for the USDA Natural Resource Conservation Service (NRCS) in Utah. Integrates on-site soil assessment, soil/landscape analysis, soil survey, spatial modeling techniques, aerial photo interpretation, and knowledge of vegetation communities, geologic processes, and geomorphology. This work includes the excavation of hand dug pits, description of soil profiles, identification of landscape and landform positions, and recording of soil physical, chemical, and biological properties and features. Classified soils to soil series and taxonomy.

- **Northwest Energy Jackrabbit to Meadow Village 69 kV Transmission Line EIS, Power Engineers, Inc., Gallatin County, Montana.** Surveyed, characterized, sampled, and documented soils along the length and within the immediately adjacent area of a proposed transmission line on U.S. Forest Service lands. Developed soil limitations, potential impacts to the soil resource, and proper mitigation measures, towards the development of the Jack Rabbit EIS. This work included identification and delineation of unique soil-geologic-landscape map units within the project area, characterization and sampling of soils within these units, and analysis of soils data to determine the suitability for reclamation and revegetation, erosion potential, and any soil limitations that would be pertinent to the proposed project. GIS and remote sensing extensively used to conduct initial mapping, development of sampling methodology, and creation of soils and interpretation maps.
- **Meagher County Soil Survey, United States Department of Agriculture, White Sulphur Springs, Montana.** Mapped soils at the Order 2 level across landscapes integrating on-site soil assessment, soil/landscape analysis, spatial modeling techniques, aerial photo interpretation, and knowledge of vegetation communities, geologic processes, and geomorphology. This work included the excavation of hand dug pits, description of soil profiles, identification of landscape and landform positions, and recording of soil physical, chemical, and biological properties and features. Conducted analysis of soils, vegetation, and topographic data to assist in the creation of soil survey database, manuscript, and development of soil interpretations. Classified soils to soil series and taxonomy. Extensive implementation of Global Positioning Systems (GPS), Geographic Information Systems (GIS), Digital Elevation Models (DEM), and remote sensing techniques were employed for development of expert-knowledge based soil mapping systems.
- **Soil Mapping for the Continental Divide – Creston Natural Gas Project, Various Clients, Wyoming.** Completed an Order 3 soil survey for over 200,000 acres of the Continental Divide – Creston natural gas development area in southern Wyoming. This project mapped soils in the EIS project area where no soils had been previously mapped, and resulted in a completed soil map for the entire EIS study area. This study incorporated the use of aerial imagery, DEMs, and other data in a GIS to create an initial soils map. Subsequent field assessment of soils, vegetation, and landscapes allowed for further modification of the initial map and creation of a final soils map in a GIS, to be used in the development of interpretations for the Draft EIS for the area.
- **Initial Soil Suitability Analysis, Various Clients, Wyoming.** Review and analysis of published soil survey and topographical data to estimate Coal Bed Natural Gas (CBNG) produced water salinity impacts on soil tilth. Implementation of GIS data to prepare surface maps showing extent of key soil properties that could potentially impact project feasibility.
- **Soil Mapping and Characterizations for Produced Water Managed Irrigation Sites, Williams Production Company, Gillette, Wyoming.** Completed Order 1 soil surveys of native rangelands in the Powder River Basin of Wyoming to determine the suitability for CBNG produced water managed irrigation projects. Included development of sampling and mapping strategy, field assessment of soils, vegetation, and landscapes to map soils at a high resolution, and analysis of soil chemical and physical data to help predict the associated impacts associated with utilizing highly sodic water for irrigation. Extensive integration of GPS technologies and GIS were employed to map and display soils in presentation quality maps.
- **Managed Irrigation of Coal Bed Natural Gas Produced Water, Williams Production RMT and Continental Industries, Wyoming.** Evaluated and monitored the use of CBNG produced water for crop irrigation and possible effects on soil quality. Reviewed soil chemistry data to determine expected impacts from irrigation with high sodium produced water. Determined salinity impacts on the physical properties. Assessed cropping systems, biomass production, and hay quality associated with CBNG produced water irrigation. Recommended water treatment and soil amendment alternatives to minimize the associated impacts from irrigation with CBNG produced water.
- **Upper Clark Fork River Soil Analysis, Deer Lodge area, Montana.** Sampling of soils for potential metal contaminants (arsenic, lead, etc) as a result of air deposition from the Anaconda Smelter Mine. Employed hillslope catena theory and identification of likely flowpaths to develop soil sampling transects. Included subsequent field description of soil profiles and characterization of soil physical, biological, and chemical properties at numerous locations, and statistical analysis, spatial modeling, and dissemination of data and results through implementation of GIS and a technical report.

- **Jonah Gas Field Soils and Vegetation Habitat Mapping. EnCana Oil and Gas (USA), Inc., Pinedale, Wyoming.** Assisted on a two year project to map soils, vegetation, and sage grouse habitat in the Jonah Gas Field. Incorporated the use of Quickbird satellite imagery, LIDAR elevation data, and soils data in a GIS to create a soils map for the Jonah Gas Field, towards the purpose of mapping vegetation. The project included developing and testing analysis methods on a pilot scale, implementing remote sensing analysis for the entire gas field, incorporating several years of field monitoring data as ground truth, and reporting results
- **Natural Resource Inventory, USDA NRCS, Montana.** Assessment and sampling of soils and vegetation for the USDA NRCS Natural Resource Inventory program. The project entailed the excavation of soil pits for field assessment of soil physical, biological, and chemical properties, and vegetation sampling using transect, point-intercept, and clipping methods. Subsequent correlation of soils to proper ecological sites was conducted upon field analysis. Extensive use of GIS and GPS employed to develop, display and locate sampling locations.
- **Development of Ecological Site Descriptions, USDA NRCS, California.** Assessment and sampling of soils and vegetation towards development of ecological site descriptions (ESD) for MLRAs 15 and 23 in California. The project entailed the excavation of soil pits for field assessment of soil physical, biological, and chemical properties, and vegetation sampling using transect, point-intercept, and clipping methods. Extensive use of GIS and GPS employed to develop, display and locate sampling locations.
- **Reclamation Monitoring, Gas Fields in South Central Wyoming. BP America, Devon Energy Corporation, and Questar Exploration and Production Company.** Assisted with efforts to monitor re-vegetation progress on over 2000 disturbed gas drilling sites in the Wamsutter area, south central Wyoming. Monitoring and data collection activities included the identification of key vegetation species, creation of data dictionaries for collection of data in a GPS, extensive field use of integrated GPS databases, post processing and differential correction of GPS data, and subsequent organization and analysis of data in a geospatial database for purpose of reporting results to clients and regulatory agencies.
- **Continental Divide – Creston Natural Gas Project EIS, Various Clients, Wyoming.** Assisted in the development of portions of the Draft EIS for Continental Divide – Creston natural gas development in southern Wyoming. In particular, this work necessitated the development of interpretations and potential for various soil characteristics (reclamation, wind and water erodibility, road construction, etc.), creation of soil interpretation maps for the project area through the use of GIS technologies, and documentation and writing of those portions of the EIS related to soil inventory, interpretations, and limitations.
- **Soil Salvage Monitoring, Encana Oil & Gas, USA, Wyoming.** 80 to 150 locations from Sept 1 2007 through the summer of 2008 were sampled from the 0 to 6 inch depth. Soils were characterized and taxonomic classification assigned, and family series were identified. Soil properties for each sample was determined and a database created to record, organize, and analyze soil properties ascertained from the samples. Results were presented in reports to be used in reclamation planning by the client.
- **Bowdoin Natural Gas Project Area (BNGPA) EIS, Fidelity Exploration and Production Company, Montana.** Assisted in the development of the EIS for natural gas development in the BNGPA, Montana. Included development of soil interpretations and potential (reclamation, wind and water erodibility, road construction, etc.), creation of soil interpretation maps for the project area through the use of GIS technologies, and documentation and writing of those portions of the EIS related to soil inventory, interpretations, and limitations.
- **Blackfoot River TMDLs and Water Quality Restoration Plan, Montana DEQ/Blackfoot Challenge, Helena, Montana.** Project scientist in support of development of TMDLs for 303(d) list streams in the 2300 square mile Blackfoot River watershed in western Montana. Tasks included data review, field collection of sediment, habitat, and stream temperature data, data analysis in a GIS relational database, development of SNTMP temperature models to develop stream temperature targets and allocations, and writing of comprehensive TMDL documents.
- **Upper Big Hole River Vegetation Change Analysis, Big Hole River Watershed Committee, Wisdom, Montana.** Analyzed upland vegetation change over time in the upper Big Hole River watershed through the use of remote sensing and aerial photo interpretation and classification within a GIS. The resulting plan identified vegetation communities and change, consequential changes to the hydrology of the Big Hole River watershed, and provided management recommendations.

- **Upper Big Hole River Resource Assessment and Inventory, Big Hole River Watershed Committee, Wisdom, Montana.** Conducted an inventory of irrigation infrastructure, vegetation communities, and riparian habitat information for the Upper Big Hole River watershed, towards development of conservation plans for improving conditions for fluvial arctic grayling. Tasks included developing appropriate data dictionaries for adequate capture of field data in a GPS, extensive use of GPS in the field for irrigation and habitat data collection, post processing of GPS data, assessment of data in a database, and aerial photo interpretation of vegetation community extent.

Employment History

- 2009 to Present. Owner and Principal Scientist. Terra Soil and Environmental Solutions, LLC. Bozeman, Montana.
- 2006 to 2009. Project Soil Scientist. K.C. Harvey, Inc. Bozeman, Montana.
- 2005 to 2006. GIS and Database Specialist. DTM Consulting. Bozeman, Montana.
- 2002 to 2005. Soil Scientist. USDA NRCS. White Sulphur Springs, Montana.
- 1999 to 2002. Research Assistant. Montana State University, Department of Land Resources and Environmental Sciences. Bozeman, Montana.

Accreditations

Certified Professional Soil Scientist (CPSS #327896) (Soil Science Society of America)

Publications

Kozar, B. J., R. L. Lawrence, and D.S. Long. 2002. Soil Phosphorous and Potassium Mapping using a Spatial Correlation Model Incorporating Terrain Slope Gradient. *Precision Agriculture*, 3 (407 – 417).

Kozar, B.J., D.S. Long, and J.M. Wraith. Relationship Between Soil Water Content and a Compound Topographic Index Derived From a DEM and Variability in the Relationship Across Space. In Progress.

Kozar, B.J., D.S. Long, and J.M. Wraith. Topographic Region Partitioning using a DEM and Analysis of Soil Water Content Variance Within and Between Regions. In Progress.