

***Proposal for  
Consulting Services for Siting  
(Keystone Pipeline)  
PU-06-421***

***Prepared for  
North Dakota Public Service Commission  
Public Utilities Division***

***May 7, 2008***

# Proposal for Consulting Services for Siting (Keystone Pipeline) PU-06-421

## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2.0</b>	<b>UNDERSTANDING OF THE PROJECT .....</b>	<b>2</b>
2.1	INSPECTOR RESPONSIBILITIES .....	2
2.2	PERTINENT ISSUES .....	2
2.2.1	Construction Right-of-Way .....	2
2.2.2	Cultural Resources .....	3
2.2.3	Threatened and Endangered Species .....	4
2.2.4	Clearing and Grading .....	4
2.2.5	Erosion Control.....	5
2.2.6	Topsoil Segregation .....	5
2.2.7	Wetlands.....	5
2.2.8	River and Stream Crossings .....	6
2.2.9	Trench Dewatering .....	7
2.2.10	Construction Specifications.....	7
2.2.11	Mitigation and Reclamation.....	7
2.3	SCHEDULE .....	8
2.4	INSPECTION PLAN .....	8
<b>3.0</b>	<b>EXPERIENCE AND QUALIFICATIONS .....</b>	<b>11</b>
<b>4.0</b>	<b>COST PROPOSAL .....</b>	<b>14</b>
<b>5.0</b>	<b>REFERENCES.....</b>	<b>15</b>

**Appendix A** Resumes

## 1.0 Introduction

The North Dakota Energy Conversion and Transmission Facility Act (NDCC Chapter 49-22) authorizes the North Dakota Public Service Commission (PSC) to determine that the location, construction, and operation of jurisdictional energy conversion and transmission facilities will produce minimal adverse effects on the environment and the welfare of the citizens of North Dakota. It is the PSC's duty to issue certificates of site compatibility, corridor certificates, and route permits in an orderly and timely manner for those projects that preserve the environment while ensuring that energy needs are met. In its February 21, 2008, order, the PSC issued a corridor certificate and a route permit to TransCanada Keystone Pipeline, LP (Keystone) for the construction and operation of a 30-inch crude oil pipeline in Cavalier to Sargent Counties, North Dakota. In finding of Fact #114, the PSC stated it would procure a qualified inspector for oversight during construction.

McCain and Associates, Inc. (McCain) is submitting this proposal in response to the PSC Request for Proposal (RFP) to acquire consulting services for monitoring construction activities of the Keystone Pipeline (Case No. PU-06-421). The consultant will conduct oversight inspection of construction activities to ensure that the facility is constructed, operated, and maintained in compliance with the terms and conditions of the order granting the certificate and permit with prompt reporting to the PSC of suspected non-compliance conditions.

McCain will comply with the provisions of the RFP. There are is no apparent conflict of interest that would prevent McCain from completing the work as described.

Correspondence regarding this proposal shall be directed to:

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**Todd A. Hartleben, P.E.**  
Senior Engineer

Date: May 7, 2008

## 2.0 Understanding of the Project

The PSC is soliciting proposals for consulting services of a qualified inspector for oversight inspection during construction by Keystone. The Keystone Pipeline's purpose is to transport Canadian crude oil from the Western Canadian Sedimentary Basin to markets in the United States. The Keystone Pipeline project in North Dakota will constitute approximately 218 miles of 30-inch steel pipeline. Above-ground appurtenances include five pumping stations, 13 main line valves, and four check valves. The pipeline is designed for a maximum allowable operating pressure of 1,440 pounds per square inch gauge. The pipeline will enter North Dakota at the Canadian/North Dakota border in Cavalier County and will extend in a southerly direction, passing through eight counties and exiting the state at the South Dakota border in Sargent County.

Construction of the Keystone Pipeline will involve approximately 500 construction workers working on two spreads. One crew will start at the Canadian Border and work southerly approximately 130 miles and the second crew will start northeast of Valley City and work southerly to the South Dakota Border.

### 2.1 Inspector Responsibilities

McCain is proposing to use more than one person to fulfill the requirements of the RFP as discussed in Section 3. Oversight inspection will be conducted for the purpose of monitoring the construction activities to ensure that the pipeline and associated facilities are constructed, operated, and maintained in compliance with the terms and conditions of the order granting the certificate and permit with prompt reporting to the PSC of any suspected non-compliance conditions. Oversight inspection will be accomplished through frequent spot inspections of construction activities including reclamation of disturbed surface areas.

Essential, results-oriented tasks necessary to achieve the desired results include: a thorough investigation, a well-coordinated effort with PSC staff, and well-written inspection reports. McCain has the experience and expertise to fulfill the requirements of this RFP. McCain staff has previously worked on large pipeline and similar, linear right-of-way (ROW) projects and realize the tasks listed in the RFP are not inclusive of work tasks that may be required.

### 2.2 Pertinent Issues

Construction of a large-diameter pipeline is a complex and often contentious undertaking. Engineering and environmental considerations affect both design and location. Permits for construction need to be obtained from federal, state, and local governing units. Negotiations with private landowners are needed to secure easements for construction and operation.

For the most parts, these components of "pre-construction" are complete for the Keystone Pipeline and, although already in place, they are key components of the necessary permits and agreements governing construction. This section briefly outlines some of the key issues surrounding pipeline construction.

#### 2.2.1 Construction Right-of-Way

The construction ROW for the Keystone Pipeline will be 110 feet wide. The ROW consists of a 50-foot permanent easement – 25 feet either side of the pipeline centerline – and a 60-foot wide

temporary work space. The Keystone Pipeline will require additional work space in areas where there are large excavations, river and stream crossings, highways, and railroads.

The ROW typically consists of a “working” side and a “spoil” side. The working side of the ROW is where construction activities take place. This includes stringing the pipe, welding, and placing the pipe in the trench. The working side also includes a “passing lane” for construction vehicles to proceed along the ROW without interrupting work. The spoil side of the ROW is reserved for placing soil from excavation of the pipeline trench.

The construction ROW is typically reduced when crossing wetland areas, wooded areas, to avoid cultural resources, and other specific locations where required. Survey crews will stake the edges of the construction ROW, extra work space areas, and the pipeline centerline. Avoidance areas should be fenced or flagged, as appropriate. Wetland boundaries should be clearly marked.

The pipeline must be buried to a minimum depth from the ground surface to the top of the pipe based on land use. Minimum depths to the top of the pipe are: 48 inches in rangeland; 48 inches for cultivated land; 48 inches at the bottom of a ditch for road crossings; and 72 inches across undeveloped section lines. All crossings of graded roads must be bored unless the responsible governing agency permits Keystone to open cut the road.

McCain will ensure that Keystone adheres to the ROW width and extra work space areas as depicted on construction line drawings. Keystone should submit plans and variances for extra work spaces not depicted on the line drawings for PSC approval prior to using the work space. McCain will ensure that all extra work space areas and deviations from the line drawings are approved prior to construction in the area of question.

### **2.2.2 Cultural Resources**

Keystone has commissioned field surveys to determine the locations of prehistoric and historic cultural resources that could be affected by surface disturbance during construction. As a result of the evaluations, certain areas will be avoided by reroutes of the pipeline.

Cultural resource mitigation plans must be submitted to the State Historic Preservation Office (SHPO) and approved by SHPO prior to the start of any fieldwork or construction activity. Any route changes necessitated by requirements of the SHPO must be filed with the PSC and approved prior to the start of construction.

If any cultural resource, paleontological resource, archeological resource, historical resource, or gravesite is discovered during construction, earth disturbing activities in the immediate vicinity of the discovery must be halted. The resource must be marked, preserved, and protected from any further disturbance until a professional examination can be made in consultation with the SHPO. A report of such examination must be filed with the SHPO and the PSC. Clearance to proceed must be given by the SHPO and the PSC.

McCain will ensure that significant cultural resources are protected, avoided, or mitigated according to recommendations by the SHPO and PSC. Previously undocumented cultural resources disturbed by construction activities will be reported promptly and work in the immediate area halted until examined.

### **2.2.3 Threatened and Endangered Species**

Surveys for federally listed threatened and endangered species have been commissioned for the Keystone Pipeline route. Threatened and endangered species in North Dakota may include:

- Piping plover and its critical habitat
- Whooping crane
- Dakota skipper (Candidate species)

State-listed species of concern may include:

- Bald eagle
- Golden eagle
- Greater redhorse
- Wabash pigtoe mussel
- Western prairie fringed orchid

Keystone has completed surveys for species/habitats of concern. Avoidance and mitigation plans should be in place prior to commencing construction in the event species/habitats not previously documented are found during construction.

McCain will ensure compliance with Federal and State requirements regarding threatened and endangered species and species/habitats of concern. In addition, McCain will report the presence of any critical habitat, threatened and endangered species or bald and golden eagles not previously recorded.

### **2.2.4 Clearing and Grading**

Clearing and grading of the construction ROW will remove obstacles such as trees, brush, large rocks, and other vegetation from the work area. Crops and other non-woody vegetation within the ROW are typically removed by mowing. Crops such as small grains with a limited amount of biomass sometimes will be left in place and simply driven over by the construction equipment.

The PSC has ordered, and Keystone has agreed, that the clearing width through windbreaks and shelterbelts shall be limited to 50 feet or less. Clear cuts through wooded areas that exceed 50 feet in length shall be limited to 85 feet or less.

Extra work space areas at river and stream crossings may require that more than the standard 110-foot construction ROW be cleared. Extra work space is required at these areas for deep ditch excavation for the stream crossing and stream bank grading. The tree clearing would be limited to 25 feet beyond the standard 110-foot ROW and should avoid trees to the extent practicable. Keystone must submit a clearing plan for extra work space areas to be approved by the PSC prior to construction. The plan must indicate the width of the ROW and the length of the extra work space on each side of the crossing.

Keystone has filed Tree and Shrub Mitigation Specifications for approval by the PSC. The specifications detail plans for tree and shrub inventories, clearing and grubbing, and mitigation/replacement.

McCain will ensure that tree and shrub inventories, clearing, and grading are completed according to the specifications for the project. Additionally, McCain will ensure that the extent of clearing and grading is in accordance with the specified ROW widths for that specific area.

### **2.2.5 Erosion Control**

Concurrent with clearing and grading activities, erosion control measures such as silt fence and slope breakers shall be installed to prevent disturbed soils from leaving the ROW and entering wetlands or other waterbodies. Erosion control measures should be inspected and maintained throughout the duration of construction. Construction must be suspended when weather conditions are such that construction activities may cause irreparable damage, unless adequate protection measures approved by the PSC are taken.

McCain will ensure that proper erosion control devices are placed, installed correctly, inspected, and maintained by Keystone. McCain will coordinate with construction crews to ensure activities that may cause damage are suspended due to weather related events.

### **2.2.6 Topsoil Segregation**

Topsoil shall be segregated from over the trench and also from over the area where subsoil will be stored (spoil side of ROW). Topsoil should only be piled on topsoil and subsoil on subsoil. At least 12 inches of topsoil, where available (or topsoil to the depth of cultivation, whichever is greater), over and along trench areas must be stripped and segregated from subsoil. Any area on which excavated subsoil will be placed must also be stripped of topsoil. After backfilling is completed, any excess subsoil must be placed over the excavation area, blending the grade into existing topography. Topsoil must then be replaced over areas from which it was stripped only after the subsoil is replaced.

McCain will ensure that topsoil is segregated during construction and replaced according to the specifications.

### **2.2.7 Wetlands**

Construction of the pipeline primarily would affect wetlands and their functions during and immediately following construction activities but permanent changes also are possible. Permits for construction within wetlands are required by the Sections 404 and Section 401 of the Clean Water Act (CWA) and administered by the U.S. Army Corps of Engineers (COE) and state agencies.

Potential construction- and operations-related effects include:

- Modification in wetland productivity due to modification of surface and subsurface flow patterns;
- Temporary and permanent modification of wetland vegetation community composition and structure from clearing and operational maintenance (clearing temporarily affects the wetland's capacity to buffer flood flows and/or control erosion);
- Loss of wetlands due to backfilling or draining;
- Wetland soil disturbance (mixing of topsoil with subsoil with altered biological activities and chemical conditions that could affect reestablishment and natural recruitment of native wetland vegetation after restoration);

- Compaction and rutting of soils from movement of heavy machinery and transport of pipe sections, altering natural hydrologic patterns, inhibiting seed germination, or increasing siltation;
- Temporary increase in turbidity and changes in wetland hydrology and water quality;
- Permanent alteration in water-holding capacity due to alteration or breaching of water-retaining substrates in the Prairie Pothole region;
- Alteration in vegetation productivity and life stage timing due to increased soil temperatures associated with heat input from the pipeline; and
- Alteration in freeze-thaw timing due to increased water temperatures associated with heat input from the pipeline.

It is assumed that the pipeline will be constructed through most wetlands by using the open-cut method. Temporary timber-mat bridges may be placed across wetlands to facilitate construction and traffic flow along the ROW. Also, the ROW width is typically reduced when crossing wetlands to minimize impacts. Generally, the wetland vegetation community eventually would transition back into a community functionally similar to that of the wetland prior to construction, if pre-construction conditions such as elevation, grade, and soil structure are successfully restored.

McCain will ensure that construction within wetlands follows plans and specifications approved by the PSC and monitor restoration efforts to ensure impacts to wetlands are minimized.

### **2.2.8 River and Stream Crossings**

The Keystone Pipeline will cross several rivers and streams. Keystone must obtain Section 404 permits from the COE if the construction or operation of the pipeline may result in the discharge into waters of the United States including navigable waters, tributaries to navigable waters, and wetlands. In addition, under Section 401 of the CWA, Keystone must provide the COE a water quality certification from the State in which the discharge originates or will originate. The state agency with jurisdiction over water quality matters is the North Dakota Department of Health (NDH).

There are several construction methods that may be used for construction across waterbodies. These include:

- Horizontal directional drilling (HDD);
- Open-cut method; and
- Dry flume crossing

HDD techniques are usually reserved for large, complex water crossings. Open-cut and dry flume crossing methods are applicable for smaller and/or intermittent waterbodies.

### **Sheyenne River**

Keystone initially proposed an open cut crossing of the Sheyenne River. The PSC has determined that open cut construction would be extremely difficult and would greatly alter the riparian zone of the river. Many trees and shrubs would need to be cleared to allow construction.

The PSC has required Keystone to file plans to cross the river and riparian zone by horizontal directional drilling (HDD) methods. Keystone has filed plans to cross the Sheyenne River by

HDD. The plans indicate that trees and shrubs on the south side of the river would not be affected by the HDD. The plans do not indicate, however, that trees and shrubs on the north side of the river will remain unaffected.

The PSC has requested that Keystone file amended plans for a HDD crossing of the Sheyenne River that shows trees and shrubs on both side of the river will be unaffected by construction. As of the date of this proposal, it is unknown if these plans have been filed or approved.

### **Other Rivers and Streams**

Several of the other river and stream crossings are classified as valuable fisheries by the North Dakota Game and Fish Department (GFD). The GFD has requested directional drilling of these streams, if possible. If not feasible, the GFD requests no construction activities within the waterway between April 15 and June 1 with appropriate controls to minimize erosion and sedimentation.

McCain will ensure compliance with the PSC order and HDD plans of the Sheyenne River crossing. Also, McCain will ensure Keystone has the appropriate permits for construction before undertaking construction of a waterbody crossing and ensure compliance with the permit requirements. McCain has a good working relationship with the COE, NDH, and GFD; and is familiar with the requirements of Section 404 and Section 401 permits for construction.

### **2.2.9 Trench Dewatering**

An issue that may arise with landowners is crop damage due to trench dewatering. If the trench becomes filled with water, Keystone will need to dewater (pump out) the trench prior to placing the pipe. If the trench water is allowed to accumulate off of the ROW and inundates a portion of a neighboring field(s), crop damage may result. McCain will work closely with landowner's and Keystone to minimize damage that may result from trench dewatering. Damages caused by trench dewatering will be reported to the PSC.

### **2.2.10 Construction Specifications**

Construction specifications for a project of this size contain many sections and are complex. They may include specifications for safety, surveying, pipe materials, construction methods, environmental considerations, hydrostatic testing requirements, etc.

Keystone will employ many inspectors to work on this project to ensure compliance with the specifications. McCain will coordinate with these inspectors to check compliance with the specifications.

One item of note relating to specific pipe specifications involves the use of thicker wall pipe. Thicker wall pipe is required in specific locations including high population areas, highway and road crossings, railroad crossings, within pump stations, at mainline valve assemblies, at pigging facilities, and at measurement facilities. In addition Keystone has agreed to install thicker wall pipe in specific areas where underground aquifers (Fordville) and drinking water supplies are located (Lake Ashtabula). McCain will ensure that thicker wall pipe is installed as specified.

### **2.2.11 Mitigation and Reclamation**

Keystone has prepared a Construction Mitigation and Reclamation Plan (CMR Plan) that is a compilation of procedures for environmental mitigation, restoration, and post-construction

monitoring compliance. It also covers noise and dust control procedures; management of weeds; fire prevention; spill prevention and containment; topsoil removal, storage, and replacement; erosion and sediment control; and reclamation.

The construction ROW is to be restored as closely as possible to its original condition. Depending on the location and circumstances, this could involve smoothing the construction area, replacing topsoil, repairing irrigation systems, applying fertilizer and grass seed, or other actions that may be necessary. Reclamation and clean-up along the ROW must be continuous and coordinated with on-going construction. Damage that occurs as a result of soil disturbance shall be paid for by Keystone.

Where soils have been compacted by construction equipment, appropriate procedures (chisel plowing, sub-soiling, or other deep-tillage techniques) should be employed to relieve compaction along the ROW to return agricultural land to the same compaction as adjacent land and to return agricultural fields to their previous productivity. The size, density, and distribution of rocks over the working area following construction should be similar to adjacent areas not disturbed by construction.

Pre-existing roads and lanes used during construction must be restored to a condition that will accommodate their previous use. Areas used as temporary roads (shoo-flies) during construction must be restored to their original condition. These are typically located to provide access at wetlands, river and stream crossings, and select special construction sites where access is either limited by permit requirements or because of anticipated wet conditions.

Keystone shall repair or replace all property removed or damaged including all fences and gates. Additionally, Keystone shall repair, replace, or compensate landowners where irrigation, drainage, or drinking water supply systems are damaged by construction.

McCain will ensure that Keystone properly repairs and restores land, roads, fences, etc., to as close as possible to their pre-construction condition. McCain will report any damages caused from construction and make recommendations for mitigation. McCain will monitor restoration efforts upon completion of construction. Items to monitor include: revegetation success, erosion, and tree and shrub replacement. As-built construction drawings will also be reviewed for accuracy.

## **2.3 Schedule**

The term of this contract is from May 23, 2008, through June 30, 2009. McCain staff will be available to fulfill the requirements of this contract for the duration of that time. It is assumed that the bulk of the construction and restoration will be completed this year except for certain items (pump stations, pigging operations, etc). Monitoring and evaluating restoration, mitigation, and seeding success will occur in 2009, as well as review of as-built construction documents.

## **2.4 Inspection Plan**

The Inspector chosen as a result of this RFP will need to thoroughly understand the issues surrounding the various orders, permits, and easement agreements issued to Keystone for

construction. Likewise, full understanding of the requirements of these documents in regard to how, when, and what construction is allowed is paramount to the success of this project.

McCain will review copies of the various documents prior to construction to become familiar with the project and ask for clarification, as needed. Copies of the various documents will be kept and neatly organized so as to allow instant access if issues arise. Copies will also be kept by field personnel so they are available on-site as well as in the office.

Keystone will employ numerous inspectors to ensure compliance with construction specifications and various plans (CMR Plan, Hydrostatic Test Plan, Spill Plans, etc). It is anticipated that inspectors will include: general construction inspectors, environmental inspectors, and welding inspectors. Close coordination and good working relations with these inspectors in the field (as well as Keystone officials) is vital.

McCain will meet with the Keystone inspectors and superintendents of each spread (north and south) at the onset of the project. This meeting will introduce the McCain personnel to the Keystone inspectors, exchange contact information, and obtain a general schedule and plan of construction. Frequent contact with the Keystone inspectors will be needed to obtain information regarding what construction activities are occurring and where they are taking place. It is anticipated that weekly meetings will be held at each spread to review construction progress and receive updates on schedule and potential problems.

McCain will conduct frequent spot inspections of construction activities along the ROW. This will involve traveling to locations where construction is taking place and noting activities. Construction progress will be tracked on line drawings and in daily inspection reports. Any incident of non-compliance or damages will be reported immediately to the PSC. Daily inspection reports will be submitted to the PSC.

Photographs are an important part of reporting and greatly aid people not working in the field to visualize the scene. Photographs should document:

- Preconstruction conditions
- Variance requests
- Non-compliance situations
- Major environmental events

Photographs will be labeled using a system agreed upon with the PSC.

Sketch maps can also aid in depicting the event. Sketch maps should be drawn using standard procedures:

- Use a north arrow;
- Include landmarks;
- Draw to scale;
- Add dimensions.

McCain personnel will be equipped with laptop computers, cell phones, and digital cameras. Laptop computers will have wireless internet and e-mail capabilities so reports and photos can be uploaded as quickly as possible. McCain also has GPS equipment and video cameras

available for project use. McCain will allocate space on our internal network server for storage of files generated for this project. McCain also has an http:// protocol web site where files can be accessed by the PSC.

### 3.0 Experience and Qualifications

McCain and Associates is a civil and environmental consulting firm specializing in general civil engineering, environmental review, permitting, investigation, remediation, and construction management. Our office locations are in Bismarck, North Dakota, and Maple Plain, Minnesota. We are uniquely qualified for this project as **all services required for this contract will be performed by McCain staff located in the Bismarck office.**

In-house staff resources that are particularly relevant to this project include:

- Civil engineers with expertise inspecting pipeline construction, performing environmental inspections, grading and site design, erosion control, and preparing and reviewing specifications and construction drawings.
- Engineers and environmental scientists with expertise in route investigations, soil classification, and wetland delineations, mitigation, and restoration.
- Environmental scientists with expertise performing surveys for threatened and endangered species, performing tree counts, and monitoring revegetation and restoration success.
- Experience with ArcGIS, ArcPad, and drafting applications.

Additional staff experience includes regulatory permitting and compliance; surveying; solid waste management; and groundwater and soil remediation.

Staff assigned to this project includes Todd Hartleben, Kathie Kjar, Greg Meyer, and Ryan Krapp. Brief profiles of individual qualifications are provided below. The team organizational chart follows the profiles. Individual resumes are included in Appendix A.

#### **Todd Hartleben, P.E. Senior Engineer**

Todd is a licensed engineer in the State of North Dakota with over 13 years of professional experience. Todd's experience while at previous employers includes:

- Researching, preparing, and submitting environmental reports satisfying NEPA and FERC requirements for construction of interstate pipelines.
- Produce, review, and edit contract documents, construction specifications, and construction drawings for pipeline and fiber optic cable projects.
- Consult with federal, state, and local agencies regarding permit requirements for interstate pipelines and fiber optic cable projects.
- Prepare and submit permit applications to federal, state, and local agencies pertaining to wetlands, rivers, threatened and endangered species, NDPES, cultural resources, air quality, and land use.
- Coordinate wetland and cultural resource surveys.
- Prepare and administer environmental training programs.
- Inspect pipeline and compressor station construction projects.

Todd will be the primary contact for this project. Todd will perform the bulk of the work including on-site inspections and attending meetings and hearings. Todd will ultimately be responsible for completion of the work in accordance with the contract.

**Kathie Kjar, PhD** *Senior Ecologist/Botanist*

Kathie has over 30 years of professional experience. Applicable experience includes:

- Tree counts and surveys
- Wetland delineation.
- Inspection and monitoring of surface coal mining operations and reclamation projects.
- GPS and GIS data acquisition and preparation.
- Background research and reporting.
- Field mapping and delineation of land uses and habitat types.
- Research and data compilation of land owners, mineral rights, structures, soils and waterways.
- Systematic annual vegetation monitoring of yield, cover and other parameters
- Erosion control monitoring
- Noxious and invasive weed surveys.
- Data collection on cropland, native grassland, hay land, tame pastureland, shelterbelts, woodlands, wetlands, and industrial areas.
- Coordination of input with State and Federal Agencies including ND Game and Fish, ND Soil Conservation Committee, ND Heritage Center, US Fish and Wildlife Service US Natural Resources Conservation Service, US Corp of Engineers, and US Bureau of Land Management.

It is anticipated that Kathie will assist Todd with ensuring compliance with tree counts, threatened and endangered species, and monitoring restoration and revegetation efforts.

**Greg Meyer, MS** *Wildlife Biologist/Ecologist*

Greg is McCain's wetland expert and will be called upon for issues involving wetland construction and restoration. Greg's wetland experience includes delineations, classification, vegetation mapping, mitigation, and restoration. At a previous employer, he led a study to determine carbon sequestration in wetlands in the upper Midwest. He has also conducted numerous floral inventories across North Dakota ranging from wetland to badland areas, including tree identification and tree counts. He currently specializes in conducting surveys for endangered, threatened, and rare plant and animal species, mapping habitats and plant communities, and delineating wetlands.

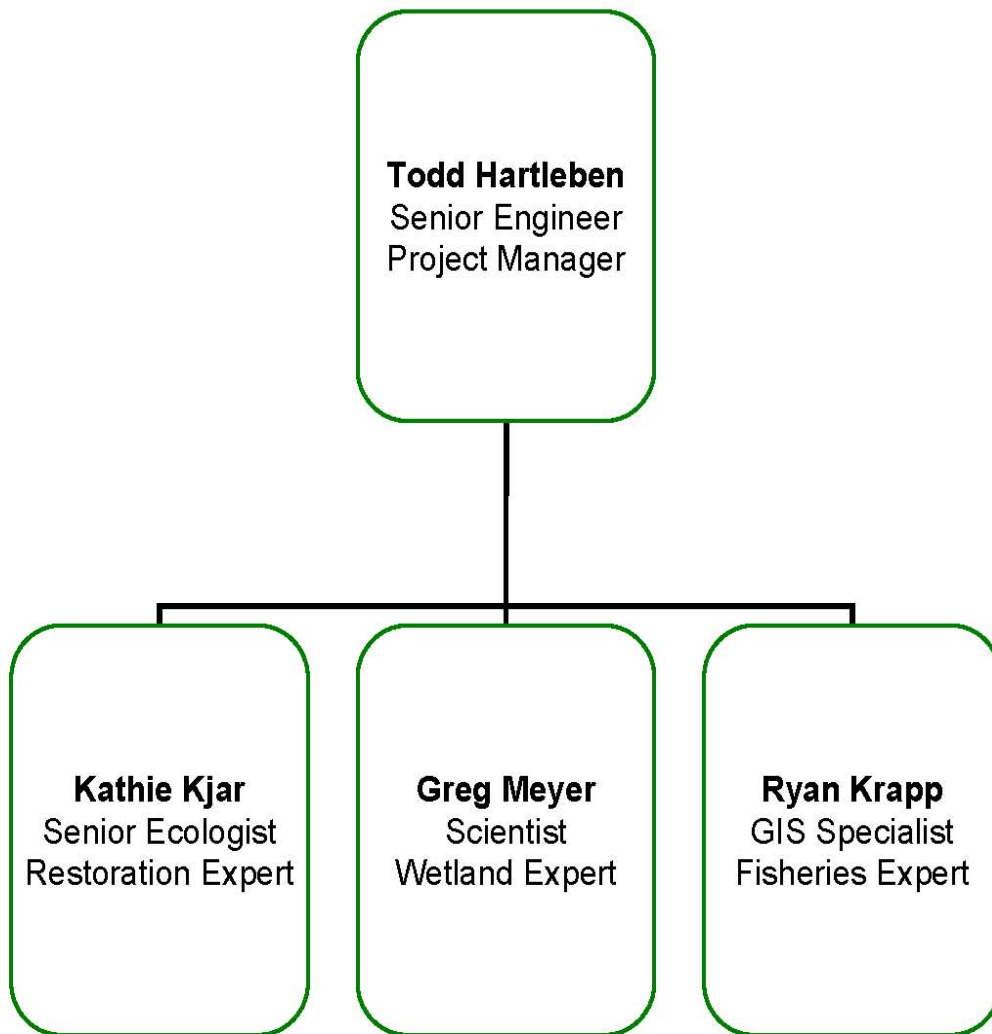
**Ryan Krapp, MS** *Wildlife and Fisheries Biologist/GIS Specialist*

Ryan provides GPS and GIS support, management, and analysis and map production. Ryan will assist in producing maps for reporting and reviewing as-built construction drawings for accuracy. He has extensive experience in creating GIS databases, managing large volumes of spatial and temporal data, and producing GIS maps that aid in habitat management, monitoring, and analysis. Ryan will also assist in reviewing river and stream crossing techniques.

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**Organizational Chart**

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## 4.0 Cost Proposal

The total cost to complete the project cannot be estimated at this time. There are many factors that may affect the total cost that cannot be quantified:

- Weather delays (construction).
- Number of on-site inspections.
- Number of formal meetings or hearings.
- Responses to damages or violations.

McCain instead proposes to base the cost on a unit cost basis. The table below provides a basis for determining project costs.

Item	Rate	Unit
Inspector Hourly Rate	\$80	Hour
Cell Phone	\$50	Month
Per Diem	\$35	Day
Vehicle Expense	\$120	Day
Lodging	Billed at cost	
GPS	\$50	Day
Video Camera	\$50	Day

The following assumptions apply to this cost estimate:

- Expenses for travel (vehicle, per diem, and lodging) will be billed only for out-of-town and overnight travel.
- Expenses for travel will not be charged for work in Bismarck.
- Services to provide expert testimony are not included in this contract.
- Work not included within this general scope of work will be addressed via amendment to the original contract.

McCain is willing to discuss our cost proposal with the PSC to clarify assumptions and answer questions.

## 5.0 References

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# ***Appendix A***

## ***Resumes***

# **Todd A. Hartleben, P.E.**

**Senior Engineer**

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## **Experience Summary**

Todd has over 13 years of experience as an engineer and technician in general civil engineering, construction services, environmental permitting and review, waste management facility design, landfill gas extraction system design and testing, and materials testing.

## **Employment History**

**Senior Engineer**, McCain and Associates, Inc, Bismarck, ND (present)

**Senior Engineer**, Earthworks, Inc., Bismarck, ND (2006)

**Senior Engineer**, McCain and Associates, Inc., Maple Plain, MN (2002-2006)

**Project Engineer**, Polaris Group, Inc., Bloomington, MN (2000-2002)

**Project Engineer**, Natural Resource Group, Minneapolis, MN (1997-2000)

**Environmental Inspector**, Cleveland Inspection Services, Cleveland, OK (1997)

**Staff Engineer**, STS Consultants, Maple Grove, MN (1994-1997)

**Civil Technician**, North Dakota Department of Transportation, Fargo, ND (1993-1994)

## **Areas of Expertise**

- Environmental review (NEPA) documentation and permitting
- General civil engineering services
- Wetland mitigation plan development
- Solid waste facility design and permitting
- Construction management
- Materials testing

## **Relevant Experience**

**Alliance Pipeline, L.P.** – North Dakota/Canada Border to Chicago Natural Gas Pipeline. Involved in permitting, construction, and environmental compliance activities. Responsibilities included:

- Responsible for reviewing construction specifications and plan sheets for 880 miles of pipeline installation to ensure compliance with environmental regulations.
- Served as environmental inspector during construction of portions of the pipeline and HDD drilling activities.
- Assisted in compiling survey data and then preparing and submitting environmental permit applications across North Dakota, Minnesota, Iowa and Illinois. Permitting agencies included FERC, Corps of Engineers, EPA, Department of Natural Resources, Watershed Districts, Soil Conservation Districts and Counties.
- Assisted in managing and compiling environmental survey data for inclusion in Resource Reports and Environmental Impact Statements.
- Assisted in producing scoping documents, Resource Reports, Environmental Assessment Worksheets and Environmental Impact Statements.

**Todd A. Hartleben (cont.)**

**Lakehead Pipeline Company** – SEP II Project, Wisconsin. Involved in permitting and environmental inspection activities. Responsibilities included:

- Managed consultations with Department of Natural Resources regarding specific endangered species impacts. Designed critical habitat structures for endangered species along pipeline route.
- Assisted in obtaining environmental permits at state and local levels.
- Performed environmental inspections during construction.

**Touch America, Inc.** – Minneapolis to Chicago Fiber Optic Project. Permit manager for construction and operation. Responsibilities included:

- Managed environmental permitting process for fiber optic cable installation from Minneapolis to Chicago. Permitting agencies included Corps of Engineers, Department of Natural Resources, Department of Transportation, Counties and Cities. Permits applications included wetland and river crossings, floodplain development, erosion control, conditional use permits and various other local permits.
- Assisted Owner's Representative with site and route evaluations.
- Directed environmental and civil survey crews. Managed data obtained from surveys and organized to include as required by permit.
- Reviewed and interpreted permit requirements and communicate requirements to construction supervisor's and inspectors.

**Northern Natural Gas, Inc.** – Farmington Compressor Station. Construction and environmental inspector during construction of new natural gas compressor station. Responsibilities included:

- Inspected construction operations to ensure compliance with construction plans and specifications and environmental regulations.
- Prepared as-built drawings upon completion of construction.

**Various Pipeline Projects**—Assisted in writing and preparing permit applications, EAW and EIS documents, directed environmental and civil survey crews.

**Indian Hills Disposal, Inc.** – Project manager for site design and re-permitting an existing disposal facility. The facility accepts oil field and other industrial wastes. Site design elements include cell design and phasing plans, a tipping pad and holding pond for contaminated soils and drilling fluids, and storm water collection and treatment.

**Confidential Client** – Project manager for site design and permitting of a proposed waste-to-energy facility in ND. Design elements included a grading plan, site layout, and utilities. Permitting requirements included wetlands, air, and solid waste.

**Jahner Sanitary Landfill, Inc.** – Designed a partial landfill final cover that included a recompacted clay layer, GCL, rooting soil, topsoil and stormwater controls.

- Prepared grading plans and specifications.
- Performed construction CQA and management during construction of final cover.

**Todd A. Hartleben (cont.)**

**Minnesota Pollution Control Agency** – Project manager for assisting the MPCA with preparing an EIS related to a proposed landfill expansion. Collected and managed data relevant to the analysis and supervised the production of a draft and final EIS suitable for publication. Also assisted the MPCA project manager with public meetings. Issues analyzed in the EIS included:

- A hydrogeologic evaluation
- Storm water management
- Landfill gas emissions and controls
- Visual impacts
- Planning and alternatives
- Land use
- Socioeconomics

**Central Disposal Systems, Inc.** – Involved in numerous design, construction, permitting and environmental compliance projects.

- Designed and performed construction management of an Alternative Final Cover (ACAP).
- Designed, modeled, prepared and submitted NSPS landfill gas management plan to DNR and EPA.
- Prepared and submitted Air Construction Permit application to DNR.
- Assisted site in modifying Title V Operating Permit.
- Prepared and submitted permit-required data and reports.
- Directed performance test of landfill gas flare. Prepared and submitted test reports for compliance with Air Construction Permit.
- Prepared construction drawings and specifications for landfill gas extraction system.

**Burnsville Sanitary Landfill, Inc.** – Involved in multiple projects including landfill gas extraction system design, grading and phasing plans, liner design, permitting, and construction management.

**Sauk Centre Landfill** – Provided design for waste consolidation and footprint reduction, final cover upgrade, stormwater management, site security and landfill gas migration controls.

- Prepared construction plans and specifications.
- Provided bidding assistance including preparing and distributing bid documents, answering contractor questions, review of bids and contractor recommendation.
- Directed CQA personnel during construction.
- Responsible for construction and contract management.

**St. Augusta Landfill** – Designed active landfill gas extraction system.

- Prepared construction plans and specifications for active landfill gas extraction system.
- Prepared and submitted permit applications to local POTW's for condensate disposal.
- Performed construction and contract management.
- Conducted system start-up and tuned landfill gas system.
- Responsible for operations and maintenance of landfill gas system.

**Todd A. Hartleben (cont.)**

**Anoka-Ramsey Landfill** – Involved in the various activities relating to force-main construction, groundwater treatment and a constructed wetland complex.

- Prepared plans and specifications.
- Performed construction surveying and staking.
- Construction and contract Management.
- Obtained appraisal services for easements along county road.

**NSP Sherco Generating Plant** – Performed construction observation of Pond 2 vertical expansion.

**Becker Ash Disposal Facility** – Performed construction observation of Cell 5 construction.

**Various Landfills Nationwide**

- Construction and contract management for environmental monitoring upgrades.
- Construction oversight of landfill gas extraction system construction.
- Evaluation and testing of existing landfill gas extraction systems.
- Prepared plans and specifications for landfill gas extraction system construction.
- Performed pump testing and site evaluations for landfill gas-to-energy projects.
- Conducted system start-up and tuned landfill gas extraction systems.
- Designed landfill gas extraction systems and system modifications.

**Miscellaneous Experience**

- Construction inspections include reinforcing steel placement, determining suitability of soil for fill, nuclear density testing, concrete testing and bridge piling installations.
- Laboratory materials testing experience includes concrete compressive tests, Marshall extractions, Proctor tests, and sieve grain-size analysis.

**Education:** B.S. Civil Engineering, North Dakota State University, 1994  
B.A. Math and Biology, Jamestown College, 1990

**Registration:** Civil Engineer: ND, MN, IA, IL

**Memberships:** American Society of Civil Engineers

# Kathie J. Kjar, PhD

## Senior Ecologist/Botanist

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### Experience Summary

Kathie has over thirty years experience in vegetation and wildlife research and reporting. Kathie has conducted biological evaluations and assessments and collected quantitative data for land grant colleges, federal offices, and coal companies. Kathie was instrumental in writing the Public Service Commission surface coal mine regulations for evaluations of vegetation in North Dakota. She has also delineated wetlands and has experience with GPS and GIS data acquisition and preparation.

### Employment History

**Senior Ecologist Botanist**, McCain and Associates, Inc., Bismarck ND (present)

**Senior Environmental Ecologist**, Earthworks, Inc., Bismarck ND (2005-2007)

**Consultant / Owner**, Dakota Grassland Consulting, Bismarck ND (1992-2005)

**Environmental Scientist**, North Dakota Public Service Commission, Bismarck ND (1985-1992)

**Graduate Teaching Assistant**, North Dakota State University (NDSU), Fargo ND (1981-1984)

**Research Technologist**, University of Nebraska at Lincoln (UNL, Lincoln, NE (1979-1981)

**Graduate Research Assistant**, UNL, Lincoln, NE (1977-1979)

**Herbarium Assistant**, Kearney State College (KSC), Kearney, NE (1976-1977)

### Areas of Expertise

- **Flora:** Field identification, collections and identification for over 30 years; over 5 years herbarium experience including collecting, pressing, identification, mounting, filing and plant exchanges
- **Teaching:** Coached undergraduate students for international competition on plant Identification teams; instructed college laboratory classes including Biology, Botany, Plant Systematics and assisted with Plant Ecology class; occasional volunteer teaching grade schools
- **Crew Leading:** Managed technical assistants associated with ecological field work and writing; instructed and oversaw graduate student field crews; oversaw field assistants for graduate work
- **Vegetation Sampling:** Extensive quantitative sampling experience including 10-point frame, Daubenmire cover frames, cover analysis in 0.1 acre plots (line intercept), biomass sampling (by species and by growth forms), double sampling, range condition, and hand sampling annual crops.
- **Coal Mines:** Regulation of active mines, vegetation monitoring, wildlife monitoring, permit applications, pre-mine data collection, land use mapping, acreage calculations, development of vegetation standards, bond release, and other tasks.
- **Oil and Gas Exploration:** Botanical surveys, wildlife surveys, and biological evaluations and assessments.
- **Data analysis:** Compilation of collected data and appropriate statistical applications such as means, variances, sample adequacy, and t-tests.
- **Field Surveys:** Wildlife and habitat surveys for species of concern, land use, weed species, vegetation habitat types, range sites, and wetlands.
- **Wetlands:** Field delineations, mapping, and acreage calculations.

**Kathie J. Kjar (cont.)**

- **Mapping:** GPS field data collection, ArcMap, and AutoCAD.
- **Compliance:** Knowledgeable of ND mining laws 1969 to permanent program, ND Public Service Commission revegetation requirements, US Forest Service botany survey requirements, USCOE Wetland Delineation Manual, USFWS Endangered Species Act, USFWS Bald and Golden Eagle Protection Act, USFWS Migratory Bird Treaty Act, National Environmental Policy Act, and others.

**Relevant Experience**

**United States Forest Service** – Evaluated sensitive plant populations.

- Collected quantitative data on 23 sensitive plant populations in McKenzie, Billings, Slope, and Golden Valley Counties, North Dakota.
- Located and mapped populations with GPS unit.
- Investigated the habitat of each population including: percent cover of species, slope, elevation, topographic position, soil, phenology, and other features.
- Prepared a report with methods, descriptions, population data, conclusions, and maps.

**Confidential Oil and Gas Clients** – Evaluated more than 700 areas - surveying species of concern, wildlife, habitat, land use, and weeds - for various proposed disturbances in the Little Missouri National Grasslands. Project include: oil well sites, pipeline routes (oil, gas, saltwater and fresh water), underground and overhead power lines, telephone lines, road upgrades, and borrow areas.

**Brosz Engineering** – Delineated wetlands and conducted tree counts for transportation projects in Adams and Bowman Counties.

- Delineated wetlands per USCOE Wetlands Manual.
- Mapped wetlands with GPS unit .
- Computed wetland acres.
- Prepared documentation and wetland forms.
- Performed a tree count for mitigation requirements.
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**North Dakota Heritage Program** – Contracted to write reports for five proposed Research Natural Areas (RNA's) in western ND.

- Documented historical background, land uses, owners, and other land designations.
- Justified use as RNA's.
- Studied literature and documented distinguishing features, cover types, fauna, flora, geology, soils, cultural sites, and other data.
- Interpreted impacts and possible conflicts on minerals, grazing, watershed, recreation, wildlife, etc.
- Created maps for location, vegetation, contour and soils.

## **Kathie J. Kjar (cont.)**

### **North Dakota State University**

- Collected quantitative vegetation data in western North Dakota.
- Classified western North Dakota grassland and shrub ecosystems
- Instructed botany and biology labs.
- Organized and coached university Range Plant team to compete in Society for Range Management (SRM) Plant Identification Contests.
- Coordinated with college and university herbariums SRM plant collection and plant specimen exchange.

### **University of Nebraska**

- Supervised graduate students during field, laboratory, and greenhouse activities.
- Trained graduate students in vegetation sampling techniques.
- Instructed various field sampling techniques such as biomass hand sampling, mechanical equipment harvesting, line interceptions, point sampling, density quadrants, frequency measurements, and soil core sampling.
- Applied various land treatments including fertilization, herbicide application, and burning techniques.
- Conducted laboratory analysis of soil samples and esophageal fistula samples.
- Served as curator of Department of Agronomy Herbarium.
- Coached UNL Range Plant team to compete in Society for Range Management Plant Identification Contests.
- Initiated and co-authored North America Range Plants book.

### **BNI Coal, Center and Larson Mines – Served as interim Reclamation Specialist for 2½ years.**

- Evaluated and prepared revisions of surface coal mining permits.
- Conducted an extensive revision and developed revegetation standards for BNCR 8702.
- Collected data, mapped and documented an area to extend the permit area.
- Supervised wildlife monitoring, prepared and submitted biennial wildlife reports.
- Monitored vegetation on mine site.
- Collected data on reclaimed cropland, native grassland, hay land, tame pastureland, shelterbelts, and industrial land use areas.
- Prepared and achieved final bond release applications on native grassland and industrial land use areas.
- Represented BNI Coal on Task Force II.

### **Consolidation Coal Company, Velva Mine – Contracted to obtain final bond release for reclaimed mine site.**

- Monitored vegetation and collected data on reclaimed cropland, native grassland, hay land, woodlands, and industrial land use areas.
- Selected and established native grasslands reference area.
- Aided in landowner relations and communications.
- Developed an alternate vegetation sampling method that was submitted to and approved by the US Office of Surface Mining and ND Public Service Commission.
- Prepared data and documentation for bond release applications.
- Achieved final and complete bond release of the mine site.

**Kathie J. Kjar (cont.)**

**Bentonite Performance Minerals, Smith Ullman Mine** – Contracted to obtain final bond release for mine site.

- Monitored vegetation and collected data on native grassland.
- Coordinated use of alternate reference area.
- Prepared data and documentation for bond release application.
- Achieved final and complete bond release of the mine site.

**American Colloid Company, Page Mine** – Contracted to conduct a pre-mine assessment.

- Collected and prepared vegetation and land use data.
- Calculated proposed revegetation standards.
- Sampled range condition on native grassland areas.
- Prepared data and documentation for permit application.

**North Dakota Public Service Commission** – Regulated surface coal mines in ND.

- Inspected surface coal mines for compliance.
- Reviewed surface coal mining permits and revisions for accuracy with primary responsibilities in land use, vegetation, wildlife, and cultural resources.
- Evaluated biennial wildlife monitoring reports.
- Co-authored the first regulations for the Standards for Evaluation of Revegetation Success and Recommended Procedures for Pre- and Post-mining Vegetation Assessments.
- Coordinated information with State and Federal Agencies including ND Game and Fish, ND Soil Conservation Committee, ND Heritage Center, US Fish and Wildlife Service US Natural Resources Conservation Service, US Corp of Engineers, US Bureau of Land Management.

**Education:** Ph.D. in Botany, North Dakota State University, Fargo, North Dakota, 1985  
M.S. in Agronomy (Range Ecology emphasis), University of Nebraska at Lincoln, Lincoln, Nebraska, 1979  
B.S. in Biology, Kearney State College, Kearney, Nebraska (now known as University of Nebraska at Kearney), 1977

**Publications**

Hirsch, K.J. 1985. Habitat type classification of grasslands and shrub lands of southwestern North Dakota. Dissertation, North Dakota State University. Fargo, North Dakota, USA

Hirsch, K.J., K. Mastel, and W.T. Barker. 1984. Grassland and shrubland habitat types of southwestern North Dakota. Page 121 in Proceedings of the Society for Range Management 37th Annual Meeting. Society of Range Management, February 16-21, 1984. Calgary, Alberta, CAN

Hirsch, K.J. Kjar, J. Stubbendieck, and R.M. Case. 1979. Relationships between vegetation, soils and pocket gophers in the Nebraska Sandhills. Transactions of the Nebraska Academy of Sciences. Vol. XII: 5-11

**Kathie J. Kjar (cont.)**

- Hirsch, K.J. and D.J. Nilson. 1990. Use of Glyphosate and interseeding to improve seasonality of reclaimed grasslands. Proceedings of the Fifth Billings Symposium on Disturbed Land Rehabilitation. March 25-30, 1990, Billings, Montana, USA
- Hirsch, K. J. and D. J. Nilson. 1990. Native grassland bond release criteria using technical information and reference area data. Proceedings of the Symposium on Disturbed Land Rehabilitation. March 25-30; Billings, Montana, USA
- Hirsch, K.J. and W.T. Barker. 1984. Classification of grasslands and shrublands in southwestern North Dakota. Volume 38 page 82 in proceedings of the 76<sup>th</sup> Annual Meeting of the North Dakota Academy of Sciences Annual Meeting. Fargo, North Dakota, USA
- Hirsch, K.J. and W.T. Barker. 1984. Grassland and shrubland classification in southwestern North Dakota. Page 10 in proceedings of the Ninth North American Prairie Conference, July 29 - August 1, 1984, Moorhead, Minnesota, USA
- Hirsch, K. J., L. A. Ogaard, and N. M. Safaya. 1986. Standards for evaluation of revegetation success and recommended procedures for pre- and postmining vegetation assessments. Public Service Commission, Bismarck, ND. USA
- Hirsch, K.J. Kjar, J. Stubbendieck, and R.M. Case. 1979. Relationships between vegetation, soils and pocket gophers in the Nebraska Sandhills. Transactions of the Nebraska Academy of Sciences. Volume XII: 5-11
- Kjar, K.J. 1979. Natural revegetation trends on rangeland following control of *Geomys bursarius*. M.S. Thesis. University of Nebraska. Lincoln, Nebraska, USA
- Kjar, K.J. and J. Stubbendieck. 1981. Natural vegetation on rangeland following control of the plains pocket gopher. Page 40 in proceedings of the 34<sup>th</sup> Annual meeting of the Society for Range Management, Tulsa, Oklahoma, USA
- Kjar, K.J. and J. Stubbendieck. 1980. Natural revegetation on rangeland following control of the *Geomys bursarius*. Transactions of the Nebraska Academy of Science 19:55
- Kjar, K.J. and J. Stubbendieck. 1977. Rangeland recovery following control of the plains pocket gopher. Sixth Annual Progress Report. Sandhills Agricultural Laboratory, University of Nebraska, Lincoln, Nebraska, USA. NPS 1-10
- Stubbendieck, J., S.L. Hatch, and K.J. Hirsch. 1985. North American Range Plants, Third edition. University of Nebraska Press, Lincoln, Nebraska, USA
- Stubbendieck, J., S.L. Hatch, and K.J. Kjar. 1982. North American Range Plants, Second edition. University of Nebraska Press, Lincoln, Nebraska, USA
- Stubbendieck, J., C.J. Wiederspan, and K.J. Kjar. 1980. Prairie restoration: an evaluation and specific recommendations for management. RFP-FOLS-80-001. Natural Resources Enterprises, Inc. Lincoln, Nebraska. USA
- Wiederspan, C.J., J. Stubbendieck, and K.J. Kjar. 1980. A vegetation analysis of three selected farm. Transactions of the Nebraska Academy of Science 19:50

# **Greg W. Meyer**

## **Wildlife Biologist/Ecologist**

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### **Experience Summary**

Greg has over 8 years experience in wetland delineations and mitigations and wildlife and habitat research. Greg's wetland experience includes wetland health assessments, wetland vegetation studies, wetland gas emission studies, delineations, and mitigations. Greg's wildlife and habitat experience includes avian surveys, raptor surveys, endangered, threatened, and sensitive plant and animal surveys for Biological Assessments and Evaluations, prairie dog surveys, botany surveys, habitat evaluations, and land inventories.

### **Employment History**

**Wildlife Biologist/Ecologist**, McCain and Associates, Inc. Bismarck, ND (present)  
**Environmental Scientist/Ecologist**, Earthworks, Inc. Bismarck, ND (2006-2007)  
**Wetland Botanist/Crew Leader**, US Geological Survey, Jamestown, ND (2004-2006)  
**Graduate Teaching Internship**, University of North Dakota, Grand Forks, ND (2004)  
**Biological Contractor**, Red River Regional Council, Grafton, ND (2003)  
**Graduate Research Assistant**, University of North Dakota, Grand Forks, ND (2001-2004)

### **Areas of Expertise**

- Wetland delineations, permitting, and mitigation
- Endangered, threatened, and sensitive plant and animal surveys
- Vegetation sampling and surveys
- Bird surveys
- Raptor surveys
- Wildlife surveys
- Biological Assessments and Biological Evaluations
- Global Positioning System (GPS)
- Geographic Information System (GIS)

### **Relevant Experience**

**Natural Resource Group, Inc.** - Conducted a wetland delineation on an approximately 450 acre land tract for industrial development. The extent of the hydrology, hydrophytic vegetation, and hydric soils were identified and spatially recorded with a GPS unit. The spatial data was downloaded into GIS and used to calculate acreage and create accurate maps. Produced a wetland delineation report that consisted of: pertinent background information of the project area, US Army Corps of Engineers field data sheets, project maps with evident delineated wetland boundaries, and field photographs of the project site.

- Manage project schedule and field work.
- Performed aerial photograph interpretation of project area.

### **Greg W. Meyer (cont.)**

- Identified wetland boundaries by identifying hydrophytic vegetation, hydric soils, and hydrology during field delineation.
- Collected GPS field data of wetland boundary.
- Utilized GIS to create maps and calculate acreage.
- Produced an accurate and concise wetland delineation report.

**Archer Daniels Midland Company** - Conducted multiple wetland delineations of a 100 acre project area. Numerous isolated wetland basins and the stream course of Spring Creek were delineated. The extent of the hydrology, hydrophytic vegetation, and hydric soils were identified and spatially recorded with a GPS unit. The spatial data was downloaded into GIS and used to calculate acreage and create accurate maps. Produced a wetland delineation report that consisted of: pertinent background information of the project area, US Army Corps of Engineers field data sheets, project maps with evident delineated wetland boundaries, and field photographs of the project site.

- Managed project schedule and performed field work.
- Performed aerial photograph interpretation of project area.
- Identified wetland boundaries by identifying hydrophytic vegetation, hydric soils, and hydrology during field delineation.
- Collected GPS field data of wetland boundary.
- Utilized GIS to create maps and calculate acreage.
- Produced an accurate and concise wetland delineation report.

**Confidential Oil & Gas Clients.** - Conducted endangered, threatened, and sensitive plant and animal surveys along three miles of a proposed underground electrical line. Prepared the corresponding Biological Assessment and Biological Evaluation for the project area.

- Prepared necessary field work items.
- Conducted complete botany survey.
- Conducted nesting raptor survey.
- Collected GPS field data.
- Produced Biological Assessment and Biological Evaluation report.
- Produced Geographic Information System (GIS) maps.

**US Geological Survey** - Conducted wetland vegetation and their surrounding catchment surveys in Iowa, Minnesota, Montana, North Dakota and South Dakota, and led a field crew collecting wetland gas emissions in Iowa, Minnesota, and North Dakota. Supervised botany technicians and oversaw clipping and drying of the vegetation samples collected during the wetland carbon sequestration study.

- Conducted wetland vegetation surveys.
- Identified species and assigned cover class to vegetation with sampling quadrats throughout wetland zones.
- Led six-person wetland gas emission collection crew.
- Supervised vegetation biomass clipping and drying technicians.
- Prepared clipped samples for drying and processing.

**Greg W. Meyer (cont.)**

**Red River Regional Council** – Conducted habitat inventory and evaluations on the Grand Forks Air Force Base which consisted of a tree species inventory and mapping their prairie areas.

- Identified all trees within the prairie areas of the Grand Forks Air Base.
- Collected GPS data of tree locations for implementation into a GIS map.
- Provided a habitat evaluation of the prairie lands of the Grand Forks Air Base.

**Education:**

Master of Science, Wildlife Biology, University of North Dakota, 2004

Bachelor of Arts, Biology Major and Chemistry Minor, Concordia College, 2000

**Memberships:** North Dakota Chapter of The Wildlife Society (2002 to present)

**Publications:**

Meyer, G. W. 2004. Biological Implications of Surrounding Land Use on Wetland Health: A Conservation Agriculture Analysis. Thesis, University of North Dakota. Grand Forks, North Dakota, USA.

**Professional Presentations and Lectures:**

Meyer, G. W. 2003 Implications Of Conservation Agriculture On Wetland Health. Prairie University Biological Symposium, Winnipeg, Manitoba, Canada.

Meyer, G.W. and S. Clancy, 2003 Biological Implications of Surrounding Land Use on Wetland Health: A Conservation Agriculture Analysis. International Water Conference, Fargo, North Dakota

Meyer, G.W. and S. Clancy, 2003 Biological Implications of Surrounding Land Use on Wetland Health: A Conservation Agriculture Analysis. North Dakota Chapter of the Wildlife Society Annual Meeting, Bismarck, North Dakota.

Meyer, G.W. and S. Clancy, 2002 Conservation Agriculture: A Comprehensive Approach to Watershed Management. Wetlands National Symposium, Indianapolis, Indiana.

Meyer, G.W. and N.H. Euliss, Jr., 2003 Nutrient Cycling and Carbon Sequestration, University of North Dakota. Prairie and Wetland Ecology

# Ryan J. Krapp, MS

GIS Specialist / Fisheries & Wildlife Biologist

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## Experience Summary

Ryan has over 8 years experience working in the field of natural resources. He utilizes Global Positioning System (GPS) and Geographic Information Systems (GIS) to record, display and model spatial and temporal natural resource data. Professional training and experience includes wildlife habitat investigations, raptor surveys, botanical surveys, threatened, endangered, and species of concern surveys, wetland delineations and fisheries sampling. He analyzes and prepares field collected data for production of Environmental Assessments (EA) under NEPA guidelines and Biological Assessments and Evaluations (BAE) for review by the US Forest Service. He has extensive experience in creating GIS databases used to manage large volumes of spatial and temporal data aiding in management, monitoring, analysis and comparisons, including black-tailed prairie dog colonies in western North Dakota grasslands.

## Employment History

**Wildlife Biologist / GIS Specialist**, McCain and Associates, Inc. Bismarck, ND

**Environmental Scientist / Ecologist**, Earthworks, Inc. Bismarck, ND (2006-2007)

**Fisheries / GIS Specialist**, North Dakota Game and Fish, Bismarck, ND (2003-2006)

**Graduate Research Assistant**, University of North Dakota, Grand Forks, ND (2001-2003)

**Fisheries Technician Assistant**, North Dakota Game and Fish, Dickinson, ND (2000)

**Fisheries Technician Assistant / Creel Clerk**, South Dakota Game, Fish and Parks Webster, SD (1999)

## Areas of Expertise

- Endangered, threatened, and sensitive plant and animal surveys
- Global Positioning Systems (GPS) mapping
- Geographic Information Systems (GIS)
- Wildlife surveys
- Raptor surveys
- Botanical surveys
- Fisheries surveys
- Biological Assessments and Evaluations

## Relevant Experience

**McKenzie Electric Power Cooperative Projects** – Conducted surveys for endangered, threatened, and sensitive plants and animals along over 25 miles proposed underground line routes. Evaluated areas of sensitive wildlife habitat and produced corresponding Biological Assessment and Evaluation under guidance of and for review by the US Forest Service.

- Conducted nesting raptor survey
- Delineation of prairie dog colony
- Assisted in complete botany survey
- Collected sub-meter GPS field data and managed GIS data
- Produced Biological Assessment and Evaluation report

## **Ryan J. Krapp (cont.)**

**Oil and Gas Client Projects** – Conducted **50+** surveys for endangered, threatened, and sensitive plants and animals for siting of oil and gas well pad and access routes. Wrote and produced the corresponding Biological Assessments and Evaluations for the project area.

- Conducted nesting raptor surveys
- Assisted in complete botany survey
- Delineation of prairie dog colonies
- Collected sub-meter GPS field data
- Managed project GIS data
- Produced Biological Assessment and Biological Evaluation report

**Development and Management of natural resource GIS geodatabase** – Creation and organization of natural resource GIS datasets into a centralized GPS-enabled geodatabase for use by many on shared server for McCain and Associates, Inc. The GPS-enabled geodatabase allows for the check-out of data for use in field by Trimble mobile device with ArcPad, field data collection and check-in capabilities with sub-foot post-processing accuracy.

- Design, create and manage geodatabase for reference base data and field collected GIS data for use in ESRI ArcGIS
- Check-out and check-in data for field reference and collection using ArcPad and Trimble GeoXH GPS
- Verify and collect in-field threatened, endangered and species of concern locations producing sub-foot accurate location coordinates

## **North Dakota Game and Fish Department – Bathymetric Lake Mapping**

Development and execution of statewide lake mapping project using the latest GPS and GIS technology. Design and setup of onboard GPS/GIS lake mapping equipment. Travel to remote lakes to collect integrated sonar depths and GPS positions.

- Post-processing of field data using ArcInfo and ArcGIS Desktop 9.X
- Development and maintenance of geodatabase, coverages and shapefiles
- Production of georeferenced bathymetric lake maps
- Lake statistical analysis using Spatial and 3D Analyst extensions
- Other duties included aquatic nuisance species investigations, lake and stream fish habitat restorations/enhancement, electroshock fisheries sampling, and standard fisheries population sampling

## **Education**

Geographic Information Systems Certificate, University of North Dakota, 2003

Master's of Science, Biology, University of North Dakota, 2003

Bachelor of Science, Fisheries and Wildlife Biology, University of North Dakota, 2000

## **Memberships**

North Dakota Chapter of The Wildlife Society (1999 to present)

North Dakota Wildlife Federation (2007 to present)

Dakota Chapter American Fisheries Society (1999 to present)

American Fisheries Society (2001 to 2006)

Great Plains Fisheries Workers Association (2001 to 2006)

## **Publications**

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**Ryan J. Krapp (cont.)**

Effects of fluctuating water-levels on quantity and quality of fish habitat in Devils Lake, North Dakota. Master's Thesis

**Professional Presentations and Lectures**

Krapp, R.J., 2004 *Bathymetric Mapping of North Dakota Fishing Waters Using GIS*. Great Plains Fisheries Workers Association - Winnipeg, MAN, Canada

Krapp, R.J., 2003 *Effects of dramatically-increasing water levels on spatial and temporal variation in age-0 yellow perch (*Perca flavescens*) abundance in Devils Lake, North Dakota*. International Water Conference - Moorhead, Minnesota

Krapp, R.J., 2003 *Developing a GIS Baseline Project of the Devils Lake Basin*. Dakota Chapter American Fisheries Society - Chamberlain, South Dakota