



Saint Mary's University of Minnesota  
Department of Resource Analysis

# GeoSpatial Services

## Overview and Activities



# GeoSpatial Services Overview

- SMU Project Center
- National Wetland Inventory Mapping
- Oil and Gas Industry – primarily BP
- Natural Resource Condition Assessments
- Climate Change Vulnerability Assessments
- Academic Support to SMU Programs
  - GSS Staff provide instruction and support
  - Student employment (internships)
  - Field-based research initiatives (biology, ecology)



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# GSS Services

- Spatial data development
  - Field data collection and digital conversion
  - Georeferencing, orthorectification and mosaicing
- Image interpretation
  - Traditional aerial photography
  - Image segmentation and feature extraction
- GIS web services
  - Site development and hosting (Silverlight and HTML)
  - Custom applications development (.NET, Java, Python)
- Natural resource assessments

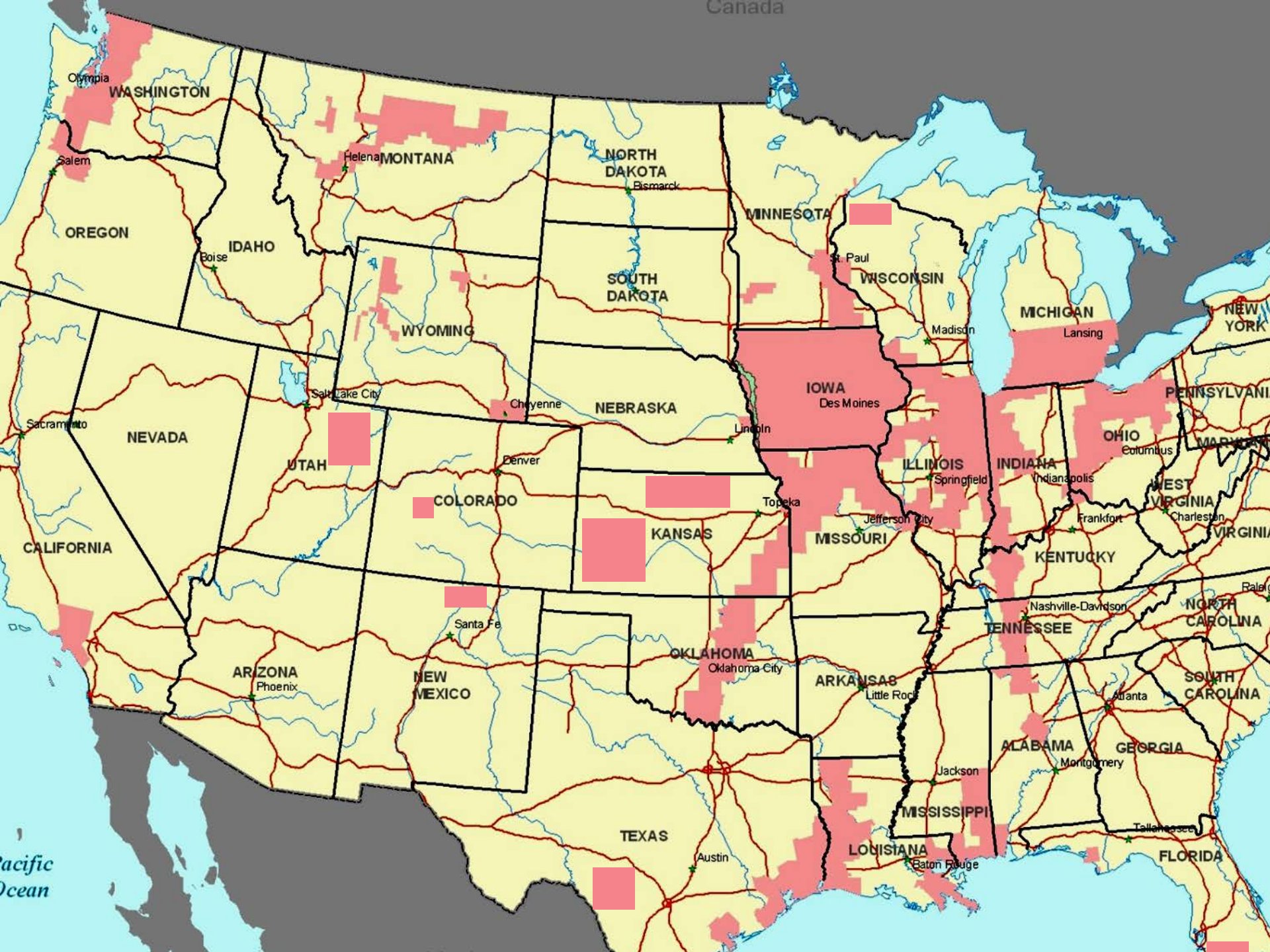


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# Current Initiatives

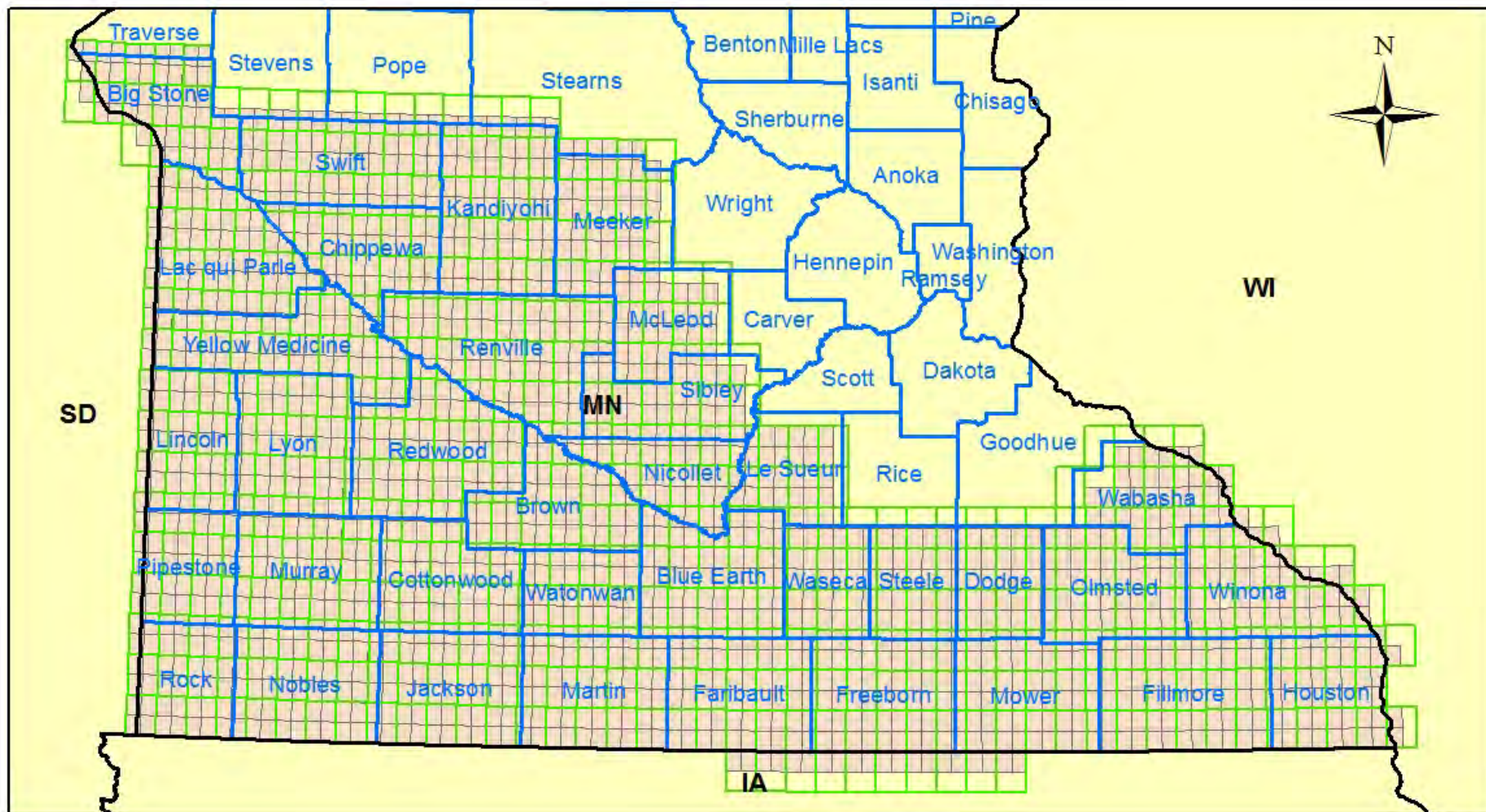
## Minnesota and Midwest

- Southern Minnesota Wetland Mapping
- Wetland functional assessment
- Identification of potentially restorable wetlands (PRW) and restoration planning
- City of Winona GIS Web Services
- Winona Area Public and Private Schools
- Web-based GIS support for silica (frac) sand mining information distribution



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# Southern Project Area Update of Minnesota National Wetlands Inventory

0 15 30 60 90 120 Miles

- Southern MN Project Area (rev. 8/31/12) - 1/4 Quadrangles
- USGS 7.5 Minute Quadrangle Boundaries
- Minnesota Counties

# Landscape Level Wetland Functional Assessment

- Based on updated wetland inventory
- Enhanced classification using landscape metrics
- Local, state and national experts provide “Best Professional Judgment”
- Define and map wetland functions across the landscape
- Identify restoration opportunities for specific functional categories
- Consider historic wetland distribution



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# Landscape Level Wetland Functional Assessment

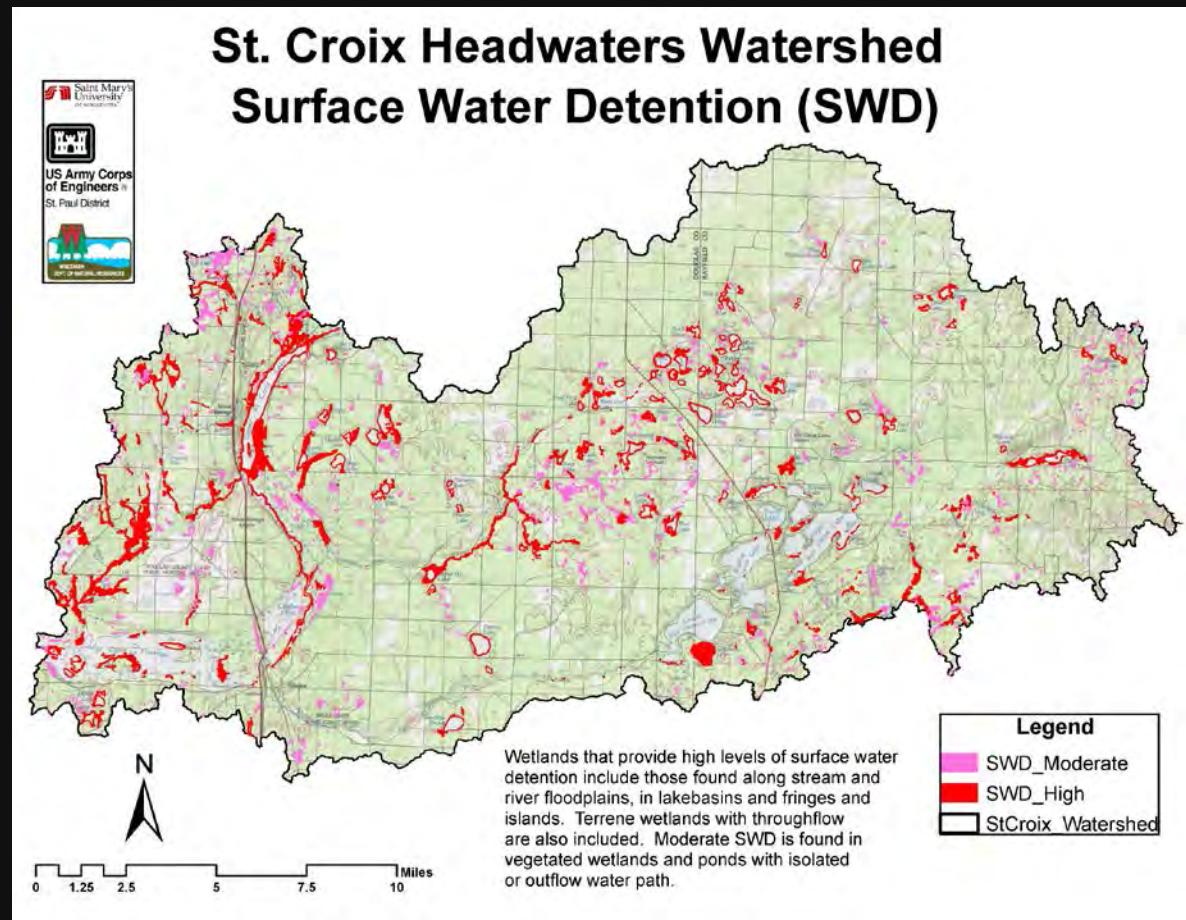
- Surface Water Detention
- Water Maintenance
- Shoreline Stabilization
- Nutrient Transformation
- Carbon Sequestration
- Sediment Retention
- Fish and Wildlife Habitat  
(waterfowl, shorebirds and amphibians)



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# Identification of Potentially Restorable Wetlands

- Updated wetlands
- SSURGO soils (52 attr)
- LiDAR DEM
- Surface derivatives (CTI, TPI, curvature)
- Statistical correlation
- Historic wetlands
- Opportunities



# Winona Public and Private Schools

- On-the-ground implementation of K-12 STEM education
- Focus on experiential learning supported by spatial technologies
- GPS, Geo-caching, wildlife/vegetation observation and mapping
- Getting students outside the classroom and interested in the environment
- Opportunities





# GIS Support Silica Sand Mining

- Partnership with the Izaak Walton League of America
- Web-based GIS and information portal under development
- Focus on silica sand mining issues and hotspots
- Impartial treatment of issues and concerns
- Opportunities for research and investigation

