

**Ryan F. Kiefer**  
**ddms, Senior Systems Engineer**

**Education**

M.S., Resource Analysis, St. Mary's University of Minnesota, Winona, Minnesota

B.S., Biology, University of Minnesota, Duluth, Minnesota

**Professional Experience**

Mr. Kiefer has more than ten years of experience leveraging geographic information systems (GIS) in conjunction with other applications to analyze and solve a variety of problems. He has more than nine years of experience in programming and developing spatially enabled web and desktop applications. Mr. Kiefer's experience includes a vast knowledge of GIS-related data processing techniques, preferred and customized analytical methodologies, and application development for both spatial and non-spatial applications for desktop and web solutions. Mr. Kiefer manages IT resources and is responsible for database design and management on a number of database platforms. Mr. Kiefer's application development has largely focused on building and managing web-based, GIS-enabled environmental database management systems and associated user interfaces. Mr. Kiefer's web-based applications are currently being used to access and manage complex environmental data on more than 30 Superfund sites. A representative sampling of his project experience is provided below:

- Provided programming expertise to several large environmental litigation initiatives. Generated data flows, created processes, and supported efforts to aggregate, process, and display data from environmental databases spatially, in tabular format, and graphically. Accelerated schedules associated with litigation required for quick turnaround time, processing a vast amount of data.
- Provided expert witness support by developing several routines to generate groundwater potentiometric surfaces, transient and non-transient particle tracks and contours using KT3D\_H2O, MapWindows, and .net technologies for use in environmental litigation context. Surfaces were generated through different model domains and extracted from a database aggregating over different time periods. This data was preprocessed and then fed into KT3D\_H2O using a predefined XML structure. Particle tracks were run on time series potentiometric surfaces and for future forecasts using cyclical seasonal water levels.
- Provided expert witness support by developing routines and a process to integrate several different data sources into a general well head conductance value. This process read and assembled information from several hundred files and parsed out necessary content to process based on vertical profile of layers, distance, and model information. The process utilized C#, WPF, and a custom algorithm for conductance output.
- Developed a custom solution for use by environmental litigation team using ArcGIS Server®, which linked documents and tabular information from Project Portal™ into an online spatial viewer that provided quick and easy access to information regarding wells, tanks, and equipment. This solution was implemented to enhance the distribution and

analysis of data by expert witnesses.

- Lead developer of Project Portal, a cloud computing application that allows environmental project teams to interact with data and documents generated from complex environmental projects in an intuitive manner. With interactive environmental database, GIS, Data Analytics, tablet PC DataLogger, document and calendar modules; project teams have a full array of powerful tools to help them efficiently interact with project data.
- Provided solution for field data entry in multiple environments by developing a customizable solution to data entry for Project Portal, DataLogger, as a tablet-PC-based solution. Data forms are configured by templates and managed within the tablet PC, then uploaded to Project Portal for potential integration into the environmental database. DataLogger has been used successfully in several projects, from sediment sampling to water monitoring equipment.
- Worked to administer and generate spatial applications and services using ArcGIS Server technologies for a variety of applications.
- Created an application that enabled users to quickly generate accurate cross-sectional views of well and lithology data simply by drawing a line through the data in ArcGIS™.
- Created a web application for use by the public, the New Mexico Environmental Department, and Los Alamos National Laboratory. This web-based application was created for use in displaying and querying large amounts of environmental data and displaying the data in both tabular and GIS formats. This application was created using ASP.net, AJAX, JSON, VB.net, PHP, and Mapscript/MapServer for GIS display and feature creation, with access to data in either MySQL or Microsoft Sql Server. Also developed a mechanism to allow data providers to upload new, modify existing, or delete data by uploading Microsoft Access or Sql Server data files to a central repository. Data are immediately validated and checked for inconsistencies, and then when marked as passed, are integrated into the live system.
- Lead developer of Aqua TrueVue®, an application developed for hydrogeologists and well-field managers to efficiently query large amounts of hydrologic data for use in displaying potentiometric surfaces, calculating well capture zones, and estimating efficiency of wells for real time data and in historic data. This application was created using ArcObjects™, ArcGIS Engine™, Mapscript, VB.net, C# and includes a custom-built library created in VB.net to run geostatistical analysis of data with the ability to export and display spatial interpolations using the following interpolations: Thin Plate Spline with Tension, Thin Plate Spline, Regularized Spline with Tension, Inverse Distance Weighted, Multiquadratic Thin Plate Spline, Trend Surface analysis, and Completely Regularized Spline with Tension. Aqua TrueVue® has been further enhanced to include linear-log kriging through the integration of KT3D\_H2O assemblies.
- Developed a web-based application to assist in Pipeline Integrity and Safety management utilizing ESRI's ArcGIS Server™ technology to allow for real time and simultaneous editing and creation of High Consequence Areas (HCA) along national pipelines using a centrally managed website and data repository. The application was creating using

- ArcObjects™, VB.net, ASP.net, ArcSDE™, and Microsoft SQL server technologies.
- Developed a GIS extension to ArcMap allowing users to couple the power of GEMS database queries with ESRI's spatial viewing capabilities. This application was created using ArcObjects™ and Visual Basic.net (VB.net) technologies.
  - Developed custom solutions to speed in the creation and production of maps using ArcObjects™ and Visual Basic for Applications (VBA) for both petroleum and power industries.
  - Developed a spatial viewer application that allows for simple feature display of ESRI shapefiles. This application was created to help as a learning tool in how a GIS works for displaying and storing data and as a way to map data without using commercial software. This application was developing using only VB.net technology.
  - Developed an ArcGIS™ application that correctly determines the potential spill volume of a pipeline given a user-defined interval, a pipeline, and a DEM. This application can be used to decrease damage caused by pipeline spills on land. By using GIS, the application can be set up to model different parameters of pipeline information and helps determine the optimal location of stop valves to reduce the volume of potential spills. This project was developed using ArcObjects™ and VBA technologies and is the Capstone project for Mr. Kiefer's Master's Degree in GIS.
  - Developed custom desktop applications for a national pipeline company to assist in identification of HCAs and other highly sensitive areas of pipelines using Linear Referencing, ArcObjects™, and Visual Basic programming technologies.
  - Developed and maintained website for Upper Mississippi River recreational boating using Mapserver and PHP to allow all users of the Mississippi River to have access to GIS data, boat survey data, reports, and custom query capabilities.
  - Taught "Introduction to ArcObjects" course for graduate level students 2005–2008.
  - Worked as a GIS technician to create highly accurate spatial data for wetlands mapping for the NWI of Iowa and mentored others in creating highly accurate wetland data.

### **Registrations and Certifications**

Certified Geographic Information System Specialist, St. Mary's University of Minnesota,  
Winona, Minnesota

### **Professional Affiliations**

National Groundwater Association

MN GIS/LIS Consortium

**Publications/Presentations**

- Mohler, H.J., H.A. Grogan, J.R. Rocco, **R.F. Kiefer**, and J.E. Till. 2012. RACER: Dynamic Use of Environmental Measurement Data for Decision Making and Communication. *Operational Radiation Safety*, Vol. 102, Suppl 1. February.
- “An Introduction to Web-based Editing Using ArcGIS Server.” GIS and LIS Consortium, 15<sup>th</sup> Annual Conference and Workshops, Duluth, Minnesota, October 2005.
- “Simulating Boat Traffic Interaction along the Mississippi Using Agent-Based Modeling.” GIS and LIS Consortium, 14<sup>th</sup> Annual Conference and Workshops, Duluth, Minnesota, October 2004.
- “Model Builder in ArcGIS 9.0.” Southeastern Minnesota GIS Users Group. Winona, Minnesota, August 2004.