The Current

NEWS FROM WATERBORNE ENVIRONMENTAL, INC. SPRING 2006

Waterborne Participates in FOCUS Kinetics Training

Waterborne staff attended the FOCUS Kinetics training in Washington, DC on January 31st, 2006, that was sponsored by the Environmental Exposure Work Group. The training session was well attended by a broad spectrum of industry scientists. The intense workshop included presentations on the regulatory background, kinetic models, data handling, metabolites, and water-sediment study analysis. The seminar covered kinetic analyses necessary to determine degradation rates in soil, water, and water-sediment studies as well as study trigger endpoints.

Many of the concepts considered by the Degradation Kinetics Work Group culminated in a series of defined decision trees to be followed based on the desired analysis endpoint (persistence trigger or modeling) found in the FOCUS document, "Guidance Document on Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration". The training seminar also provided hands-on sessions to work on data handling issues, parent kinetics, and metabolites. The hands-on sessions included learning the Kinetic evaluation software with a Graphical User Interface (KinGUI) developed by Bayer Crop Sciences and an ECPA Work Group. This software adds to Waterborne's extensive kinetic modeling experience using ModelMaker in implementing the guidance document for the analysis of laboratory, field or water-sediment study data sets.

Those attending from Waterborne included Amy Ritter, Nathan Snyder and new employee Jessica Prenger (see bio under Staff News). Contact Nathan Snyder or Amy Ritter to discuss how Waterborne can assist you in bringing the analysis of your studies into compliance with these guidelines.

An Introduction to the New NHDplus Data Set

Paul S. Miller, PhD, EIT

A National Hydrography Dataset (NHD) workshop was held jointly by USEPA and USGS at the USGS Rocky Mountain Mapping Center in Denver, Colorado, from February 7th to February 9th, to introduce the new NHDplus data set for use in water resources applications in the US. The audience was a mixture of both governmental and private sector engineers and scientists including every major developer of the NHDplus data set among other national water resources databases. Chris Holmes and Paul Miller represented Waterborne at the workshop with the goal of learning the ins and outs of NHDplus and utilizing the wealth of these data in our GIS and water resources projects.

The first morning in the workshop was spent being introduced to the data set. The NHDplus data set is comprised of a number of water resources geospatial products including updated and corrected versions of the NHD, the NED (National Elevation Dataset), and the WBD (Watershed Boundary Dataset). In addition to these data, the NHDplus includes elevation-derived catchments developed using new techniques of watershed generation, improved network navigation, and database linked catchment attributes. A significant feature of this new data set is the ability to navigate hydrography completely within a database setting either through queries or VB scripting for optimized processing and modeling. Additional discussion of VAAs (value added attributes) included in the product suite commenced, which includes the entire NLCD (National Landcover Dataset) for each flowline/catchment (individually and cumulatively by percent of watershed area). This was particularly exciting since watershed landuse is usually a critical variable for Waterborne analyses.

An in depth review of the catchment delineation process was on the schedule for the afternoon including discussions of the DEM (Digital Elevation Model) products available with this data set. For every flowline, a catchment was developed with over 2.4 million catchments currently finished. The DEMs have been processed by burning

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Chris Holmes Promoted

Chris Holmes, head of the Spatial Technologies Group (STG) at Waterborne, has been promoted to the position of Principal Geographer. Holmes manages the firm's GIS/remote sensing group that manages numerous environmental characterization studies for the crop protection industry in both US and European settings. Mr. Holmes is an industry leader advancing the use of spatial technologies in the risk assessment process. He has been with Waterborne since 1999 and has been instrumental in building STG within the firm. Mr. Holmes holds an M.S. in Geographical Studies from Southern Illinois University and a B.A. in Computer and Information Science from the State University of New York at Potsdam. Mr. Holmes joins Amy Ritter, P. E., Les Carver, P. G., and Mark Cheplick as Principals with Waterborne. Please join us in congratulating Chris on his promotion!

CURRENT EVENTS

Waterborne busy at the National ACS meeting in Atlanta, GA, March 2006

Waterborne staff will be presenting several papers during the upcoming ACS symposium on "Advances in Pesticide Environmental Fate and Exposure Assessments" to be held at the National ACS meeting in Atlanta, GA during March 26–30, 2006. This symposium focuses on advances in environmental fate research, study design, modeling, and monitoring that influence pesticide environmental exposure assessments. A total of 31 papers will be presented during the platform session on various topics related to pesticide degradation and dissipation, runoff and surface-water assessments, ground-water monitoring, modeling, and GIS assessments. Waterborne, a recognized leader in this field, has participated in organizing this symposium with other panel members from industry and academia. The following papers will be presented by Waterborne staff at this symposium (presenting author in bold):

- *Site selection for surface water sampling locations in smaller watersheds using a GIS based procedure,* **Jennifer R. Trask,** Christopher M. Harbourt, Chris Holmes, Paul Hendley.
- *Spatial approaches to estimating pesticide spray drift exposure to surface water at the landscape level using GIS and remote sensing,* **Chris Holmes,** Ryan Williams.
- *A multi-state small-stream and weather monitoring network: Equipment design, data handling, and reliability,* **Nathan J. Snyder,** Christopher M. Harbourt, Les S. Carver, Paul Hendley, Gene Burnett.
- *Dispersion and dissipation of 2,4-D residues associated with aquatic uses,* **Brian R. Jacobson,** Krishna Balu, W. Martin Williams, Larry E. Hammond, Ronald D. Wilson.
- *Exposure assessment of 2,4-D herbicide for aquatic uses,* **Krishna Balu,** Amy M. Ritter, W. Martin Williams.
- *PLUS: A regional groundwater assessment and ranking tool,* **Scott H. Jackson,** Paul Hendley, J. Mark Cheplick.
- *Considerations for the prediction of crop protection product residues in crop commodities,* **Nathan Snyder,** Coleen M. Kennedy, Steven F. McEuen, and Jeffery J. Anderson (Poster).

Additionally, Waterborne will sponsor a hospitality suite on the evening of Wednesday, March 29, from 5:00–7:30 p.m. at the Omni Hotel in Atlanta. Clients and friends attending the ACS meeting are invited to visit our hospitality suite for hors d'oeurves, drinks, and a friendly chat with the staff of Waterborne and others.

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An Introduction to the New NHDplus Data Set, *continued from page 1*

in streams so that inconsistencies in vector stream flowlines and elevation-derived flowlines are removed. Additional DEM derived data are also available with the NHDplus suite. These include all flow accumulation and direction grids so that users can reprocess data or use these products in other modeling processes if needed for project specific goals (for example, processing in ArcHydro). A particularly exciting advancement was the inclusion of bathymetric gradients in water bodies, which might be utilized in numerically modeling the effect of these systems on water quality.

After a quick introduction to additional governmental GIS and water resources databases on Wednesday morning, Alan Rea (USGS) presented work on correctly mapping and linking all of the USGS gaging stations to the NHDplus. This enormous, manual effort was initiated to correct inaccuracies in locations of historical gages for a number of reasons. This data layer, combined with linked internet data sources and ArcObject toolsets, will provide water resources engineers a spatial database for water quality modeling studies with facile access to historically monitored data.

Our mid-morning and afternoon were spent navigating through the myriad geospatial databases and learning to efficiently use all of the available data by linking multiple databases together. Additional examples of navigating the hydrologic network were shown including navigating the network using simple queries and understanding the linkages between nodes while traversing the network. We could see the advantages of this approach computationally and could see the possibilities of integrating Waterborne's modeling into this paradigm for modeling watershed hydrology and in-stream transport.

On Thursday morning, we had workstation access to the data set including manipulating elements that were previously either described or very quickly shown to us. We also had the chance to work directly with the key developers, ask them very specific questions, and to develop continuing relationships.

All in all, it was a great experience to meet some new people and develop technical skills with an impressive, freely available geospatial product suite that will aid us in future projects. Waterborne has the data for the entire Mississippi river basin in house (the currently available data set), representing approximately one-third of the US. We are examining ways to integrate these data into our current analyses to maximize efficiency, and are also developing new approaches to take advantage of the wealth of information in the new surface water framework.

STAFF NEWS

Jason Jeffries-Glasgow

Kate Marincic

Jessica Prenger

Lauren Weissenborn

Raghu Vamshi

Jason Jeffries-Glasgow joined Waterborne as Project Information Technology Specialist in December 2005. He earned a BBA degree in Computer Information Systems and a minor in Computer Science from James Madison University. While at JMU, Jason worked as a web programmer for the division of University Relations. He has since worked as a Windows systems administrator in both the government and private sectors. As a Waterborne employee, Jason will work to refine the firm's technology infrastructure in an effort to expand capabilities and improve administrative and technical efficiencies. Jason will also be working with data and data structures to assist projects requiring data analysis.

Kate Marincic began work at Waterborne in January 2005 as a Staff Geologist. Kate earned a B.A. degree in Geology at Smith College and an M.S. degree in Geology at the University of Florida. Her master's thesis involved the study of carbon cycling in an anoxic lake basin in Florida using carbon isotopes as a tracer. Prior to joining Waterborne, Kate worked as project coordinator for the North Fork Goose Creek Watershed Project, a local volunteer citizens group, involved in monitoring stream water quality, riparian restoration projects, and public education workshops. Earlier in her career, she was employed with a civil engineering firm in Whidbey Island, Washington, where she performed analyses and prepared engineering reports for evaluation of existing and proposed public water systems, designed and analyzed well pumping tests, and performed AutoCAD design and hydraulic modeling. Kate also worked as an environmental health specialist with the Island County Health Department in Washington state where she administered the drinking water program for over 650 public water systems and assisted in the design and implementation of a county-wide well monitoring program.

Jessica Prenger began work at Waterborne in January 2006 as an agricultural engineer. Jessie has food, agricultural, and biological engineering degrees (B.S. and M.S.) from The Ohio State University in Columbus, Ohio. While at Ohio State as an employee and then graduate student, Jessie conducted research on instrumentation and control for controlled environment agriculture such as greenhouse and nursery systems. The research group focused on developing non-contact sensing for a 'speaking plant' approach to automating closed environment plant production. Her master's thesis described implementation of a system that used canopy temperature feedback for automated irrigation control. Prior to joining Waterborne, she worked on the science team creating a locker-size growth chamber developed to study low-gravity plant production on the U.S. space shuttle. Working primarily on irrigation control and growth media moisture sensing, she coordinated research activities for ground studies and integration with flight hardware. She also contributed to facility instrumentation and control systems for growth chambers in the space life sciences laboratory. Earlier in her career, she enjoyed two summers working for USDA-Natural Resources Conservation Service participating in surveying, drainage design, agricultural structure design, and emergency watershed protection (EWP) programs with the agency. At Waterborne, Jessie is working with the engineering group on modeling and field studies.

Lauren Weissenborn began working for Waterborne in December 2005 as a Staff Environmental Scientist. Lauren earned a B.S. degree in Environmental Science with a focus on aquatic resources from Virginia Tech. While at Virginia Tech, Lauren was involved in various field and lab research projects studying the water quality of rural streams and ponds in southwest Virginia. She was employed by the Virginia Tech water testing facility where she assisted with studies on chicken and fish fecal matter detections in local streams. Prior to joining Waterborne, Lauren was an intern for the USEPA Office of Pesticide Programs (OPP). She worked on a variety of projects at OPP including responding to Congressional letters and inquiries from the public regarding pesticide regulations. While working at OPP, she learned the workings of a government agency, and some of the

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Upcoming Posters and Presentations

- *Using spatial approaches to examine natural variation in the agricultural landscape for aquatic exposure assessment,* Chris Holmes, platform presentation, Behavior of Pesticides in Air, Soil and Water, Akademie Fresenius, Franfurt-Mörfelden, Germany, June, 2006.
- *Using spatial technologies to generate probabilistic inputs for pesticide aquatic exposure modeling,* Chris Holmes, platform presentation, SETAC Europe 16th Annual Meeting, The Hague, The Netherlands, May 2006 (with W. M. Willams and R. Williams).
- *Mapping risk to aquatic organisms from exposure to pesticides,* Chris Holmes, poster presentation, Pesticide Behavior in Soils, Water and Air, Society of Chemical Industry (SCI), Warwick, UK, March 2006 (with C. Brown, C. Wells, R. Williams, S. Beulke, and W. van Beinum).

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pesticide policies that are established at USEPA. At Waterborne, Lauren is working with the field group on ground-water and surface-water studies.

Raghu Vamshi started working for Waterborne in February 2006 as a Project GIS Specialist. Raghu earned a B.S. degree in Agriculture from the University of Agricultural Sciences, Bangalore, India, as well as a Diploma in Computer Science from the International School of Computer Technology. Raghu worked as a Web Analyst for Informatics India, Ltd before starting a program at Texas Tech University. While there he received an MBA degree concentrating on Management Information Systems and Geographic Information Systems. Prior to joining Waterborne, Raghu worked as an Information Systems (GIS) Analyst at Paradigm Alliance in Wichita, KS, which offers GIS mapping applications and strategic marketing solutions to the energy/pipeline and retail/restaurant industry. Raghu designed and developed custom GIS and database applications for the ArcGIS suite of products using ArcObjects, MS Access and Visual Basic. His experience also includes website development with HTML, ASP, SQL, VB Script and Java Script; including developing an ArcIMS web application for Texas county information enabling users to download GIS data from an agricultural database. He has also designed and developed spatial databases using ArcSDE and SQL Server. At Waterborne, Raghu will be working in the Spatial Technologies Group performing GIS & database analyses, while developing tools to automate and enhance GIS processing and database functions.

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