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In this Issue:

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Research Events

Ecology of Lake Superior – Integrated Approaches & Challenges of the 21st Century, May 3-5

This conference was co-hosted by the Division and the Aquatic Ecosystem Health and Management Society (AEHMS), at EPA's Duluth facility. Jack Kelly of MED and Moni Munawar of Fisheries and Oceans Canada served as co-chairs. The Lake Superior Binational Program, Great Lakes Regional Research Information Network sponsored the conference, which was organized by a committee from the US, Netherlands, and Canada. MED researchers were lead or contributing authors on over 20% of the presentations.

The goal of the meeting was to gather scientists who have been studying Lake Superior, in order to develop both an integrated perspective of the ecology and trends in the lake and an interactive, cross-disciplinary science network to further engage in lake research and management. Based on feedback solicited from the 125 or so conference participants from various institutions in the US and Canada, the meeting was indeed a "grand success" in these endeavors. The plenary speaker, Jim Kitchell of the University of Wisconsin, summarized, saying, "This is the best meeting that I've ever attended. I'm mightily impressed by the current status of Lake Superior, its institutions, and the people they contain. There's meaningful, dedicated leadership in this group. Lake Superior will be better for it in many ways. It's a poster child for successful accomplishments by research and management groups. I'm pleased to count myself among those who can make contributions in the future."

Topics ranged from physical and chemical aspects of the lake and basin, through biological systems, to management and modeling. Researchers discussed the limited amount of long-term Lake Superior data, and the sometimes conflicting nature of the data available. Many admitted that the lake's ecology, in some ways, is still not well known, which always presents a challenge to science and management. Even so, some remarkable changes in the big lake across the last three decades were noted: recovery of lake trout from lamprey invasions, dramatic increases in surface temperatures, and some striking biogeochemical changes that reflect changing inputs from air and land.

The broad disciplinary and spatial scope of the conference was indeed evident as physical climate modelers, for example, talked with phytoplankton ecologists, and landscape geographers with carbon cycling geochemists. But the integration across disciplines may be

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ECOLOGY OF LAKE SUPERIOR – *CONTINUED*

best exemplified by the foodweb discussions, which brought together two large groups studying the "bottom" and "top" of the foodweb –microbial scientists and the fisheries researchers–who came away knowing that the ecological distance between microbes and fish is not so great that it cannot be bridged to assist lake management.

The Publication and Production Committee of AEHMS, chaired by Chief Editor Dr. Munawar, is overseeing the publication of about two dozen selected manuscripts from the conference, in the ISI-rated journal *Aquatic Ecosystem Health and Management* and/or in the *Ecovision World Monograph Series*. The first issue is expected in spring 2011. For more information, including presentation abstracts, see the AEHMS website: http://www.aehms.org/. **Contact**: Jack Kelly (218) 529-5119.

MED AND REGIONAL RESEARCH PARTNERSHIP HOST REGION 9 EMPLOYEE

From May 3-14, ORD's Regional Research Partnership Program (RRPP) supported Region 9's Garrett Peterson, in a detail with the Division at its Large Lakes & Rivers Forecasting Research Branch in Grosse Ile, MI. Dr. Peterson was mentored in "Analytical Techniques for Mercury, Methyl Mercury, and Other Metals in Fish Tissues, Sediment, and Other Matrices." Grosse Ile staff Ronald Rossmann and John Filkins mentored him while he observed onsite contractors analyzing fish and sediment samples. Region 9 requested the mentoring through the RRPP, and a second period of mentoring with Peterson may occur. The Grosse Ile laboratories are recognized for their analytical expertise with total and methyl mercury and other metals in a variety of media, including fish, avian species, sediment, and water. Facilities house state-of-the-art equipment, including clean-room facilities. During his stay, Dr. Peterson observed and was mentored primarily in the analysis of fish tissue (Coho salmon, walleye, and brown trout) for methyl mercury and sediments (Lake Michigan sediment cores) for a variety of trace metals (lead, zinc, copper, and others).
Contact: John Filkins (734) 692-7614.

EPA ORD SUPPORT FOR THE GREAT LAKES RESTORATION INITIATIVE

Great Lakes RESTORATION Great Lakes Restoration Initiative
Accountability - Action - Urgency

The Division is actively supporting the Agency's Great Lakes Restoration Initiative (GLRI) in various ways (http://restoregreatlakes.us/). Director Carl Richards is serving as an ORD point-of-contact with EPA's Region 5 Great Lakes National Program Office (GLNPO), which is administering the GLRI. Various ORD Laboratories, including the National Health & Environmental Effects Research (NHEERL), National Exposure Research (NERL), and National Risk Management Research (NRMRL) Laboratories, are supporting the scientific underpinnings of GLRI restoration themes. The GLRI is organized under an Action Plan (http://greatlakesrestoration.us/action/wp-content/uploads/glri_actionplan.pdf); Division staff are supporting EPA in planning for a scientific review of the Plan, likely by EPA's Science Advisory Board.

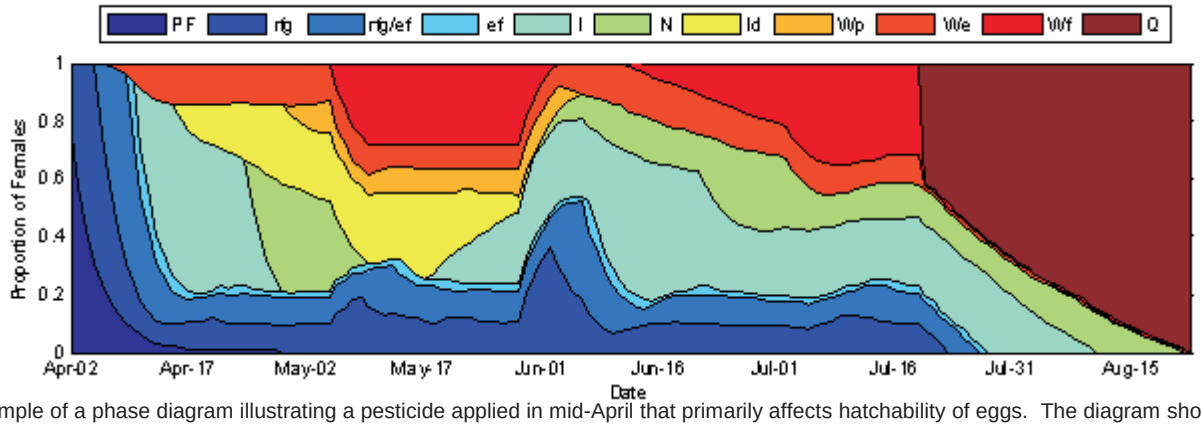
Division staff are working with GLNPO personnel on the GLRI focus areas. For the focus on Toxic Substances and Areas of Concern, Division staff are collaborating with GLNPO and other ORD Divisions to refine the strategy for reducing toxic effects in the Great Lakes; collaborating with GLNPO and other federal agencies on developing an effects-based monitoring program; developing a tool to rank pharmaceutical chemicals for their potential to cause adverse effects in aquatic species; and developing information on the human benefits and ecosystem services realized from restoration of Areas of Concern in the Great Lakes. Division and GLNPO staff are working together to advance concordance between the chemistry of contaminated sediments and toxicity, addressing unmeasured toxicants, predicting bioavailability, estimating multiple causes of toxicity, and addressing non-toxicant factors in test results.

For the focus on Invasive Species, Division staff have supported the solicitation and review of proposals for funding for "Forecasting and Synthesis of Ecosystem Effects of Invasive Species" and for "Threat, Distribution, and Early Detection of Invasive Species." These two project areas evolved from Division research on modeling and early detection of invasive species. Several Division activities are supporting the focus area on Accountability, Education, Monitoring, Evaluation, Communication, and Partnerships. Division scientists are supporting the design, indicators, and assessment of Great Lakes nearshore and embayments through the National Coastal Condition Assessment, being carried out by EPA's Office of Water. These efforts also support GLNPO's synoptic nearshore assessments, and Division scientists have developed technology, data analysis, and visualization tools. Division researchers are planning to address the human benefits and ecosystem services derived from coastal wetland protection and restoration; these efforts contribute to the accountability of habitat restoration under the GLRI. **Contact**: Carl Richards (218) 529-5010.

Estimating the Magnitude of Pesticide Effects to Reproduction: MCnest

An ongoing challenge in the field of ecotoxicology is to improve methods for characterizing pesticide risks to wildlife populations. One approach is to use population models that require estimates of the magnitude of pesticide effects on demographic parameters, such as fecundity (reproduction) and survival rates, at specified application rates. However, standardized laboratory reproduction tests are designed to determine threshold levels (e.g., no-observed-adverse-effect concentrations or NOAECs) below which adverse effects are not observed, rather than quantify dose-response relationships. These toxicity thresholds can be used in risk quotients to classify whether or not adverse effects are possible, but they can not determine the probability or magnitude of potential reproductive effects.

In avian risk assessments, even if the reproduction test was designed to quantify dose-response relationships, none of the current measured endpoints is sufficient, on its own, to directly estimate the magnitude of changes in reproductive success. However, the existing suite of avian toxicity tests (i.e., reproduction test, LD50, and LC50) does provide information on specific pesticide-related effects occurring at various phases of nesting that can be combined with information on species life history and pesticide application timing, to estimate overall effects on reproductive success. To translate toxicity information into a currency useful for population-level assessment, a Markov chain nest productivity model, known as MCnest, has been developed based on methods used by ecologists to estimate nest success. MCnest simulates the response of an avian population to a pesticide-use scenario based on the pesticide's toxicity thresholds for a suite of endpoints, the application rate, date(s) of application, and degradation half-life of residues on food types. In addition to estimating how a pesticide-use scenario changes the overall reproductive success rate for a breeding season, MCnest provides a phase diagram displaying the proportion of females in a given reproductive phase each day throughout the breeding season and a seasonal exposure profile. MCnest also can be used in risk assessment to determine which species (or life history strategies) are at greatest risk from a specific pesticide-use scenario, or determine which application dates result in the greatest risk to various species.



Example of a phase diagram illustrating a pesticide applied in mid-April that primarily affects hatchability of eggs. The diagram shows the proportion of females in each of 11 states throughout the entire breeding season, including: pair formation phase (*PF*), rapid follicle growth period (*rfg*), eggshell formation period (*ef*), overlap of *rfg* and *ef*, incubation phase (*I*), nestling rearing phase (*N*), doomed incubation phase (*Id*), the waiting periods after pesticide failure (W_p), ecological failure (W_e), brood success (W_f), and quit breeding (*Q*).

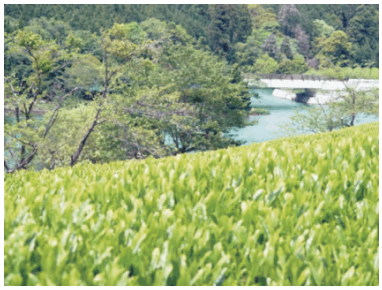
This research is being conducted at MED by Co-Principal Investigators Richard Bennett and Matthew Etterson and is being coordinated with partners in the Office of Pesticide Programs' Environmental Fate & Effects Division to improve the suite of tools available for wildlife risk assessments. The research also has an international component, since the original conceptual approach emerged from a workshop attended by Bennett on long-term pesticide risk assessment methods sponsored by the Department of Environment, Food and Rural Affairs of the United Kingdom; and Bennett's involvement in a workgroup within the European Food Safety Authority, charged with revising the risk assessment guidance for birds and mammals. The breeding phase-specific approach, which forms the basis for MCnest, has been adopted into new European Union guidance in 2009 for avian and mammalian risk assessments. Approximately one dozen papers have been published in risk assessment and ecology journals, building the scientific basis for the approach used in MCnest to estimate pesticide effects on avian reproductive success. Etterson continues to collaborate with ecologists and ornithologists in academia on methods for improving features in MCnest for estimating seasonal productivity. Bennett and Etterson also are working with aquatic toxicologists at MED on ways to better translate available toxicity information from other taxa, such as fish or amphibians, into estimates of effects on demographic parameters. **Contact**: Rick Bennett (218) 529-5212, Matt Etterson (218) 529-5158.

MED Collaborates with EPA Programs to Develop "ALSV" Methodology

Detections of pesticides, or identification of toxicity due to pesticides, in US surface waters have raised concerns about possible risks these chemicals pose to aquatic life. Although pesticides are registered by the USEPA Office of Pesticide Programs (OPP) under the Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA), potential hazards identified in FIFRA risk assessments are not defined relative to the level of aquatic life protection outlined by the Office of Water (OW) under Clean Water Act (CWA) programs. The OW defines protection levels by developing chemical-specific aquatic life water quality criteria (ALWQC), but few pesticides have ALWQC. Some states and tribes (the implementers of the CWA) have listed currently registered pesticides as the cause of water quality impairment under section 303(d) of the CWA, and must develop Total Maximum Daily Loads (TMDLs) to bring waters back into compliance. In cases where the 303(d) listing is due to violation of a narrative standard (e.g., "no toxics in toxic amounts"), and the violation is linked to a pesticide, this creates a particular challenge if ALWQC are not available, because TMDL development requires the use of numeric pollutant limits. It is uncertain whether effects benchmark concentrations developed as part of pesticide registration provide adequate surrogates for ALWQC in specifying such limits.

A major limitation to derivation of ALWQC for pesticides is insufficient toxicity data to meet the minimum data requirements (MDRs) defined in the 1985 "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses." Under FIFRA, fewer aquatic toxicity data are required for characterization of effects of pesticides than for ALWQC derivation. Therefore, in cases where pesticides with no ALWQC are detected in surface waters or where pesticides have been identified as causing violation of a narrative water quality standard, approaches are necessary to provide some type of screening benchmark comparable to an ALWQC.

MED scientists (Russ Erickson, Matt Etterson, Dave Mount, Chuck Stephan, Chris Russom, and Dale Hoff) are working collaboratively with representatives from Region 9, OW, and OPP to write white papers on tools and applications in predictive toxicology that can be used to supplement data sets lacking the data needed for ALWQC development. The collaboration has led to the development of a new term: Aquatic Life Screening Value (ALSV) – intended to be a conservative approximation of an ALWQC with a known degree of uncertainty. In current drafts of white papers, the authors describe what existing predictive toxicology techniques are available to develop an ALSV and what evaluations will be completed to validate or refute the approaches. During the first week of June, visiting scientists from OPP's Environmental Fate & Effects Division (Kristin Garber) and Region 9 (Patti Tenbrook) visited MED scientists to kick off the writing of the current draft of the white papers, which are currently being forwarded to upper level management at OPP and OW for their review before being posted on-line. In September/October of this year the white papers will be the subject of discussion at program office-sponsored national stakeholder meetings. For more information see: http://www.epa.gov/oppefed1/cwa_fifra_effects_methodology/scope.html. **Contact**: Dale Hoff (218) 529-5386.



Computational Tools: MetaPath and Metabolism Simulators

Both metabolic bioactivation and detoxification are key determinants of a chemical's potential hazard and risk. There are no current methods for predicting xenobiotic metabolism for the wide array of chemicals of Agency relevance. EPA's Office of Chemical Safety & Pollution Prevention (OCSPP), part of the Office of Pesticide Programs (OPP), requires pesticide registrants to submit rat metabolism, livestock and plant residue, and environmental degradate information routinely as part of the registration process under FIFRA, but currently relies heavily on institutional memory as a major means of maintaining consistency in incorporation and evaluation of metabolism data and residue determinations across pesticide chemical classes. OCSPP faces similar challenges in evaluating the potential toxicity of chemicals regulated under the Toxic Substance Control Act (TSCA), with a similar need for advanced predictive tools.

ORD's computational tools address these needs. The goals of this research program are to gain a better understanding of the metabolic fate of chemicals across chemical structures and species, to identify data gaps to target research, and develop advanced databases and predictive tools. ORD, led by the Division, has partnered with OPP to:

- Build MetaPath, a computational tool providing a relational and searchable metabolism pathway database with embedded data evaluation tools. MetaPath facilitates efficient and systematic comparison of metabolites across chemicals, species, and environmental matrices to identify and quantify metabolites of greatest toxicological concern.
- Build metabolic simulators specific to animal species, chemical classes, environmental matrices, and levels of biological organization (e.g., *in vitro* to *in vivo*) through simulating known metabolic transformation types using measured metabolism pathway information in MetaPath.

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COMPUTATIONAL TOOLS – *CONTINUED*

Division researchers are leading this research effort, with EPA partners from ORD/NERL/ERD-Athens, OPP Health Effects Division, and OPP Environmental Fate & Effects Division. International partners include the Laboratory of Mathematical Chemistry (LMC); Bourgas University, Bulgaria; and Health Canada's Pesticide Management Regulatory Agency (PMRA). Additional collaborators came from the OECD Pesticide Working Group MetaPath Project: European Food Safety Authority, Australian Pesticides & Veterinary Medicines Authority, Office of Chemical Safety & Environmental Health (Australian Department of Health & Ageing).

MetaPath (developed via cooperative agreement with LMC) is built upon a pre-existing software platform that displayed metabolism pathways (maps). ORD engaged OPP to identify critical information to capture to maximize utility of the system for OCSPP risk assessments as well as ORD research, including: searches/comparisons across treatment groups, gender, species, chemicals, sub-structures. Data Evaluation Record (DER) Composer templates provide a standardized template for EPA, their contractors, and pesticide registrants (through e-data submissions) to efficiently enter required metabolism and pharmacokinetic information from registrant submitted study files. Ongoing efforts with OPP include: locating additional rat metabolism and livestock residue maps for entry into MetaPath (once located additional resources are needed for map and data entry), and expanding DER Composers/MetaPath for plant residues and environmental degradates. ORD and LMC are expanding a rat metabolism simulator to cover pesticide chemical classes currently in MetaPath. This effort has developed the MetaPath software with an initial set of data for >250 pesticide rat metabolism maps and has uploaded the software to >30 computers within OPP. Additional maps have been obtained through a pilot project with PMRA. The DER Composer has been developed for rat metabolism and livestock residues; OPPT and OPP staff have received training. Additionally, OPP proposed a project for international development of MetaPath across the global pesticide regulatory agencies and the project was accepted by the OECD Working Group on Pesticides in May 2010. **Contact**: Pat Schmieder (218) 529-5161.

Current Events

NHEERL DIRECTORATE VISIT

On May 11-12 NHEERL Director Hal Zenick and Associate Director for Ecology Steve Hedtke visited the Division to discuss the NHEERL Action Plan, which conveys a commitment by the NHEERL Senior Management Team to prepare our organization for the challenges and opportunities of the next decade. The Plan has three key objectives:

- transforming our research portfolio
- invigorating our workforce
- strengthening our intramural budget.

Hal encouraged all of us to contribute "as we move toward developing a culture of collaboration, teamwork, and accountability." Hal took questions from staff at an all-hands meeting and met with Division Branches and with the Senior Management Team to discuss the Action Plan. Hal and Steve joined us in a potluck lunch. We celebrated Steve's impending retirement with a humorous retrospective of his 39-year EPA career, which included a period as MED Director (1992-1999).

DIVISION STAFF SUPPORT EPA OIL SPILL RESPONSE

Division scientists have supported EPA in its responses to the Deepwater Horizon oil spill in the Gulf of Mexico. David Mount, Dale Hoff, Lawrence Burkhard, and Gary Ankley have been involved in advising Agency personnel on approaches for estimating the toxicity of oil products and dispersants associated with the spill.

Dave Bolgrien

In response to a call for volunteers to represent the Agency on wellhead monitoring cruises, over 25 Division staff stepped forward. Ted Angradi, David Bolgrien, Barbara Sheedy, Anne Cotter, and Patrick Fitzsimmons traveled to Louisiana to represent the Agency on BP-operated cruises to monitor for water quality and movement of the oil plume around the wellhead. While Ted, David, Barb, and Anne served on monitoring vessels to observe activities, provide expertise in quality assurance, and report to the EPA command center contact, Pat was not able to participate because of concerns about exposure to hazardous chemicals and an increasing emphasis on training in hazardous substance handling. Several other planned monitoring cruises were scheduled for ORD (including Division) staff, but ORD support was decommissioned for safety reasons.

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Computational Tools – *continued*

Anne Cotter on right

Division staff are now being tapped to provide additional scientific support and advice to EPA's efforts associated with the oil spill. Expert teams are being formed in the areas of air quality, dispersant chemicals, contaminated sediments, and wetland restoration.
Contact: Janet Keough (218) 529-5025.

Coastal Condition Survey in Full Swing

MED researchers saw the first arrival of phytoplankton samples to the laboratory this June as a sign that the fruits of their labors were soon to be realized. A team of MED researchers (Jack Kelly, Peder Yurista, Jill Scharold, Tim Corry) and GIS contractor (Matt Starry) have worked over the past year and a half with the Office of Water (OW); EPA Regions 2, 3, and 5; the Great Lakes National Program Office; and other ORD coastal researchers from Gulf Breeze, Corvallis/Newport, and Narragansett to include the Great Lakes as a reporting region of the US National Coastal Condition Assessment (NCCA). The MED team developed the GIS framework and survey design for OW that will enable a first-time ever region-wide comprehensive and nationallyconsistent reporting on the condition of the nearshore zone of the Great Lakes.

The statistically-based survey will sample 225 locations in the broad nearshore zone (up to 5 km from shore and up to 30 m depth). Great Lakes Restoration Initiative program support has also enabled sampling of additional Great Lakes-specific indicators, and another 150 sites representing a defined "embayment" population that is especially vulnerable to watershed threats and may be responsive to restoration actions. Sampling is being done by several state crews (MI, WI, OH, NY) as well as OW contractors with Great Lakes expertise. MED scientists continue to be involved in the data analysis and assessment arising from the sampling, with all sites to be visited by September 2010, and laboratory analyses to be completed in 2011. The objectives of the survey are to define the proportion of the nearshore and embayment resources that are in good, fair, and poor condition and to link those conditions with stressors, including a geospatially-explicit analysis of conditions associated with landscape disturbance metrics developed in the recent Great Lakes Environmental Indicator collaboration. A MED 2009 pilot which sampled the NCCA Lake Erie sites has provided an example where successful linkage of nearshore conditions and landscape disturbance has been achieved. Results were presented this past spring at the 6th International Lake Erie Millennium Conference in Windsor, Ontario, Canada.
Contact: Jack Kelly (218) 529-5119.

ORD Assistant Administrator and Congressman Visit

Dale Hoff, Sig Degitz, Dr. Anastas, Liz Blackburn, Joe Tietge

On August 6, ORD Assistant Administrator Paul Anastas visited the Division to discuss his "Path Forward," a coherent vision for ORD. At an all-staff meeting, Dr. Anastas emphasized that the Path Forward will sustain and improve ORD's ability to provide timely, relevant, and solution-oriented research, and describe a plan for the future of ORD where sustainability is our "true north." He had a frank question and answer session with staff on topics such as transdisciplinary research and flexible, action-oriented approaches to environmental problem-solving. Dr. Anastas also introduced Elizabeth Blackburn, ORD's new Communications Director.

Dr. Anastas, Carl Richards, Anett Trebitz

In May, Dr. Anastas announced the formation of the Delta Team, comprised of the Laboratory and Center Directors, who focused for two months on specific actions needed to implement the Path Forward, to reach the goals of transdisciplinary research and sustainable science. Dr. Anastas also received hundreds of comments from ORD staff, which show a deep commitment to ORD's mission and a desire to work more collaboratively. An ORD-wide town hall meeting on the Path Forward is planned for August 25.

Capt. Sam Miller, Jack Kelly, Cong. Oberstar, Dr. Anastas

After a tour of the facility and lunch, Dr. Anastas and Minnesota 8th District Congressman James Oberstar joined MED staff at the Duluth Harbor to christen MED's new research vessel *Lake Explorer II* with Lake Superior water. The Congressman discussed recent EPA work in the Gulf, and spoke highly of the Division's research on Great Lakes issues. Tours of the vessel followed, for attendees and the public.

Upcoming Events

Two SETAC Sessions Focus on Effects of Toxic Substances in Large Aquatic Ecosystems

Large aquatic ecosystems in North America, such as the Great Lakes, Puget Sound, San Francisco Bay, and Chesapeake Bay, receive potentially toxic chemicals from numerous point and non-point sources. Chemical monitoring programs have detected a variety of compounds in the water, sediment, and biota of these systems, including so-called "Chemicals of Emerging Concern." However, many of these chemicals have insufficient toxicological effects data to allow their risk to be evaluated. MED scientists, in collaboration with the EPA Great Lakes National Program Office, have organized two sessions to address this issue at the SETAC North America 31st Annual Meeting in Portland, OR (November 7-11). The objective of the first session, a special symposium entitled, *The Great Lakes Restoration Initiative/Puget Sound: Strategies to Assess The Impact Of Toxic Substances In Large North American Aquatic Ecosystems*, is to reduce the uncertainties associated with potentially toxic chemicals in large aquatic ecosystems by providing an opportunity for scientists from different disciplines and organizations to present strategies and approaches to improve effects-based information. The second session, *Assessing the Impact of Toxic Substances in the Great Lakes and Other Large Aquatic Ecosystems*, will provide an opportunity to present effects data from studies relevant to the Great Lakes and other large aquatic ecosystems, including empirical studies on the effects of single chemicals and complex mixtures, development and application of predictive toxicity models, results from effects-based monitoring, and assessment activities. Together, these two sessions include 16 presentations. More information on the specific topics and presentations will be available at http://portland.setac.org/.
Contact: Joseph E. Tietge (218) 529-5176, tietge.joe@epa.gov.

New Publications since March 2010

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Hill, B.H., F.H. McCormick, B.C. Harvey, S.L. Johnson, M.L. Warren, and C.M. Elonen. 2010. Microbial enzyme activity, nutrient uptake, and nutrient limitation in forested streams. *Freshwater Biology* 55:1005-1019.

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Yurista, P.M., H. Vanderploeg, J. Leibig, and J. Cavaletto. 2010. Lake Michigan *Bythotrephes* prey consumption estimates for 1994-2003 using a temperature and size corrected bioenergetic model. *Journal of Great Lakes Research (SI), online at* doi:10.1016/j.jglr.2010.03.007.

MED Seminars

March 31
- Dr. Euan Reavie, Natural Resources Research Institute (NRRI), Duluth, MN
  Scientific aspects of the Great Ships Initiative

April 21
- Drs. Jerry Niemi & Lucinda Johnson, NRRI, Duluth, MN
  The evolution of Great Lakes Environmental Indicators to the Great Lakes Indicators Consortium

April 28
- Dr. Joel Hoffman, USEPA/MED
  Bathypelagic food web structure of the northern Mid-Atlantic Ridge based on stable isotope analysis

May 7
- Dr. Emma Lavoie, USEPA/Office of Chemical Safety & Pollution Prevention, Washington, DC
  The Design for the Environment program: Partnerships for safer chemistry

May 26
- Dr. Robin Sternberg, USEPA/MED, NRC Post-doc
  Re-writing the book on thyroid-stimulating hormone control during amphibian metamorphosis

June 9
- Dr. Kellie Faye, Post-doc Candidate, UW Seattle
  A comparative analysis of short-term vs. long-term culture of primary mouse hepatocytes for modeling in vivo responses to toxicants

June 23
- Dr. Timothy Collette, USEPA/National Exposure Research Laboratory, Athens, GA
  Environmental metabolomics: From small fish to cell cultures

June 30
- Robert Spehar, USEPA/MED
  Research at EPA in Duluth: A historical perspective (the early years, 1965-1989)

July 14
- Dr. Bryan Brooks, Baylor University, Waco, TX
  Human pharmaceuticals in the environment and other adventures in urban aquatic systems

July 23
- Dr. Ted Valenti, Baylor University
  Advancing an understanding of ecological risk assessment approaches for ionizable contaminants in aquatic systems

August 19
- Sarah Hoheisel, MS Candidate, U of MN Duluth
  Thesis Defense: Effects of nanosilver on *Daphnia magna* and *Pimephales promelas*

September 29
- Dr. Jose Serrano, USEPA/MED
  Cellular biomarkers of traumatic brain injury in humans and animals: Correlation to endocrine disruption research at MED

Awards

2009 Scientific and Technological Achievement Awards (STAA)
These awards are sponsored by EPA's Office of Research & Development to recognize publications that demonstrate scientific excellence in support of the Agency's mission. Publications are reviewed and selected annually by EPA's Science Advisory Board, a panel of non-EPA experts. STAA winners represent some of our finest accomplishments and our best products.

Level 2

Ankley, G.T., D.H. Miller, K.M. Jensen, D.L. Villeneuve, and D. Martinovic. 2008. Relationship of plasma sex steroid concentrations in female fathead minnows to reproductive success and population status. *Aquatic Toxicology* 88:69-74.

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Miller, D.H., K.M. Jensen, D.L. Villeneuve, M.D. Kahl, E.A. Makynen, E.J. Durhan, and G.T. Ankley. 2007. Linkage of biochemical responses to population-level effects: A case study with vitellogenin in the fathead minnow (*Pimephales promelas*). *Environmental Toxicology and Chemistry* 26:521-527.

Burkhard, L.P., P.M. Cook, and M.T. Lukasewycz. 2008. Organic carbon-water column concentration quotients (Π_{soc}s and π_{poc}s): Measuring apparent chemical disequilibria and exploring the impact of black carbon in Lake Michigan. *Environmental Science & Technology* 42:3615-3621.

Cormier, S.M., J.F. Paul, R.L. Spehar, P. Shaw-Allen, W.J. Berry, and G.W. Suter. 2008. Using field data and weight of evidence to develop water quality criteria. *Integrated Environmental Assessment and Management* 4:490-504.

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Erickson, R.J., J.W. Nichols, P.M. Cook, and G.T. Ankley. 2008. Chapter 2. Bioavailability of chemical contaminants in aquatic systems. In: *The Toxicology of Fishes*, R.T. DiGiulio and D.E. Hinton, Eds., Taylor & Francis, Boca Raton, FL, pp. 9-54.

and

Kleinow, K.M., J.W. Nichols, W.L. Hayton, J.M. McKim, and M.G. Barron. 2008. Chapter 3. Toxicokinetics in fishes. In: *The Toxicology of Fishes*, R.T. DiGiulio and D.E. Hinton, Eds., Taylor & Francis, Boca Raton, FL, pp. 55-152.

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Peterson, G.S., M.E. Sierszen, P.M. Yurista, and J.R. Kelly. 2007. Stable nitrogen isotopes of plankton and benthos reflect a landscape-level influence on Great Lakes coastal ecosystems. *Journal of Great Lakes Research* 33 (S3):27-41.

Level 3

Angradi, T.R., D.W. Bolgrien, T.M. Jicha, M.S. Pearson, B.H. Hill, D.L. Taylor, E.W. Schweiger, L. Shepard, A.R. Batterman, M.F. Moffett, C.M. Elonen, and L.E. Anderson. 2009. A bioassessment approach for mid-continent great rivers: the Upper Mississippi, Missouri, and Ohio (USA). *Environmental Monitoring and Assessment* 152:425-442.

and

Angradi, T.R., M.S. Pearson, T.M. Jicha, D.L. Taylor, D.W. Bolgrien, M.F. Moffett, K.A. Blocksom, and B.H. Hill. 2009. Using stressor gradients to determine reference expectations for great river fish assemblages. *Ecological Indicators* 9:748-764.

Ankley, G.T., B.W. Brooks, D.B. Huggett, and J.P. Sumpter. 2007. Repeating history: Pharmaceuticals in the environment. *Environmental Science & Technology* 41:8211-8217.

Ankley, G.T., K.M. Jensen, M.D. Kahl, E.A. Makynen, L.S. Blake, K.J. Greene, R.D. Johnson, and D.L. Villeneuve. 2007. Ketoconazole in the fathead minnow (*Pimephales promelas*): Reproductive toxicity and biological compensation. *Environmental Toxicology and Chemistry* 26:1214-1223.

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Martinovic, D., L.S. Blake, E.J. Durhan, K.J. Greene, M.D. Kahl, K.M. Jensen, E.A. Makynen, D.L. Villeneuve, and G.T. Ankley. 2008. Reproductive toxicity of vinclozolin in the fathead minnow: Confirming an anti-androgenic mode of action. *Environmental Toxicology and Chemistry* 27:478-488.

and

Villeneuve, D.L., L.S. Blake, J.D. Brodin, K.J. Greene, I. Knoebl, A.L. Miracle, D. Martinovic, and G.T. Ankley. 2007. Transcription of key genes regulating gonadal steroidogenesis in control and ketoconazole- or vinclozolin-exposed fathead minnows. *Toxicological Sciences* 98:395-407.

Eckman, D.R., Q. Teng, D.L. Villeneuve, M.D. Kahl, K.M. Jensen, E.J. Durhan, G.T. Ankley, and T.W. Collette. 2008. Investigating compensation and recovery of fathead minnow (*Pimephales promelas*) exposed to 17α-ethynylestradiol with metabolite profiling. *Environmental Science & Technology* 42:4188-4194.

Honorable Mention

Morrice, J.A., N. Danz, R.R. Regal, J.R. Kelly, G.J. Niemi, E.D. Reavie, T. Hollenhorst, R.P. Axler, A.S. Trebitz, A.M. Cotter, and G.S. Peterson. 2008. Human influences on water quality in Great Lakes coastal wetlands. *Environmental Management* 41:347-357.

and

Trebitz, A.S., J.C. Brazner, A.M. Cotter, M.L. Knuth, J.A. Morrice, G.S. Peterson, M.E. Sierszen, J.A. Thompson, and J.R. Kelly. 2007. Water quality in Great Lakes coastal wetlands: Basin-wide patterns and responses to an anthropogenic disturbance gradient. *Journal of Great Lakes Research* 33 (S3):67-85.

Nichols, J.W., A.D. Hoffman, P.N. Fitzsimmons, and G.J. Lien. 2008. Quantification of phenol, phenyl glucuronide, and phenyl sulfate in blood of unanesthetized rainbow trout by online microdialysis sampling. *Toxicology Mechanisms and Methods* 18:405-412.

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Nichols, J.W., A.D. Hoffman, P.N. Fitzsimmons, G.J. Lien, and C.T. Jenson. 2008. Use of online microdialysis sampling to determine the *in vivo* rate of phenol glucuronidation in rainbow trout. *Drug Metabolism and Disposition* 36:1406-1413.

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ORD HONOR AWARD – Bronze Medal

Nanomaterial Research Strategy Writing Team

For advancing EPA science by co-authoring the Office of Research and Development's Nanomaterial Research Strategy

Steve Diamond, Dave Mount, and others from IOAA, NCCT, NCEA, NERL, NHEERL, and NRML

OSWER Bronze Medal Award

Aquatic risk assessment of selenium effects after the Kingston Coal Ash spill

Dale Hoff, and others from OW, OSWER, ORD/NCEA, and Region 4

People

HAPPY RETIREMENT!

Al with SEEs Judy Vee and Betty Harwood

Allan Batterman retired in April after a 39-year career in the EPA. Allan conducted aquatic toxicology research at the Division for most of his career. Since 1989, Allan served as the Division's Quality Assurance Manager. In recent years, Allan also served as Outreach Coordinator, and also managed the Division's technical support contract. In addition, Allan played a lead role in organizing the annual Holiday Cookie Party and facilitated blood drives, among many other contributions. We wish Allan and his wife, Sherry, all the best in retirement!

Marta Lukasewycz retired in June after a lengthy career with the federal government, the past 15 years with MED. Marta conducted chemical research at the Division, specifically performing low-level targeted analysis and unknown identification in sediment, tissue, and aqueous samples. She also served on several committees, including Chemical Assessment, and Space. Marta began her career with the Department of Health in Philadelphia where she and husband, Luke lived and grew up after coming through Ellis Island from the Ukraine at a young age. They moved to Texas and Michigan for Luke's doctoral research and settled in Duluth. She spent several years working on contract to the EPA in the 1980s after working in chemical research at UMD. Marta will enjoy her retirement with her children and grandchildren, playing bridge, traveling, and getting back to some serious water color painting. We wish Marta all the best in her well-deserved retirement!

Ron receiving an EPA Plaque for Distinguished Service from Russ Kreis, Branch Chief

Dr. Ronald Rossmann, Head Research Chemist, retired from the Division's Ecology Division, Large Lakes & Rivers Forecasting Research Branch at Grosse Ile, MI, after over 18 years of EPA service.

Ron's focus was heavy metals and trace elements, specializing in total and methyl mercury, as well as lead, cadmium, arsenic, zinc, and copper. Analyses included water, sediments, birds, and fish. Although well known for his analytical capabilities, he is an internationally recognized expert in the interpretation of sediment dynamics and metals, as exemplified by his recent publication, "Protocol to reconstruct historical contaminant loading to large lakes: The Lake Michigan sediment record of mercury" *Environmental Science & Technology* 44:935-940.

Ron has worked in all five of the Great Lakes, as well as in Lake St. Clair. He has also studied several of the major Great Lakes tributaries including the Fox, Detroit, Saginaw, and Tittabawassee Rivers. Ron has contributed over 100 journal publications and reports, and has been involved with well over 100 presentations at scientific conferences and meetings. He has received the following awards: NHEERL Goal 1 Award, Support the Agency's Mission; EPA Scientific and Technological Achievement Award; EPA Bronze Medal; Editor's Award, International Association for Great Lakes Research.

We wish Ron the best in his retirement after an extremely successful scientific career. He will now be devoting more time to family, church and choir, fishing, visiting his property in northern Michigan, and orchid cultivation.

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Happy Retirement!

Robert Spehar retired in June after a 40-year career in the EPA. Bob served the Division as a Research Scientist, conducting research on advancing water quality criteria and guidance for the Agency. In recent years, Bob served as a Special Assistant to the Division Director; he served on the ORD CADDIS Team, developed the Division's Technical Assistance Information System, organized Division nominations for STAA recognition, and served as Acting Associate Director for Science on multiple details. We wish Bob and his wife, Diane, all the best in Bob's retirement!

Corlis West retired from MED at the end of July after 31 years of federal service…30 with EPA. Corlis received his BS in Biology from Bemidji State University in Bemidji, MN and began his federal career in Oswego, NY conducting field studies with the US Fish and Wildlife Service. He arrived at the Duluth laboratory in 1986 following stops at the Cincinnati lab and the Monticello research station. Corlis worked in several different areas over the years, including stream mesocosm studies at Monticello, laboratory toxicity testing in different programs (sediment-related studies, in particular), and participating in various field studies on Midwest wetlands and rivers, and on the Great Lakes. He authored or co-authored approximately 20 published papers across the various topical areas in which he worked. As a member of the MED community, Corlis served as the Landscape Committee chair, organizing plantings, clean-up campaigns, and seeking to eradicate the dreaded buckthorn from our premises. He was also the primary organizer of MED's annual Earth Day pancake breakfast, an important community tradition. Ever the provocateur, Corlis always managed to come up with an insightful question or two for VIPs when they held all-hands meetings…which kept the staff entertained. It is an underappreciated fact that Corlis bears a striking resemblance to Chevy Chase….well, at least in his younger days. He was occasionally stopped on the street for autographs or waved to by passers-by thrilled to have spotted the comedian. In his own comedic way, Corlis let them believe it. In retirement, Corlis will keep himself occupied with sailboats, gardens, the Minnesota Twins, and pigeons…yes pigeons….fishing, apple trees, and homemade maple syrup.

New Federal Employees

Lindsey Blake has joined our Molecular and Cellular Mechanisms Research Branch as a Biologist. In May 2005 Lindsey received her BS in Biology from the University of MN Duluth (UMD). Her interest in ecotoxicology was ignited while working as a student contractor in the Toxic Effects Characterization Research Branch with Gary Ankley and Dan Villeneuve from May 2005-May 2007. In May 2009 Lindsey received her MS in Integrated Biosciences with an emphasis in Cell, Molecular, and Physiological Biology at UMD. Lindsey's thesis focused on the effects of endocrine active chemical mixtures on the androgen receptor using a reporter gene assay. From June 2009-June 2010 Lindsey worked as a student contractor with Sig Degitz, studying the reproductive effects of endocrine disrupting compounds on amphibians. Lindsey is in 124B, x5237.

Tylor Lahren recently joined the Ecotoxicology Analysis Research Branch as a Chemist. He received a BS in Chemistry from the University of North Dakota in 2006 and is now completing his Master's Thesis in Analytical Chemistry there. From 2008 to 2010 he worked for Northeast Technical Services (an environmental lab) in Virginia, MN as the Technical Group Leader for the semi-volatiles and PCBs analysis department. Tylor's research interests are to create better analysis methods for increasing sensitivity and accuracy of environmental contaminants. At MED he will be working on the analysis of PCBs and other bioaccumulative compounds using high resolution GC/MS. Tylor is in room 127, x5193.

Stephanie Warhol joined the Program Operations Branch as Program Analyst in July. This is a new MED position, established for each Eco Division by NHEERL. Stephanie's responsibilities include administrative analysis, property management, COR duties, ground fleet management, utility payments, and coordination of incoming/outgoing workers. She came to us from the DOD in St. Paul, where she was in Plans & Programming for four years. Stephanie is originally from Newark, DE and has a husband, two cats, two Papillons, and lots of fish. She is in room 150, x5154.

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New EPA Post-Docs

Dr. Carlie LaLone is working in the Toxic Effects Characterization Research Branch, developing a framework to prioritize pharmaceuticals for ecotoxicological screening. She received a BS in Biochemistry/Molecular Biology and a BA in Chemistry at UMD in 2003. From January to July 2004 she was a student contractor with Pat Schmieder's team. She received her PhD in Genetics at Iowa State University in December 2009, focusing on the anti-inflammatory properties of Echinacea. Carlie's mentors are Gary Ankley and Dan Villeneuve. She is in room 114B, x5038.

Dr. Mark Rowe completed a PhD in Environmental Engineering at Michigan Technological University in December 2009. His doctoral work focused on measurement and modeling of gaseous air-water exchange of organic toxics in the Great Lakes. In February 2010, he began a post-doctoral fellowship at the Large Lakes & Rivers Forecasting Research Branch in Grosse Ile, MI. Mark is working with Branch Chief Russ Kreis on riverine water quality and aquatic ecosystem modeling for the Future Midwest Landscapes Study. Mark is in room 108, (734) 692-7690.

New NRC Post-Doc

Dr. Hongbo Ma joined the Ecotoxicology Analysis Research Branch as an NRC postdoc research associate in June. She earned her undergraduate degree in Environmental Engineering in 1998 from Liaoning University of Petroleum and Chemical Technology (China). Hongbo received her PhD in Environmental Toxicology at the University of Georgia in 2009 and her MS in Environmental Health Sciences at the University of South Carolina in 2004. Hongbo's primary research interest lies in the nanotoxicology of manufactured nanoparticles, particularly metal oxide nanoparticles with photocatalytic properties. Her research at MED focuses on phototoxicity of manufactured titanium dioxide nanoparticles; Dr. Steve Diamond is her mentor. She is in room 114B, x5071.