

UMRR
Long Term Resource Monitoring FY15 Activities (Living Document)
(Oct. 2014–Sept 2015)

Publications, Presentations, and Conference Attendance

First Quarter

(UMESC) Jennifer Sauer, Yao Yin, Brian Ickes, Jeff Houser, Jim Rogala, and Ben Schlifer presented a webinar October 27 on how to access Long Term Resource Monitoring (LTRM) data and how to use available data tools for addressing management questions. The LTRM is an element of the U.S. Army Corps of Engineers' Upper Mississippi River Restoration (UMRR) program. The LTRM has made considerable investments in gathering baseline data on key ecosystem components across 1200 miles of river for over 20 years. In addition, LTRM has made considerable investments to develop applications that help get these data and the information they provide into the hands of the public, program managers, natural resource managers, students, faculty, and policy makers. To make these data and applications more widely known and useful to program partners, LTRM conducted a webinar to introduce participants to the basics of database structure, access tools, processing data for analyses, and any special considerations for using LTRM data.

John Manier (UMESC) presented his Master's thesis work at a USGS invited seminar on Monday, November 10, 2014. John's presentation was Spatial and Temporal Dynamics of Phytoplankton Assemblages in Selected Reaches of the Upper Mississippi River: Navigation Pools 8, 13, And 26

(UMESC) Barry Johnson, Jennifer Sauer, and Jeff Houser will attend the meeting of the Analysis Team of the U.S. Corps of Engineers' Upper Mississippi River Restoration (UMRR) program at the U.S. Fish and Wildlife Service office in Rock Island, Illinois, 6 November 2014. The meeting will include representatives of UMRR partner agencies and will focus on discussion of research proposals for action during the FY2015.

(UMESC) Mark Gaikowski, Barry Johnson, Jennifer Sauer, and Jeff Houser will participate in the November quarterly meeting of the U.S. Army Corps of Engineers' Upper Mississippi River Restoration (UMRR) Coordinating Committee, November 19, in St. Paul, MN. The UMRR funds the Long Term Resource Monitoring Program on the Upper Mississippi River System (UMRS), which is implemented through USGS-UMESC. This partnership meeting provides a forum for the Corps, USGS, other federal agencies, and the five UMRS states to discuss and consider a range of program policy and budget issues concerning the UMRR program. Agenda includes; discussion, endorsement, and implementation of the new UMRR Strategic Plan 2015-2025; and development of the next UMRR Report to Congress (due FY 2016).

Kueter attended UMRCC fall WQ technical meeting at Fairport Fish Hatchery – October, 2014.

Bierman attended on-site visit at Sunfish Lake - Pool 12 Overwintering HREP Stage 1, with USFWS and USACE staff – November, 2014.

Kueter and Vogeler recertified on CPR and first aid training in Fairport, Iowa – December, 2014.

Levi Solomon, Rich Pendleton, and Andy Casper. Are Asian Carp Influencing the Fish Community as a whole. INHS December Newsletter

Andy Casper, Doyn Kellerhals, Rich Pendleton and Levi Solomon attended A Team meeting in Moline. Bartels participated in a conference call with WDNR, MPCA, EPA, and UMRBA staff discussing a pilot bioassessment monitoring project for the UMR along the MN/WI border.

Second Quarter

(UMESC) Jeff Houser, participated in the U.S. Army Corps of Engineers' Upper Mississippi River Restoration (UMRR) Program's operational planning meeting January 20-22, 2015, in St. Paul, MN. The Operational Plan will be a document that guides the UMRR program to help achieve its vision as documented in the UMRR Strategic Plan. The UMRR Strategic Plan is a 10-year vision for the Program. UMESC provides science leadership for the UMRR program.

(UMESC) Mark Gaikowski, Jennifer Sauer, Jeff Houser, and Nate De Jager will participate in the February quarterly meetings of the Upper Mississippi River Basin Association (UMRBA) and the Upper Mississippi River Restoration (UMRR)-Coordinating Committee (UMRR-CC), February 10-11, in Rock Island, IL. Gaikowski will present an update on detection and control methods for aquatic invasive species, as well as represent USGS in the UMRBA meeting. De Jager will present, "Upper Mississippi River Landscape Ecology—Moving toward Synthesis and Significance," at the UMRR-CC meeting. Houser will highlight recent monitoring and research done by the Long Term Resource Monitoring (LTRM) element of the UMRR. The UMRR is a U.S. Army Corps of Engineers' research and restoration program for the Upper Mississippi River System. The Upper Midwest Environmental Sciences Center (UMESC) implements the LTRM element of the UMRR, combining environmental monitoring, research, systemic data acquisition, and modeling in an effort to provide a solid scientific foundation upon which resource managers and policy makers base management actions and develop environmental policy on the Upper Mississippi River System.

Jennifer Sauer, Yao Yin, and Ben Schlifer met with the Steve Winter (USFWS), Megan Moore (MDNR) and Mike Griffin (IDNR) on developing a proposal for submittal to the Upper Mississippi River Conservation Committee (UMRCC) to organize and serve on the Internet the UMRCC aquatic vegetation data.

On 31 March 2015, Brian Ickes participated in the second annual convention of the Environmental Science Advisory Board at the University of Wisconsin (UW) – Stout, as a Board member and adviser. As a polytechnic institution, the Environmental Science program at UW-Stout provides a broad science, management, and policy foundation that includes field work and internship experiences, as well as a new \$43 million science facility. Board discussions centered on (1) core curriculum development and content; (2) pedagogical approaches; (3) practicums; and (4) skills students need in today's environmental sciences fields.

Bowler compiled and submitted the Bellevue LTRM Operational Report for 2014 to district supervisor – January, 2015.

Bierman attended the UMRR Coordinating Committee quarterly meeting in Rock Island, Illinois – February, 2015.

Vogeler attended Fisheries Statewide at Honey Creek State Lodge – March, 2015.

Bierman hosted an informational meeting with Iowa's new UMRBA representative, Tim Hall, along with Randy Schultz and Mike Griffin (IDNR Wildlife) – March, 2015.

Bowler and Vogeler attended meeting of the Iowa Chapter of the American Fisheries Society in Ames, Iowa – March, 2015.

Bierman, Bowler, Kueter, and Vogeler attended spring district meeting at the Hurstville Interpretive Center in Maquoketa, Iowa – March, 2015.

Bowler compiled and distributed Pool 13 Fisheries Highlights, 2014 to UMRS personnel and to Manchester Research for the Rivers and Streams Technical Committee meeting and AFS NCD – March, 2015.

Bierman participated in UMRR-LTRM Team Leader conference call regarding the FY16 budget – March, 2015.

DeLain, S. Five Year Summary of LTRM Fish Data on Pool 4 of the Upper Mississippi River 2009 – 2013.

Megan Moore participated in a conference call with some members of the UMRCC Wildlife Technical Section to discuss what pool(s) to sample this year and potential funding for analysis of previous years' data.

Walt Popp participated in a MN DNR Mississippi River Team Steering Committee meeting in St. Paul on Feb. 9th with other Mississippi River staff and several regional managers.

Walt Popp participated in three conference calls (Feb. 19, Mar. 6, and Mar. 24) with ACE, USGS and other team leaders to discuss the President's 2016 budget and the budget implications and strategies.

Third Quarter

(UMESC) Brian Ickes participated in the second annual convention of the Environmental Science Advisory Board at the University of Wisconsin (UW)-Stout, March 31, 2015, where Ickes serves as a board member and adviser. As a polytechnic institution, the Environmental Science program at UW-Stout provides a broad science, management, and policy foundation that includes field work and internship experiences, as well as a new \$43 million science facility. Board discussions centered on (1) core curriculum development and content; (2) pedagogical approaches; (3) practicums; and (4) skills students need in today's environmental sciences fields.

(UMESC) Jeff Houser, Brian Ickes, and Yao Yin will lead the U.S. Army Corps of Engineers (USACE) Upper Mississippi River Restoration (UMRR) Program's Long Term Resource Monitoring (LTRM) Component Meetings, April 14-15, 2015 at the Upper Midwest Environmental Sciences Center (UMESC) in La Crosse, WI. The primary objective of the Component Meetings are to maintain consistency in sampling methods and procedures for collecting water quality, aquatic vegetation, and fishery data, as well as discuss new techniques, technologies, and issues. Participants include LTRM staff from the USACE, Illinois Natural History Survey, Iowa Department of Natural Resources (DNR), Minnesota DNR, Missouri Department of Conservation, and Wisconsin DNR. UMESC implements the LTRM element of the UMRR, combining environmental monitoring, research, systemic data acquisition, and modeling in an effort to provide a solid

scientific foundation upon which resource managers and policy makers base management actions and develop environmental policy. The LTRM has collected component data on the Upper Mississippi River System for over 25 years.

Bierman, Bowler, Kueter, and Vogeler attended LTRM/UMESC/USACE component meeting in La Crosse, Wisconsin – April, 2015.

Bowler met with Bellevue Research and Mississippi River Wildlife biologists and discussed future HREP projects in Iowa – May, 2015.

Jason Rohweder will present “The Upper Mississippi River Floodscape: Spatial patterns of flood inundation and associated plant community distributions” on Thursday July 9. Co-authors include: Nathan De Jager (UMESC), Erin Hoy (UMESC), and Yao Yin (UMESC). International Association of Landscape Ecology World Congress

Justin R. Seibert^{1,2*}, Quinton E. Phelps^{1,2}, Kasey L. Yallaly¹, Sara Tripp^{1,3}, Levi Solomon⁴, Tom Stefanavage⁵, David P. Herzog¹ and Michael Taylor². Use of exploitation simulation models for silver carp (*Hypophthalmichthys molitrix*) populations in several Midwestern U.S. rivers. *Management of Biological Invasions* (in press)

Use of the Long Term Resource Monitoring element’s fish monitoring methodologies throughout the Midwest. Levi Solomon and Andrew Casper. *INHS* June 2015 Issue No. 413(6).

Pendleton, R., D. Hoeninghaus, L. Gomes, and A. Agostinho. 2015. Trophic downgrading results in complex ecosystem dynamics in experimental tropical floodplain food webs. *Hydrobiologia*. DOI 10.1007/s10750-015-2299-9.

Effects of Asian Carp on Native Fishes and the Upper Mississippi River System. Platform presentation by Rich Pendleton, Quinton Phelps, and Levi Solomon at the UMRR component meeting 4/15/2015

Black Crappie population characteristics in the La Grange Reach of the Illinois River with a comparison to Pool 13 of the Mississippi River. Joshua D. Bruegge, Rich M. Pendleton, Levi E. Solomon, and Andrew F. Casper. Poster Presentation MRRRC

Juvenile Asian Carp as Forage for Native Predators in the LaGrange Reach, Illinois River Cory A. Anderson, Rebekah L. Haun, James T. Lamer, James H. Larson, Brent Knights, Jon Vallazza, Levi Solomon, Rich Pendleton, Andrew Casper, Nerissa McClelland. Platform Presentation MRRRC

Competition among river planktivores: are native planktivores still fewer and skinnier? Rich Pendleton, Chris Schwinghammer, Levi Solomon, Jason DeBoer, and Andy Casper. Platform Presentation MRRRC
Andy Casper, Rich Pendleton and Levi Solomon attended MRRRC in La Crosse

Doyn Kellerhals, Algal Blooms and Health Impacts: Current Knowledge and Research Needs Symposium, University of Illinois at Urbana-Champaign

Steve, Rob and Megan participated in a LTRM field station meeting with USACE, UMESC and the other state field stations on Apr. 14-15 in La Crosse.

Rob, Megan and Steve attended the Miss. River Research Consortium on Apr. 22-24 in La Crosse. Rob finished his zooplankton manuscript and cover letter, and submitted to the journal *Freshwater Biology*.

Megan gave a presentation titled, Spatial and temporal dynamics of submersed aquatic vegetation communities of Pool 4, Upper Mississippi River (1998-2011) at the Mississippi River Research Consortium on Apr. 24th in La Crosse.

Gray BR. Estimating trends in river water temperature at level 3 (year), given variable occasion designs, data sparseness, and level-2 (date) and level-1 (time) confounders. *Modern Modeling Methods (M3) Conference*, 19-20 May 2015, University of Connecticut, Storrs.

Fourth Quarter

Brain Ickes and Jennifer Sauer participated in the special session, “Long-Term Fish Monitoring and Assessment: Landscape Level Comparisons within and between River Basins Provides Context to Natural Resource Management Strategies,” at the 145th Annual Meeting of the American Fisheries Society, August 17-18, 2015 in Portland, OR. Brian presented, “Environmental Assessment Approaches in Large Complex Ecosystems: The Upper Mississippi River Experience.” Sauer presented, “Overview of Long-Term Fish Monitoring on the Upper Mississippi River System: The First 20-Years.”

(UMESC) Yao Yin presented, “Identifiable patterns of submersed aquatic plants in the Upper Mississippi River based on 17 years of annual monitoring data,” at the 14th International Symposium on Aquatic Plants, September 14-18, 2015, in Edinburgh, Scotland. In the presentation, Yin and James Rogala provided a hypothesis on the mechanism of the crash-recovery process of submersed aquatic vegetation in the Upper Mississippi River, based on spatial and temporal patterns observed over the last 3 decades in the long term dataset collected by the U.S. Army Corps of Engineers’ Upper Mississippi River Restoration Program (UMRR).

Deane Drake provided Betsy Bloom, La Crosse Tribune, with information on trends of Wild Rice on Pool 8.

(UMESC) Nathan De Jager attended the USGS Ecological Flows workshop in Fort Collins, CO, September 22-24, 2015. Discussions included research and management topics that a USGS ecological flows initiative should address. A component of the discussion will be a series of river science questions identified in a 2007 National Research Council report “River Science at the US Geological Survey.”

Vogeler attended Iowa AFS continuing education course “Fish Population Analysis and Simulation with FAMS” in Ames, Iowa – July, 2015.

Bierman participated in A-Team conference call – July, 2015.

Rob Burdis, Megan Moore and Steve De Lain attended the International Society for River Science on Aug. 24-27 in La Crosse, WI.

Megan Moore presented Temporal Trends in Water Quality and Biota in Segments of Pool 4 Above and Below Lake Pepin, Upper Mississippi River: Indications of a Recent Ecological Shift at the International Society for River Science in La Crosse, WI on Aug 25th.

Megan Moore attended the UMRCC Wildlife Technical Section meeting in Decorah, IA from Sept 22nd -24th.

Culver, Edward F. and J. H. Chick. 2015. Shocking Results: Assessing the Rates of Fish Injury from Pulsed-DC Electrofishing. *North American journal of fisheries management*. 35(5): 1055 – 1063. DOI: 10.1080/02755947.2015.1074964. This study was funded through Illinois DNR and the USFWS Sport Fish Restoration Program. We wanted to share this paper with you as it is a good example of a leveraged project looking at LTRM sampling in collaboration with the field crews located at the National Great Rivers Research and Education Center and the Illinois River Biological Station.

Juvenile Asian Carp as Forage for Native Predators in the LaGrange Reach, Illinois River Cory A. Anderson, Rebekah L. Haun, James T. Lamer — Department of Biological Sciences, Western Illinois University; James H. Larson, Brent Knights, Jon Vallazza — Upper Midwest Environmental Sciences Center, United States Geological Survey; Levi Solomon, Rich Pendleton, Andrew Casper — Nerissa McClelland, Illinois River Biological Station, Illinois Natural History Survey, Havana Field Office, Illinois Department of Natural Resources Platform Presentation National AFS Portland Aug 16-20 2015.

Doyn Kellerhals attended 2015 iSEE Congress, Water Planet, Water Crises? Meeting the World's Water-Food-Energy Needs Sustainably. Hosted by the Institute for Sustainability, Energy, and Environment at the University of Illinois at Urbana-Champaign. Sept. 14-16, 2015

Chick, J.H. Triumphs and tragedies of partnerships: Balancing competing objectives for the Upper Mississippi River Restoration – Environmental Management Program. Annual Meeting of American Fisheries Society. Portland, Oregon. 8/2015.

Gibson, D.R., Casper, A.F., Chick, J.H., Fritts, M.W. DeBoer, J.A. Waves of invasion and recovery: insights from 57 years of a monitoring program on a large river. Annual Meeting of American Fisheries Society. Portland, Oregon. 8/2015.

Gittinger, E.J., Ratcliff, E.N. and J.H. Chick. The great fish depression: Exploring three consecutive years of low catch of fishes from UMRR monitoring. Annual Meeting of the American Fisheries Society. Portland, Oregon. 8/2015.

Gittinger, L.S., and J.H. Chick. Efficacy of automated sampling buoys used in the Great Rivers Observatory Network. Annual Meeting of the American Fisheries Society. Portland, Oregon. 8/2015.

Lubinski, B. DeBoer, J.A., Fritts, M.W., and J.H. Chick. Variation in the community structure of fishes from main channel border habitat among reaches of the Mississippi and Illinois rivers. Annual Meeting of the American Fisheries Society. Portland, Oregon. 8/2015.

Casper, A.F., Gibson, D.R., Fritts, M.W., DeBoer, J.A., and J.H. Chick. Interpretation of long-term datasets depends on both landscape and temporal sampling design: examples using a 50 year record of recreational,

commercial and nuisance invasive fish in a large river. Annual Meeting of the American Fisheries Society. Portland, Oregon. 8/2015.

John Chick – Poster Session: Long-term perspectives on human-river dynamics at the confluence of the Illinois and Mississippi rivers: Interdisciplinary research for students in ecology and archeology. Results were from Year 1 of a new National Science Foundation – Research Experience for Undergraduates grant to PI: Carol E. Colaninno (Co-PI: John H. Chick). The students conducted interdisciplinary projects analyzing archeological data and fish monitoring data from LTRM and LTEF, and presented their findings in poster format. 8/2015.

Ed Culver presented information about Mississippi River ecology, LTRM fish sampling, and fish and mussel identification at the Alton, Illinois Earthtones Festival, which is an It's Our River Day event. It's Our River Day is an annual state recognized celebration of Illinois Rivers including more than 60 education, recreation and conservation events throughout the state. 9/2015.

Ben Lubinski participated in an Illinois American Fisheries Society Executive Committee conference call. 9/2015.

Technical activities and assistance:

First Quarter

Jeff Houser (UMESC) met with Rob Striegl, Ted Stets (USGS Denver) to discuss a project evaluating C flux in North America. As part of that project they are interested in having samples collected at the LTRM WQ fixed sites in Pool 8 for their project.

Brian Ickes provided Andrea Ania, USFWS Fishery Biologist at Alpena FWCO in Michigan with information on LTRM fisheries data collection and efficacy of gear used in different riverine habitats.

Wisconsin LTRM Field Station will collaborate with USGS scientists from USGS in Boulder, Colorado. Rob Striegl and Ted Stets from Colorado, are part of a larger project evaluating carbon flux in North America (LandCarbon). Specifically, they are interested in better understanding carbon flux in large rivers and initiating some work in the UMR. They made two sampling trips to the Upper Mississippi in 2014 (including Pool 8) during which they worked out sampling techniques and gathered initial data. The Wisconsin field station will collect one additional water sample at eight of the Pool 8 LTRM WQ fixed sites for each sampling episode in FY2015.

Jeff Houser provided information on the LTRM data to Molly Reichert, Adjunct Faculty at the University of Minnesota--School of Architecture. Ms. Reichart is part of a team who is creating a public art piece for the new Saints Stadium in Lowertown St. Paul. Comprised of 28 sculptural objects, Meander is inspired by the Upper Mississippi River's shape, bathymetry, and the 28 locks along its course from Saint Anthony Falls, Minnesota, to St. Louis, Missouri. Each section will be artistically fabricated out of cast glass and masonry – made from silica and lime harvested from the Mississippi River Valley. Both materials have been crucial to the industrial history of Saint Paul. The glass cap of each piece will contain an embedded LED light, illustrating the changing water conditions of the river and organically reacting to viewers' presence.

Jennifer Sauer, Yao Yin, Brian Ickes, Jennifer Sauer (USGS), John Chick (Illinois Natural History Survey), and Megan Moore (Minnesota Department of Natural Resources) provided information to Sandra Morrison (USGS) data for the the 2014 WRRDA Report to Congress on Asian Carp prevention in the Upper Mississippi River and Ohio River basins.

Brian Ickes and Ben Schlifer (USGS) provided information on walleye and sauger stocks in Pool 8 to Dave Heath (WDNR).

Ben Schlifer (USGS) provided fisheries data to John Kosovich (USGS). John is working on nation-wide Large River Fisheries Monitoring Forum.

Bowler collected 151 adult common carp in Pool 13 with Mike Wolf and Tyler Ham of the Missouri Department of Conservation as part of a systemic effort in Asian carp microsatellite analysis in the Upper Mississippi River – October, 2014.

Bowler and Reed collected sub-adult common carp from routine LTRM fisheries monitoring for Quinton Phelps of the Missouri Department of Conservation as part of a large-scale effort in microsatellite research in the Upper Mississippi River – October, 2014.

Bowler provided two LTRM fisheries summary reports for 2013 to Andrew Allison, curator of the National Mississippi River Museum and Aquarium in Dubuque – October, 2014.

Bowler recertified on CPR and first aid training in Elkader, Iowa – November, 2014.

Bowler sent accounts of skipjack herring in the UMR to John Olson, Central Office Biological Monitoring & Assessment Program Team for identifying species of greatest conservation need for the Iowa Wildlife Action Plan – October, 2014.

Ben Yeager was hired to track white crappie for the telemetry segment in conjunction with the Pool 12 overwintering HREP project – October 27, 2014.

Bowler reviewed and provided comments on fact sheet “Tree maps: A unique way to explore long-term fisheries data” by Ben Schlifer, Brian Ickes, and Jennifer Sauer of the USGS – October, 2014.

Yeager assisted Green Island Wildlife with collection of CWD samples from Jackson County – December, 2014.

Nathan De Jager received data from Lisa Maas (USFWS) and Bobby Jackson (USACE) from hobo water level data loggers. The loggers were installed in the Reno Bottoms area from 2010-2014 to monitor ground water levels as part of a NESP project. The data might be used to better link water levels in adjacent channels with ground water levels and better understand the role the above-ground plant community might play in modifying such relationships.

Nathan De Jager assisted Alicia Weeks with some spatial analysis of submerged vegetation and Bithynia abundance data and develop a poster. Alicia helped collect SAV data with the Wisconsin DNR in summer 2014 and is currently a graduate student at UWL studying SAV-bithynia distributions with Dr. Roger Haro. Alicia won second place for her poster at a recent UW-L geospatial poster contest.

Nathan De Jager assisted Jason Rohweder with some data analyses related to the USGS Midwest Region’s Large Rivers Initiative. Jason is working with Rob Jacobson (USGS-CERC) to conduct a geomorphic assessment of river-floodplain connectivity for the large rivers of the Midwestern United States.

Nathan De Jager assisted Patricia Reis (UMESC) with some spatial analysis of native mussel distributions.

Levi Solomon provided insight on grass carp populations in the La Grange Reach to Kevin Irons, IDNR

Levi Solomon provided information, video, and photos of jumping Asian carp to Jen Mui, INHS, for upcoming presentations and newsletters

Rich Pendleton and Levi Solomon provided stomach contents of piscivorous fishes (many collected under SOW item 2015B6) from the La Grange Reach of the Illinois River to Jim Lamer, Western Illinois University

Rich Pendleton and Levi Solomon provided fish specimens to Wen Su Liu, U of I Champaign, for stomach microbe analysis.

Rich Pendleton and Doyn Kellerhals are members of a working committee to redefine and restructure the tiles and advancement tracts for Illinois Natural History survey contract employees.

Rich Pendleton, Levi Solomon, and Andy Casper submitted a proposal (UMRR Science and Support) titled "Assessing the quality and use of existing overwintering habitat in the La Grange reach of the Illinois River."

Andrew Casper submitted a proposal to the Science in Support of Restoration designed to develop and conduct a pilot study of the use of fish indicator groups for communicating system wide perspective on fish response to restoration

Rich Pendleton and Levi Solomon traveled to Pool 4, Lake City, MN to assist Steve DeLain in annual LTRM monitoring. Trip was part of personnel exchange to ensure continued use of standard methods among LTRM Component Specialists.

Bartels responded to a request from WDNR staff in Milwaukee to provide printed information to a citizen seeking information on bull sharks in the Mississippi River.

Walt Popp participated in a LTRM conference call on Oct. 6th to discuss the content of proposed annual field station summary reports for USACE management and state resource managers.

Megan Moore provided her 2014 data analysis summary figures showing vegetation trends in Pool 4 to USACE, USGS, and field station team leaders as an example of an annual field station summary report.

Walt Popp participated in a LTRM Analysis Team meeting on Nov. 5-6 in Moline, IL.

Walt Popp participated in a MNDNR Mississippi River Team Steering Committee meetings on Dec. 8th in St. Paul to discuss river issues with the Miss. River Hydrologist and Fisheries staff, Asst. Commissioner Barb Naramore, the regional director and several regional managers.

Walt Popp participated in a UMRR conference call on Dec. 9th for Kevin Stauffer to discuss possible development of a UMRR Operating Plan to complement the Strategic Plan.

Walt Popp chaired, and Rob Burdis and Megan Moore participated, in a DNR Mississippi River Team meeting on Dec. 10th in Lake City.

Megan Moore reviewed a USGS report at the request of USGS.

Eric Ratcliff provided information regarding potential sampling locations for a Principia College student research project on microplastics in the Mississippi River 10/2014

Second Quarter

Jennifer Sauer reviewed Hazard Analysis & Critical Control Points (HACCP) plan for the USGS project "Assessing the statuses of amphibian populations relative to global change on wetland-upland 3 landscapes" HACCP planning is a management tool that provides a structured method to identify risks and focus procedures that is being successfully used in natural resource pathway activities. Understanding

pathways and developing plans to reduce non-target species and prevent biological contamination is necessary to avoid unintended spread of species.

Brian Ickes provided fisheries information to Ronald M. Koth, Senior Fisheries Ecologist (the Barr Company) which provides engineering and environmental consulting services to clients. Barr is working on the effort to re-create Hall's Island in Pool 1.

Brian Ickes provided information and guidance to the WDNR as they are looking at the potential to develop a backwater fish IBI for the Mississippi River.

Jeff Houser provided Dennis Wasley (MPCA) with information on the collection and analysis of phosphorous and chlorophyll-*a* done by the LTRM. Dennis will be looking at total phosphorus and chlorophyll-*a* data compared to their recently approved river eutrophication standards.

Yao Yin and Jennifer Sauer provided the wild rice % frequency data for 2014 data collected in Pools 4 and 8 to John Sullivan. John was drafting an article for Reggie McLeod, Big River Magazine.

Jennifer Sauer provided *Bithynia tentaculata* (faucet snail) information to Jennifer Koop, Ph.D. University of Arizona Whiteman Lab. Dr. Koop is a researcher interested in the ecology and evolution of species interactions, particularly in reference to host-parasite systems.

Jennifer Sauer provided Kim Olson, La Crosse County Emergency Management, with a list of Equipment Resources. The County asked for a listing of equipment that could potentially be utilized in the event of an emergency such as an oil spill.

Jeff Houser provided water quality information to Chuck Theiling (USACE). Chuck was gathering information for a HREP opportunity to consider nutrient dynamics at Keithsburg Refuge, Pool 18.

Jeff Houser provided LTRM water quality information to the U.S. Geological Survey's National Water-Quality Assessment Program. They would like to use data from LTRM monitoring as part of a national analysis of trends in water quality.

Bowler provided data and summaries of 2014 special projects fisheries sampling for Pools 9, 10, 16, 18 and Huron Island HREP to Guttenberg and Fairport Management – January, 2015.

Bowler provided current compilation of Iowa fish species to Fisheries Chief for the Director's Listening Sessions – January, 2015.

Bowler compiled and distributed list of current fish species collected from Pool 19 for Bob Hrabik of the Missouri Department of Conservation, John Olson of the Central Office Biological Monitoring & Assessment Program Team, Hal Schramm of the Mississippi State Cooperative Fish & Wildlife Research Unit, and various other UMR personnel – January, 2015.

Bowler aged digitized otoliths of black crappie from Pool 26 for Levi Solomon of the Illinois Natural History Survey – January, 2015.

Kueter analyzed long-term trends of suspended solids, total nitrogen, total phosphorus, and turbidity by stratum in Pool 13 from 1994-2013 for the 2014 IDNR Operational Report – January, 2015.

Bowler provided information on three Bellevue LTRM fisheries reports to Jeff Houser of UMESC for a presentation at the UMRR Coordinating Committee quarterly meeting – February, 2015.

Bowler provided report “Evaluating the Effectiveness of a Mandatory Catch and Release Regulation on a Riverine Largemouth Bass Population” to Chuck Theiling of the USACE for the Brown's Lake HREP Performance Evaluation Review – February, 2015.

Bowler provided information on Pool 13 gizzard shad abundance (1993-2014) to Alma Gaul for an article on bald eagle declines in the Quad City Times – February, 2015.

Bierman recertified on CPR and first aid training in Bellevue, Iowa – February, 2015.

Bowler provided current compilation of Iowa fish species to Des Moines Research – March, 2015.

Bowler plotted sampling areas and sampling points in ArcView for the Pool 11 Train Derailment Mussel Survey for Guttenberg Management – March, 2015.

Bowler made heat map of Iowa’s 2014 commercial harvest of common snapping turtles for annual report for Guttenberg Management – March, 2015.

Steve DeLain provided catch-per-unit-effort trends of select fish species to a WI DNR Fisheries manager.

Steve DeLain provided specifications on an electroshocking boat to the Havana Field Station.

Steve DeLain provided data on declining river shiner numbers in Pools 4 and 8 to Jay Hatch who is working on the book, *Fishes of Minnesota*.

Rob Burdis provided technical assistance regarding habitat restoration needs on Pool 4 to the WI DNR Mississippi River Water Quality Specialist.

Rob Burdis provided Secchi data for Lake Pepin to MN DNR Fisheries Management.

Megan Moore provided technical assistance to the UMRCC Wildlife Technical Section regarding their aquatic plant list.

Megan Moore provided wild rice data from Pool 4 to the WI DNR.

Megan Moore provided multiple years of Pool 4 vegetation data to the WI DNR Mississippi River Water Quality Specialist.

Megan Moore provided LTRM vegetation protocols and photos to the WI DNR Mississippi River Wildlife Specialist.

Megan Moore provided Dave Hokanson, UMRBA Water Quality Specialist, with the submersed macrophyte index (SMI) sampling protocol that Heidi and she adapted from LTRM protocols for pools without adequate bathymetry coverage.

Megan Moore provided information on native milfoil locations on Pool 4 to a Wabasha County Soil and Water Conservation District invasive species specialist.

Third Quarter

Jeff Houser consulted with the USACE on HREP opportunity to consider nutrient dynamics at Keithsburg Refuge, Pool 18.

Yao Yin and others met with Quan Dong, Chief and Supervisory Ecologist Aquatic Systems Branch, USGS Fort Collins Science Center to discuss work being done by the LTRM on the UMRS. He is especially interested in exchanging ideas on invasive species (Asian carps as well as invasive plants).

Brian Ickes provide Chuck Theiling with information on species-area curves. Chuck was gathering information for a colleague on using mixed sized plots and effort along transects to build species ratification curves.

Ben Schlifer, Jim Rogala, and Jeff Houser provided USACE Nicole Manasco, Acting Chief Water Quality and Sedimentation Section Engineering Division - Rock Island District information on LTRM databases and nutrient monitoring.

Jeff Houser provided John Sullivan with information on recent reports/articles describing nutrient trends (N or P) in the Upper Mississippi River.

Jeff Houser provided Ronald B. Zelt, Associate Director (NAWQA), U.S. Geological Survey, Nebraska Water Science Center with protocol or references for mapping/stratifying habitats for sample designs.

Nathan De Jager assisted Derek Ingvalson by providing data and other information regarding floodplain forest tree species tolerance to flooding for use in planning a restoration project at Conway Lake, Pool 9.

Ogden, Bierman, Feldman, Fitzpatrick, Kueter, and Vogeler tracked radio-transmitted white crappie in Pool 12 – April-June, 2015.

Vogeler assisted Fairport Management with walleye broodstock collections in Pool 16 – April, 2015.

Bowler entered other five LTRM field stations' incidental turtle catches for 2014 into master dataset in Excel – April, 2015.

Bierman assisted Green Island Wildlife with spring spotlight surveys in Jackson County, Iowa – April, 2015.

Bowler entered bluegill age data into the Pool 12 HREP project database – April/May, 2015.

Vogeler assisted Bellevue Research with collections of shovelnose sturgeon from the Cedar River – May, 2015.

Bowler provided records of pugnose minnows from Pool 13 and Pools 16-19 for Bob Hrabik of the Missouri Department of Conservation and Hal Schramm of the Mississippi State Cooperative Fish & Wildlife Research Unit – May, 2015.

Bowler applied aged bluegill data to unaged fishes via SAS routine and calculated mortality in the six backwater study lakes for the Pool 12 HREP – May, 2015.

Bowler compiled and distributed “Pools 12 & 13 Highlights, 2014” to UMR personnel – May, 2015.

Bowler made bathymetric map of Brown’s Lake for Chuck Theiling of the USACE for the Brown's Lake Hydrology and Hydraulics Model – May, 2015.

Bowler compiled and provided records of threatened and endangered fish species in Illinois collected from Pools 12 and 13 (1993-2014) for Tara Kieninger (Heritage Database Program Manager for the Illinois Department of Natural Resources) – May, 2015.

Bowler assisted Bellevue Research with comparative CPUE statistics of northern pike report for Federal Aid Study 7038. – June, 2015.

Bowler provided analysis of LTRM wingdam electrofishing of walleye CPUE (Kruskal-Wallace; 1994-2014) in Pools 8 and 13 to evaluate pre-and-post slot limit regulation changes in Iowa for Bellevue Research – June, 2015.

Kueter and Vogeler built new rails for shop and installed new electrical outlets in office to comply with state and OSHA standards in collaboration with Rodney Tucker (Iowa EPD) – June, 2015.

Bowler, Fitzpatrick, and Reed collected and delivered fish for Swiss Valley County Conservation aquarium in Dubuque – June, 2015.

Bowler provided LTRM length/weight data of bowfin and shortnose gar (2006-2014) to Guttenberg angler to estimate weights of angled fish – June, 2015.

Bowler, Feldman, and Fitzpatrick updated the Bellevue LTRM fish reference collection and database for Konrad Schmidt (Minnesota DNR) and John Lyons (Wisconsin DNR) so that the collection can be catalogued and housed at the University of Wisconsin-Madison – June, 2015.

Jim Rogala provided Richard DeFer, Engineering Tech., CEMVR-EC-TS (Survey Section) with information on information on the vertical control used for the various gage stations along the IWW.

Levi Solomon provided LTRM minifyke specifications and information about vendors to Clint Morgeson, Eastern IL University.

Levi Solomon and Rich Pendleton provided documentation and literature to Chris Hine, INHS, of increasing grass carp populations in the Illinois River.

Levi Solomon and Rich Pendleton provided LTRM sportfish data from 2009-2014 to Jason DeBoer and Mark Fritts, INHS.

Rich Pendleton and Levi Solomon provided Mike McClelland, IDNR, American eel LTRM data.

Walt and Rob reviewed and discussed UMRR Operating Plan with Kevin Stauffer, Minnesota's representative on the UMRR Strategic Planning Committee.

Walt participated in a LTRM Analysis Team meeting on Apr. 14th by phone.

Walt worked with Megan on budget development and management.

Rob sent Lake Pepin residence time data to WI DNR WQ coordinator, Shawn Giblin.

Rob participated in and served as WQ expert on a boat tour of Lake Pepin for Legislative-Citizen Commission on Minnesota Resources (LCCMR) on June 16th.

Rob met with Jodie Hirsch (MNDNR zooplankton specialist) on June 17th to receive training on the process and best techniques to count and identify rotifers.

Steve provided MNDNR Lake Pepin Fish Specialist, Nick Schlessner, with 1993-2014 LTRM common carp data from all field stations.

Steve provided fish identification of confiscated minnow bait to a WI DNR Fisheries biologist.

Steve sent Lock and Dam 1 closure information to John Chick, team leader for Alton Field Station.

Megan provided vegetation completion report to Lake City fisheries management staff (Nick Schlessner, Dan Dieterman, and Kevin Stauffer).

Megan coordinated with Stephen Winter (FWS) on UMRCC Quick Response Program (QRP) vegetation proposal. The intent of the proposal is to have the past, present and future vegetation data collected by the UMRCC partnership available for public use via website servers.

Megan provided metadata information to the Fish & Wildlife Service on Pool 5 vegetation data she had collected in years past.

Megan provided slides from her vegetation report to UMESC staff Jennie Sauer and Jeff Houser to highlight her LTRM project for an upcoming UMRR-CC meeting in St. Louis

Megan provided vegetation monitoring training for two new UMRR-LTRM vegetation specialists from the states of Wisconsin and Iowa on June 15th in Bellevue, IA.

Fourth Quarter

Jennifer Sauer supplied Shawn Giblin, Mississippi River Water Quality Specialist, Wisconsin Department of Natural Resources with a figure of the 5-states and 6 field stations for use in a publication.

(UMESC) Jennifer Sauer met with staff from the U.S. Fish and Wildlife Service, University of Wisconsin–La Crosse, and University of Massachusetts-Dartmouth on July 20, 2015, to discuss past, present, and future work on *Bithynia tentaculata*, an invasive snail found in the Upper Mississippi River. *Bithynia* is host to several trematodes that cause waterbird mortality.

Teresa Newton talked to Brook Herman, Planner/Restoration Ecology U.S. Army Corps of Engineers - Chicago District, about the UMRS Mussel Index. Herman just received some funding to look at the possibility of developing a freshwater mussel community index.

Jeff Houser provided Davi Michl, Regional Planning and Environment Division North U.S. Army Corps of Engineers, a rough estimate of NPP to use in the benefits comparison on continuous oxygen data from Mud Lake for his thesis.

Ogden and Vogeler tracked radio-transmitted crappie in Pool 12 – July-September, 2015.

Bowler, Feldman, Fitzpatrick, and Reed collected sub-adult common carp from routine LTRM fisheries monitoring for Quinton Phelps of the Missouri Department of Conservation as part of a large-scale effort in microsatellite research in the Upper Mississippi River – July-September, 2015.

Bowler, Fitzpatrick, and Reed collected silver chub specimens from routine LTRM fisheries monitoring for Dave Herzog of the Missouri Department of Conservation for DNA analysis – July-September, 2015.

Bierman met with Scott Gritters – Iowa DNR Fisheries, Kurt Kemmerer – Iowa DNR Wildlife, and landowner Mark Cross to discuss on-going wetland mitigation efforts in the Rock Creek watershed of Clinton County, Iowa – July, 2015.

Bowler provided in-situ data for pallid shiner locations in Pool 13 to Konrad Schmitt of the Minnesota Department of Natural Resources – July, 2015.

Bierman assisted Mike Griffin, Iowa DNR Wildlife, with roadside survey in Jackson County – August, 2015

Bierman provided historical water quality data from the Dubuque Tailwater area to Tom Keller, USACE hydrologist, Rock Island District – August, 2015.

Bierman, Fitzpatrick, Ogden, and Reed assisted Bellevue Research with walleye collections in Pool 13 via electrofishing – August, 2015.

Bowler generated random sampling points and plotted points in ArcView for Pool 12 overwintering project – August, 2015.

Bowler compiled temporal summary statistics in SAS on a multitude of water quality variables for 2014 SRS data in Pool 13 – September, 2015.

Kueter updated master WQ spreadsheet with summarized 2014 SRS data in Pool 13 – September, 2015.

Bowler and Reed conducted pallid shiner surveys and collected DNA samples of multiple cyprinid and darter species in Pool 13 with Minnesota ichthyologist Konrad Schmitt for the fisheries research department at the University of Tennessee – September, 2015.

Fitzpatrick assisted Guttenberg Management with outpool electrofishing sampling in Pool 11 – September, 2015.

Bowler and Reed collected freshwater drum and white bass specimens from regular LTRM sampling for the statewide mercury project and Cold Springs Research – September, 2015.

Vogeler assisted Bellevue Research with shovelnose sturgeon collections in Pool 13 via trammel netting – September, 2015.

Bierman assisted Small and Large Impoundments Team with the fishery renovation of Bob White Lake in Wayne County – September, 2015.

Bowler, Reed, and Vogeler collected yellow perch specimens from regular LTRM sampling for aging study – September, 2015.

Bowler made map of fish outpool sampling sites (2009-2014) of Boston Bay in Pool 18 for Fairport Management – September, 2015.

Bowler submitted article on recent crystal darter and pallid shiner collections in Pool 13 by Bellevue Research and LTRM for Konrad Schmitt of *American Currents* – September, 2015.

Bierman, Reed, and Vogeler collected age-0 bowfin specimens from Green Island for John Bruner of the University of Alberta for ontogenetic growth comparisons to a newly discovered age-0 fossil of *Amia scutata* – September, 2015.

Megan Moore participated in the UMRR-LTRM Analysis Team mtg on July 28th by phone.

Megan Moore participated in the UMRCC Wildlife Technical Section's aquatic vegetation sampling of Pool 9 on Aug. 4th and 10th.

Rob Burdis provided Steve Heiskary of MNPCA with a comprehensive WQ dataset from Pool 4 (including Lake Pepin) and Pool 8 including secchi, turbidity, TSS, VSS, TP and chlorophyll from the main channel covering 1993-2014.

Rob edited an article prepared by Kirsten Mickelson from UMRBA for the Report to Congress that will feature the research by our Lake City LTRM staff showing the Temporal and Spatial changes in Pool 4 and the identified ecological shift that occurred.

Rich Pendleton and Levi Solomon continued to supply Sarah Marochella, grad student at Illinois State University, with processed laboratory fishes and Asian carp to serve as bait for continued turtle research.

Levi Solomon and Rich Pendleton continued to supply Ti Fen Ting, University of Illinois Springfield, with processed laboratory fishes and Asian carp to serve as food for osprey as part of collaboration with the IDNR.

Levi Solomon provided photos of field sampling to Pat McDonald, Illinois DNR, for an upcoming presentation about the IDNR's osprey project

Levi Solomon provided technical assistance and advice to Justin Seibert, researcher at SIUC, on sampling Asian carp in backwaters on the La Grange Reach of the Illinois River.

Rich Pendleton and Levi Solomon provided specimen collection and technical assistance to Dennis Richardson, Quinnipiac College, for the redescription and molecular characterization of a Glossiphoniid leech for comparisons to historic specimen collections from 1901.

Rich Pendleton attended and provided technical assistance at the US Army Corps Sangamon River Sediment Conceptual Modeling Workshop, Beardstown, IL

Levi Solomon and Rich Pendleton provided information regarding the status of Asian carp to Kirsten Mickelsen, Ecosystem and Navigation Program Director, UMBRA, for the 2016 UMRR report to congress.

Levi Solomon assisted Al Messinger of University of Minnesota-Duluth and Robin Calfee and Brooke Vetter of UGSG-Columbia on Asian carp research on the La Grange Reach of the Illinois River.

Levi Solomon and other IRBS personnel hosted a Fisheries Techniques class, University of Illinois Urbana-Champaign. Included tour of station, discussion of UMRR LTRM mission and goals, field demonstration of LTRM fisheries gears, and fish identification

Doyn Kellerhals, Levi Solomon and other IRBS personnel hosted an Ecology and Evolution class, McMurray College of Jacksonville. Included tour of station, discussion of UMRR LTRM mission and goals, field demonstration of LTRM fisheries gears, and fish identification

Rich Pendleton and Levi Solomon provided slides and information to Clint Morgeson, INHS, for upcoming presentation to Davidson College about Asian carp biology, invasion, impacts and effects.

Levi Solomon and Rich Pendleton collected skipjack herring for Josh Egan, University of Minnesota, for thesis research.

Rich Pendleton and Levi Solomon continue to collect aging structures for Sarah Huck, INHS, for research into gar and bowfin life history on Illinois rivers.

Eric Ratcliff, Ben Lubinski, and Eric Gittinger hosted visiting scientist Dr. Patricia Hernandez of George Washington University and assisted her with collecting Asian carp tissues to be used for studying feeding morphology. 9/2015.

Outreach

First Quarter

(UMESC) Randy Hines, Shelly Bartsch, and Larry Robinson hosted over a 100 students from La Crosse's Longfellow Middle School's "School on the River," October 16, 2014. The Program's curriculum focuses on the Mississippi River's ecological systems and how these systems lead to students' understanding of how cultural, economic, political and organizational systems work in the real world. Presentations included the use of geographic information systems to map and monitor floodplain vegetation on the Upper Mississippi River System, including the use of historic aerial photos and 3D mapping technologies.

Bierman gave a tour of local HREP projects and gave an overview of UMRR-EMP to Eric Anderson, a graduate student at the University of Idaho, who is focusing on environmental restoration projects for his graduate research – November, 2014.

Steve DeLain hosted two Havana Field Station fish specialists for three days during period 3 sampling as part of a field station staff exchange.

Steve DeLain received assistance with electrofishing during period 3 sampling from two USACE St. Paul District staff.

Ben Lubinski volunteered at a fishing demonstration for approximately 10 military veterans participating in the Alton, IL Senior Services Plus, Healthy Minds Healthy Bodies Program. Ben spoke to the group about fisheries and fisheries research on the Mississippi River. 10/2014.

Ben Lubinski and Ed Culver presented information about the LTRM and INHS to approximately 160 high school seniors attending a "Who Works on the River" career fair event at the National Great Rivers Research and Education Center. 11/2014.

Second Quarter

Jennifer Sauer gave a tour of UMESC to ACOE staff from across the nation participating in a leadership 101 intensive class.

Third Quarter

(UMESC) U.S. Congressman Ron Kind held a face-to-face meeting of his Mississippi River Advisory Board at UMESC, April 1, 2015. The Mississippi River Advisory Board meets periodically to discuss regional issues related to the Mississippi River. Congressman Kind also used the meeting as an opportunity to meet with UMESC's new Center Director, Mark Gaikowski. The last time the Mississippi River Advisory Board met at UMESC was January 26, 2012.

Randy Hines provided LTRM activities to the Lake Onalaska Protection and Rehabilitation District

Bowler assisted Manchester Management with the Hy-Vee Fishing Derby at Bergfeld Pond in Dubuque, Iowa during Free Fishing Weekend – June, 2015.

Bierman, Bowler, Feldman, Fitzpatrick, Kueter, and Vogeler hosted annual Iowa River Rat meeting at Bellevue State Park – June, 2015.

Bowler and Reed assisted Bellevue Research in collecting fish for Bellevue's 4th of July display – June, 2015.

Illinois Natural History Survey and Illinois DNR staff hosted a delegation of USACE and USGS personnel for a UMRR LTRM element demonstration on the Illinois River near Havana, IL.

Rich Pendleton provided fish show and tell for "Tot Time" at Dickson Mounds State Museum, Lewistown, IL.

Megan was interviewed by the Rochester Post-Bulletin regarding invasive plant species on the Mississippi River.

Ben Lubinski gave a 30 minute talk to a 3rd grade class at Woodland Elementary School in Edwardsville, IL titled "Fishes of the Mississippi River" April 2015.

Ben Lubinski gave a 45 minute presentation about river ecology to the Healthy Minds Healthy Bodies coffee chat at Alton Senior Service Plus in Alton, IL. Healthy Minds Healthy Bodies is a trademarked program offered free of charge to qualified veterans. June 2015.

Ben Lubinski gave a demonstration about Mississippi River fish biology and ecology to a summer camp group hosted by the YMCA at Riverlands Migratory Bird Sanctuary in West Alton, MO. June 2015.

Eric Ratcliff presented information about invasive species of the Mississippi River with emphasis on Asian Carp to attendees of the Two Rivers Family Fishing Fair at Pere Marquette State Park in Grafton, Illinois. June 2015.

Eric Ratcliff gave a presentation on fishes of the Mississippi River to a group of Pattonville, MO middle-school students participating in Pattonville High School's STEM (science, technology, engineering and math) Camp. June 2015.

Eric Ratcliff and Eric Gittinger gave a presentation about fishes of the Mississippi River and LTRM fish sampling for a group of 40 eighth grade students and adults participating in the National Audubon Society's River Visions Program. May 2015.

John Chick, Eric Ratcliff, Eric Gittinger, and Ben Lubinski demonstrated LTRM fish sampling techniques, fish identification, and ecology of Mississippi River fishes, as well as LTRM water quality sampling techniques to approximately 30 National Great Rivers Research and Education Center (NGRREC) college interns during NGRREC intern week. The demonstration was held at the USACE's Riverlands Environmental Demonstration Area, West Alton, MO. May 2015.

Ben Lubinski presented fish identification, ecology, and biology to attendees of the Two Rivers Family Fishing Fair at Pere Marquette State Park in Grafton, Illinois. June 2015.

John Chick gave a lecture to approximately 30 National Great Rivers Research and Education Center (NGRREC) college interns, titled: What Makes a River Great? May 2015.

John Chick gave a talk titled "Triumphs and Tragedies of Partnerships: Balancing Competing Objectives for the Upper Mississippi River Restoration Program" at the LTRM component meeting in La Crosse, WI. April 2015.

John Chick gave a talk titled "Triumphs and Tragedies of Partnerships: Balancing Competing Objectives for the Upper Mississippi River Restoration Program" at the Mississippi River Research Consortium annual meeting. April 2015.

John Chick gave a talk titled "What's up with the Upper Mississippi River System?" to the Piasa Palisades Chapter of the Sierra Club. June 2015.

Fourth Quarter

Randy Hines provided a tour of UMESC to the UMRR Coordinating Committee following the August 5, 2015 UMRR-CC meeting.

Bowler worked the fish aquarium at the Iowa State Fair – August, 2015.

Megan interviewed with MNDNR Climatology Office regarding UMRR-LTRM data components, structure and data availability.

Eric Ratcliff, Eric Gittinger, Ben Lubinski, and Ed Culver presented Mississippi River fish and freshwater mussel ecology and identification to approximately 250 fifth-grade students attending the Water Festival 2015 event at Lewis and Clark Community College. 9/2015.