**Working Group Summary Status Reports**

At the 2016 LTAR meeting, one of the first agenda items is a summary status report from each working group (Common Experiment-Croplands and Rangelands, Observatory Measurements, and Data Management). To provide better documentation on progress to-date, the Program Committee requests that each designated Observatory Measurement Working Group leader prepare the following ***summary*** in advance and provide all current working group documents. Similarly it is requested that the Common Experiment- Croplands and Rangelands, and the Data Management Working Group also prepare your own short summary in advance and send with any supporting documents.

Please complete by the 17th  Feb and email to the Archbold-UF team (rboughton@ufl.edu). We will compile and have electronic and hard copies of all material available for participants.

Email to Raoul Boughton at rboughton@ufl.edu.

**Summary of current status**

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| --- | --- |
| **Working group name:**  **(eg: biological)** | Hydrologic measurements |
| **Working Group Leader(s)** | Greg McCarty – Claire Baffaut |
| **Participants** | Claire Baffaut [claire.baffaut@ars.usda.gov](mailto:claire.baffaut@ars.usda.gov) CMRB  Greg McCarthy [Greg.McCarty@ars.usda.gov](mailto:Greg.McCarty@ars.usda.gov) LCB  Dave Goodrich [dave.goodrich@ars.usda.gov](mailto:dave.goodrich@ars.usda.gov) WGEW  Dave Augustine [David.Augustine@ars.usda.gov](mailto:David.Augustine@ars.usda.gov) CPER  Mark Nearing [Mark.nearing@ars.usda.gov](mailto:Mark.nearing@ars.usda.gov) WGEW  Kevin King [kevin.king@ars.usda..gov](mailto:kevin.king@ars.usda..gov) ECB  J.R. Rigby [JR.Rigby@ars.usda.gov](mailto:JR.Rigby@ars.usda.gov) LMRB  Bob Lerch [Bob.Lerch@ars.usda.gov](mailto:Bob.Lerch@ars.usda.gov) CMRB  Danny Marks [Danny.Marks@ars.usda.gov](mailto:Danny.Marks@ars.usda.gov) GB  Curtis Dell [curtis.dell@ars.usda.gov](mailto:curtis.dell@ars.usda.gov) UCB  Tony Buda [Anthony.Buda@ars.usda.gov](mailto:Anthony.Buda@ars.usda.gov) UCB  Stephen Hamilton [Hamilton@msu.edu](mailto:Hamilton@msu.edu) KBS  Harry Schomberg [harry.schomberg@ars.usda.gov](mailto:harry.schomberg@ars.usda.gov) LCB  Seth Dabney [seth.dabney@ars.usda.gov](mailto:seth.dabney@ars.usda.gov) LMRB  Daniel Moriasi [daniel.moriasi@ars.usda.gov](mailto:daniel.moriasi@ars.usda.gov) SP  Tom Moorman [tom.moorman@ars.usda.gov](mailto:tom.moorman@ars.usda.gov) UMRB  Jason Taylor [Jason.Taylor@ars.usda.gov](mailto:Jason.Taylor@ars.usda.gov) LMRB  Martin Locke [martin.locke@ars.usda.gov](mailto:martin.locke@ars.usda.gov) LMRB  Daren Harmel [Daren.harmel@ars.usda.gov](mailto:Daren.harmel@ars.usda.gov) TG  David Bosch [David.Bosch@ars.usda.gov](mailto:David.Bosch@ars.usda.gov) GACP  Dennis Busch [Buschd@uwplatt.edu](mailto:Buschd@uwplatt.edu) UMRB |
| **List of measurements currently done or planned** | The answers given in this document are based on responses from the 10 following sites: CMRB (Central Mississippi River Basin), GACP (Gulf Atlantic Coastal Plains), UWPlatteville (Univ Wisconsin Platteville, Platte River / High Plains Aquifer), GRL (Grazingland Research lab, Southern Plains), CPER (Central Plains Experimental Range), TG (Texas Gulf), UCB (Upper Chesapeake Bay), WGEW (Walnut Gulch Experiment Watershed), LCB (Lower Chesapeake Bay), and UMRB (Upper Mississippi River Basin).  East and Midwest:   * practically everywhere: Discharge, surface runoff, subsurface flow (tiled or lateral), soil moisture, irrigation inputs when relevant, some forms of N and P, Suspended Sediment, selected herbicides, groundwater level, * sometimes: conductivity, TDS, chloride, ET related measurements   West (WGEW, CPER) focused on water and sediment. No mention of nutrients or water quality. |
| **List of sensors or equipment used or planned (if applicable)** | Generally: weir or flumes, pressure transducer or flow bubblers, rating curves, Campbell dataloggers, ISCO or Sigma samplers, Sentek or Decagon soil moisture probes. The pressure transducer, battery, and datalogger are all combined in one piece of equipment (Solinst levelogger) at UWPlatteville. Lab equipment for sample analysis was generally not described so I am not including here.  Exception:   * Specifically designed flume and sampler adapted to site conditions (WGEW) * piezometers (GACP) * ultrasonic sensors (UW Platteville) * optical sensors (LCB)   In some cases, water level was measured using two techniques (possibly including one analog) providing backup in case one technique fails. These setups were usually made because newer equipment was installed without removing the older equipment. |
| **SOP or sampling approach** | SOPs are uniquely dependent on the site and the measurement. They vary as a function of research objectives, size of drainage areas, site specific conditions, and expertise available. Where data have been collected for a long time, they have been adjusted at regular intervals as greater understanding of the site behavior and improved technologies became available. Telemetry is currently being implemented or planned on several sites.  Only a few sites document measurement error.  This is definitely the hardest part to summarize. To be done later. |
| **Data Management concerns**  **(e.g. large volumes, QA/QC, data formats, data transfer)**  **Explain** | **The comment from UCB summarizes the flavor of most of the comments received:**  Until now, quality assurance and quality control (QA/QC) of hydrologic data has typically been overseen by the technician in charge of the monitoring point. While software has been developed for QA/QC in some cases, the process has typically been done without the aid of automated procedures. Some sites have started or considered using open source and proprietary (e.g., Aquarius) software to automate the QA/QC process. If near real-time data are expected from all monitoring points from the 18 sites, then automating QA/QC and data transfer processes will be paramount for success. |
| **List of sites where measurements are implemented (if known)** | In most LTAR sites, especially those collocated with an ARS watershed, hydrologic measurements are currently implemented at some points (edge-of-field or streams) but need to be expanded to other points.  In places where measurements have been going on for >20 years, equipment has been regularly updated as new technologies became available. |
| **List any major concerns or issues** | * Increasing the work load at individual locations to the point where meeting the defined objectives are no longer feasible. * Ensuring data quality in runoff monitoring programs * **I**dentifying priority hydrologic measurements to be made (e.g., stream discharge, soil moisture, runoff, etc.), * Automating the QA/QC process for these data, * Working toward real-time delivery to the LTAR website. * Data quality from in situ sensors; optical sensors must remain clean for good data. |
| **File name(s) of supporting documents (attach to email)** | **Partial list of data documentation papers for the ARS watersheds**  **CMRB**  - Baffaut, C., Ghidey, F., Sudduth, K.A., Lerch, R.N., John Sadler, E., 2013. Long-term suspended sediment transport in the Goodwater Creek Experimental Watershed and Salt River Basin, Missouri, USA. Water Resources Research, 49.  - Baffaut, C., Sadler, E.J., Ghidey, F., 2015. Long-Term Agroecosystem Research in the Central Mississippi River Basin: Goodwater Creek Experimental Watershed Flow Data. Journal of Environmental Quality, 44, 18-27.  - Lerch, R.N., Baffaut, C., Sadler, E.J., Kremer, R.J., 2015. Long-Term Agroecosystem Research in the Central Mississippi River Basin: Goodwater Creek Experimental Watershed and Regional Herbicide Water Quality Data. Journal of Environmental Quality, 44, 28-36.  - Lerch, R.N., Kitchen, N.R., Baffaut, C., Vories, E.D., 2015. Long-Term Agroecosystem Research in the Central Mississippi River Basin: Goodwater Creek Experimental Watershed and Regional Nutrient Water Quality Data. Journal of Environmental Quality, 44, 37-43.  **GACP**  - Bosch, D. D., and J. M. Sheridan (2007), Stream discharge database, Little River Experimental Watershed, Georgia, United States, Water Resour. Res., 43, W09473, doi:10.1029/2006WR005833  - Feyereisen, G. W., R. Lowrance, T. C. Strickland, J. M. Sheridan, R. K. Hubbard, and D. D. Bosch (2007), Long-term water chemistry database, Little River Experimental Watershed, southeast Coastal Plain, United States, Water Resour. Res., 43, W09474, doi:10.1029/2006WR005835.  **TG**  - Harmel, R.D., D.R. Smith, K.W. King, and R.M. Slade. 2009. Estimating storm discharge and water quality data uncertainty: A software tool for monitoring and modeling applications. Environ. Modelling Software 24(7):832-842. (National Environmental Methods Index #USDA HWQ2)  - Harmel, R.D., R.J. Cooper, R.M. Slade, R.L. Haney, and J.G Arnold. 2006. Cumulative uncertainty in measured streamflow and water quality data for small watersheds. Trans. ASABE 49(3):689-701. (National Environmental Methods Index #USDA HWQ1)  - Harmel, R.D., K.W. King, B.E. Haggard, D.G. Wren and J.M. Sheridan. 2006. Practical guidance for discharge and water quality data collection on small watersheds. Trans. ASABE 49(4):937-948. (National Environmental Methods Index #USDA HWQ2)  - Harmel R.D., K.W. King, and R.M. Slade. 2003. Automated storm water sampling on small watersheds. Applied Eng. Agric. 19(6):667-674. (National Environmental Methods Index #USDA HWQ3)  **GRL**  - Guzman, J.A. et al., 2014. Upper Washita River Experimental Watersheds: Data Screening Procedure for Data Quality Assurance. Journal of Environmental Quality, 43.  - Starks, P.J. et al., 2014. Upper Washita River Experimental Watersheds: Meteorologic and Soil Climate Measurement Networks. Journal of Environmental Quality, 43.  - Moriasi, D.N. et al., 2014. Upper Washita River Experimental Watersheds: Reservoir, Groundwater, and Stream Flow Data. Journal of Environmental Quality, 43.  - Zhang, X.-C., Garbrecht, J.D., Steiner, J.L., Blazs, R.L., 2014. Upper Washita River Experimental Watersheds: Sediment Database. Journal of Environmental Quality, 43.  - Starks, P.J. et al., 2014. Upper Washita River Experimental Watersheds: Nutrient Water Quality Data. Journal of Environmental Quality, 43.  **UCB**  - Buda, A. R., G. W. Feyereisen, T. L. Veith, G. J. Folmar, R. B. Bryant, C. D. Church, J. P. Schmidt, C. J. Dell, and P. J. A. Kleinman (2011), U.S. Department of Agriculture Agricultural Research Service Mahantango Creek Watershed, Pennsylvania, United States: Long‐term stream discharge database, Water Resour. Res., 47, W08703, doi:10.1029/2010WR010059  **WGEW**  - Stone, J. J., M. H. Nichols, D. C. Goodrich, and J. Buono (2008), Long-term runoff database, Walnut Gulch Experimental Watershed, Arizona, United States, Water Resour. Res., 44, W05S05, doi:10.1029/2006WR005733  - Nichols, M. H., J. J. Stone, and M. A. Nearing (2008), Sediment database, Walnut Gulch Experimental Watershed, Arizona, United States, Water Resour. Res., 44, W05S06, doi:10.1029/2006WR005682. |