



THE UPPER WHITE RIVER REVIEW

*The Newsletter of the South Missouri Water Quality Project, a USDA-NRCS Water Quality Office
Providing Conservation Solutions To Non-Point Source Water Pollution.*

Clear...Concise...and to the Non-Point

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Stewardship Compass by Steve Hefner



Steve Hefner, South Missouri Water Quality Project Team Leader

The saying, “*climate is what we expect, weather is what we get,*” coined by Missouri author Mark Twain about 100 years ago, still rings true today. “Weather” is truly what the Midwest has been experiencing this spring. Several slow moving fronts tapped into abundant moisture from the Gulf of Mexico and drenched northern Arkansas and southern Missouri. Most of the Upper White River Basin in Missouri has

received approximately 60% of “expected” annual rainfall totals during the first four months of 2008.

As you can imagine, tremendous runoff resulted in historic flooding. With every inch of rain, over 27,000 gallons of water fell on each acre of land. Soils quickly became saturated, rivers became swollen, levees

breeched, and people suffered. All but three of the twenty-one counties in our project area received Disaster Declarations for Public Assistance.

Damage assessment teams attributed over \$28.5 million dollars in damage to public infrastructure like roads and bridges. Accurate damage estimates on private property and the collective impact on aquatic systems may never be known. Sediment loss and transport to streams and lakes, saturated wastewater, septic and lagoon systems, and the influx of trash and chemicals from flooded residences are examples of pollution that can not be easily quantified.

People from the Ozarks are as resilient as any other and will resume operations. The USDA-NRCS has applied for emergency funding and if approved, will assist the public through the Emergency Watershed Protection (EWP) program. EWP assistance can be used to repair levees, remove sediment from drainage ditches and streams, remove logjams, and stabilize streambanks. This program has specific requirements, including applying for assistance within 60 days of the event. To learn more, contact your local USDA Service Center or Soil and Water Conservation District.

Missouri State University holds Community Caravan Two South Missouri Water Quality Projects Featured

Missouri State University conducted a Community Caravan throughout Southwest Missouri in the spring of 2008. Tour stops were organized to showcase activities that demonstrate the University’s commitment and service to public affairs. In March, South Missouri Water Quality Project staff presented two service learning projects conducted by University students to local Christian County civic groups and government agencies.

Details of the *PhotoStore* and the *Early Childhood Education* projects, highlighted in prior issues of this publication, were featured. “Both projects are excellent examples of cooperative partnering,” said Steven Hefner, SMWQ Team Leader. “Students obtain an authentic work experience, the public receives various services, and agencies utilize limited resources more efficiently.”

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Ozarks Pounded by Rain

Record Levels Set at Various Locations

In March an extended weather system over the Midwest left many residents of the Upper White River Basin battling water. Many Missouri locations logged record March rainfall totals with some locations reporting more than 10 inches above long term averages. March runoff levels were further exacerbated by above normal rainfall totals in February that left soils completely saturated. Year to date rainfall totals (Table 1) are high and have lead to severe springtime flooding for several of the streams in the Upper White River Basin.

The James, White, and Black River systems set historic levels (Table 2). At Galena, MO, where river data has been collected 87 years, the James River set an all time gauge level mark at nearly 36 feet. As water from the James River emptied into the White River system, it combined with drainage from Arkansas and set an all time water level of 933.25 feet on April 12, 2008 at Table Rock Lake. In

Poplar Bluff, the Black River also reached its highest recorded level at just over 22 feet and flooded several properties. For Black River, only one other storm event in 1904 was estimated to be of similar magnitude. Without Clearwater Dam, a flood control structure completed in 1948 and located upstream, the situation in Poplar Bluff would have been much worse.



Water released at 49,500 ft³/sec to reduce record water levels in Table Rock Lake



Above: Flooding in Piedmont from McKenzie Creek (photos by Paul Davis, Daily American Republic)



Above: Flooding in Poplar Bluff from Black River (photos by Paul Davis, Daily American Republic)

Table 1. Precipitation Totals in the Upper White River Basin (Jan 1—April 10, 2008)

Missouri Location	Total Precipitation (in)
Alton	25.73
Ava	27.67
Doniphan	23.64
Ellington	26.87
Eminence	24.37
Gainesville	24.58
Ozark	26.26
Springfield	24.51
West Plains	25.34
Van Buren	20.16

*CoCoRaHS data from USDA-FSA reporting stations

Table 2. Peak Streamflow Data¹ for Selected Missouri Sites within the Upper White River Basin

Site Location	Years of Record	Record Gauge Level (ft)	Record Date	March 2008 Gauge Level (ft)	March 2008 Crest Rank
Black River near Annapolis	70	27.38	11-14-1993	20.03	6
Black River at Poplar Bluff	86	22.15	3-19-2008	22.15	1*
Bryant Creek near Tecumseh	53	26.74	12-3-1982	22.20	3
Current River at Van Buren	96	29.00	3-26-1904	25.71	6
Current River at Doniphan	92	25.49	12-3-1982	24.11	4
Eleven Point near Bardley	88	21.64	12-3-1982	21.33	2
Jacks Fork at Eminence	89	17.82	11-15-1993	16.44	8
James River at Galena	87	35.96	3-19-2008	35.96	1
North Fork River near Tecumseh	64	28.10	11-19-1985	22.79	4

¹ USGS Provisional Data—subject to change

* Peak flow for a March 1904 storm event was estimated as a historical peak, but no stream gauge level provided.

Benefits of Riparian Forest Buffers

Riparian Forest Buffers Reduce Impacts of Flooding

The widespread flooding from recent rains has caused damage ranging from minimal to large scale devastation. Once the water receded, the benefits of riparian forest buffers were truly revealed.

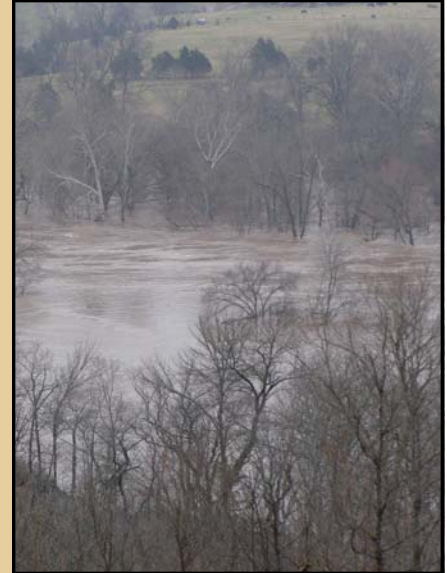
"I had the opportunity to tour some of our waterways, both during and after flooding. Some rivers rose well above flood stage and became raging water courses that spread out over half a mile wide," said Robert DeMoss, SMWQ staff forester.

"A lot of turbulence and swift moving water was noted outside the main channel. The one correlation I made was areas having an adequate band of trees along the stream banks exhibited calmer, slower moving water. Very little evidence of flooding was seen in fields adjacent to riparian forest buffers. Those areas where trees were ab-

sent had the most turbulence."

Trees along streams reduce erosion by covering the ground with leaf litter and decrease nutrient and pathogen migration by filtering storm water. Strong roots also help prevent stream bank erosion. Tree canopies provide shade to keep water temperatures cooler and provide habitat that benefits both aquatic and terrestrial wildlife.

There are many programs available to landowners for both financial and technical assistance in establishing buffers. Many of the programs provide from 50-75% cost share in addition to incentives or annual rental payments for areas enrolled. If you are interested in obtaining additional information you can contact your local USDA-NRCS or the South Missouri Water Quality Office.



Riparian forest buffers dissipate the energy of storm water and help protect land from its harmful effects

Wildlife Benefit from Trees Growing Near Streams

Riparian forest buffers are beneficial to water quality and stream bank stabilization. These two benefits alone can justify the existence of this stewardship practice. Yet, riparian forest buffers also provide many benefits to wildlife.

Aquatic wildlife benefit from the shade of the canopy. With shade, water temperatures are cooler and sustain more dissolved oxygen. Trees also add organic material that small organisms rely upon for food. These macro-invertebrates support other larger animals in the stream ecosystem food chain.

Riparian forest buffers also provide essential habitat for birds and other non-game species. Buffers usually work well to connect larger blocks of segmented habitat together. Deer, turkey, quail, and

other non-game species like song birds thrive in these areas.

"When planning a riparian forest buffer you should consider native species to the area you are planting," said Andy Humble, Missouri Department of Conservation Private Lands Conservationist. "It is also beneficial to wildlife to designate areas where low growing woody shrubs are planted in blocks. Spacing of the shrubs should be closer together than tree planting rows to enhance the habitat."

Another option to maximize the wildlife benefit is to plant large trees next to the bank, taper to shorter shrubs, and finish with a strip of native warm season grasses and forbs at the field edge. This practice will provide great habitat for wildlife to travel and escape, reduce

the potential for stream bank erosion, and improve water quality.



*Northern Bobwhite Quail
Photo from MU Guide MP902, Missouri
Bobwhite Quail Habitat Appraisal Guide*

Lawn Nutrient Plans Get Repeat Customers

The South Missouri Water Quality Project and the James River Basin Partnership have jointly prepared over 550 lawn plans since 2003.

Assistance provided by the James River Basin Partnership and the South Missouri Water Quality (SMWQ) Project over the past five years is coming full circle. Many of the original homeowners who first participated in the urban lawn program are back to update recommendations.

One such homeowner is Pete Deaton. Pete's original plan was written in 2004 by Adam Coulter, SMWQ Urban Conservationist.



Pete Deaton

"I already had a beautiful lawn," said Deaton. "Although my lawn was important to me, it was not the single factor in my decision to request a plan. I enjoy the outdoors, and my wife and I enjoy fishing. I was concerned after reading several articles which identified runoff as a source of pollution in area lakes. I was also very interested in protecting the environment."

"Nutrient management is one important piece of the puzzle in the many steps required to produce a high quality lawn," says Clay Robertson, SMWQ Resource Conservationist. "The key to this type of planning is conducting soil testing." Soil test reports describe the existing fertility levels. It can take several years of planned fertilization and management to build nutrient levels of unfertile soils. Retesting soils every four years

monitors changes in soil fertility levels and can eliminate over-application of nutrients.

Deaton concurs. "The plan I received from Mr. Coulter was very similar to what I was already doing, with one exception. The soil test indicated I needed to add a significant amount of lime during the first two years. I would not have known my lawn needed the addition of lime without a soil test."

Robertson expands on the importance of evenly spreading the lime and fertilizer. "Poor distribution uniformity can cause color and growth variations (streaking) that degrade the appearance. To reduce this problem, a simple procedure for calibrating a lawn spreader is included in each plan. When the spreader is set correctly, the prescribed amounts of material will treat the entire lawn."

He additionally notes, "Some nitrogen will always be needed, but the amount of phosphorus and potassium may be less. It's all specified in the plan – the type and amount of fertilizers are listed with a four-year application calendar. Applying the correct amount of fertilizer is both good for the lawn and the environment."

"My plan was easy to follow and the materials were readily available," Deaton said. "I've been pleased with my lawn and I feel that I'm helping protect the environment. I'm ready for another four-year plan."



A lawn following a four-year nutrient management plan

What is Nutrient Management?

Nutrient management addresses **COMPONENTS** (fertilizer, lime, manure, compost), and **ACTIVITIES** (application timing, rate, form) on urban or rural lands whose ultimate goal is to **optimize growing conditions** while **minimizing adverse impacts** to the environment.

Biosolids Research Forthcoming

Area Farmland Benefiting from Recycled Material

Biosolids, the remaining product following sewage treatment, is a great source of nutrients and organic matter for farmland. Recently, the City of Springfield Public Works Department designated funds to study the reuse of biosolids through its application on farmland. The study will be conducted by Missouri State University and will provide information on the fate and availability of nutrients reflecting local soils and climate conditions. Crop, soils, and run-off data from land treated with both commercial fertilizer and biosolids will be compared.

"We believe the data will show that biosolids application can be a safe and viable component in an overall soil fertility program," said Ed Malter, Sanitary Services Superintendent. "However, we felt it is important to have an independent organization like the University manage the project. University data should boost the credibility of the results for those who may have reservations about the use of biosolids."



Terra-gator applying biosolids on field. Photo courtesy of City of Springfield, MO

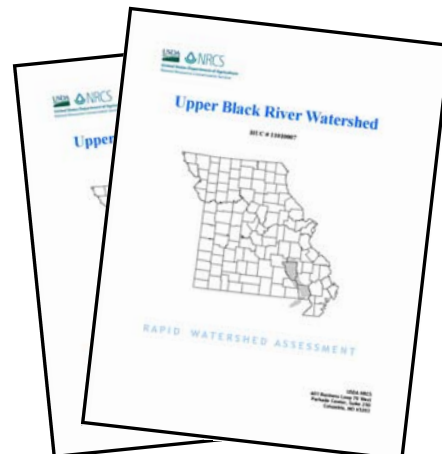
Study initiation and data collection is planned for this growing season. A local work-group consisting of representatives from Springfield Public Works, Missouri State University, Greene County Soil and Water Conservation District, Southwest Missouri Resource

Conservation and Development, and the USDA-NRCS South Missouri Water Quality Project planned the study from a series of discussions spanning over four years.

Rapid Watershed Assessments On-line

Five Rapid Watershed Assessments for Missouri watersheds have been completed by USDA-NRCS Conservationists and are now available on-line. The Upper Black and Current River watersheds in southeast Missouri, the North Fabius and Sny River Basins in northeast Missouri, and the Lower Missouri Crooked River watershed in west central Missouri were analyzed. Rapid Watershed Assessments provide initial estimates of where conservation investments best address identified concerns. They include physical descriptions of the watershed, census and social data, and current and desired future conditions. The project was funded through the USDA Cooperative Conservation Partnership Initiative Grant and the results can be found at the following web site:

<http://www.mo.nrcs.usda.gov/technical/RWAs.html>



Volunteer and Education Update

Educators

New Partnership With Greenwood Laboratory School Supports Mission

Students from the Greenwood Laboratory School, located on the Missouri State University campus in Springfield, are required to complete a 25 hour service-learning experience prior to graduation. Three students partnered with the SMWQ Project during February and March and completed projects which supported the mission of the office.

Madison Pulley volunteered under the supervision of Steve Hefner, SMWQ Project Team Leader. Madison created a public service announcement illustrating the positive impacts recycling paper has on local forests, soils, and water resources. Upon approval, Madison's public service announcement will be posted on the USDA-NRCS state web site.



Madison Pulley



Landon Tagge

Landon Tagge assisted Robert DeMoss, the SMWQ Forester, and Mark Green, the Greene County District Conservationist, with a tree planting project in Greene County. Landon also developed a forestry brochure covering the benefits of windbreaks. The brochure will be used to promote forestry conservation practices at local outreach meetings.



Kate Mattax

Kate Mattax participated in a pilot adaptation of the Early Childhood Education Program. She worked under the supervision of Mary Giles, the SMWQ Education/Outreach Coordinator. She also consulted with community partner, Drew Gerdes, an Early Childhood Education consultant and local kindergarten teacher. Kate developed a lesson plan about water conservation. Her lesson included a story book and supporting materials. She student-taught her lesson in a kindergarten classroom and created an Early Childhood Education public service announcement, which upon approval, will be posted on the state NRCS web site. The success of the adaptation proved the suitability of the program for high school students. This supports the outreach strategy of the SMWQ to offer the Early Childhood Program to high schools in the watershed.

Former Student Volunteer Accepts Challenge



Jenny Barkdoll

"Hi Jenny! Remember me?" That's how the conversation began when Mary Giles, SMWQ Education/Outreach Coordinator, called Jenny Barkdoll, a former OTC student and Earth Team volunteer, and asked if she would be interested in doing the illustration of a 24 page children's book about the forms of water. When Jenny seemed interested, Mary dropped the challenge,

"And did I mention that I need it by tomorrow?"

Not too many people who are working full time would have accepted such a challenge, but Jenny did and delivered the book the next day at the agreed upon time. It was immediately used by SMWQ staff to teach an original water lesson at an early childhood facility.

In 2007, Jenny wrote and illustrated a children's water book as part of the USDA-NRCS partnership with children's literature classes at OTC. Her goal is to be a professional illustrator. As Mary expected, this second book was a big hit with the children!

Volunteer Voices

Quotes from OTC Volunteer Exit Surveys

- I think this is an amazing project for college students and little one's. We all need a reminder that water is important.
- This is a good experience for future teachers because it gives a nice glimpse of what it is going to be like.
- Don't underestimate children and how much they can understand!!
- I learned that I enjoy working in the classroom. I feel that this experience has given me confidence.
- I think I have the ability to be a good teacher. I'm grateful to USDA-NRCS, and OTC for this opportunity.

Reflections from MSU Volunteer Class Reports

- The experience allowed me the freedom to come up with an idea, research it, implement it, and then evaluate the successes and failures. I believe it was a success!
- I feel the lesson and take-home activity will help children and their families think more about water, how often we use it, and how much of an important resource it is.
- I know if I were asked to do this activity again, I would. I learned so much throughout this assignment. I felt proud to say I was an Earth Team volunteer with USDA.

Contact SMWQ Project Staff at: 417-581-2719 x5