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Thursday, August 14, 2008

To: The Rivanna River Basin Commission

From: The RRBC Technical Advisory Committee

Subject: TAC July 2 meeting summary

The main purpose of the July Technical Advisory Committee meeting was to continue the discussion of next steps and develop a recommendation for the Commission. The group also discussed the role of the TAC and RRBC in the future of the South Fork Rivanna Reservoir and water conservation, and discussed appointing new TAC members.

Presentation – Ken Hyer, USGS
Ken Hyer gave a presentation on several USGS sedimentation studies and their relationship to the Rivanna River watershed. USGS is undertaking a variety of projects that may be relevant to the work of the RRBC and TAC, including the following:

- Chesapeake Bay Conceptual Model – USGS is working to address the factors affecting water quality in the watershed and delivery to the Bay. They are monitoring nutrient and sediment conditions, quantifying nutrient and sediment loads, identifying long-term trends, and exploring factors affecting these trends. To measure sediment, they have deployed turbidity meters that collect data every 15 minutes. According to the Bay model, things look a lot better than the field sampling tells us. This may be in part due to the fact that the model assumes 100% efficiency of BMPs. They have also learned that high water years have much higher sediment loads. They are discussing adding a monitoring station on the Rivanna River at Palmyra, but this probably won't happen this year.

- Assessing Effects of BMP Implementation in Fairfax County – USGS is researching the effectiveness of strategies, such as stream restoration, at improving water quality in urban watersheds. In this 10-year study, they are looking at watershed-scale effectiveness of BMPs using 14 sample watersheds that represent a range in watershed characteristics (such as % impervious cover). Most of the sample watersheds are about 3 square miles in area. 5 years is the minimum amount of time that data should be collected before beginning to look at trends, and 10 years of data collection is better. USGS may also begin calculating sediment budgets and conducting sediment fingerprinting as part of this project. Fairfax County is covering 80% of the cost of the project, and USGS is providing the remaining 20%. The total cost is about $250,000/year for monitoring of the 14 sites.

- Regional Curves for Piedmont – USGS is developing regional curves for reference streams in non-urban areas that relate bankfull stream characteristics (depth, width, cross-sectional area, and discharge) to drainage area. This will provide information for stream restoration channel design, evaluating current conditions, and assessing changes over time. Cross-sections of

Rivanna streams could be measured and compared to reference conditions using the regional curves.

- Hydrological Integrity Assessment Process – In this project, USGS is evaluating 171 biologically relevant hydrologic indices using existing flow records. They are comparing these to current or proposed hydrologic alterations (following urbanization, for example), and developing linkages between hydrological response variables and ecosystem response/integrity. Virginia is recently starting to recognize that flow is a pollutant. EPA is excited about this and the TMDL Department at DEQ is also getting involved in this.

Ken also discussed implications for the Rivanna watershed. He noted that to understand how altered hydrology is impacting the health of the watershed, we need an integrated approach to understand the interactions and processes related to land use, flow patterns, water quality, geomorphology, and ecology. A likely first step will involve the installation of infrastructure to collect basic watershed data with subsequent process-level interpretive work once basic data collection is supported. Ken stated that we have four flow gauges in the Rivanna watershed, good land use data, and good ecological health data. Water quality and geomorphology data are harder to collect, but Ken suggested we consider trying to establish a program to collect such data. We could set up a few transects or cross sections and could also develop regional curves for the watershed. He added that we also need more sediment data, since few high flow events have been captured. We could also compare historical records from flow gauges to watershed changes to try to determine what is driving the changes in flow.

Report on Stormwater Regulation Workgroup

Ridge Schuyler gave a report on the Department of Conservation and Recreation (DCR)'s work to develop new stormwater regulations. When DCR began looking at revising these regulations, they were focused on water quality. However, the TAC they had appointed to help develop the regulations suggested a workgroup be formed to look at quantity as well. Ridge is participating on this workgroup, which will provide suggestions to the TAC on how to incorporate water quantity into the regulations. The TAC will then pass the suggestions on to DCR. The workgroup is recommending that the regulations require runoff characteristics to replicate the characteristics that would have been present if the site were in good forested condition. Understanding that it is hard to replicate the forested function, they are also looking at requiring an energy balance method, which would try to prevent impacts to streams by ensuring that the energy leaving the site is what it would have been if the site were forested. These suggestions may not make it into the regulations, but this work is similar to what the RRBC and TAC are working on with altered hydrology so Ridge wanted to make sure everyone knew about it.

Report from Practice Subcommittee

Dave Hirschman gave the report of his subcommittee, which was charged at the last TAC meeting with synthesizing information on cost, acceptance, feasibility, and multiple benefits of practices to address altered hydrology. The purpose of synthesizing this information was to get a better idea of which practices the RRBC/TAC might recommend for implementation. Dave prepared a spreadsheet listing the runoff reduction, cost effectiveness, and multiple benefits of a variety of practices used on development sites. Much of this information was gathered from research that the Center for Watershed Protection has completed. The runoff reduction values

are based on small storms (1" of rainfall or less), and indicate the ability of a practice to reduce the volume of water that enters it. With events greater than 1", the runoff reduction of the practices decreases. Dave pointed out that the cost numbers in the spreadsheet don't include the costs of design, and cost estimates for some practices range because their cost decreases as the system size increases.

The TAC discussed possible ways to move forward with the spreadsheet the Practice Subcommittee created. One possibility is to score each of the criteria in the spreadsheet and sum the scores for each practice to get an idea of which practices rank the highest. From this, the TAC could recommend to the RRBC the top practices to promote. The TAC discussed the concern that providing a list of practices to the RRBC to recommend for implementation may be problematic because some of the practices may not work on certain sites. Instead of giving the RRBC a list of practices to promote, the TAC could work with a locality, UVA, or a developer to create a site-specific recommendation for practices to include on a particular site and see how implementation goes before recommending the RRBC promote the practices more broadly. This would serve as a demonstration site/pilot project that the TAC and the community could learn from. The TAC could ask the RRBC for project ideas throughout the watershed. RRBC Member Holly Edwards was in attendance and agreed that she would like to see some of these practices in place and then be able to go back to the localities and suggest they be implemented on a broader scale. To proceed with this, the TAC and RRBC need to decide whether to begin by working with a locality or with a developer, how to engage the locality/developer, and whether RRBC resources should be spent or if the RRBC's role would be to encourage this but not spend resources.

The TAC also discussed the need to add non-structural practices (such as riparian buffers) to the spreadsheet, but the data on these practices would first need to be compiled through a literature review. Another thought was that it might be helpful to compile information on what localities ordinances require or allow with respect to these practices. There was also the suggestion that the TAC should compile a list of existing innovative practices.

The TAC would like to prepare a technical document for the Commission that expands on the spreadsheet Dave created and gives the RRBC some ideas about how they could proceed. Tamara, Kristel, and Alyson volunteered to join Dave on the Practice Subcommittee to assist with preparation of the document.

Report from Watershed Model Subcommittee

Greg Harper gave the report of his subcommittee, which was charged at the last TAC meeting with looking into the data needs and level of effort required to complete a modeling exercise. The goal of this exercise is to determine the contribution of various land uses to the altered hydrology problem and the impact of implementation of site-level practices on overall watershed hydrology. The question the TAC is trying to answer is whether or not the watershed can be restored by implementing practices on new development sites alone, or if it is also necessary to install practices on other land use types, such as agricultural lands or already developed areas.

Greg prepared a spreadsheet to estimate relative contribution of different land uses to altered hydrology to serve as a starting point for this analysis. The contribution to altered hydrology by

each land use is a function of the area of land in that land use type and the degree of land conversion relative to an ideal land cover (one that has no negative impact on streams). Greg used forest in good condition as the ideal land cover for this analysis. To calculate runoff from various land uses, he used curve numbers, which are empirically-derived numbers that represent how much runoff a particular land use and soil type will generate due to a particular rainfall amount. Greg computed relative impact scores for each land use, by calculating the difference in curve number between each land use and that of a good forest (to represent the degree of land conversion), and weighting this number by the relative area of each land use.

Greg presented sample impact score calculations for the Moores Creek watershed and for the Rivanna watershed as a whole. He noted that the analysis assumes that most forest cover in the watershed is less than ideal since it is managed or urban. Thus, the curve number for forest used in this analysis is for fair forest, which is higher than the curve number for ideal forest. The outcome from Greg's analysis is that forests and pastureland likely contribute significantly to the alteration of hydrology, accounting for three quarters of the overall alteration in the case of the Rivanna watershed as a whole. Urban areas, despite their smaller portion of the land use, logically have a substantial affect, especially for the more urbanized Moores Creek watershed (accounts for 55% of total alteration).

The group felt that this was a helpful exercise and that the analysis shows that the TAC needs to look at agricultural practices in addition to practices on new development sites, since agricultural land use contributes significantly to altered hydrology. A previous TAC subcommittee found that there wasn't much information about runoff reduction practices on agricultural lands, so researching and testing such practices may be an important gap for the TAC to fill. The TAC also discussed several elements of the model that could be refined to improve it.

Determine Next Steps
Following the reports of the Practice and Watershed Model subcommittees, the TAC discussed next steps and a recommendation for the RRBC on how to proceed.

- The Practice Subcommittee (Dave, Kristel, Tamara, and Alyson) will work to develop a document to present to the RRBC at their August meeting. The subcommittee will post the document for review by the full TAC prior to the RRBC meeting. A TAC member (perhaps Dave Hirschman) will give a presentation about the document at the meeting. The document will include information on the practices for mitigating altered hydrology, ideas for how the RRBC could move forward with a pilot project with a locality, UVA, or a developer, and specific ways the RRBC could participate in this. The document will include the following:
    - Information on practices
        - One page per practice with a basic description of the practice and a photograph or diagram; technical/engineering specifications are not necessary.
        - Buffers should be added as a practice, with the caveat that more research needs to be done on the effectiveness of buffers for runoff reduction.
        - Locations where these practices are currently in place.
    - The suggestion that the RRBC move forward with a pilot project with local government, UVA, or a developer.

  - Specific ideas for how to engage in this, e.g., contributing RRBC resources to hire a firm to work with a developer/locality to create a site plan incorporating practices, or simply encouraging these practices on pilot projects.
- The Watershed Model Subcommittee (Greg, Ridge, Dave, Sam, and Rochelle) will work to refine the modeling analysis as follows (not anticipated that this will be completed before the next RRBC meeting):
  - The subcommittee will look into whether existing Rivanna watershed forests really are that much different from ideal forests in terms of hydrology. This has important implications for the model results, since such a significant portion (66%) of the watershed is in forest.
  - The estimates of future development will be refined. Greg estimated that 2% of the forested area would be converted for future development, but additional research should be done to refine this estimate.
  - The subcommittee will revisit whether it makes sense for the model to use a CN value for grasslands that is higher than that of low-density residential development.
  - The subcommittee will look into applying the refined model to a few watersheds where monitoring data (e.g., stream flows and sediment) is available and can be compared to model results.

Discuss Role of TAC/RRBC in Future of South Fork Rivanna Reservoir and Water Conservation

A Task Force has been created by the City Mayor and the chairs of the Albemarle County Board of Supervisors, Albemarle County Service Authority, and Rivanna Water and Sewer Authority to advise them on maintaining the South Fork Rivanna Reservoir. Over the course of 4 months, the Task Force will determine whether the reservoir should be dredged and for what purpose, and establish a scope of work to guide a study that will be conducted by a firm hired by RWSA. Sally Thomas, RRBC Chair and a member of the Task Force, requested that the TAC provide input on what should be presented at the initial meeting of the Task Force and who should make the presentation. She also wanted to know what role the TAC sees itself playing in the Task Force's discussion.

TAC members suggested the report written by Stephen Bowler when he was Watershed Manager for Albemarle County, "South Fork Rivanna Reservoir and Watershed: Reflecting on 36 Years, Anticipating 50 Years," would be the best document to provide background on the reservoir. Members also suggested that the presentation include photos and maps of the reservoir, maps of the drainage basin and its land use, and a brief history of the reservoir (perhaps with a timeline). Much of this material is in Stephen's report. It might also be helpful to determine if any further research or reports have been completed since Stephen's report. Steve Macko, a professor at UVA, may have done some research since the report was written, and Diane Frisbee offered to contact him to inquire about this. The TAC also thought it would be helpful if Stephen or a member of the TAC gave a 10-15 minute presentation at the first Task Force meeting. Dave Hirschman offered to contact Stephen to see if he would be interested in giving the presentation.

The TAC also discussed the role of the RRBC/TAC in the Task Force. Ridge reminded the group that City Council passed a resolution that stated the need to look at maintenance of the

reservoir and at water conservation, and the resolution mentioned that RRBC should help with this. The TAC discussed their role in the Task Force as having three components:

1) Maintenance of the reservoir
2) Water conservation
3) Participation on the Task Force

The TAC discussed the fact that 1) and 2) above are consistent with the work the TAC and RRBC have been doing. Maintenance of the reservoir is not just about dredging; it's in large part about how to stop excessive sedimentation. The TAC and RRBC are working to try to address the problem of altered hydrology to try to stop excessive sedimentation in the Rivanna watershed, including the reservoir. Rainwater harvesting is a practice that can meet the goal of stopping sedimentation and the goal of conserving water, so one role the RRBC/TAC could play is to work harder to promote rainwater harvesting. Number 3) above is also related to the RRBC and TAC, since the RRBC is charged with protecting natural resources within the Rivanna watershed and this includes the reservoir. The TAC would like the RRBC to provide them with guidance on how involved the TAC should get in working on maintenance of the reservoir, since it is just one part of the larger watershed they are working to protect. If the RRBC wants the TAC to be further involved in these discussions, the TAC would like direction from the RRBC about how they should proceed.

Develop recommendation for Commission to appoint new non-staff TAC member(s)
There are two vacancies on the TAC for staff members – one for Charlottesville and one for Greene County. RRBC members from those localities should be bringing forward recommendations to fill those vacancies at the next RRBC meeting.

As of the last TAC meeting, there was one vacancy on the TAC for non-staff members. There are now three vacancies on the TAC for non-staff members, since Ed Imhoff stepped down, and Andrea Terry left her position as Watershed Manager with RWSA. To fill the vacancy discussed at the last TAC meeting, the TAC had requested applications from interested citizens. Diane Frisbee reported that she received only one application, from Joanna Curan who has also expressed interest in serving on the RRBC itself. If the City decides to appoint Joanna to the RRBC, she will serve in that role instead of serving on the TAC. The TAC will wait until the City decides whether to appoint Joanna to the RRBC, and if she is not appointed to the RRBC, they will discuss her application to join the TAC. The TAC also decided to leave the RWSA vacancy open for the person who replaces Andrea. The TAC will seek to fill the other vacancies with people who have forestry and/or soil science experience since there is a gap in TAC member expertise in this area. The TAC would like to identify and recruit people with this specific expertise to serve on the TAC, and Diane Frisbee will start a TAC weblog discussion to see if anyone has ideas of people who might be good to recruit.

Kate Cooper announced that she will be on maternity leave soon and Darren Coffey, Planning Director for Fluvanna County, will fill in for her on the TAC in her absence.

The next meeting was set for August 22 at 9:00 am at TNC.

Compiled by Diane Frisbee and respectfully submitted by Samuel H. Austin, TAC Chair.

Attachmetnts:

A. Ken Hyer presentation 08Jul02
B. Ken Hyer USGS.HIAP 08Jul02
C. Action Items 08Jun25
D. Altered hydrology Greg Harper 08Jul02
E. Next steps summary flow chart 08Jul02
F. Practice Subcommittee report 08Jul02