**CBP STAC 2014 Proactive Workshop Proposal:**

***Re-plumbing the Chesapeake Watershed:***
***Improving roadside ditch management to meet TMDL water quality goals***

***Steering Committee Members:***

Kathy Boomer – TNC, MD/DC Chapter - Chair, Conference Organizer
Rebecca Schneider – Cornell University - Chair, Summary Report and Follow-up
Norm Goulet – Northern VA Regional Commission; CBP Urban Stormwater GIT
Steven Bloser – Director, PA Center for Dirt and Gravel Roads
David Orr – Director, Cornell Center for Local Roads
Michael Slattery – USFWS, Chesapeake Bay Program
Jennifer Greiner – USFWS, Chesapeake Bay Program
Donnelle Keech –Allegany Forests Project Director, TNC

***Workshop Objectives:***

- Share recent scientific assessments of regional surface water quality impacts from ditches alongside low-volume, rural roads;
- Review CBP accepted best management practices to mitigate impacts from roadside ditches and explore novel approaches to treating road runoff;
- Outline additional policy and research and monitoring needs to enhance rural roadside ditch management; and
- Establish a communications network for professionals, including decision-makers, practitioners, and scientists, engaged in building better ditch management across the Bay Watershed.

***Description of Workshop Topics and Degree of Urgency*:**

Roadside ditches crisscross every watershed, and capture more than 20% of runoff from road surfaces and adjacent hillslopes. Each ditch acts as a high velocity "faucet", shunting water, soil nutrients, and sediment to our waterways. For example, in the Upper Susquehanna basin, roadside ditches contributed up to 15% of the total TSS and TP measured storm loads (Diaz-Robles 2007). In Talbot County, MD, more than 1200 ditch treatment opportunities were identified *along rural county roads alone*; and based on CBP5.3 loading rates, the average edge-of-stream sediment load to these concentrated flow channels is approximately 1000 lbs per year (Boomer, unpublished). In addition to exacerbating excess sediment loads, roadside ditches increase nitrogen transport to our waterways because of elevated supply from vehicular traffic (Howarth et al 2009), and also act as rapid conduits for fecal coliforms (Falbo et al. 2012). Finally, the rapid runoff significantly increases peak storm flows, adversely affecting aquatic habitat conditions and increasing downstream flooding (Buchanan et al 2012). All of these impacts will be exacerbated by climate change, particularly by the increased frequency of high intensity storms (Buchanan et al 2013). These huge urban-sector impacts tend to occur outside mapped development, however, and so remain largely unaccounted for in the current Chesapeake Bay TMDL framework. Yet the large surrounding 'open' space could present exciting, cost-effective opportunities to meet urban-sector TMDL goals.

Unfortunately, ditch management practices have not changed in nearly a century and likely present an overlooked key strategy to protecting water resources (Schneider et al, in review). For example, Town highway staff routinely "clean" or scrape ditches, resulting in hundreds of miles of exposed dirt that washes into

streams during each storm, along with nutrients, deicers, and other road contaminants. Promising 'modern' strategies range from simple hydroseeding and channel reconfiguration to more resource intensive green infrastructure including bioswales, biofilter bags, permeable asphalt, and under-road drain tubes. In short, redirecting attention to road ditch networks will provide a new and overlooked suite of strategies to support the development of WIPs and achieve the desired TMDL goals for reducing excess nutrients and sediment cited in the New Bay Agreement.

NY State Cooperative Extension workshops engaging nearly NYS 2,500 town highway staff (e.g. the on-the-ground implementers) consistently revealed that changing the policy and practices enforced by a century of momentum will require support from policy-makers at regional and state levels, who can allocate resources and funding, and also introduce regulatory mandates to mitigate impacts from roadside ditches. The proposed workshop would provide an opportunity to share information on this topic among a broad array of stakeholders, including federal, state, and level policy makers, watershed planners, public works and highway staff, and restoration specialists.

***Workshop Products:***

1) A final report of the workshop discussions developed for local practitioners that will include an overview of the current science regarding impacts to regional waterways from roadside ditches, an outline of potential management strategies, a review of existing targeting/assessment tools, and a summary of feedback concerning obstacles and potential solutions to practice implementation. The report also will include a list of recommended next steps and strategies.
2) Participants will provide a basis for initiating a communications network to share innovative decision tools, management strategies, and also monitoring outcomes that will improve our capacity to manage urban impacts in the predominantly rural landscape across the Chesapeake Bay watershed. To ensure successful distribution of the workshop products and to foster follow-up dialogue, the steering committee will engage the National Local Technical Assistance Program (http://www.nltapa.org/nltapa/) which is present in all Bay states to provide guidance for the transportation industry. This program already has established communication mechanisms including quarterly newsletters, websites, and email lists, as well as participation in regional and statewide meetings. A new list-serve also may be established and maintained by the Cornell Local Roads Program, if participants agree this is a critical need/networking mechanism.
3) Identify individuals to serve on a BMP Expert Panel with expertise in evaluating and mitigating impacts from rural road networks. This panel will support the Water Quality Goal Implementation Team (WQGIT) through the Urban Stormwater source sector workgroup.

**Anticipated Sessions and Speakers** (additional speakers will be added to finalize the agenda)*:*

**I. Sizing up the Problem and Evaluating Opportunities:**

- Zachary. Easton (VA Tech): Impacts from roadside ditches to watershed hydrology
- Mark Noll (SUNY Brockport): Roadside ditches increase TSS loads
- Mark Tomer (USDA ARS-Iowa): Nutrient loads linked to roadside ditches and ag runoff
- Dan Buckly (Cornell): Roadside ditches as conduits for fecal coliforms

**II. Strategies and Estimated Costs for "Re-plumbing" our Watersheds:**

- Rebecca Schneider (Cornell): Quick, cheap fixes with big impacts
- Steve Bloser (PA Center for Dirt and Gravel Roads): Disconnecting ditches – the pros and cons of infiltration basins, detention ponds, under-road drains, and constructed wetlands
- David Wick (SWCD – Warren County, NYS): Successful case studies
- David Orr (Cornell Local Roads): Cutting edge alternatives– permeable asphalt
- Bern Sweeny (Stroud Water Research Institute): Level lip spreaders
- Peter Kleinman (Penn State): Filter mediums for treating flow in ditches.

III. **Linking Ditch Management Policies across Multiple Spatial Scales:**

- Jeff Sweeny (CBP) Roadside ditches in the current/future TMDL management framework
- Kathy Boomer (TNC): Considering an adaptive management framework to meet TMDL goals.
- Shorna Allred (Cornell): Overview on Barriers to Adoption of Green Infrastructure

**IV. Short Field Trip – (to nearby demonstration site)**

***Workshop Logistics:***

*Timeline:* The workshop will convene a diverse group of approximately 100 policy-makers, scientists, and practitioners in October, 2014. A draft report will be ready for review by workshop participants in late November, 2014 (60 days post-workshop), with the final report to be completed by late December, 2014.

*Location:* Harrisburg, Pennsylvania, to minimize travel distances for all participants.

***Requested Budget*:**

| **Item** | **Estimated Cost** |
|---|---|
| Venue | $1,500 |
| Lodging at $100/night for 50 participants (50 nights, total) | $5,000 |
| Local Transportation for 50 participants at $100/trip | $5,000 |
| Food | $1,500 |
| Travel, lodging for steering committee to prepare report (2 days, 1 night) | $500 |
| **Total** | $13,500 |
| **Committed Matching Support** | $1,000 (so far) |

***Additional potential fiscal partners supporting workshop:*** *Cornell University*

***Previous related STAC funded workshops:*** The proposed workshop would build on previous efforts initiated by STAC and the CBP Local Government Advisory Committee to explore urban storm water programs (Exemplary Strategies to Protect and Restore Urban Watersheds: Preparing for the Chesapeake Bay TMDL and Watershed Implementation Plans, held May 13, 2010). This workshop will **shift the focus** from highly developed, urban areas to t**he intersection of development, agriculture, and timber harvest in rural settings, specifically to low-volume roads and associated drainage ditches**. Further, the previous workshop was conducted prior to the TMDL regulations; local policy-makers and practitioners had not stepped through the WIP process or begun defining strategies to meet mandated water quality goals. Participants in the 2010 workshop would be invited to this workshop with the hope that they would contribute their experience and insights gained since the 2010 meeting.

A previous workshop organized by Robert Howarth and Ron Entringer (2009) was focused on atmospheric deposition as a major source of nitrogen to the Chesapeake Bay. Although the discussion highlighted the importance of near-road deposition from vehicle exhaust and the potential for ditch transport, the workshop did not consider the broader implications of roadside ditch networks for their roles in moving water, sediment, phosphorus, or other pathogens to regional waterways. Newly initiated research at Cornell this year is investigating the role of roadside ditches as hotspots for denitrification and potential filters of nitrogen runoff from agricultural fields as well as associated impervious surfaces. Preliminary findings will be presented at the workshop.

**Literature Cited:**


Buchanan, B., and others. 2013. Modelling hydrologic effects of roadside ditch networks. J of Hy 486: 293-305.

Buchanan, B.P., and others. 2012. Hydrologic impact of roadside ditches in an agricultural watershed in c. New York: implications for non-point source pollutant transport. Hydrologic Processes. [doi: 10.1002/hyp.9305 ] (online May 2012)

Diaz-Robles. J. 2007. Evaluation of the effects of ditch management practices on suspended sediment, bedload and dissolved chemical contaminants transported to downstream receiving waters. Ms. Thesis. Dept. Civil and Environmental Engineering, Cornell University.

Entringer, R., and R. Howarth. 2009. Workshop on Atmospheric Deposition of Nitrogen -- Chesapeake Bay Program Science and Technical Advisory Committee. January 8, 2009. STAC Publication 09-001. (http://www.chesapeake.org/stac/Pubs/atmosphericnitrogen.report.pdf.

Falbo, K., and others. 2013. Roadside ditches as conduits of fecal indicator organisms and sediment:. JEM 128: 1050-1059.

Schneider, R.L., and others. (in prep) Re-plumbing watersheds: consequences of roadside drainage on water resources.