

SEDIMENTS

Newsletter of the North Carolina Sedimentation Control Commission

Handling Turbidity in Pumped Water

By Richard McLaughlin, Ph.D., Department of Soil Science, NC State University, Raleigh, NC

There continues to be much discussion among those involved in the construction industry about the Environmental Protection Agency's proposed Effluent Limit Guidelines for construction site stormwater. The biggest concern is the apparent need to install expensive water treatment equipment to reduce turbidity to an acceptable range, not to mention the area needed to store the runoff until it is treated. Research at North Carolina State University, funded by the North Carolina Department of Transportation, suggests an inexpensive alternative to the portable water treatment plant approach. Passive and active dosing of pumped, turbid water was investigated under controlled conditions at the Sediment and Erosion Control Research and Education Facility (SECREP). The research was intended to simulate pumping that is often required for excavations and borrow pits where the water is highly turbid. The researchers were looking for inexpensive ways to introduce the flocculating agent polyacrylamide (PAM) into the pumped water prior to discharge into a stilling basin. They found that turbid water can be treated with PAM by either injecting a concentrated solution into the water pump intake or by passing the water pump discharge over a solid block of PAM. The injection method is much more controlled, since you can dose at a known concentration, but it is relatively simple. Discharging over a PAM block was nearly as effective, but of course the actual dose and concentration in the treated water is unknown. Passing the treated water through a stilling basin with at least one baffle is sufficient for removal of the flocculated sediment and retention times can be relatively short. The type of baffle, rock or coir netting, was not

important. The authors observed that a substantial amount of floc trapping appeared to be on the 2:1 slope of the dam, suggesting a shallower slope might have worked even better. The alternative of pumping treated water into a geotextile sediment bag is also effective in removing flocs, but the bags tend to clog and need frequent replacement. These studies were recently published in Transactions of the American Society of Agricultural and Biological Engineering, and there are several fact sheets on these systems <http://www.soil.ncsu.edu/about/publications.php>.

Bhardwaj, A. K., and R. A. McLaughlin. 2008. Simple polyacrylamide dosing systems for turbidity reduction in stilling basins. Transactions of the ASABE. 51(5): 1653-1662.

Bhardwaj, A. K., R. A. McLaughlin, and D. L. Babcock. 2008. Energy dissipation and chemical treatment to improve stilling basin performance. Transactions of the ASABE. 51(5): 1645-1652.



Figure 1. Photo of stilling basin beginning to fill.

Last paper issue! GET SEDIMENTS On-line

Sediments will be available in electronic form ONLY after the April-June 2009 issue.

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State of North Carolina,
Department of Environment & Natural Resources
William G. Ross, Jr., Secretary

Land Quality Section
Division of Land Resources
James D. Simons, Director and State Geologist

IECA International Conference - Technical Highlights

Environmental Connection '09

By Melanie McCaleb, CPESC
NC State University, Raleigh, NC

The International Erosion Control Association (IECA) hosted their annual Environmental Connection conference this year in Reno, NV. Celebrating their 40th year of meetings proved to be a very eventful week full of technical paper sessions, case studies, training workshops, and forums. There were also many opportunities to meet and talk with people from all around the world that are also involved in the erosion control industry...really quite valuable. Erosion and sedimentation happen on so many different levels and in every part of the world. It is easy to focus so much on one's immediate surroundings and the techniques that we as a state use to control these behaviors, that we often don't think outside the box to solve problems. EC'09 gives you an opportunity to explore and learn about similar situations and different techniques and ideas that really can have a significant impact in controlling the urbanization problems that we are faced with everyday.

Monday, February 9, 2009, I joined in a field trip that took us out to look at an ongoing re-vegetation and erosion control project along the I-580 freeway in Reno (Figures 1 & 2).

This project, when finished, will be the connector between Carson City and Reno and will consist of 7.4 miles of 6-lane freeway including 7 bridges. Some of the techniques used to control erosion and establish vegetation on 1.5:1 slopes that primarily consisted of rock were quite amazing. They were able to establish some vegetation with a combination of top soil, rock and organic matter, soil inoculants and hydroseeding with two different application rates of paper mulch with tackifier (and some pretty rare spring storms).



Figure 1. View of an overpass constructed along the I-580 freeway.



Figure 2. Re-vegetation and stabilization of slope along the I-580 freeway.

Monday evening was set aside for IECA Chapter meetings. The Southeast Chapter had a remarkable turnout with over 40 people in attendance to mingle and introduce ourselves, again learning about other practices and ideas.



Figure 3: Attendees enjoying a well deserved break from class during Monday's luncheon.

Tuesday February 10th, Wednesday February 11th, and Thursday February 12th were designated days for technical sessions with breaks to enjoy awards luncheons and time in the expo hall where vendors from all over the world were there displaying their products.



Figure 4: Grand opening of EC09 expo hall.

Qualitative Valuation of Performance Testing for Sediment Retention Devices (SRDs)

By Kevin B. Wolfe, Ph.D., P.E.,
D. WRE, CPESC and Janette L.
Peters, E.I.T., CPESC-IT, Civil and
Environmental Consultants, Inc.,
Franklin, TN

In December 2009, the Environmental Protection Agency (EPA) will be announcing new standards and guidelines for effluent turbidity limitations on construction sites. Due to these new (and maybe somewhat stringent) regulations Kevin Wolfe with Civil and Environmental Consultants, Inc (CEC, Inc) thought it necessary to begin understanding the efficiencies of different SRD's and how well they may be able to improve water quality. In doing so he realized that there were no real specific standards for each type of device (due to environmental variables, i.e rain amounts, soil types, infiltration rates, etc). There are, however, standards for testing different performance variables. Efficiency and hydraulic flux rates specifically for silt fence using site-specific soils is tested under ASTM D 5141. ASTM D 7351 evaluates solids removal efficiency under inter-rill flow conditions and ASTM D 7208 evaluates performance of the device based on percent soil and water retention.

Question: Could he then take these three standards and apply them to different SRDs to try to determine how well they may or may not work?

Answer: There are pros and cons to each test method (standard) and field testing is essential as some of the devices have failure due to undercutting (dependent on soil type) and flow conditions. Understanding the application of the test standards and their limitations is also important.

To report possible violations of
the NC Sedimentation Pollution
Control Act, call

1-866-STOPMUD
786-7683

The Effectiveness of Soil Amendments and Fertilizers with Polyacrylamides for Sediment and Nutrient Control

By Dr. John F. Katers, Bioresources Development Manager, ENCAP, Green Bay, WI

Dr. John Katers with ENCAP discusses a practical application of water soluble polyacrylamides (WSPAMs) to non-agricultural lands. While WSPAMs have been known to enhance infiltration, reduce runoff, reduce soil loss, and possibly reduce nutrient losses, Dr. Katers states that due to the small amounts of WSPAMs needed to treat a given area are so small, it makes for difficult "uniform" application. So, ENCAP has designed different "Advanced Soil Technologies (ASTs)" that help to distribute the WSPAMs with fertilizers and lime in hopes of reducing the amount of sediment and nutrient runoff from given areas. These products utilize recycled paper granules that are coated/impregnated with the WSPAMs. Dr. Katers study looked at three different ASTs for iron, lime and gypsum as soil amendments. All of these treatments were then compared to bare soil for runoff sediment loads as well as runoff solution testing for various nutrients.

Question: Did the different treatments with WSPAMs help to reduce sediment and nutrient loss for the soil?

Answer: "Although the initial results of this study look very promising, a significant amount of additional research must be completed to fully understand the impacts that WSPAMs may potentially have when used in conjunction with soil amendments and fertilizers." There were significant reductions for all ASTs used during this experiment but there are many variables that affect sediment and nutrient loss (i.e. soil type, rainfall amounts and rates, and even pH) that can't be determined in a controlled environment using one type of soil, distilled water for rain, and specific rainfall amounts. Therefore more testing will need to be done



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Send comments to Gray Hauser, NCDENR-Land Quality, 1612 Mail Service Center, Raleigh, NC 27699-1612. Email: Gray.Hauser@ncdenr.gov. Send change of address and subscription information to NCSU Water Quality Group, NCSU Box 7637, Raleigh, NC 27695-7637; (919) 515-3723; bonnie_kurth@ncsu.edu). To receive *Sediments* electronically, please subscribe at: <http://www.dlr.enr.state.nc.us/pages/sedimentationnewsletters.html>. Five thousand copies of this newsletter were printed at a cost of \$1,215 or 25 cents per copy.

Personnel of the Land Quality Section of the NC Department of Environment and Natural Resources provide information and assistance for implementation of the NC Erosion and Sedimentation Control Program. For assistance, please contact the Regional Engineer or the Raleigh headquarters listed below:

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The North Carolina Sedimentation Control Commission

The Sedimentation Control Commission (SCC) was created to administer the Sedimentation Control Program pursuant to the NC Sedimentation Pollution Control Act of 1973 (SPCA). It is charged with adopting rules, setting standards, and providing guidance for implementation of the Act. The composition of the Commission is set by statute to encompass a broad range of perspectives and expertise in areas related to construction, industry, government, and natural resource conservation and quality. All members are appointed by the Governor and serve three-year terms, except for the Director of the Water Resources Research Institute of the University of North Carolina, who serves as long as he remains Director. The chairman of the SCC is named by the Governor. The following is a list of current members with the organizations they represent:

Chairman:

Donnie W. Brewer
Greenville

NC Environmental Management Commission

Commissioners:

W.T. "Buzz" Bryson
Raleigh

NC Public Utilities

Elaine C. Chiosso
Bynum

Non-governmental Conservation

Thommy Esqueda
Wake County

NC Association of County Commissioners

Joseph H. Kleiss
Raleigh

NC State University, Dept. of Soil Science

Grover McPherson
Winston-Salem

NC Soil and Water Conservation Commission

John William Miller, Jr.
Burnsville

NC Mining Commission

Director WRRI (currently vacant)
Raleigh

Water Resources Research Institute of
The University of North Carolina

Robin Smith
Burnsville

Non-governmental Conservation

Mark A. Taylor
Greensboro

Professional Engineers of NC

Richard Vick
Wilson

Carolinas Associated General Contractors

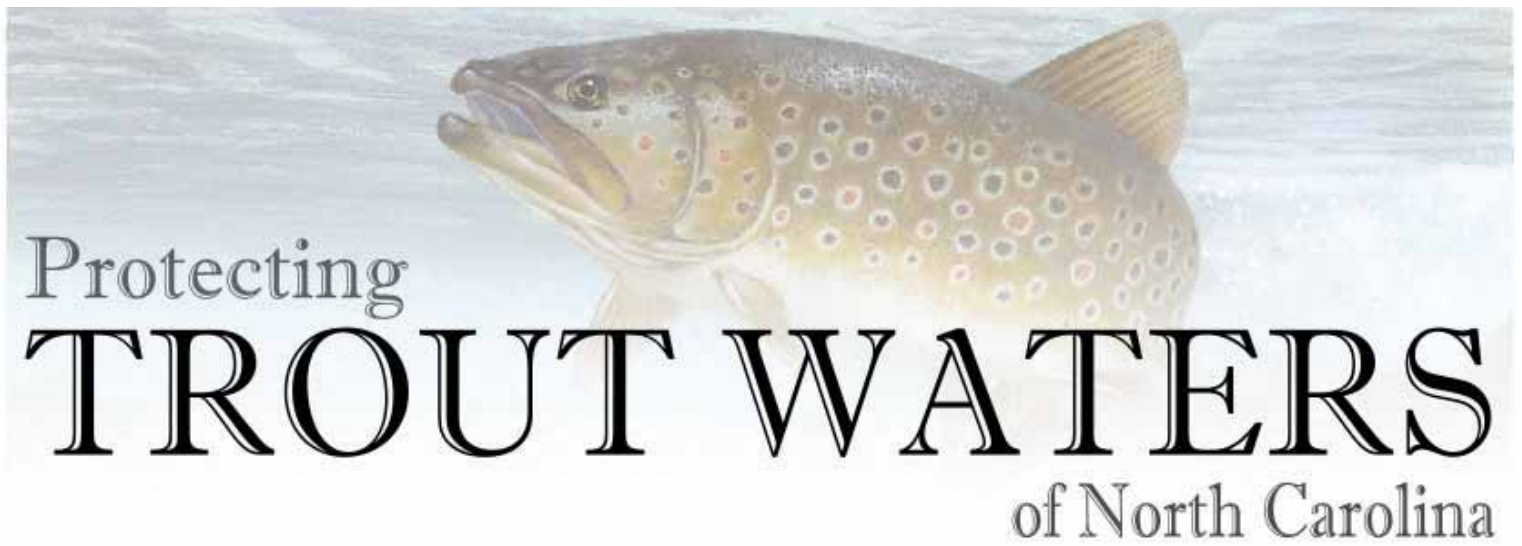
Rob Weintraub
Wake Forest

NC Home Builders Association

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Trout Waters (Tr) Classification

Trout waters are defined in the Environmental Management Commission Rule (15A NCAC 2B .0202) as “waters which have conditions which shall sustain and allow for trout propagation and survival of stocked trout on a year-round basis”. All named and unnamed tributaries to trout waters usually carry the trout waters classification. This classification does not and is not intended to provide public access to streams for fishing on private and public lands and does not regulate, in any way, fishing activities (seasons, size limits, creel limits, and bait and lure restrictions) handled by the NC Wildlife Resources Commission.

Trout Buffer Law

The Sedimentation Pollution Control Act of 1973 requires buffer zones along trout waters. G.S. 113A-57(1) of this Act says: “Waters that have been classified as trout waters by the Environmental Management Commission shall have an undisturbed buffer zone 25 feet wide or of sufficient width to confine visible siltation within the twenty-five percent (25%) of the buffer zone nearest the land-disturbing activity, whichever is greater. Provided, however, that the Sedimentation Control Commission may approve plans which include land-disturbing activity along trout waters when the duration of said disturbance is temporary and the extent of said disturbance would be minimal.”

Why a Trout Buffer?

Trout buffers provide protection for waters that support trout populations. Buffers capture sediment and pollutants from runoff, and buffers shade the water to maintain a healthy water temperature for trout and other aquatic life. Additional benefits of trout buffers are:

- Providing leaves and sticks for aquatic insects, which serve as a food source for fish and other aquatic life.
- Providing logs and branches that serve as habitat and feeding areas for trout and aquatic insects.
- Keeping stream banks stable.
- Preventing erosion and sedimentation.

Trout Buffer Requirements

Division of Land Resources Rule 15A NCAC 04B .0125 specifies the following requirements for buffer zones for trout waters that must be met:

- The (minimum) 25-foot buffer must be measured horizontally from the top of the bank.
- A land-disturbing activity in the buffer zone adjacent to trout water may be approved by the Division of Land Resources (DLR) if the duration of the disturbance is temporary and the extent of the disturbance is minimal.
- To be considered minimal, a land-disturbing activity must meet two conditions. (1) The land-disturbance must be limited to a maximum of ten percent of the total length of the buffer zone on your property. (2) There must not be more than 100 linear feet of disturbance in each 1000 linear feet of buffer zone. For example, if there is 750 linear feet of buffer zone on your property, up to 75 linear feet of that buffer can be disturbed. If there is 1500 linear feet of buffer zone on your property, you are still limited to 100 linear feet of disturbance in any 1000 linear foot section along the stream. Please check with the appropriate Regional Office (contact information on back) to verify that the proposed activity is minimal.
- If the disturbance will exceed 10 percent or 100 linear feet in every 1000 linear feet, approval for the disturbance must be obtained from the Director of the Division of Land Resources. Please submit your trout buffer variance request through the DLR Raleigh Central Office (contact information next page).
- A land-disturbing activity within a buffer zone adjacent to trout water that will cause adverse stream temperature fluctuations, as set forth in 15A NCAC 2B .0211, is prohibited.

One should check with local governments to ensure the land-disturbing activity in the buffer zone is in compliance with all local requirements.

Continued on page 5

Frequently Asked Questions about Trout Buffers

Q: Does the Trout water (Tr) classification give the public permission to access private property for fishing or boating?

A: No. Property rights do not change when a stream is classified as trout. This trout classification only protects water quality for trout to live and survive, and does not provide any access for any reason.

Q: What is a land-disturbing activity?

A: "A land-disturbing activity means any use of the land by any person in residential, industrial, educational, institutional or commercial development, highway and road construction and maintenance that results in a change in the natural cover or topography and that may cause or contribute to sedimentation." (G.S. 113A-52(6))

Q: If my land has a trout stream on it, can I continue to mow the grass up to the stream bank, even though it is within the trout buffer?

A: In most cases, Yes. For an activity to be considered land-disturbance, it must have the potential to increase soil erosion and sedimentation. If mowing does not damage the ability of the ground cover to prevent soil erosion, then it is not a land-disturbing activity. Weed-eating or bush-hogging may result in "scalping" that would result in soil erosion. Minimal land disturbance may take place as described above in the "Trout Buffer Requirements" section.

Q: Can I trim the vegetation within the trout buffer if it is adjacent to an existing use (house, road, garage)?

A: In most cases, Yes. The buffer zone is to protect the stream from sedimentation and prevent adverse water temperature fluctuations from land-disturbing activities. Trimming of limbs or other vegetation is generally not a land-disturbing activity, and temporary and minimal land-disturbing activities are allowed as described above in the "Trout Buffer Requirements" section. Sufficient shade must be left to prevent adverse water temperature fluctuations in the stream.

Q: Can I cut down existing brush or trees within the trout buffer not associated with any existing structure?

A: The understory of small trees and shrubs is an important part of the stream buffer. The roots of the woody vegetation hold the soil together, preventing soil and stream bank erosion. Clearing of brush must be limited to the amount that is considered minimal, as described above in the "Trout Buffer Requirements" section, and it must not result in stream sedimentation or adverse water temperature fluctuations. Ground cover must be maintained to prevent soil erosion.

Q: Can I harvest the timber next to a trout stream on my property?

A: Yes, but forestry activities must follow the statewide Forest Practices Guidelines Related to Water Quality. For more details and guidance please visit the NC Division of Forest Resources website at www.dfr.nc.gov/water_quality/water_quality.htm or call your local County Ranger. Please note the second item in the next answer below.

Q: Are there any land disturbing activities that are exempt from the trout buffer requirements?

A: Yes. The Sedimentation Pollution Control Act, which protects trout buffer zones, does not apply to the following types of land-disturbing activity (G.S. 113A-52.01):

1. An activity, including breeding and grazing of livestock, undertaken on agricultural land for the production of plants and animals useful to man, including but not limited to: forage and sod crops, grains and feed crops, tobacco, cotton, and peanuts; dairy animals and dairy products; poultry and poultry products; livestock, including beef cattle, llamas, sheep, swine, horses, ponies, mules, and goats; bees and apiary products; fur producing products.
2. An activity undertaken on forestland for the production and harvesting of timber and timber products and conducted in accordance with best management practices set out in Forest Practices Guidelines Related to Water Quality, defined in 15A NCAC 11.0100-.0209, as adopted by the North Carolina Department of Environment and Natural Resources.
3. An activity for which a permit is required under the Mining Act of 1971, Article 7 of Chapter 74 of the North Carolina General Statutes.
4. An activity essential to protect human life during an emergency.

Q: If a tree falls into the trout buffer on my property, can I remove it?

A: Yes, with minimal disturbance to the trout buffer.

Q: Can I make repairs to my septic system, paint my house and do other maintenance activities to an existing structure within the trout buffer?

A: Yes. You can still maintain your house, deck or any other existing structures.

Q: Can I make repairs to roads, driveways or culverts if it is within the trout buffer?

A: Yes, provided that any land-disturbance is temporary and minimal, and does not result in stream sedimentation.

Q: Can I build a new garage or shed in the trout buffer zone ?

A: Building a new structure is a land-disturbing activity. If land-disturbance within the buffer is minimal, as described above in the "Trout Buffer Requirements" section, and it doesn't result in stream sedimentation or adverse water temperature fluctuations, a new structure can be built in the buffer. The land-disturbance around the structure, as well as the building itself, must be considered. If the proposed disturbance would not be minimal, contact the DLR Raleigh Central Office to request a variance.

Q: If there is already a 30 foot buffer requirement in place, does a trout buffer add another 25 feet to the existing buffer requirement?

A: No. The most restrictive buffer requirement takes precedent, in this example, 30 feet.

Q: Is it possible to culvert over the creek that runs through my property?

A: Any work done within a stream, regardless of a trout buffer, first requires approval from DWQ and the US Army Corps of Engineers.

For More Information about Trout Buffers

Citizens and state agencies working together to protect North Carolina trout waters

Division of Land Resources (DLR)
(919) 733-4574
<http://www.dlr.enr.state.nc.us>

Division of Water Quality (DWQ)
(919) 807-6300
<http://h2o.enr.state.nc.us>

Regional Offices
Asheville: (828) 296-4500
Winston-Salem: (336) 771-5000
Mooresville: (704) 663-1699



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7/7/09	Level III-A: Design of Erosion & Sediment Control Plans, Raleigh, NC http://www.bae.ncsu.edu/workshops/dot	7/23/09	Level II: E&SC Recertification/Stormwater Site Management, Raleigh, NC http://www.bae.ncsu.edu/workshops/dot
7/8/09	Level III-B: Design of Erosion & Sediment Control for Reclamation Plans, Hickory, NC http://www.bae.ncsu.edu/workshops/dot	8/18/09	Level I: Erosion & Sediment Control/Stormwater Certification, Hickory, NC http://www.bae.ncsu.edu/workshops/dot/
7/11-15/09	Soil & Water Conservation Annual Conference, Dearborn, MI http://www.swcs.org/	8/19/09	Level II: Erosion & Sediment Control/Stormwater Site Management, Hickory, NC http://www.bae.ncsu.edu/workshops/dot/
7/16-17/09	Stormwater BMP Inspection & Maintenance Certification, Raleigh, NC http://www.bae.ncsu.edu/stormwater/	8/20/09	Level II: E&SC Recertification/Stormwater Site Management, Hickory, NC http://www.bae.ncsu.edu/workshops/dot
7/17/09	Stormwater BMP Inspection & Maintenance UPDATE (certificate renewal), Raleigh, NC http://www.bae.ncsu.edu/stormwater/	9/14-16/09	From Dust Bowl to Mud Bowl, Kansas City, MO http://www.swcs.org/en/conferences/sedimentation
7/21/09	Level I: Erosion & Sediment Control/Stormwater Certification, Raleigh, NC http://www.bae.ncsu.edu/workshops/dot/	2/14-18/10	International Erosion Control Association (IECA) Environmental Connection, Dassel, TX. Abstracts Due May 15, 2009. http://www.ieca.org