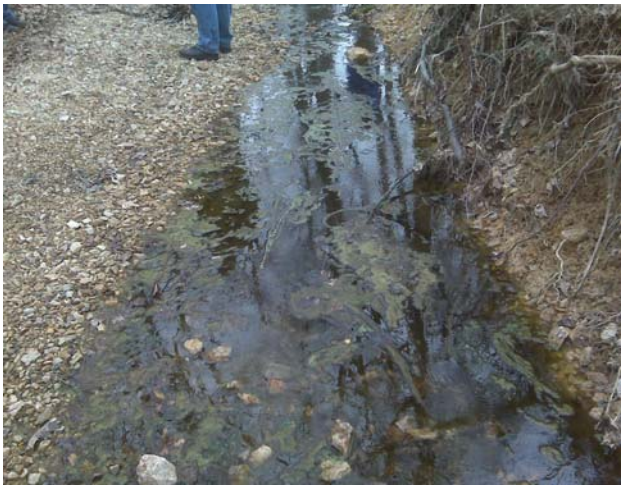
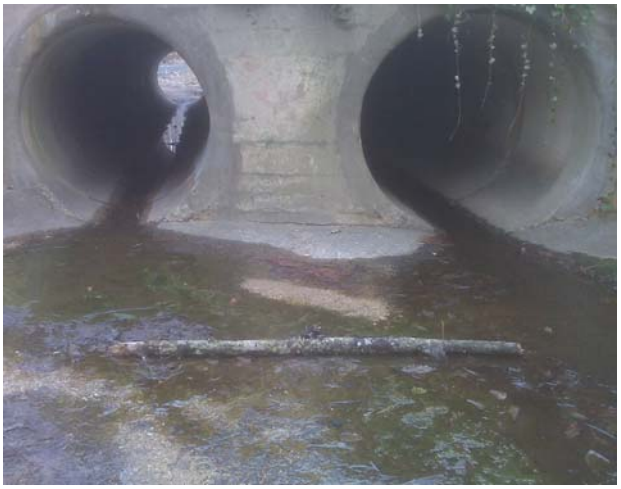
Wetland Studies and Solutions, Inc.

Algae in Snakeden Branch and The Glade
March 23, 2009

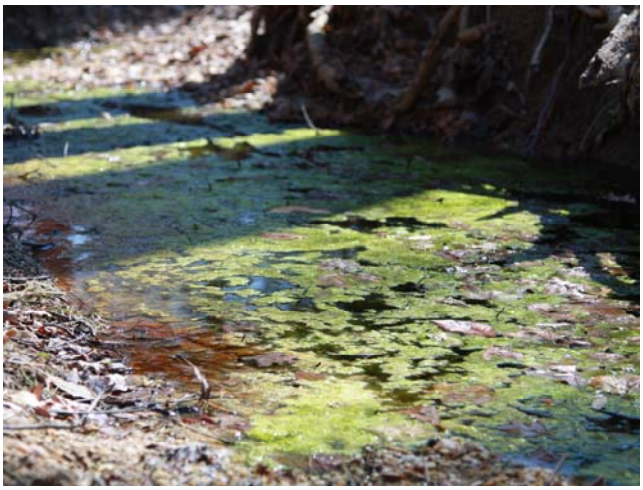


Snakeden Branch Reach 13 ***upstream*** of current stream restoration work on March 14, 2009.

Algae growth in Reach 3 of The Glade on March 22, 2009, prior to restoration.



Algae growth just upstream of Reach 4A of The Glade on March 19, 2009



Algae growth in Reach 3 of The Glade on March 22, 2009, prior to restoration

Today, most of Snakeden Branch has been restored, and the headwater reaches of The Glade (1-3) are underway. Recently, a number of stream restoration observers have noted the presence of significant amounts of algae in both Snakeden Branch and The Glade. Algae are present year-round in both streams. The types typically found are green algae (Division Chlorophyta) and golden algae, or diatoms (Division Chrysophyta). Having some algae in the streams is generally good for the health of the stream as the photosynthetic process releases oxygen into the water, which helps sustain other aquatic life. It provides food for grazing species and cover for other aquatic animals. However, having excess algae in streams can have a detrimental effect on the stream fauna because it can cover instream habitat and eventually cause die-offs of aquatic fauna.

5300 Wellington Branch Drive • Suite 100 • Gainesville, VA 20155 • Phone 703.679.5600 • Fax 703.679.5601 • wetlandstudies.com

With the algae present in the streams year-round, it often takes a specific set of conditions for the growth to spike, or bloom. Algae growth is driven by three primary factors – nutrients (typically nitrogen and phosphorous), light, and temperature. A series of warm and sunny days (which we had in early March before leaf-out) can rapidly increase the growth rate. Also, during drought conditions, a light pulse of rain generating runoff could provide a quick flush of nutrients from surrounding pervious and impervious surfaces; the nutrients would be readily assimilated by the algae in the streams, promoting growth. We are currently experiencing such drought conditions (according to the VA Drought Monitor http://www.deq.virginia.gov/waterresources/drought.php). Since Tropical Storm Hanna on September 7, 2008, the Reston area has received just 6.65 inches of precipitation with the long term average for the period being 15.57. February was one of the driest on record with just 0.35 inches, when normal for the month is 2.77 inches. These abnormally dry conditions are currently promoting rapid algae growth because the pollutant loads are less diluted by rainfall volumes. Additionally, in normal precipitation periods, much of the algae is flushed further down the stream systems and dissipated.

The brownish to reddish color of the algae in some reaches is due in part to the species present (diatoms) and the presence of oxidizing iron in the water and surrounding soils. Iron is a naturally occurring element in some soils and often leaches into streams, causing iron precipitate to accumulate on the stream bottom. In addition, during the restoration of Snakeden Branch, some areas of soil that contain iron have been exposed to air, which creates the oxidizing conditions. Once the iron present and exposed is oxidized, this condition should gradually go away, though predicting that time frame is difficult.

How do we reduce the amount of algae? We need to eliminate or reduce the primary three growth factors described above – nutrients, light, and temperature. Stream restoration can ***help*** accomplish this, but restoration alone will not solve the problem. By reconnecting the stream to the floodplain and providing gentler stream banks, the restoration allows the roots of many more trees and shrubs to be in direct contact with groundwater adjacent to the stream; this will help remove nutrients. The shrubs planted along the stream banks will directly shade and transpire water from the stream edge, reducing water temperatures as they grow. However, the nutrient pollutant loads from development (which are currently washed directly into the stream from parking lots, roads, and roofs, instead of being utilized by trees), coupled with the thermal loading from rainfall on hot pavements and roof tops, will still cause excess algae growth.

We can solve this problem by working as a community and reducing nutrient loads by:

1. Switching to no-phosphorous fertilizers (see Wetland Studies' *Field Notes* Vol. 17 No. 1) and only fertilizing in the fall if needed;
2. Picking up our pets' waste and disposing of it properly;
3. Correcting any leaking sewer systems; and
4. Installing Low Impact Development (LID) practices such as rain gardens, pervious pavers, vegetated swales, as well as more conventional storm filters and ponds to treat the stormwater and remove pollution running off our pavements and roof tops.