

Falls Lake PowerPoint Notes

September 1, 2009

Our Drinking Water

Why is Falls Lake impaired? Because of current development practices and lack of controls and enforcement.

Durham's Urban Growth Area

This slide shows the water supply watersheds and urban growth areas in Durham County. Note the urban growth areas even in the critical watershed of Falls Lake.

Several counties are in the Falls Lake watershed – which is all the land area and creeks that drain into Falls Lake – but the majority of the watershed is in Durham County. Other counties include: Person, Granville, Wake, and Orange.

Development Brings:

Impervious surface, such as sidewalks, pavement and rooftops, which increases the runoff of pollutants and the speed of the water, which in turn increases erosion

Impaired Creeks in East Durham

The creeks that flow into Falls Lake are impaired. They carry large amounts of soil and nutrients into the lake. Falls Lake is a sensitive body of water and it will be pushed over the edge if we keep adding nutrients.

Lick Creek

What's the impact of stormwater runoff from developed areas? High volumes of rainwater, rushing at high speeds, literally eroding the creeks and carrying huge amounts of sediment into Falls Lake.

Ravenstone Subdivision

Developers currently have two options to manage stormwater, neither of which is particularly good. They can either build stormwater retention ponds, which don't work very well, or they can buy nitrogen credits, paying a fee for their nitrogen runoff and the funds are used to mitigate problems elsewhere. It's usually cheaper to buy credits than to implement stormwater controls. Sadly, the amount of nitrogen credits allowed is too high, permitting huge amounts of nitrogen to flow into the creeks and Lake.

Purpose of NCSU Center for Applied Aquatic Ecology Sampling Program

NC State University was funded by the NC Department of Health and Human Services and the Centers for Disease Control from 2002-07 to examine bacteria and toxins in our drinking water supply.

Why? Because Falls Lake looks like this...

Falls Lake Algae – Photo 1

These photos were taken at the upper part of Falls Lake.

Algae overgrowth is causing two major problems: 1) it is literally choking the oxygen out of portions of the lake, creating dead zones where no species can live, and 2) it is creating high levels of cyanobacteria, also known as “toxic algae” because it creates cyanotoxins

Falls Lake Algae – Photo 2

This is blue-green algae. Blue-green algae are naturally occurring, but are known to form noxious and toxic blooms when they are in nutrient-degraded waters. They especially proliferate at the high levels of nitrogen and phosphorous such as occur in upper Falls Lake.

Summertime is when the problem is worst because heat combines with lawn fertilizers to grow more algae.

NCSU has collected oxygen profiles, taking water samples in columns, and has found that oxygen decreases as you go deeper down in the water.

Falls Lake Sediment – Photo 3

This photo shows the high degree of sediment (or dirt) runoff into the lake. With each rainfall, sediment flows into the lake carrying nitrogen, phosphorus and stormwater runoff pollutants with it.

Falls Lake Sediment – Photo 4

Sediment itself is also a problem because it is literally filling up the lake, reducing the CAPACITY of the lake. Given increasing demand for drinking water, water is becoming in short supply.

Water quality is already degraded in the upper lake

Water is being tested in different parts of the lake. Fortunately, the intake for our drinking water is at the lower end of the lake, where it's cleaner. However, the data collected provide compelling evidence that action is required to clean up Falls Lake.

% of Data Exceeding Chlorophyll-a standard

NCSU scientists and others are monitoring Falls Lake and are testing for cyanobacteria levels. In the upper portions of Falls, closer to Durham, researchers are finding very high levels of Chlorophyll-a – in violation of state standards. Between 2002-06, NCSU found cyanobacteria in upwards of 95% of the algae.

According to Dr. Joan Burkholder, cyanobacterial blooms can make toxins that promote liver tumors in humans, and they have caused the death of humans as well. Their toxins also attack the human nervous and gastrointestinal systems. Children and the elderly are especially susceptible to the chronic effects of these potent toxins.

As cyanobacteria are fed more nutrients (like nitrogen), they can produce microcystins, which are potentially cancer causing and can kill wildlife. Hence, cyanobacteria have gotten the nickname “toxic algae.”

Microcystin-LR Toxin – NC Reservoirs

The World Health Organization guidelines rate microcystin as unsafe at a level of greater than 1 microgram per liter.

What is concerning is that NCSU researchers have found very high levels of microcystins in the lowest part of Falls Lake – far away from the upper, much more polluted region.

Remember, the more nitrogen and phosphorus, the greater the algae, and the greater the levels of microcystin.

Cyanobacteria

The concern is that this is public health problem, as well as an ecosystem problem.

Phase 1 of Sierra Development

Here’s an example of just one development proposed in the Falls Lake watershed in Durham County – it’s 430 acres.

Topography of Sierra Site

An added challenge at this site is the topography. The steep slopes increase the flow of water and runoff.

Big Picture

The Chesapeake Bay watershed has struggled with these same threats of development to water quality. Because of the increased use of chemicals required to treat the water, public health agencies and advocates have gotten involved. They understand the impact on drinking water, and it’s beginning to turn the tide for action to protect their watershed.

Stormwater Runoff

We have some stormwater controls, but they aren't all effective.

Developers can buy their way out of stormwater controls with buy-down credits, and cities and counties lack strong enforcement of stormwater measures

.
This does not mean development cannot happen, but rather that how it is done is critical. Low impact development can provide more effective on-site capture of stormwater and help alleviate the our water quality problems.