Report to Town Board
December 2020

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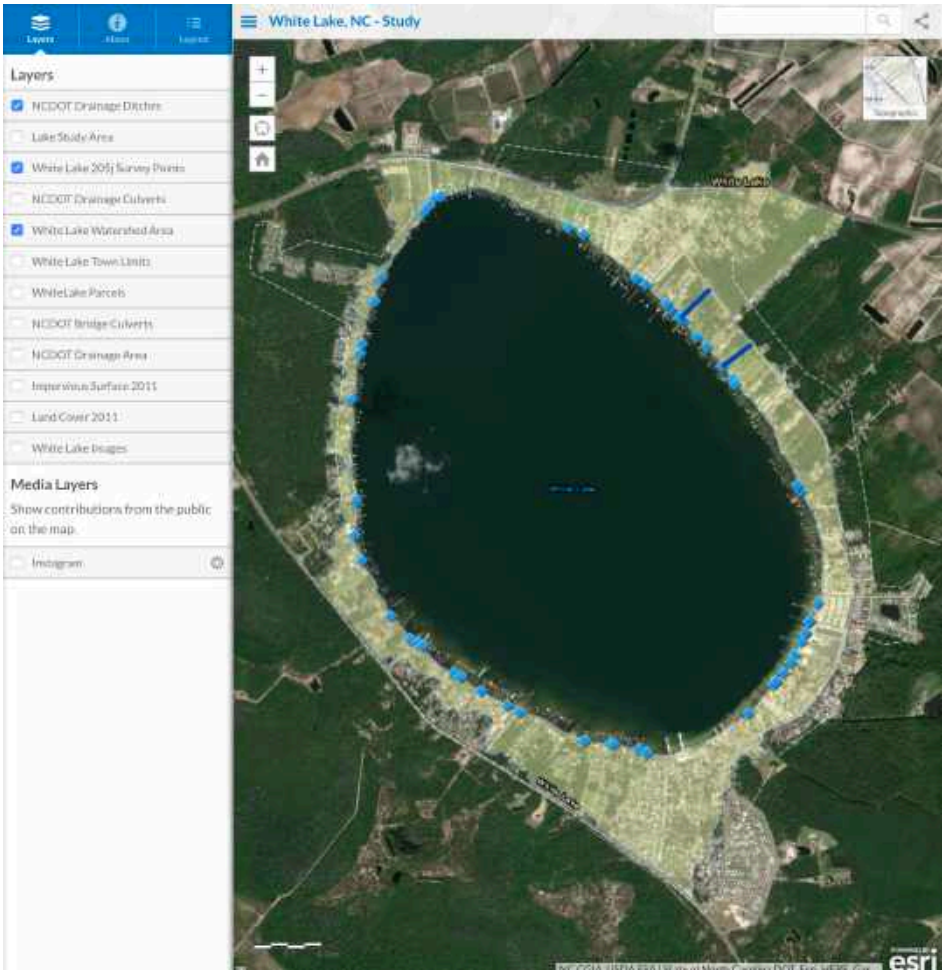
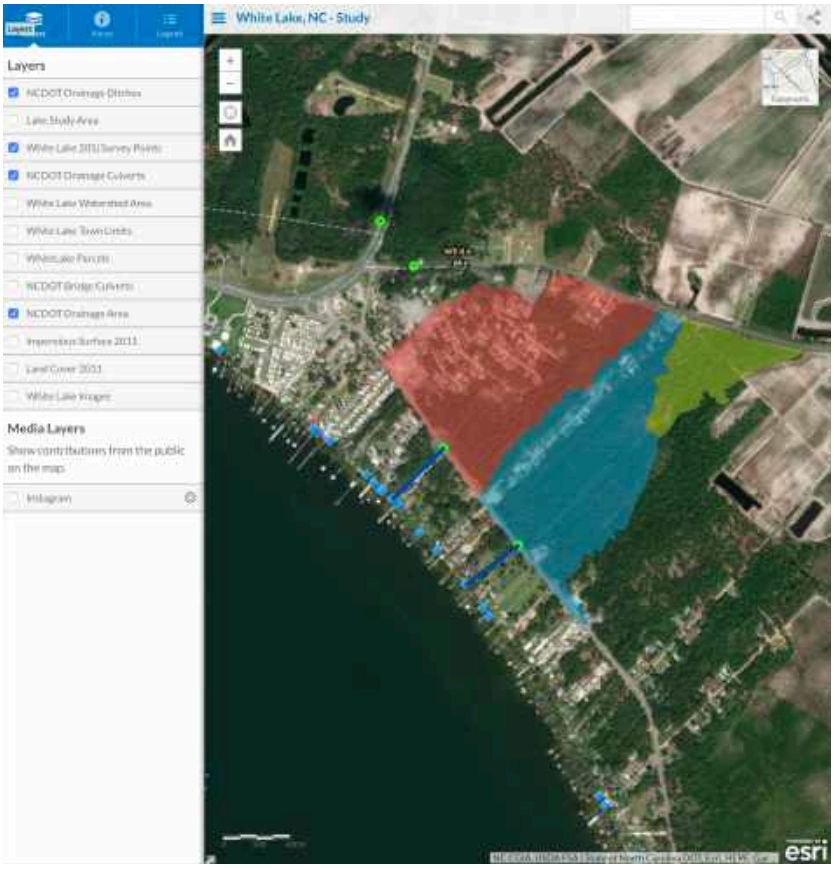
LIMNOSCIENCES

This month is a follow-up to last month's discussion about stormwater, and includes the following:

1. A map of the stormwater pipes (blue squares) and NCDOT ditches (dark blue) that drain to the lake, and the lake watershed (in yellow).



The Town asked NCDOT to look at the White Lake Drive drainage ditches and this was done in January 2014. As reported in an October 19, 2016 letter to Alan Pittman, "a field investigation for the cross-line pipe located at 408 White Lake Drive revealed the total drainage area is approximately 55 acres. The area of this watershed within NCDOT Right-of-Way is approximately 2 acres, or about 3.6% of the total watershed area. The watershed for the cross-line pipe located at 580 White Lake Drive is approximately 49 acres. The area of this watershed within NCDOT Right-of-Way is approximately 2.1 acres, or about 3.3% of the total watershed area Therefore, the vast majority of the property located within these two watersheds is privately owned". The delineation line between the two watersheds is near Woodlief Drive, and subsequent survey work by the Town's engineer defined the watersheds in the same way.



Water quality samples have been taken at various points along each of the NCDOT ditches on a number of occasions, and while there has always been a difference between the two ditches, sampling done on November 12, 2020 found a more substantial difference, indicating that the stormwater at 408 White Lake Drive is picking up more pollutants somewhere in the developed/disturbed portion of the watershed.

Further ditching and piping in this area is the wrong thing to do, sending polluted water to the lake faster. There are several green infrastructure options that would be appropriate, but the needs of the entire 55-acre watershed should be addressed at the same time in order to accomplish the goal of protecting the water quality and aesthetics of the lake. And a reminder: Shank and Zamora's groundwater study indicated that this region is at the heart of the groundwater infiltration zone for the lake, so groundwater flows are lessened when there is more surface runoff.

The ditch perpendicular to White Lake Drive, which connects to a ditch that drains the area around Lennondale Drive (behind the Bladen Medical Center), Nov. 12, 2020.

The NCDOT ditch parallel to White Lake Drive, looking south from where the ditch in the previous photo ties in. The culvert at 408 White Lake Drive is located near where the utility poles are located. November 12, 2000.

The end of the ditch at 408 White Lake Drive, November 12, 2000. The volume of water carried by the ditch is a function of both the **increasing amount of impervious surface in the watershed** and rainfall levels. The large amount of rain received in the summer of 2013, including several very large rain events, resulted in more "brown water" in the lake than had been noticed in previous years (which led the Town to ask NCDOT about the ditches and

drainage), while the large amounts of rain earlier this year also resulted in brown water in areas of the lake far from the ditches. Sediment, organic debris, trash, nutrients, bacteria and other substances are contained in stormwater runoff, as well as the organic acids that contribute to the brown color of the water. The solution to the worsening stormwater problems in this area should be a priority but must be addressed in a comprehensive and systematic way, and NCDOT needs to be an engaged partner.

2. Also mentioned last month was the opportunity to address stormwater when redeveloping properties such as Goldston's Beach. The photos below show several situations: a pipe under the pier which directs roof runoff to the lake, and another location where runoff washes towards the lake:

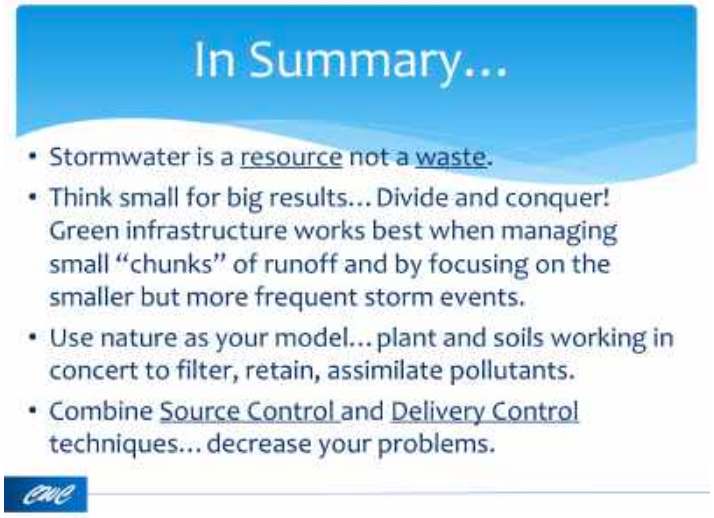
2. There are many other areas that are in need of green infrastructure retrofits, including neighborhoods like Turtle Cove (where a "green streets" option would be appropriate). In addition, guidelines and ordinances for new construction can help the Town define and communicate what "responsible development" means (per the Town's mission statement), so that harmful practices are avoided.

4. To that end, the Town will be participating in a grant program through NC Office of Resiliency and Recovery (agenda item at February 2020 board meeting). NCORR defines a resilient community as "one that can rebound, adjust, and thrive amid changing conditions and

challenges" (https://files.nc.gov/rebuildnc/documents/files/Natural-Hazards-Resilience-Quick-Start-Guide-for-NC-Communities-FINAL-033120.pdf Examining flooding risks and options to mitigate them with wisely-designed and located green infrastructure is increasingly recognized as the best way to protect both property and natural resources, and ultimately foster more desirable and livable communities. The US Environmental Protection Agency has created the document *Enhancing Sustainable Communities with Green Infrastructure: A Guide to Help Communities Better Manage Stormwater While Achieving Other Environmental, Public Health, Social, and Economic Benefits* https://www.epa.gov/smartgrowth/enhancing-sustainable-communities-green-infrastructure which shows examples of green infrastructure.

5. I participated in the 2020 North American Lake Management Society Symposium last month, which was held virtually this year, and presented a paper on White Lake (I have presented in 2018 and 2019 as well). This meeting facilitates engagement with scientists and lake managers, and it was particularly "well-attended" this year. I took a workshop on Stormwater for Lake Management, and thought it would be helpful to share a couple of slides as they summarize some of the things that I have mentioned earlier in this report:

HABs are Harmful Algae Blooms



6. It would be prudent to prepare a grant application for the 2021 funding cycle of the Clean Water Management Trust Fund—applications are due in February—specific to stormwater needs.

7. I will be participating in a stormwater and green infrastructure finance workshop offered by the UNC School of Government on December 8-9.

8. This is a good time to move forward with a moratorium on sea walls (and mooring buoys) as has been discussed in the past and the Town would need to make a request to State Parks for these items. There are other situations (such as underwater lighting) which should also be looked at from a public safety standpoint.