

Land Application of Biosolids and Spray Irrigation: Overview and Regulatory Framework



Introduction

- In response to Commissioner requests and resident concerns, staff is providing this informational overview of biosolids land application and spray irrigation.
- This presentation is organized into three primary sections:
 - Biosolids Application
 - Spray Irrigation
 - PFAS and Biosolid/Spray Application
- Within those sections, staff will:
 - Provide a high-level overview of the issues,
 - Explain applicable regulatory frameworks (Federal, State, and Local),
 - Clarify Chatham County's authority, and
 - Discuss potential long-term land and public health considerations.
- Due to the complexity of these issues, some questions may require follow-up.
- Staff also reviewed this presentation with NCDEQ for accuracy purposes.



Biosolids Application

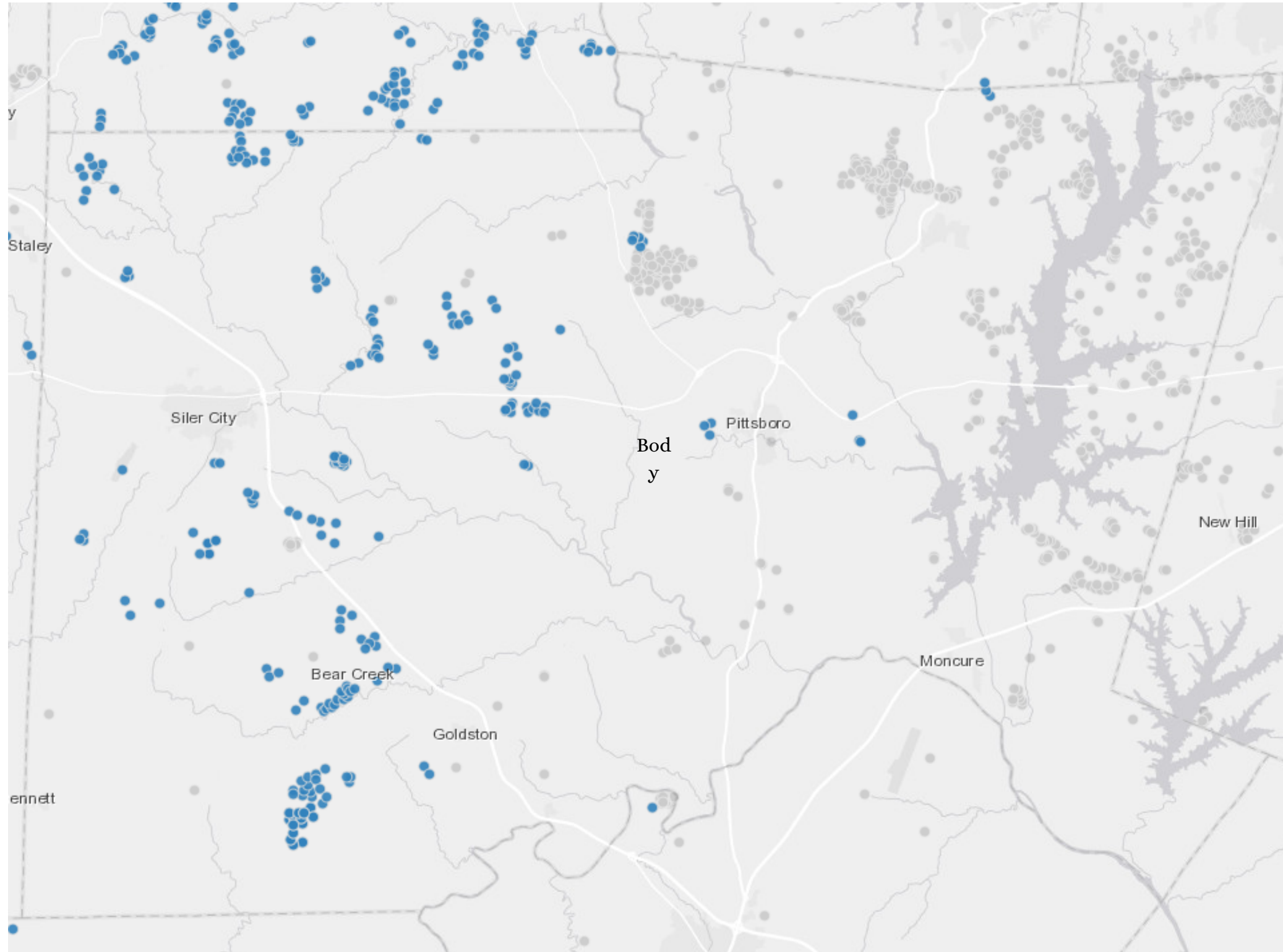


Overview

- Wastewater treatment produces residual solids as part of the treatment process.
- After treatment, those materials may be referred to as sewage sludge or biosolids.
 - **Biosolids** are primarily organic materials produced during wastewater treatment which may be put to use.
 - **Sewage sludge** is the broader regulatory term for biosolids;
- **Land application** is the spraying, spreading, incorporation, or injection of biosolids into or onto the land to either condition the soil or fertilize crops or vegetation grown in the soil.
 - Land application of biosolids is allowed in NC through NCDEQ (North Carolina Department of Environmental Quality) permitting.



Chatham County - Biosolids Application



Chatham County 503 and 503 Exempt Application Sites



Regulatory Frameworks



Regulatory Framework – Federal

- EPA's 40 CFR Part 503 sets national standards for the use or disposal of sewage sludge generated during domestic wastewater treatment.
- This rule addresses biosolids that are land applied, placed on surface disposal sites, or incinerated.
- The requirements primarily address pollutant and pathogen standards.
- The federal framework does not currently establish PFAS biosolid limits.



Regulatory Framework – State

- NCDEQ's Division of Water Resources administers non-discharge permitting for residuals including biosolids and wastewater effluent land application facilities.
- North Carolina state program is independent from the EPA. Regulations are equal to or more restrictive than those in EPA's 40 CFR Part 503.
- 15A NCAC 02T governs "Waste Not Discharged to Surface Waters"; Section .1100 addresses residuals management.
- State permits establish the requirements of land application and field location.
- NCDEQ is responsible for the entire permitting process in North Carolina.



Regulatory Framework – Local

- Counties have general land-use and public health authority, and can regulate the land use of wastewater facilities.
- County's actions are generally strongest in coordination with NCDEQ.
- NCDEQ is responsible for the entire permitting process in North Carolina.



Permitting

- Applicants submit permit materials to NCDEQ identifying sources, and other logistics management.
- NCDEQ reviews applications against federal and state standards.
- Landowners authorize use of their property, but the permit responsibility generally rests with the permitted operator/program.
 - Permits may address:
 - Approved residuals sources;
 - Treatment requirements;
 - Application rates;
 - Nutrient management;
 - Site restrictions;
 - and Monitoring.
- Farmers work with permit holder as biosolids provide major benefits to farmers and other land owners.



Local Authority

- Local authority over biosolids land application is limited by state preemption.
- Granville Farms, Inc. v. County of Granville (N.C. Court of Appeals, 2005)
 - Granville County adopted a local ordinance adding county permitting, fees, notice, recordkeeping, and deed-recording requirements.
 - The Court found that North Carolina's state regulatory framework for biosolids was comprehensive and preempted the county ordinance.
- Counties may not create a separate local biosolids permitting program or add additional local requirements.



Spray Irrigation

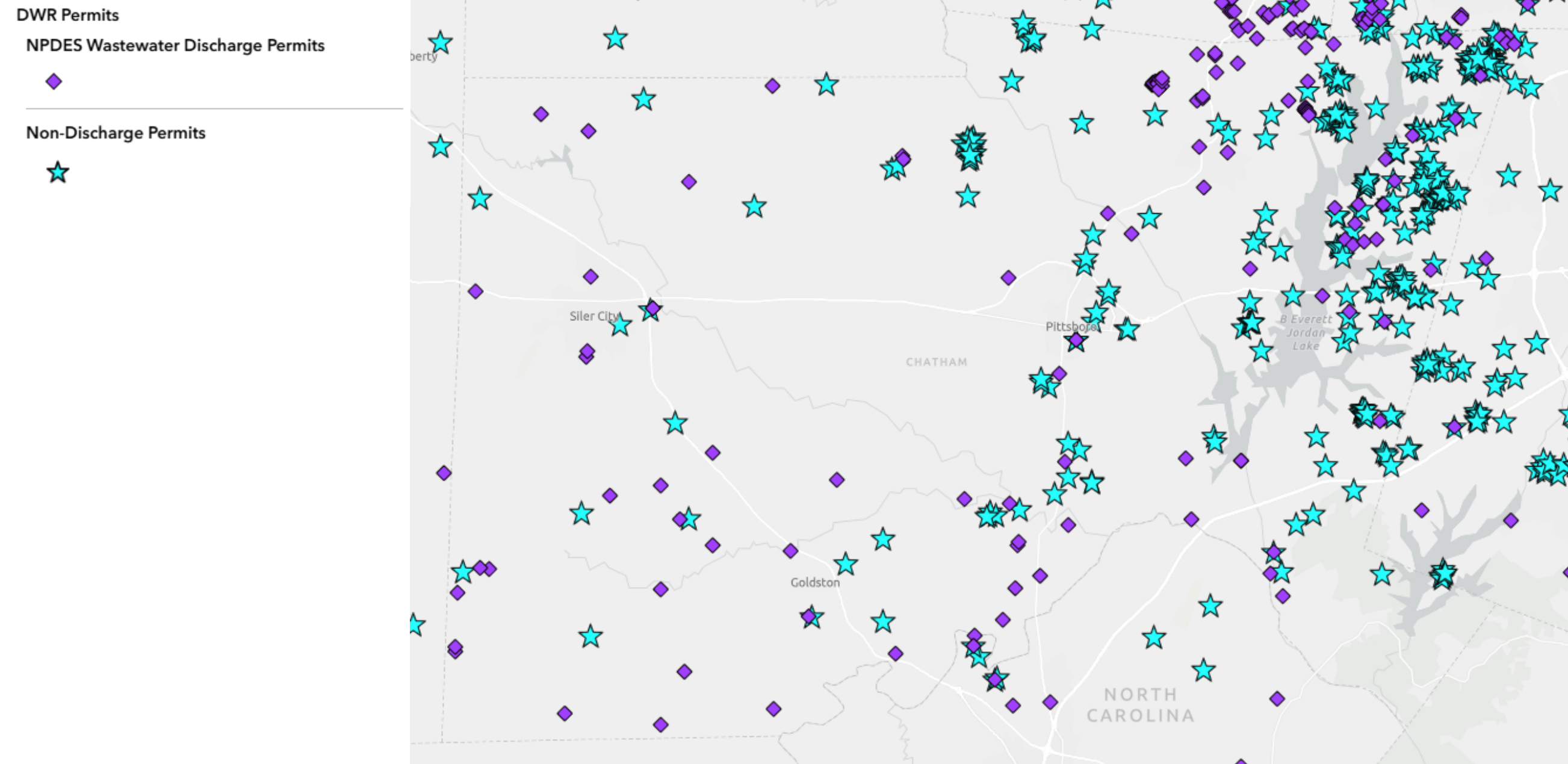


Overview

- **Spray irrigation** generally refers to the application of treated wastewater effluent onto land through an irrigation system.
 - Unlike biosolids land application, which involves treated residual solids, spray irrigation involves treated wastewater effluent that is applied to permitted land areas.
- In North Carolina rules, surface irrigation of wastewater includes spray irrigation, drip irrigation, and other application of wastewater to the ground surface.
- Spray irrigation is allowed in North Carolina through NCDEQ non-discharge permitting.



Chatham County – Spray Irrigation



Wastewater Discharge/Non- Discharge Permitting NCDEQ

Regulatory Framework



Regulatory Framework – Federal

- The primary federal framework is the Clean Water Act.
 - The Clean Water Act regulates point-source discharges of pollutants into waters of the United States through the NPDES (National Pollutant Discharge Elimination System) permitting program.
- Spray irrigation is different from a direct discharge because treated wastewater effluent is applied to land through a non-discharge system, rather than discharged directly into surface waters.
- Federal law provides the broader water quality framework, while states administer specific permitting programs.
 - In North Carolina, that permitting role is carried out by NCDEQ through the state non-discharge permitting program.
- If a system discharges to surface waters, or fails in a way that results in a regulated discharge, NPDES requirements may become relevant or a permit may be required.



Regulatory Framework – State

- In North Carolina, spray irrigation is regulated by NCDEQ through the state non-discharge permitting program.
 - These systems are governed primarily under 15A NCAC 02T, Waste Not Discharged to Surface Waters.
 - 15A NCAC 02T .500 - Wastewater Irrigation Systems
 - 15A NCAC 02T .0600 - Single-Family Residence Wastewater Irrigation Systems
 - 15A NCAC 02U - Reclaimed Water Systems
- NCDEQ's Non-Discharge Branch is responsible for regulating wastewater effluent land application facilities.
- These State permits generally address:
 - Wastewater treatment requirements;
 - Irrigation areas;
 - Application rates;
 - Storage capacity;
 - Site suitability;
 - Setbacks;
 - and Runoff prevention.



Regulatory Framework – Local

- Counties have general land-use and public health authority, but state law limits local authority over state-permitted spray irrigation systems.
- NCDEQ is responsible for permitting and compliance for wastewater effluent land application facilities, including non-discharge spray irrigation systems.



Local Authority

- Local authority over spray irrigation systems is limited by state preemption.
- Phillips v. Orange County Health Department (N.C. Court of Appeals, 2014)
 - Orange County Health Department attempted to inspect and charge fees for state-permitted spray irrigation wastewater systems.
 - The Court found that wastewater systems that discharge effluent are regulated by NCDEQ
- The Court held that Orange County was preempted from regulating those systems through a separate local inspection and fee program.
- Counties may not create programs regulating state-permitted spray irrigation systems.



PFAS and Biosolid/Spray Application



Overview

- Per- and Polyfluoroalkyl Substances (PFAS) are a broad class of manufactured chemicals that have been used in many industrial processes and consumer products.
 - Often called “forever chemicals”
- Wastewater treatment facilities receive PFAS from waste.
- Because PFAS may pass through wastewater treatment processes, they can be present in:
 - Treated wastewater effluent used in spray irrigation;
 - Residual solids that are treated and managed as biosolids.
- PFAS were detected across wastewater, biosolids, soil, and compost samples.



DEQ PFAS in Wastewater and Biosolids

- NCDEQ completed a 2023 PFAS study on wastewater treatment plants and biosolids.
- The study was intended to improve understanding of PFAS occurrence in wastewater discharges and biosolids.
- NCDEQ sampled PFAS in wastewater influent, wastewater effluent, biosolids, and soils from fields where biosolids had been repeatedly land applied.
 - PFAS were detected across wastewater, biosolids, soil, and compost samples.
 - PFOS (A type of PFAS) was detected in biosolids.
 - PFOS was present in soils after repeated biosolids application.
 - Most quantified PFAS leaving sampled wastewater treatment plants was found in effluent, rather than biosolids.
- There are currently no PFAS surface water regulations in North Carolina.
- The Environmental Management Commission at NCDEQ is reviewing a new proposal regarding rules in monitoring and minimizing these pollutants, which has been met with mixed reviews by environmental advocates.



Upcoming UNC Collaboratory Sampling

- Collaboratory funded sampling (spring/summer 2026)
 - Sampling additional wells near land application sites in Chatham, Orange and Alamance Counties.
 - Research conducted through UNC.
- Chatham County Public Health Department
 - Well sampling
 - Research
 - Outreach/community engagement



Questions?

