Modeling and Regulatory Support Workgroup Meeting September 25, 2019

Agenda

- Administrative items
  - Establish MRSW process for FY2020
  - Discuss 3rd party reviews and data confidentiality
- Discuss options for simulating several types of onsite wastewater treatment systems
- Status updates
  - Development of land use data
    - Incorporating data from DOT and addressing non-DOT roads
    - Merging agricultural data with USGS National Land Cover Data
  - Meteorological data
  - Flow Data
- Discuss Re-examination MOA with DWR

Administrative Items

Establishing Process for MRSW Review

- <u>Discuss with MRSW:</u>
  Project focus has shifted from monitoring to modeling
- Need to establish a process for MRSW input moving forward
- Options for FY2020
  - Scheduled meetings as needed
    - Sometimes delayed progress when meetings were rescheduled for weather, etc.
  - Raise topics first at PFC meetings (e.g., September)
    - Is this helpful to the PFC and MRSW?
    - Prefer to mention to MRSW first?
  - Schedule recurring meetings, calls, or webinars
  - Initiate some topics via email to keep MRSW up to date with follow up as needed

3rd Party Review by UNC Collaboratory

- <u>Discuss with MRSW:</u>
  Nathan Hall is beginning to review model input files associated with publicly available data
- When reviewing other input files, it may be helpful for him to review raw data files from UNRBA members
- Some members have indicated their data should not be shared outside of the modeling team
  - How can we best manage the concerns of the local governments while facilitating the third party review?
  - Can members of the Collaboratory be considered part of the modeling team for the purposes of information sharing?
  - Should 3rd party review only include model input files?
  - Would non-disclosure agreements stating that data would not be further distributed alleviate concerns?

Options for Simulating Onsite Wastewater Treatment Systems

Onsite Wastewater Treatment Systems: Number and Type of Systems

- <u>Informational background:</u>
  Modelers are compiling local data (number and type) for onsite wastewater treatment systems in the watershed
- Three counties have parcel level data with year of occupancy and presence of onsite system
  - Durham County
  - Orange County
  - Granville County
- Person County is compiling similar data
- Franklin County is developing an online database that will identify systems permitted since 2004
  - 2012 inventory of number of systems in the watershed will be used to approximate the number of older systems present

Onsite Wastewater Treatment Systems: Model Parameters

- <u>Information Background:</u>
  Based on draft DWR crediting documents and the types of systems currently present in the watershed, WARMF model could be customized to address potentially 12 to 15 types of systems
  - Category: Conventional; discharging sand filter
  - Type: Functioning, malfunctioning; single pass, recirculating, TS-II, etc.
  - Discharge layer: Surface or subsurface
  - Wetland treatment via incidental overland flow
- Model inputs include pollutant concentration data, discharge flow rates, and discharge layer

Onsite Wastewater Treatment Systems: Model Parameters

- <u>Informational background:</u>
  Modelers are coordinating with researchers at the UNC Collaboratory to help develop model inputs (proposal submitted but not yet approved and funded)
  - Based on data collected in the watershed and literature reviews
  - Researchers proposing additional targeted monitoring

Onsite Wastewater Treatment Systems: Model Code Development

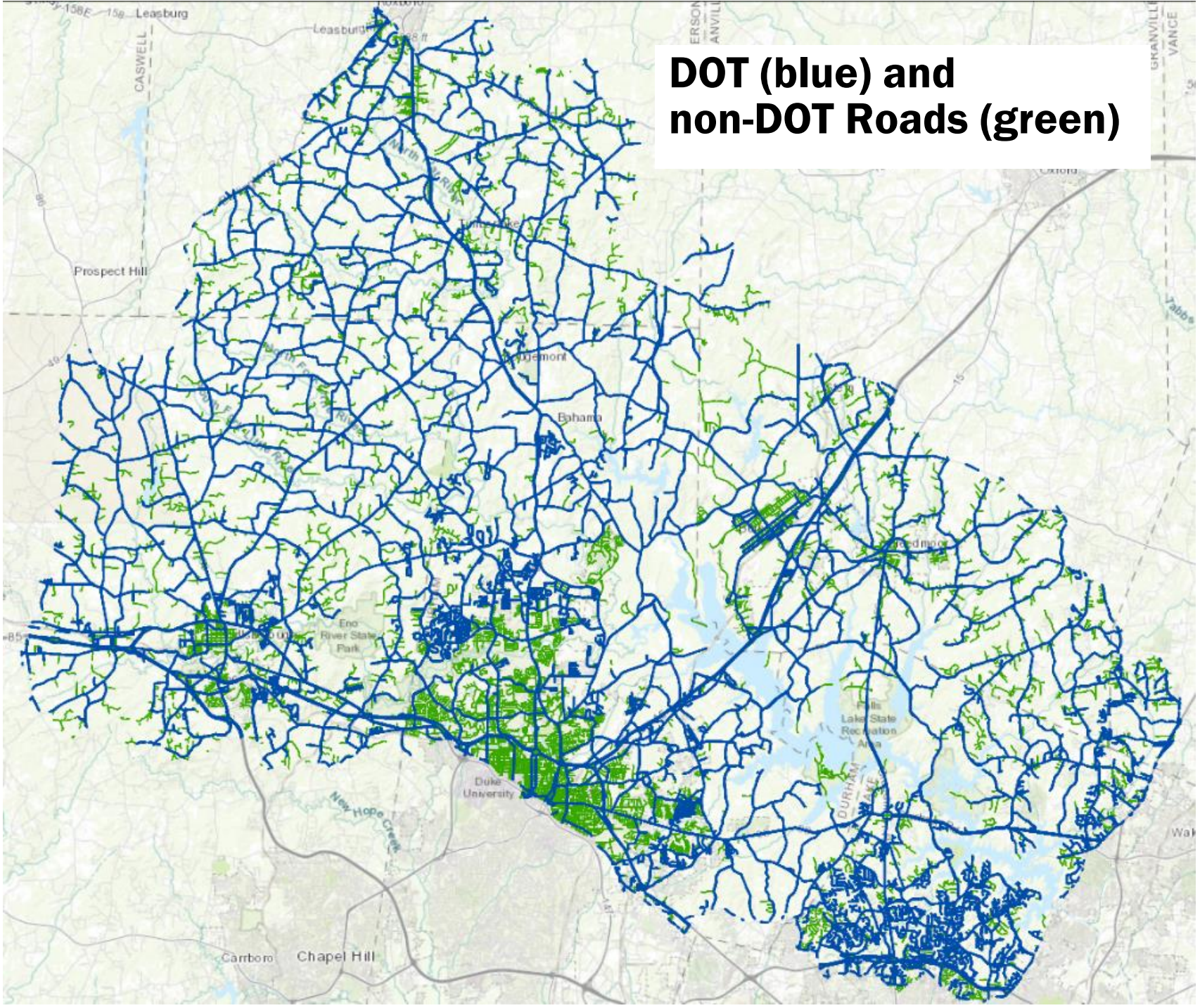
- Current version of WARMF simulates 3 types of onsite wastewater treatment systems
- Simulation of more types of systems would require development of custom model code
- **Discuss with MRSW:**
  - Scope: Beyond current scope; addresses uncertainty associated with nutrient from onsite wastewater treatment systems
  - Cost: Systech Water Resources estimates approximately $17,000 to develop code
  - Schedule: Could include this development in FY2021 MRS budget; hydrologic modeling in FY2020 would proceed with 3 types of systems included in WARMF

Development of Land Use Data

Land Use Data: Coordination with NC DOT

- NC DOT is providing spatial databases for DOT maintained roads
  - "Connected" to streams: within MS4 boundaries or within 300 ft of a stream
  - "Not directly connected" to streams
  - Right of way area
  - Impervious area

  } Calculate percent imperviousness for connected and disconnected roads
- Two separate databases to represent modeling periods
  - Baseline (2005 to 2007) (slightly refined from database provided to DWR for original modeling)
  - Recent (2015 to 2018)
- Data will address DOT-maintained roads


DOT (blue) and
non-DOT Roads (green)
Leasburg
CASWELL
Prospect Hill
Bahama
Eno
River State
Park
Duke
University
New Hope Creek
Carrboro
Chapel Hill
DURHAM

Land Use Data: non-DOT Roads

- Two approaches for simulating non-DOT roads
  - Specify separate land use categories: connected or disconnected non-DOT roads
  - Lump in with local government “development” consistent with underlying USGS NLCD designations: low, medium, high density urban development
- Decision affects the number of land uses and input parameters required by the model

Land Use Data: non-DOT Roads

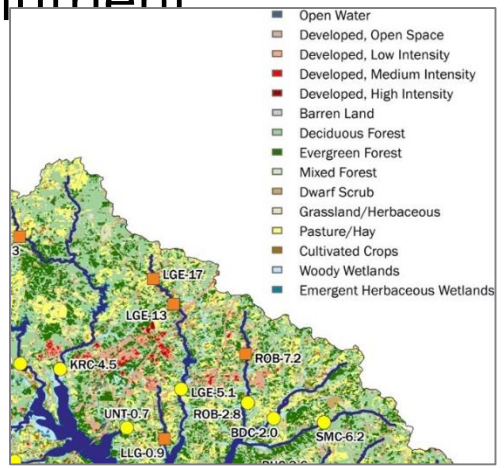
- Impacts to model development
  - Literature values for model parameters tend to include roads in the developed categories
  - Eliminating roads from this land use class would require more effort to parameterize not only the non-DOT roads but also the urban developed landuses
- Decision would affect simulation of street sweeping BMP
  - Accounts for mass removal from impervious surfaces
  - Often street sweeping occurs beyond roads (e.g., parking lots that would be part of the urban development classes)
  - To confine street sweeping to roads only, would need to separate from other urban development

MRSW Discussion on non-DOT Roads

- Pros and cons of both approaches in terms of model development and simulation of management practices
- Does the MRSW prefer to keep non-DOT roads as separate land use category
  - Source allocation specific to roads
  - Management strategies specific to roads
- Or, it is easier for you to manage this source as part of other developed categories/impervious surfaces?

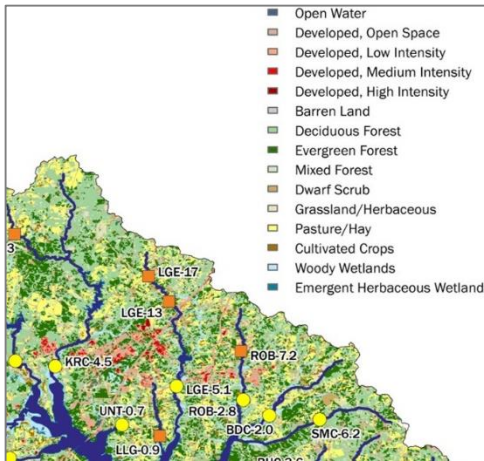
Agricultural Land Use and Crop Data

- <u>Informational Background:</u>
- NC Department of Agriculture provided county-level crop and pasture acreages
- Modelers selected 12 agricultural land use categories to represent agriculture
  - Collapses categories with less than 1 percent of the agriculture in every county into other crop acreages
  - <u>Confirm approach with MRSW</u>
    - Scope: Provides good resolution of crop data; crops are collapsed into types with similar nutrient applicate rates and timing
    - Cost: Accounted for in budget
    - Schedule: Additional resolution would require more land use categories which may affect model run times



Agricultural Land Use and Crop Data

- <u>Informational Item:</u>
  - Modelers are coordinating with NC Dept. of Ag. on the development of model inputs and parameters:
    - Nitrogen application rates
    - Phosphorus application rates
    - Planting and harvest dates
    - Biomass accumulation (growth) and removal (harvest)
  - Scope: Subject matter experts (SMEs) provide nutrient applicate rates and timing
  - Cost: Accounted for in budget
  - Schedule: While additional coordination is needed with SMEs, their input should provide better model inputs and potentially save modeling calibration time



Merging Land Use Data from the USGS NLCD and NC Department of Agriculture

- <u>Informational Background:</u>
- USGS National Land Cover Data (NLCD) provides data for cultivated crops and hay/pasture
- USGS has reported technical difficulties in distinguishing crops, pasture, grass, etc.
- NLCD crop and pasture areas are not sufficient to "cover" the county-level data provided by NC Dept. of Ag, especially in 2006

Merging Land Use Data from the USGS NLCD and NC Department of Agriculture

- Modelers need to “borrow” area from other NLCD land uses for accounting: herbaceous grass, shrub/scrub, forest
- Only “borrow” area from subwatersheds that include NLCD crop and pasture
- Department of Ag is QAQC’ing land use estimates for baseline model; revisions underway
- <u>Confirm approach with MRSW</u>
  - Scope: accounting for agriculture is a required scope item
  - Cost: Accounted for in budget
  - Schedule: Approach has been set up and run to generate estimates;

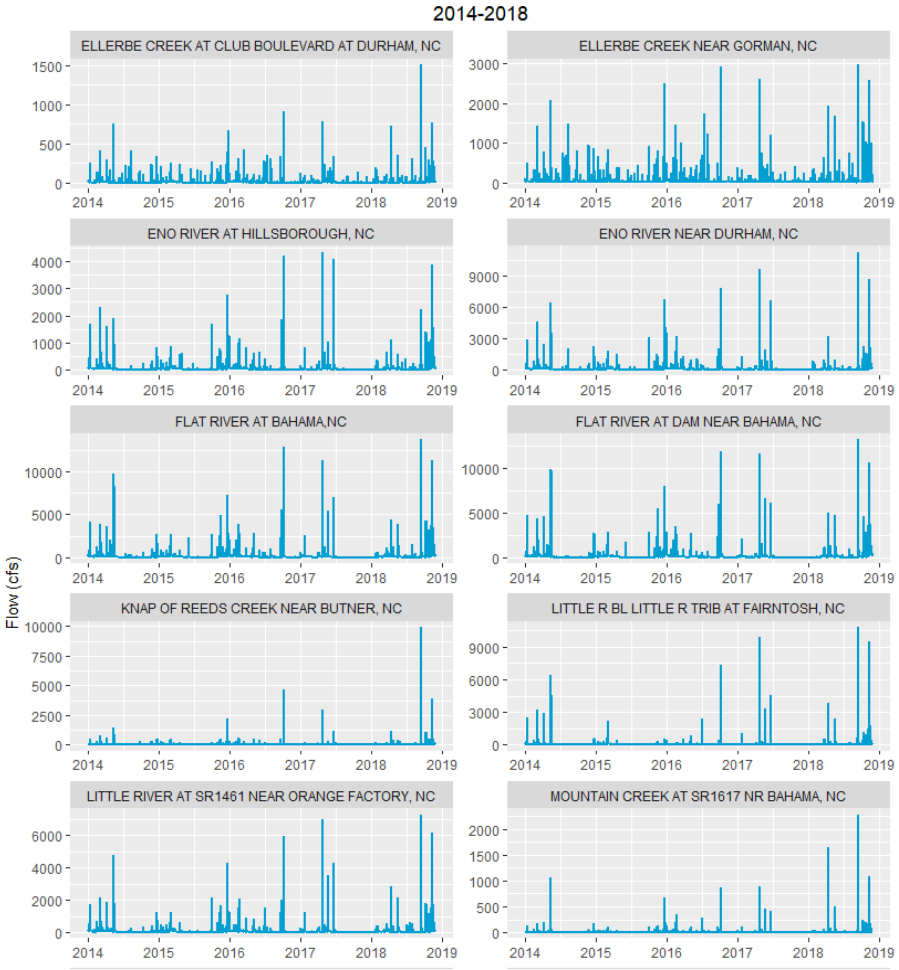
Formatting Meteorological and Flow Data

Meteorological Data

- <u>Informational Item:</u>
  Modelers have received and formatted the weather inputs for WARMF using the NLDAS and NEXRAD data
  - 6-hr time steps to run model
  - **Decided by MRSW at March 2019 meeting**
- Nathan Hall (UNC Collaboratory) is reviewing and QAQC'ing weather inputs (3rd party review)

USGS Stream Flow Data

- <u>Informational Item:</u>
  Modelers have processed the USGS stream flow data for
  - Model calibration
  - Specification of outflows from two impoundments
  - 6-hr time steps
- Nathan Hall (UNC Collaboratory) is reviewing and QAQC'ing USGS flow data (3rd party review)



MRSW Discussion of Re-examination MOA with DWR

Authorizing Legislation: Session Law 2010-155

- Authorize coalitions of local governments to jointly implement water quality protection plans for the Falls Lake watershed
- To the extent allowed by law, the Department of Environment and Natural Resources may enter into memoranda of understanding with the Association to implement the [following] purposes:
  - Share information and assist local governments in complying with State and Federal laws related to water quality in Falls Lake
  - Coordinate and fund common technical resources
  - Plan for and conduct water quality monitoring
  - Record and track nutrient offsets and credits
  - Review and discuss innovative approaches to restore, protect, and maintain water quality in Falls Lake
  - Conduct and evaluate scientific research related to water quality in the watershed and reservoir

Draft MOA with DEQ

- Legal group has drafted a preliminary MOA that is under review
- Discussed at November Board and PFC Meetings
- Definitions and clarifications to discuss
  - Supplemental Modeling
  - Supplemental Modeling submission
  - Submission
  - Draft recommendations
  - Recommendations
  - Supplemental information
  - Combined set of recommendations
  - Final version of recommendations

Items to Discuss

- Agency review time (DWR/EPA) and
  - Assignment of an agency point of contact
  - Establishment of project milestones and technical meetings
- Upper versus lower – potential silos
- Expectations for DWR to provide comments throughout the process, not just formal submissions
  - As work products are developed and posted (tech memos)
  - After stakeholder meetings, PFC and BOD meetings
  - Following or during supplemental technical meetings with agencies
  - As issues or concerns arise
- Third party reviewers
  - Who will fund this?
  - Who will manage this?
  - When can we expect to roll this into the process?
- Education of the EMC
- Conflict resolution, agency level

Summary of MRSW Discussion from March 2019

- Add that the UNRBA be able to present the re-examination findings to the EMC
- Supplemental modeling is what DWR approves under the QAPP
- MRSW to continue development of definitions for the draft MOA

Closing Comments
Additional Discussion