Markets for Water Pollution in North Carolina

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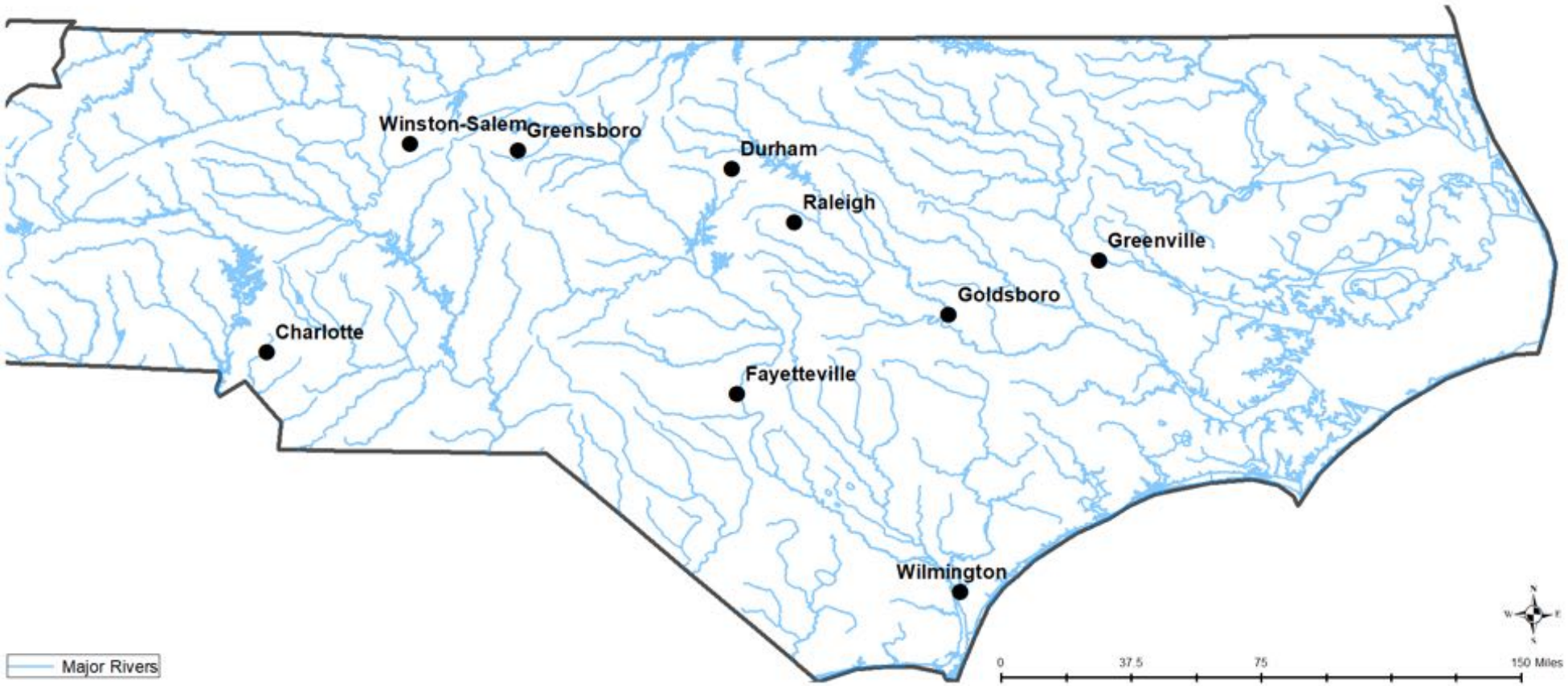
Introduce Problem in NC

- NC waters primary pollutants are Nitrogen and Phosphorous
  - Increase algae growth and oxygen levels damaging ecosystems
  - Result in eutrophocation
- Fish Kill in Pamlico Sound

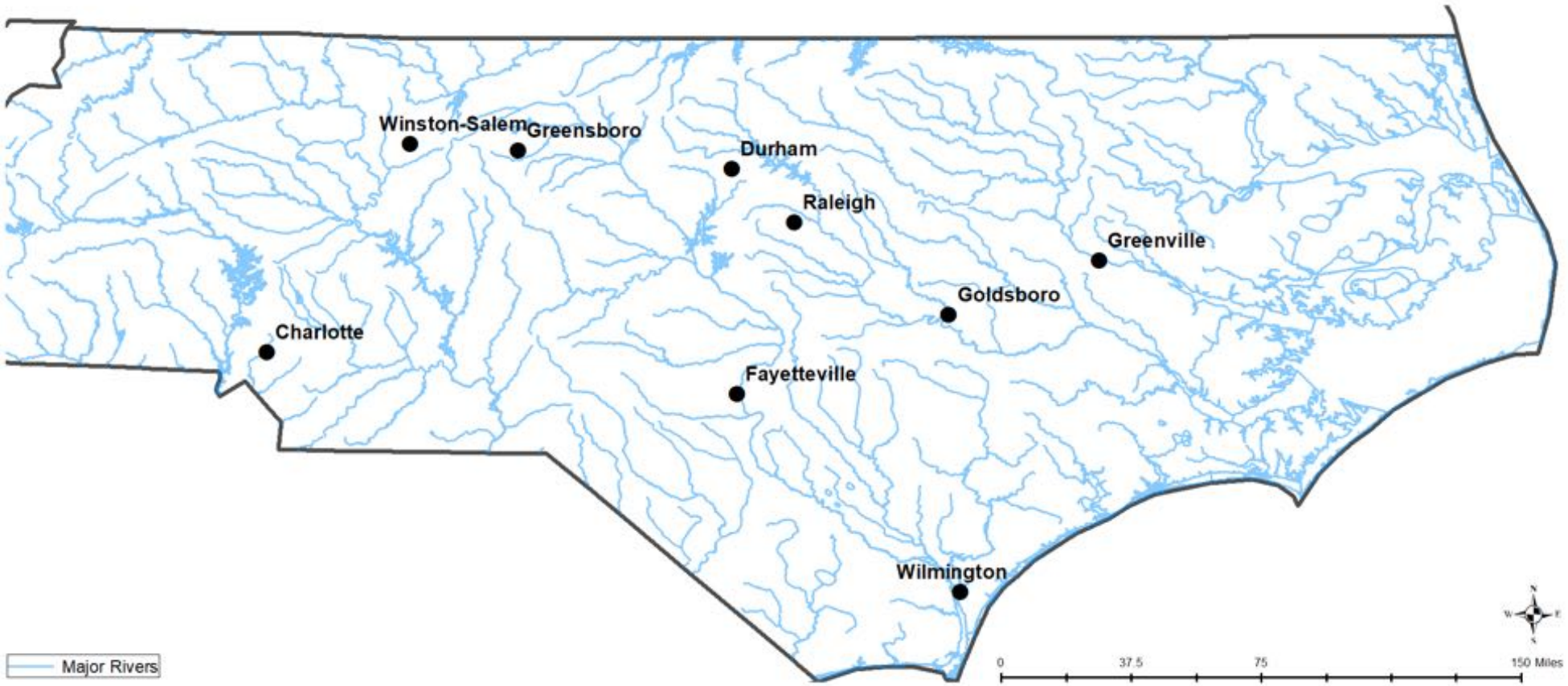
North Carolina's Major Rivers



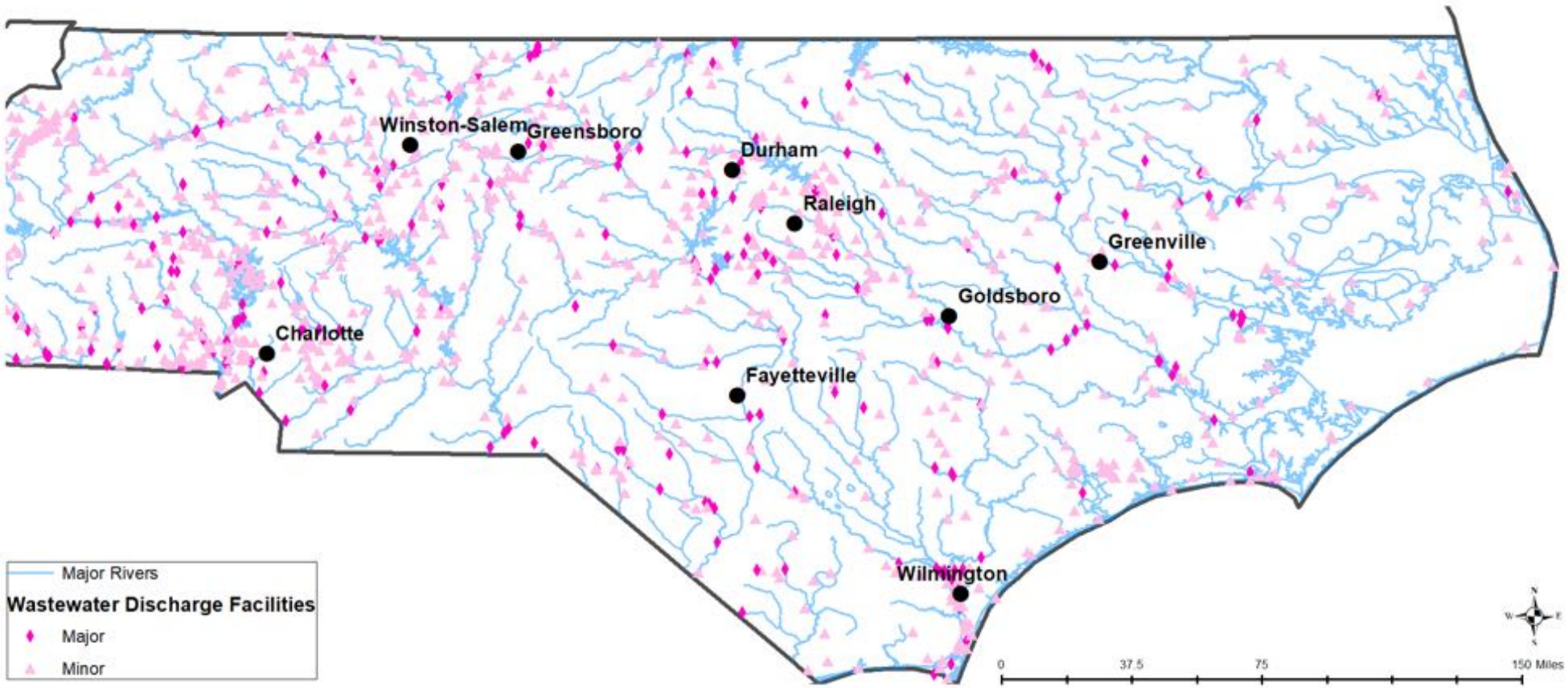
Regulatory setting

- Under The Clean Water Act, the EPA develops standards to ensure water is suitable for a variety of purposes- drinking, swimming fishing
- NCDEQ responsible for achieving standards mandated by Clean Water Act.
- Point Sources: Activities that discharge pollutants directly into water
  - Require a National Pollution Discharge Elimination System (NPDES) Permit
  - Limits volume of pollutant that can be discharged
- Non-point sources: Activities that indirectly degrade water quality through runoff
  - Must secure NPDES permit or submit to restrictions on land disturbance and use activities.

North Carolina's NPDES Permits



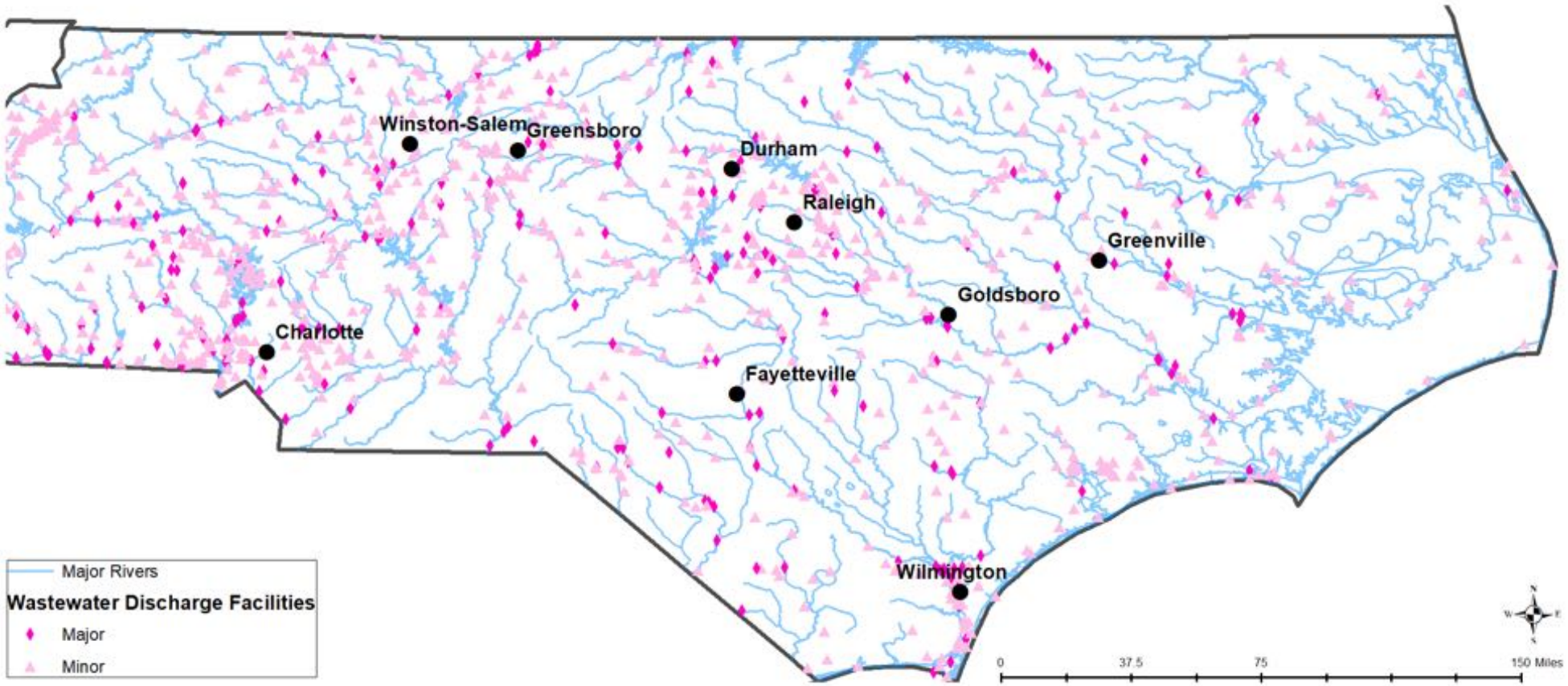
NPDES Permits



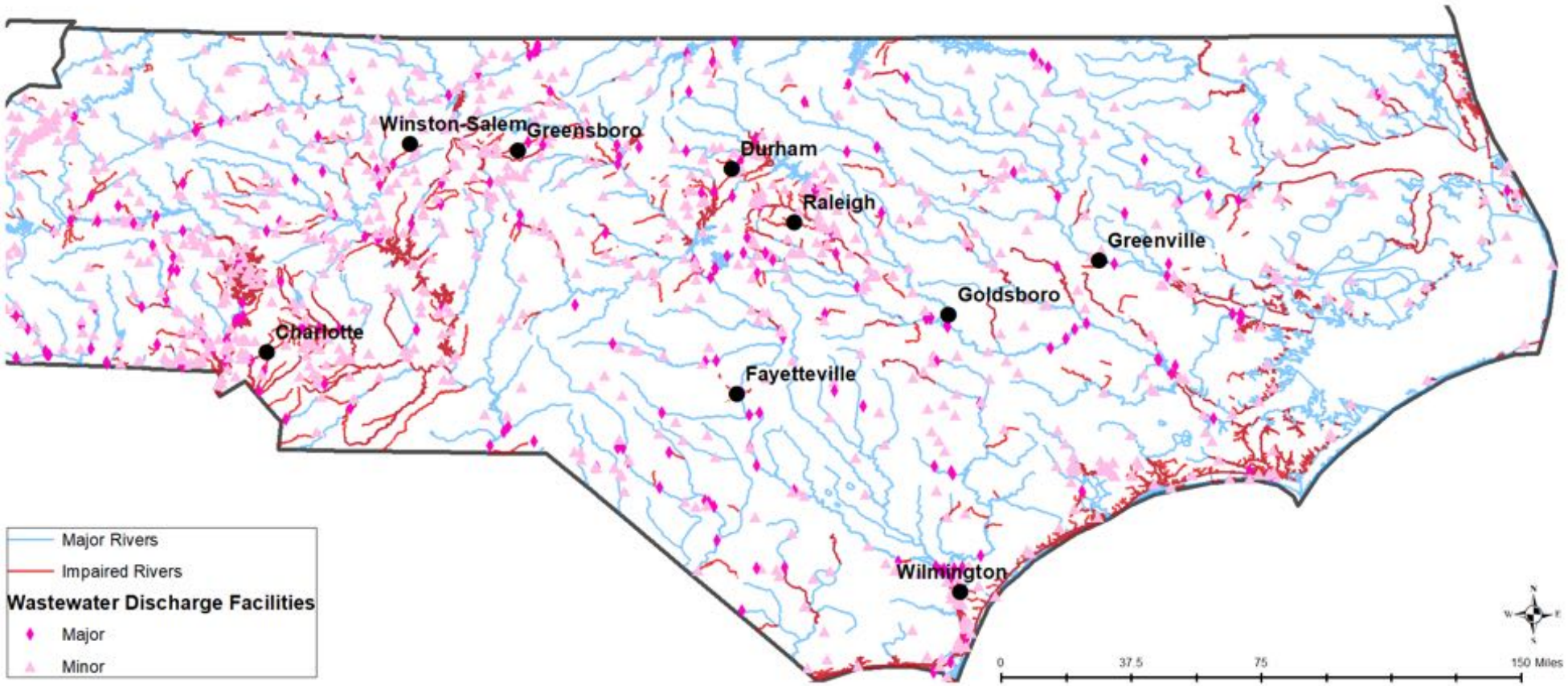
North Carolina Waters

- Has resulted in NCDEQ classifying waters as “impaired.”
- Impaired waters face:
  - more severe restrictions on various pollutions levels, known as total maximum daily load (TMDL)
  - Stricter nutrient discharge allowances in NPDES permits
  - Requirements of stormwater management

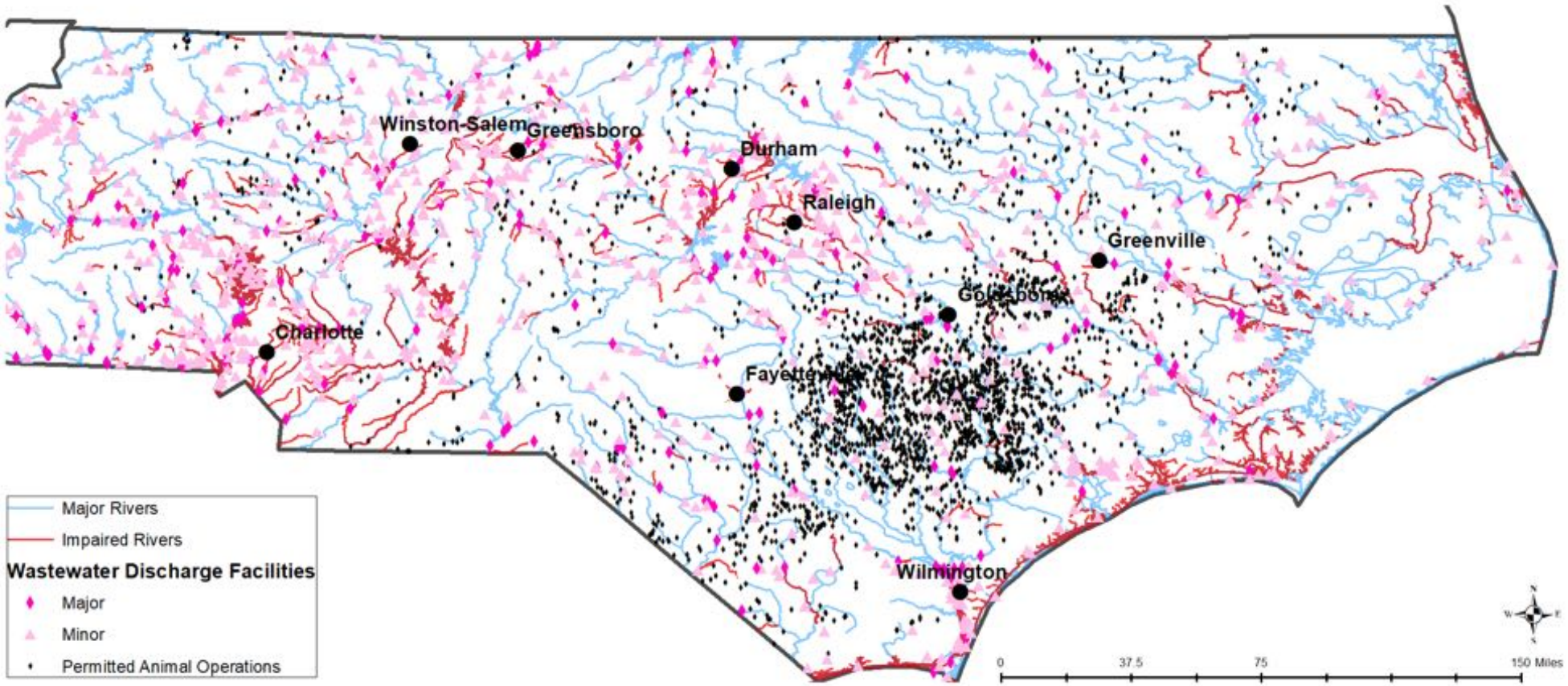
North Carolina's Impaired Waters



North Carolina's Impaired Waters



Permitted Animal Operations

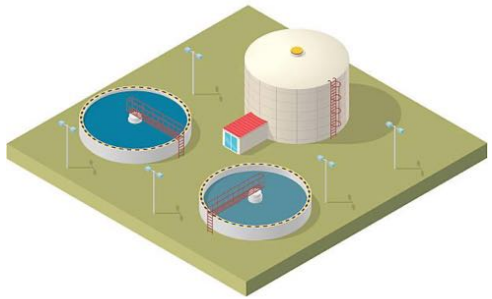


Cost-Effective Abatement

- Maintaining water quality is expensive
  - Cost of pollution control technology
  - Limitations placed on land use and input and output decisions
- Marginal Cost of abatement (MCA): cost of cutting back on pollution
  - Varies according to the actor → some high cost, some low cost

Cost of Abatement

- A wastewater treatment plant and a farm emit phosphate
- If total phosphate abatement needs to be 1,000kg and each actor abates the same amount…



MCA = $150/kg

Total Cost=500kg x $150/kg

=$75,000

MCA = $35/kg

Total Cost=500kg x $35/kg

=$17,500

Total Cost= $92,500

Cost of Abatement

- If only the low cost farm abates:

MCA = $35/kg

Total Cost=1,000kg x $35/kg

=$35,000

- Much lower cost, but allocating all abatement to the farm may not be fair. Look to market based solutions.

Cap-and-Trade

- Regulator sets pollution cap and allocates individual water pollution allowances to polluters in the target area
  - Allocation based on discharger's prior recorded use, type of use, classification of waters being discharged into
- Polluters trade excess nutrient discharge allowances
- Polluters with lower abatement costs benefit from selling allowances to high abatement cost polluters.
- Market for allowances:
  - quantifies a price for pollution
  - incentives search for cost-minimizing abetment procedures.

Cap-and-Trade

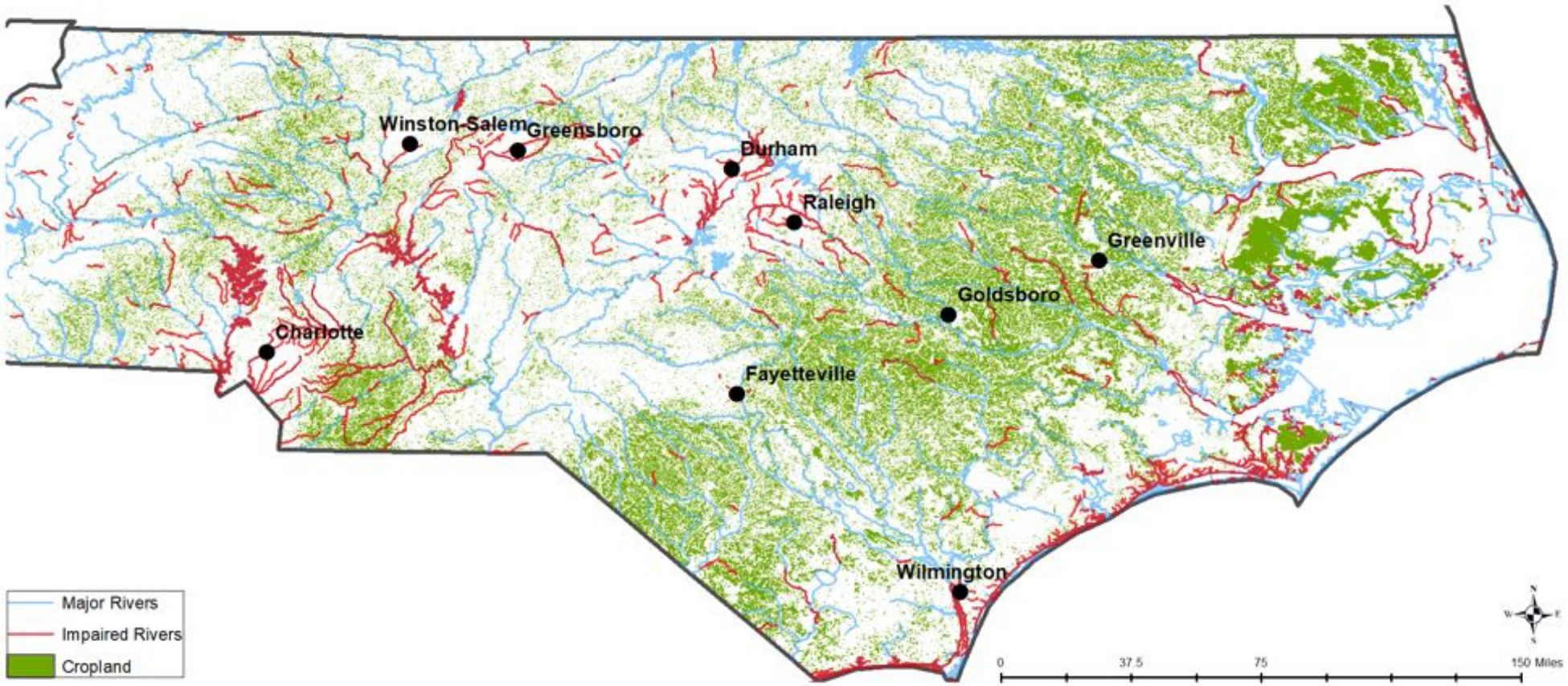
From the previous example:

- If the farmer and the wastewater plant are allocated same number of pollution permits
  - Wastewater plant would pay Farmer for 500 kg of abatement
  - Total cost to farmer to implement $35,000:
    - Farmer's 500 kg of cut back $17,500 plus additional 500 kg of abatement for the plant at $17,500
  - Wastewater treatment plant willing to pay up to $75,000 to farmer avoid abating 500 kg (cost of abatement of 500 kg)

Offsets

- Produced by construction or improvement of restoration projects.
- Price of offset based on documented water quality improvement
- Polluters can purchase offsets and credit their purchases towards pollution reduction requirements

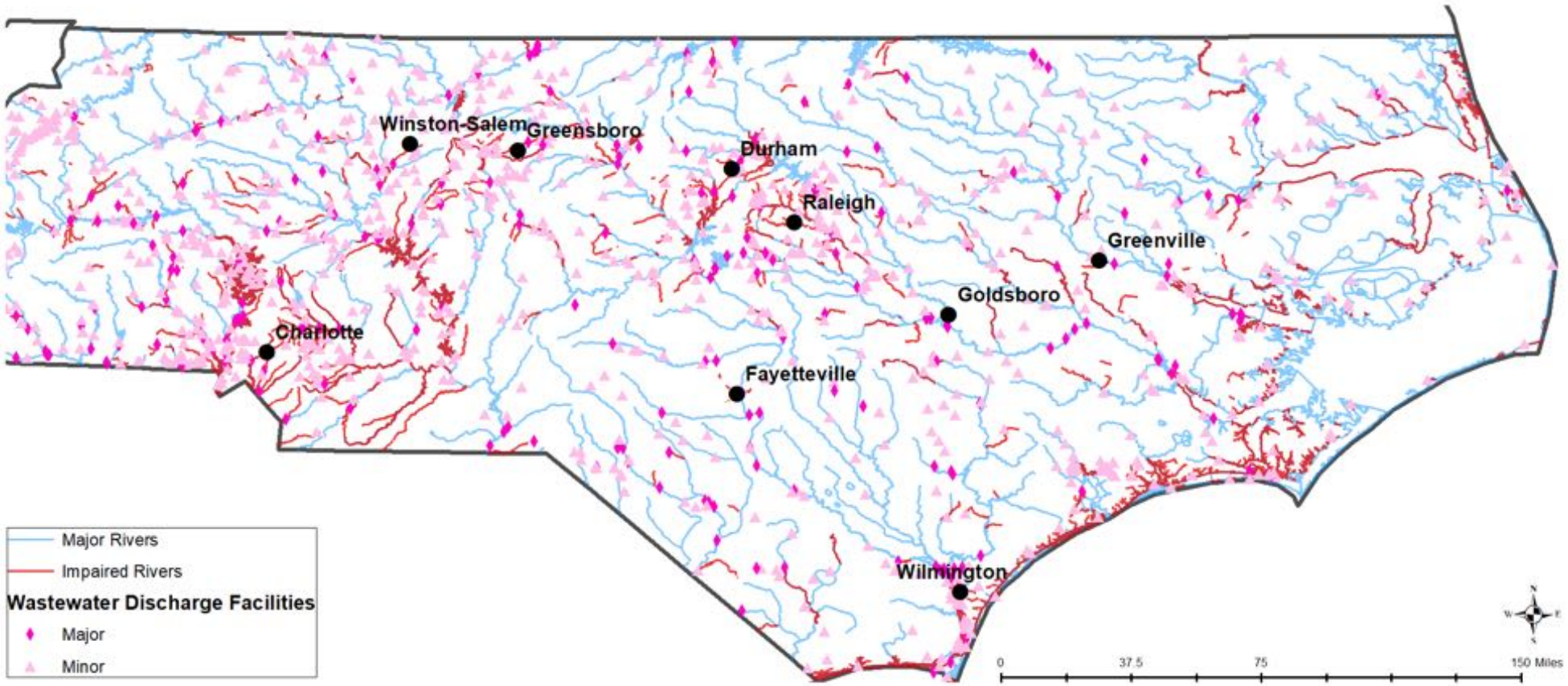
Cropland and Impaired Waters



North Carolina Markets

- Markets in NC consist of Nitrogen and Phosphorous credit trading
- Two basins & two watersheds have nutrient credit markets
  - Neuse River Basin, Tar-Pamlico River Basins
  - Jordan Lake Watershed and Falls Lake Watershed
- Pollution allowances supplemented by nutrient offset credits.

North Carolina's Nutrient Trading Basins



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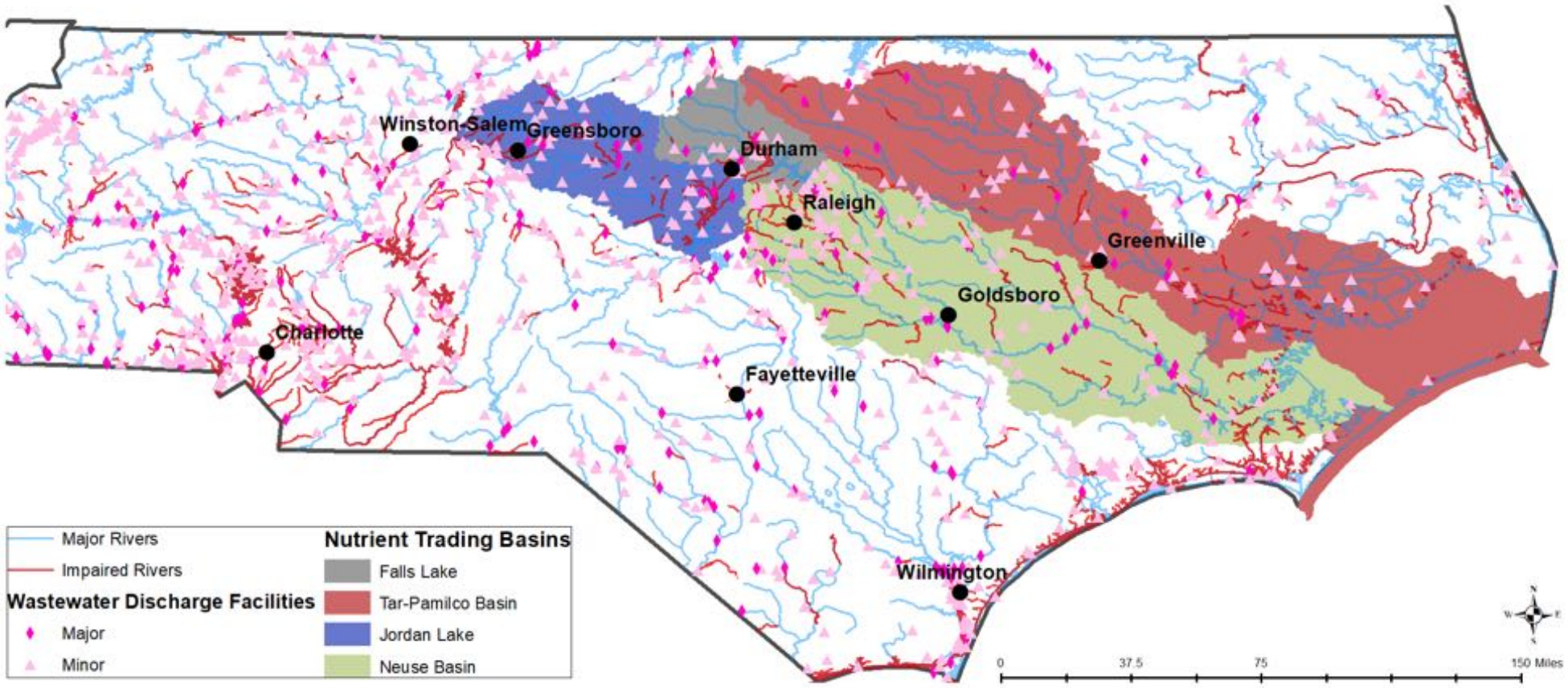
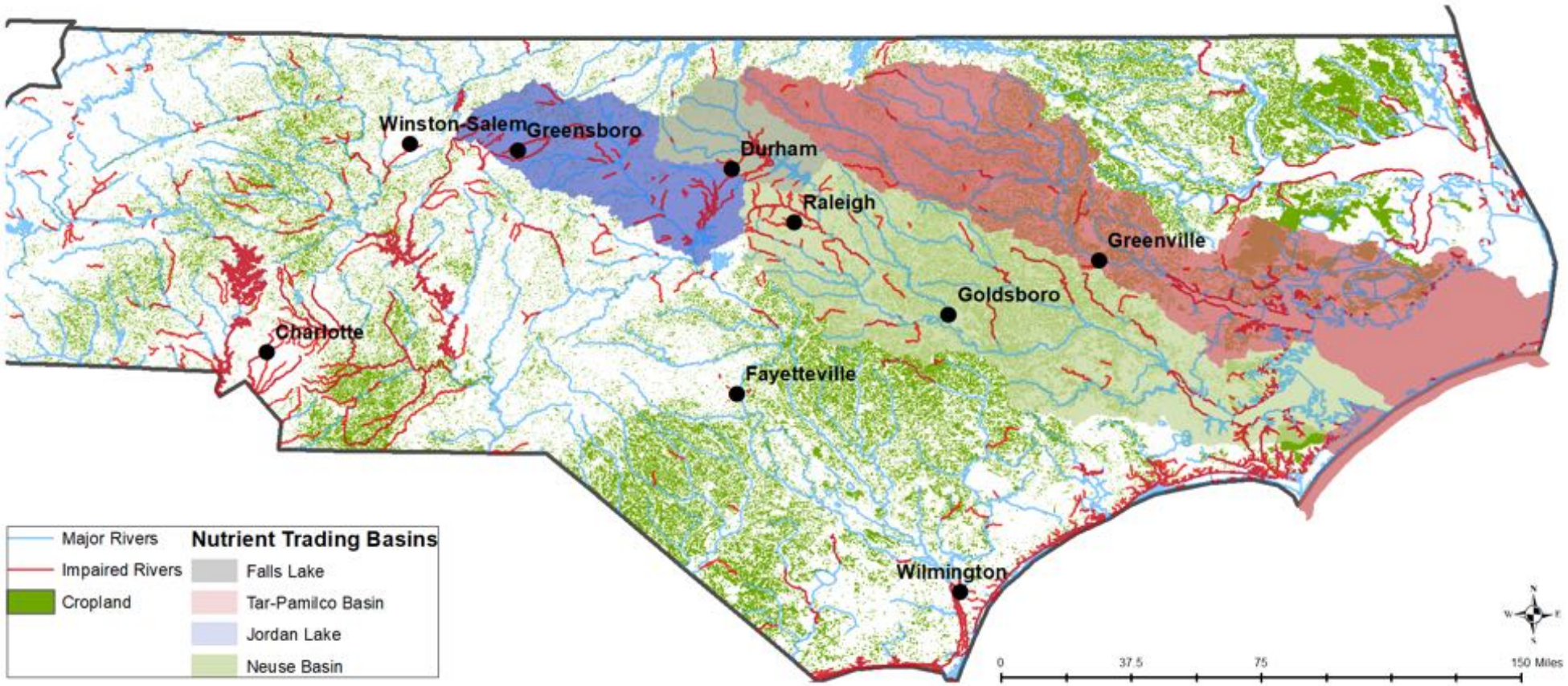


Buying Offsets in NC

- Private Mitigation Banks (PMBs)
- In-lieu fee mitigation
  - Only allowed when other options unavailable

- Most common and successful mitigation practice is creation/enhancement of riparian buffers

Current Potential for Cropland Offsets



Nutrient Allocation Trading in NC

- Available to point sources
- Requires mutually obtaining permit modifications
- Permitted if trades are within the same watershed and involve total Nitrogen, total Phosphorous, or sediment loads
- Only 7 allocation trades have have occurred in NC since 2004
  - Prices ranging from $291-$495 lbs/N year
  - Last trade in 2012

Issues in Nutrient Trading

- Two major issues:

1. Uncertainty over future nutrient management needs
   - Unwilling to trade credits that may be needed later
   - Future Ratcheting
2. Credit valuation uncertainty
   - Prevalent in offset credit production, especially agricultural riparian buffers
3. Permit modification process

Path Forward

- Joint Compliance
  - Multiple polluters can cooperate to satisfy a group cap.
  - Polluters form and govern cooperative groups to ***jointly*** meet regulatory requirements
  - Trading within association allows members to circumvent pollution permit modifications
  - Avoid cost of finding trading partner