Chesdin Reservoir Wetland and Stream Assessment

Prepared for:

Appomattox River Water Authority

Prepared by:

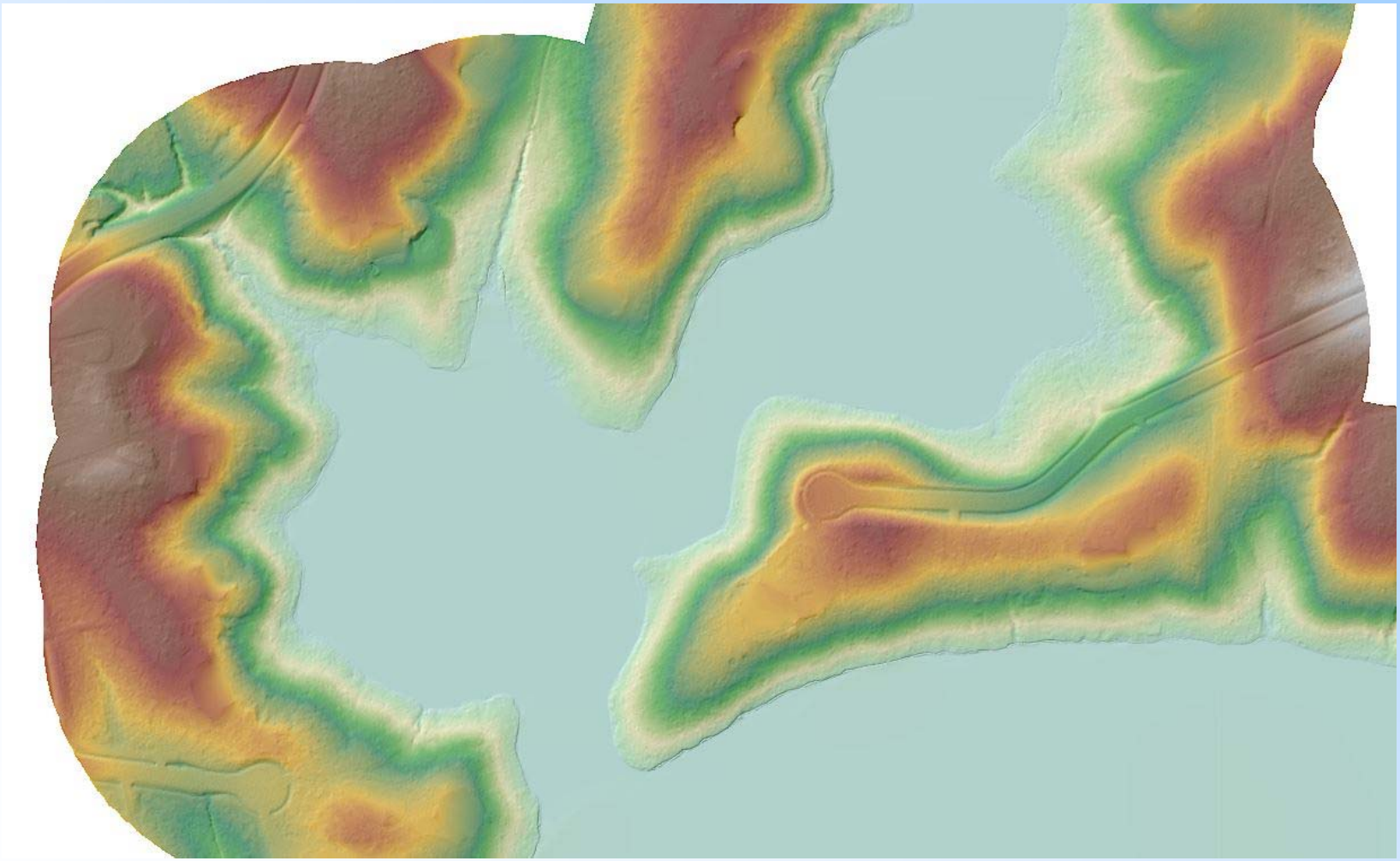
EA Engineering, Science, and Technology, Inc.

September 25, 2014

Background

- ARWA is evaluating raising the targeted full-pool elevation by 18 inches (from 157.2 to 158.7 ft msl).
- ARWA agreed to conduct a study to quantify potential impacts to wetlands and streams.
  - Work conducted under an agency approved study plan, dated October 2013.
  - A field assessment of wetlands and streams was conducted in April 2014.
  - A GIS-based desktop analysis was completed to quantify impacts to wetlands and streams for the entire reservoir (gross and net impacts)
- ARWA acquired high resolution LIDAR data (Sanborn).
  - LIDAR (topography) data collected on 14 March 2014;
  - LIDAR imagery collected on 20 March 2014

LIDAR Digital Elevation Model



Field Studies

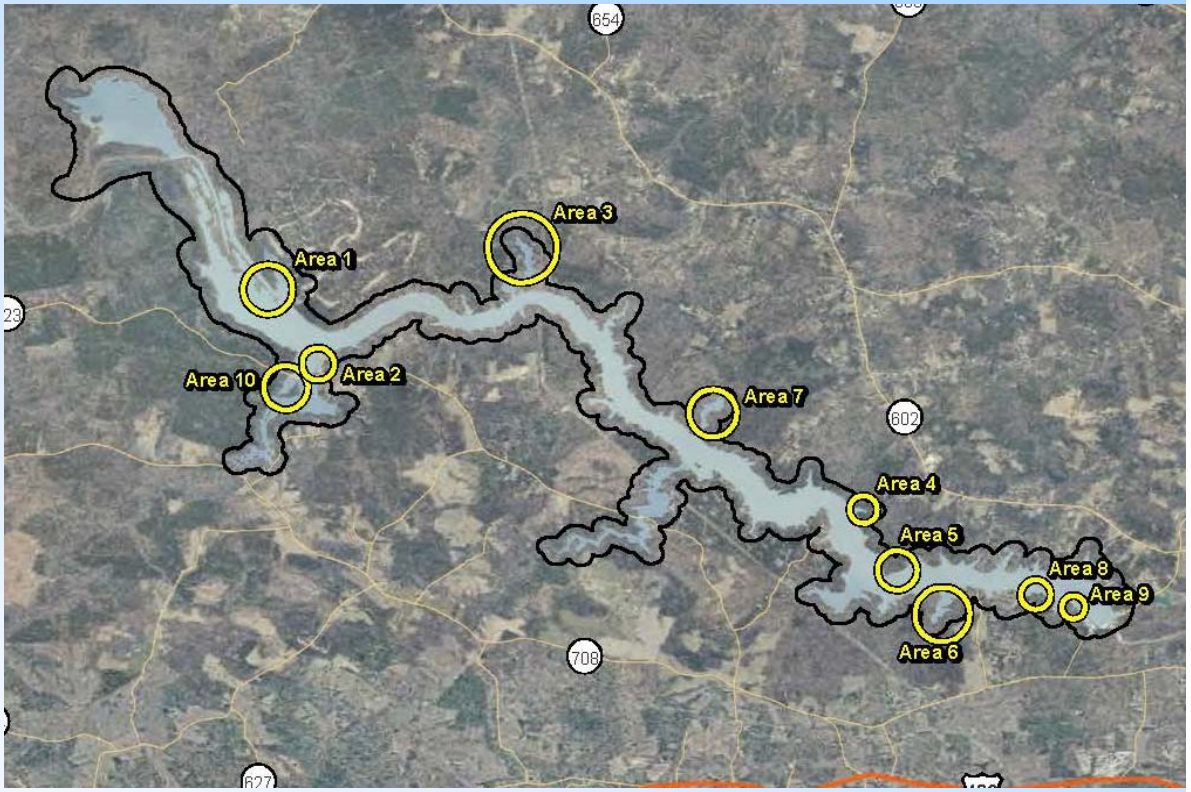
- Area of Review

  Contained within elevation 159.2 ft msl and below (+24”)

- Field data collected within 10 study areas.

  Consistent with agency input, the following were assessed:

  - 5 Coves
  - 4 Shoreline Areas
  - 3 Existing Wetland Areas
  - 10 Tributaries



Field Studies – Wetland Assessment

- Methodology

  Established Wetland Transects within the 10 study areas

  - Documented slope, vegetation, dominance, & condition
  - Conducted formal USACE wetland delineations within 3 wetland areas

- Goals:
  - Quantify wetland impacts within 10 study areas
    - Categories: Emergent, scrub-shrub, forested
  - Develop algorithm for impacts and re-establishment in areas not field surveyed.

Field Studies – Stream Assessment

- Methodology

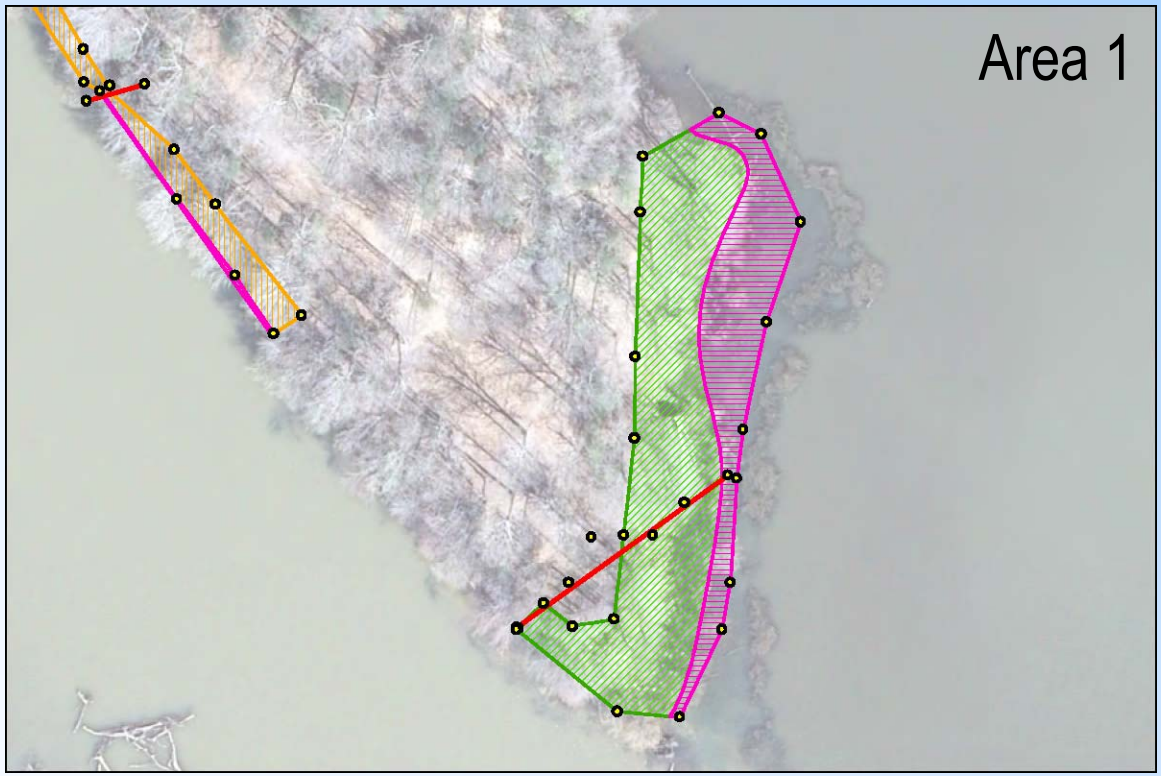
  Norfolk COE's and VDEQ's Unified Stream Methodology (USM)

  - Assessed existing stream conditions, characterize potential impacts at +18", and determine compensation credit

  - Using LIDAR data, identified 159 stream segments impacted at proposed +18" inundation elevation.

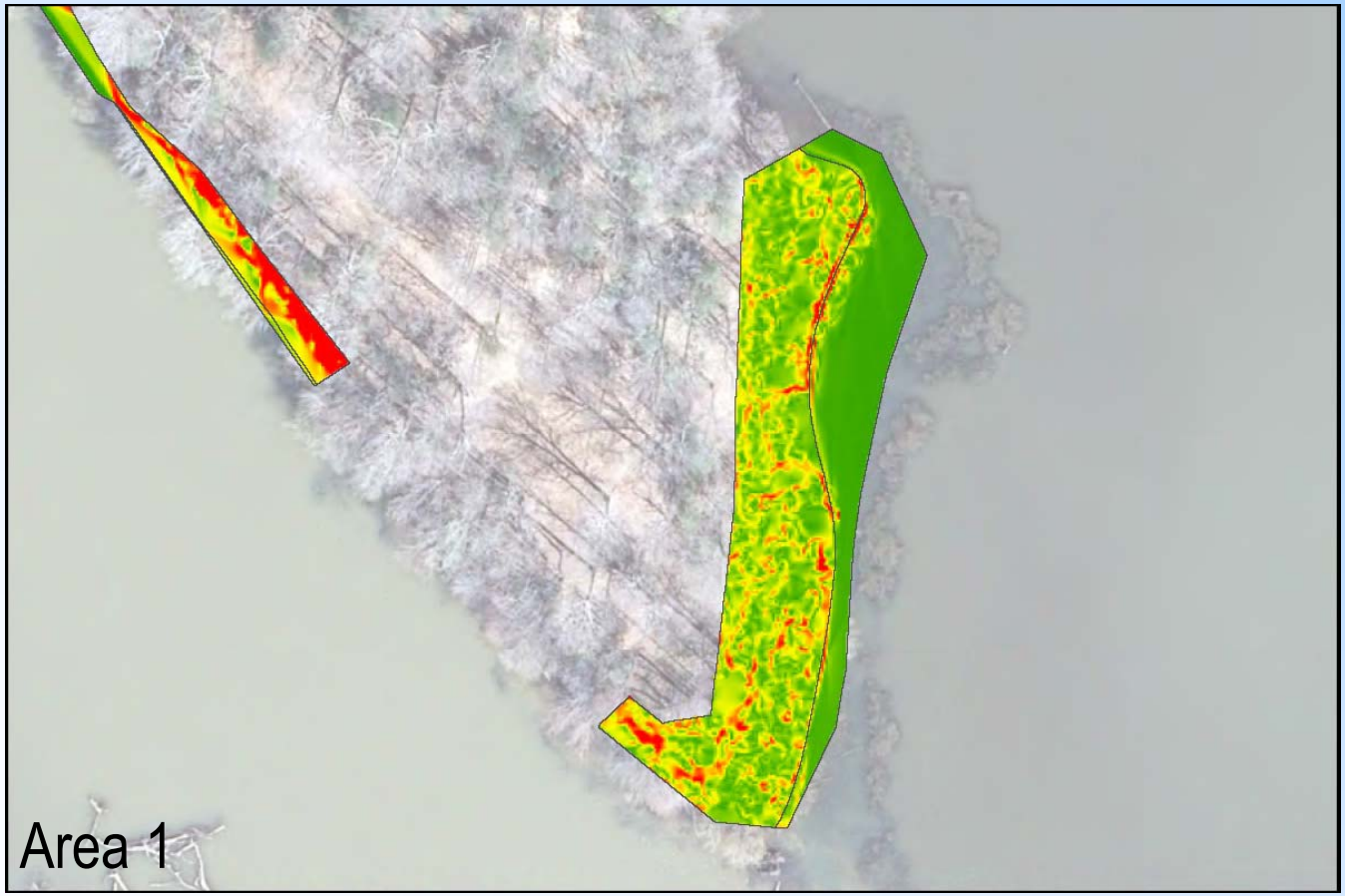
Desktop Analysis – Wetlands

- Field-collected data
  - Post-processing GPS data
  - Building Geodatabase
  - Wetlands

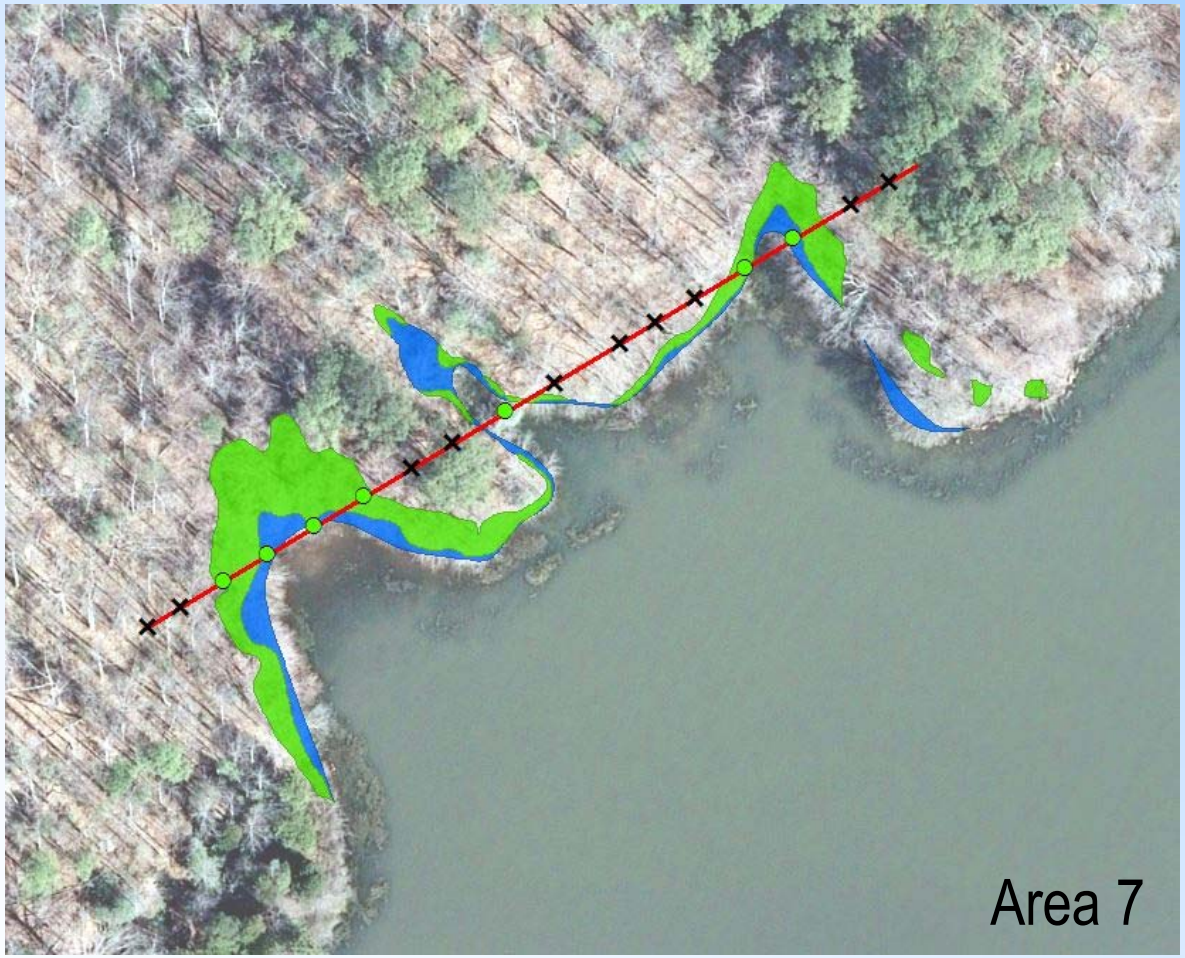


Desktop Analysis – Streams

Desktop Analysis – Slope



Desktop Analysis – QA/QC Crosscheck



Results

- Wetland Results

  Includes field delineated wetland areas, plus assumes 100 percent of the area with ≤5% slope within the current zone of inundation supports wetlands and will be potentially impacted

  Wetlands are expected to re-establish within the new ≤5 % slope area following the +18" rise in pool elevation

  - Total Gross Impacts = 220 acres
    (126 acres emergent; 94 acres scrub-shrub/forested)
  - Total Potential Wetland Re-establishment = 76 acres
    (38 acres emergent; 38 acres scrub-shrub/forested)
  - Net Impacts = 144 acres
    (88 acres emergent; 56 acres scrub-shrub/forested)

Results

- Stream Results

  Identified 159 streams in the Area of Review, based upon LIDAR, GIS, and field surveys (includes the 10 that were field surveyed)

  Total Impacts = 12,992 linear feet

  (Reflects VDEQ and COE input)

  Total Compensation Requirement = 17,149 credits

Mitigation Requirements

- Federal and State laws require that "compensation requirements shall be sufficient to achieve no net loss of existing wetland acreage and functions"
- Typical wetland compensation ratios:
  - 1:1 for emergent wetland impacts
  - 1.5:1 for scrub-shrub wetland impacts
  - 2:1 for forested wetland impacts
  - COE and DEQ agreed with 1:1 mitigation compensation ratio for entire project based on "conversion"

Mitigation Options

- VDEQ has identified the following mitigation approaches:
  - Purchase of wetland credits from DEQ-approved mitigation banks
  - Contribute to a DEQ-approved in-lieu fee fund
  - Wetland creation or restoration (with required monitoring)
  - Stream restoration credits - Approved mitigation banks
  - Preservation of existing W&S when used in conjunction with creation, restoration or mitigation bank credits
- Availability of required credits when they are needed?

Mitigation Cost Estimates

Net Wetland Impacts = 144 acres

- Emergent wetland impacts = 88 acres
- Scrub-shrub/forested impacts = 56 acres

Assume $33,000 - $40,000/acre from mitigation bank:

- Total of all impacts at a 1:1 ratio = *$4.75M to $5.76M*

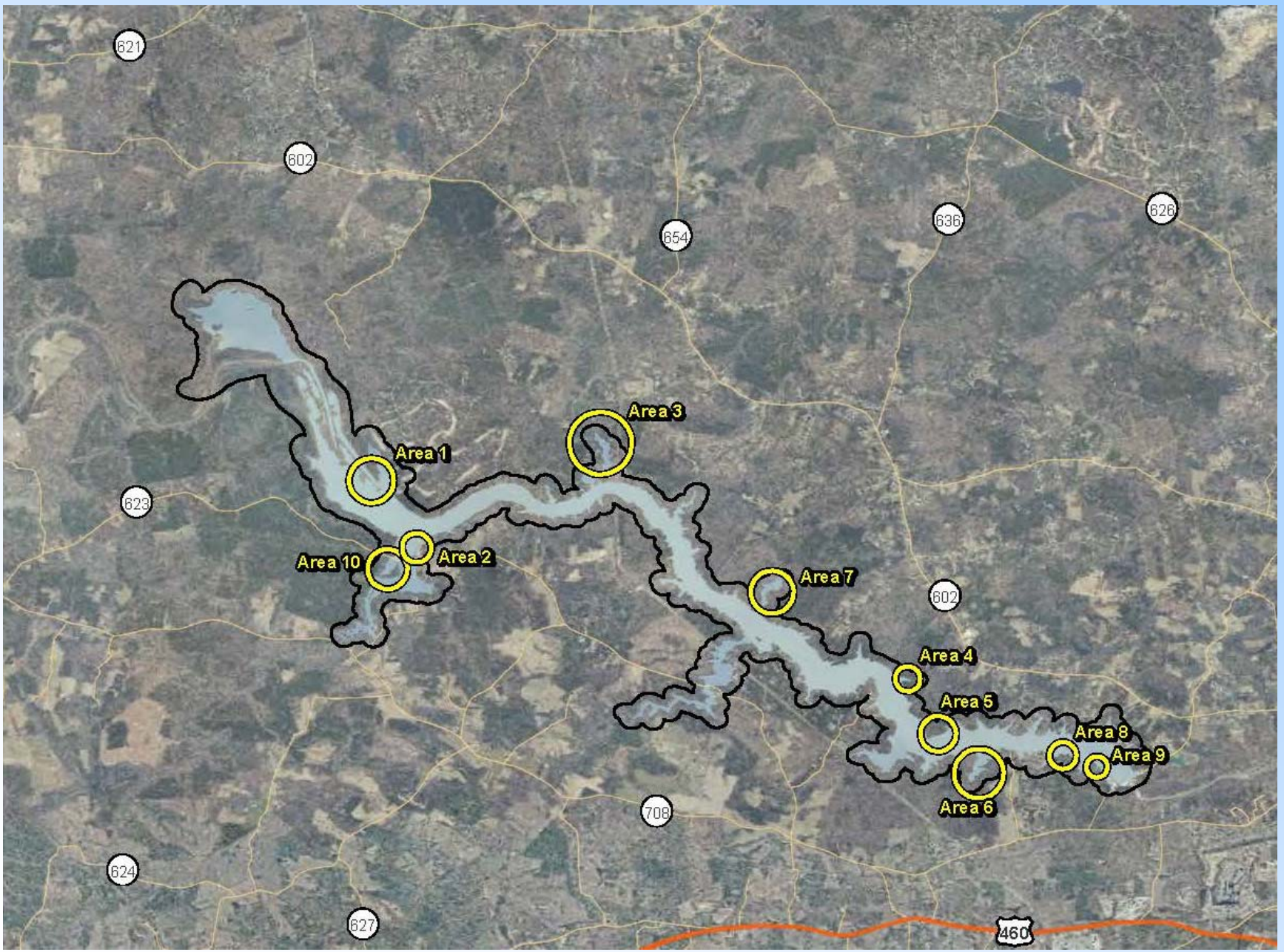
Stream Mitigation Impacts: CR=17,149 credits

- Assume $350-$500/linear foot = *$6.0M to $8.57M*

➢ Total costs estimated for Wetland & Stream Mitigation:

$10.75M-$14.33M

Questions?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