

Wetland and Stream Mitigation Assessment for Transportation Planning

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December 7, 2016

NCTCOG Regional GIS Meeting



Purpose

- **As the region's MPO, NCTCOG is responsible for long-range transportation planning**
- **Transportation projects can have a big impact on wetlands and streams**
- **Under the Clean Water Act, these impacts must be avoided or mitigated by purchasing credits from a mitigation bank**
- **Currently unknown:**
 - **Supply of suitable sites for mitigation**
 - **Overall impact of planned transportation projects recommended in Mobility 2040**
- **SHRP2 grant**

What is Mobility 2040?

- The defining vision for the multimodal transportation system in the Dallas-Fort Worth Metropolitan Planning Area
- Guides the implementation of multimodal transportation improvements, policies, and programs through the year 2040
- Officially adopted by the Regional Transportation Council in March 2016

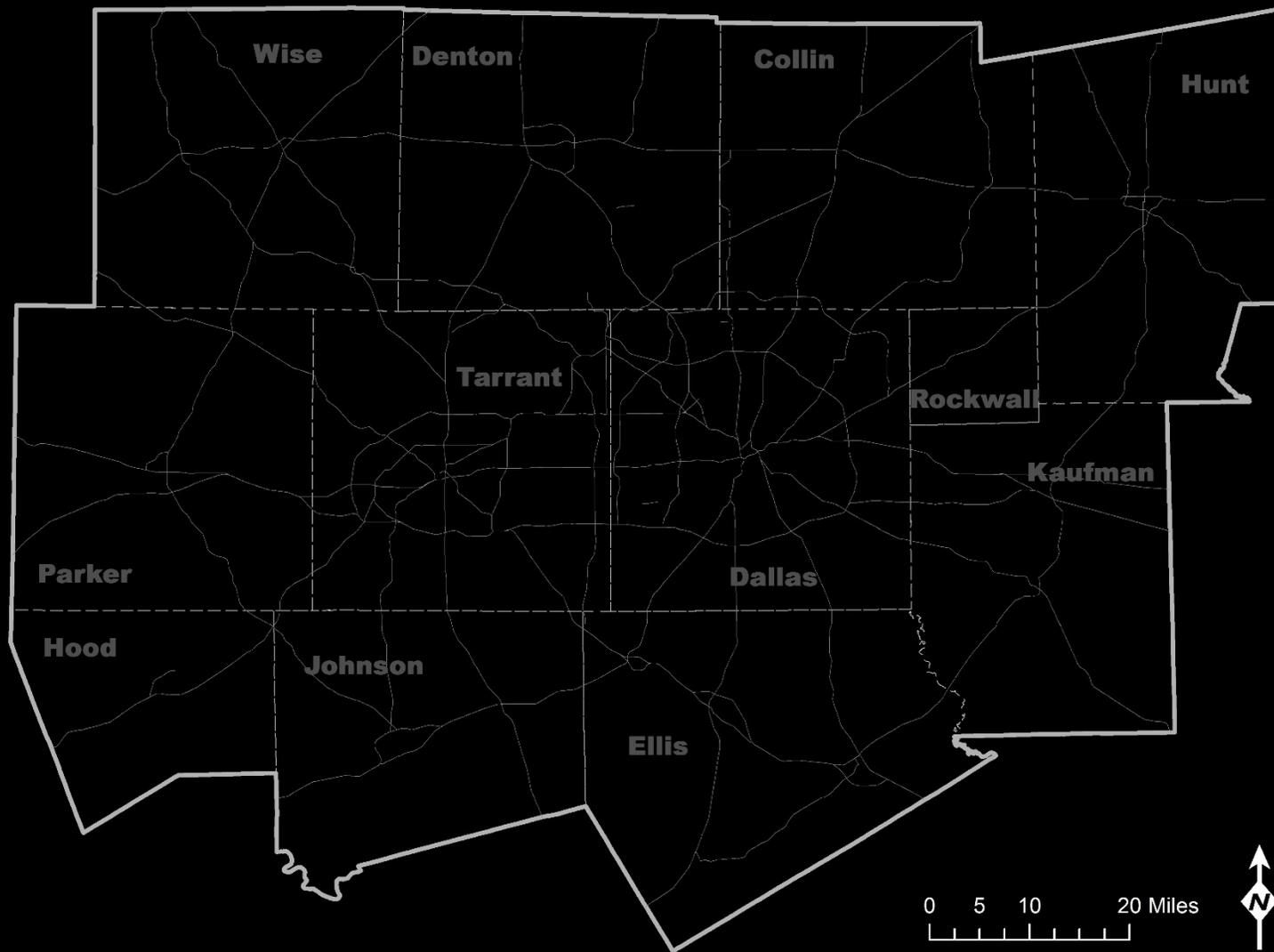


What is Mobility 2040?



THE METROPOLITAN TRANSPORTATION PLAN
FOR NORTH CENTRAL TEXAS

Metropolitan Planning Area



What is Mitigation Banking?

- **Enhancement or restoration of streams and wetlands to compensate for adverse impacts to similar nearby streams and wetlands**
- **Enhancement or restoration activity in a mitigation bank site generates credits that may be purchased to offset nearby impacts**
- **Implemented and required by the Clean Water Act**
- **Tracked by Army Corps of Engineers using RIBITS database**

What is Mitigation Banking?



Image: A wetland mitigation site at The Nature Conservancy's Clymer Meadow

What is Mitigation Banking?



Image: A stream mitigation bank near Camp Creek State Forest in Spanishburg, WV

GIS Analyses Performed

1. Identification of suitable stream and wetland sites in the region for mitigation
2. Estimation of the wetland and stream impacts of major roadway projects recommended in Mobility 2040

Mitigation Site Identification

- **Performed for stream enhancement, wetland enhancement, and wetland restoration**
- **With help of advisory committee, developed two types of criteria:**
 - **Absolute factors: Important factors that geographically restricted the searches to areas where mitigation is possible**
 - **Relative factors: Factors used to score these areas to determine which are best suited for mitigation**
- **Built absolute and relative factors into a GIS model**

Mitigation Site Identification

Wetland Restoration Criteria:

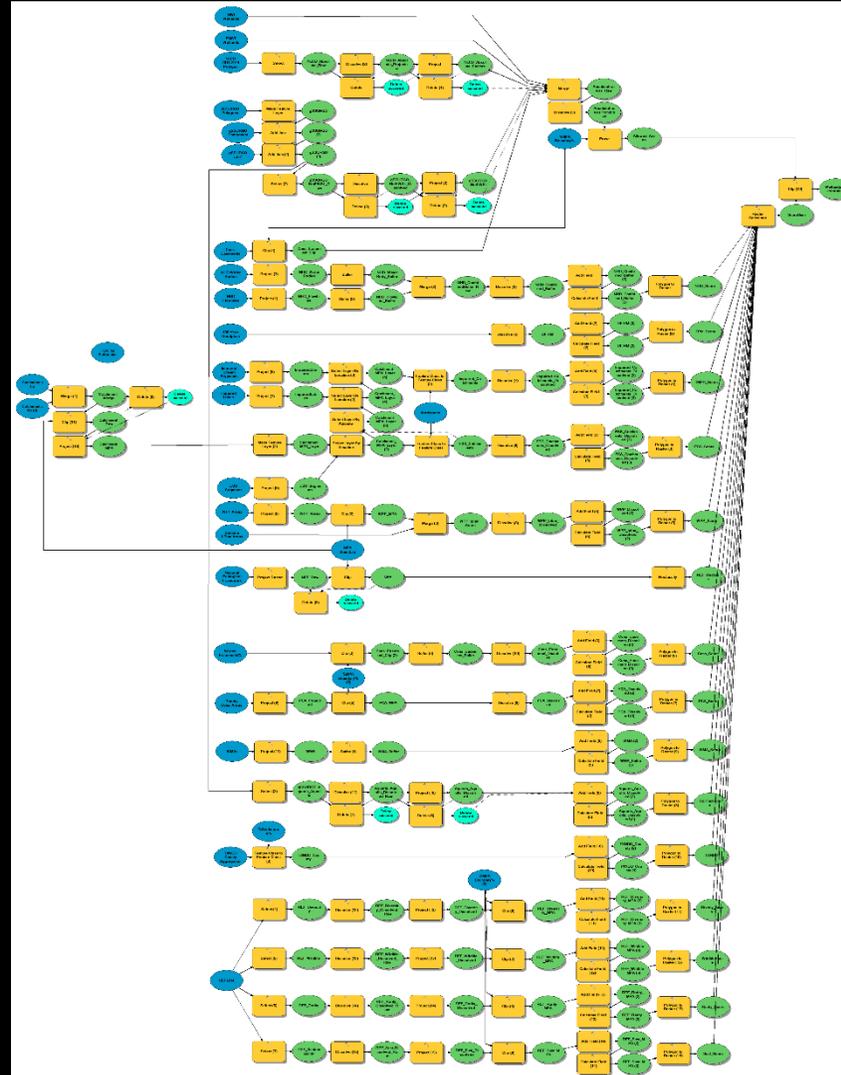
Absolute Factors

- NWI, NLCD Wetlands, EMST Wetlands (USFWS, USGS, TPWD)
- Potential Wetland Soil Landscapes (gSSURGO)
- NLCD Developed Land (USGS)
- Conservation Easements (National Conservation Easement Database)

Relative Factors

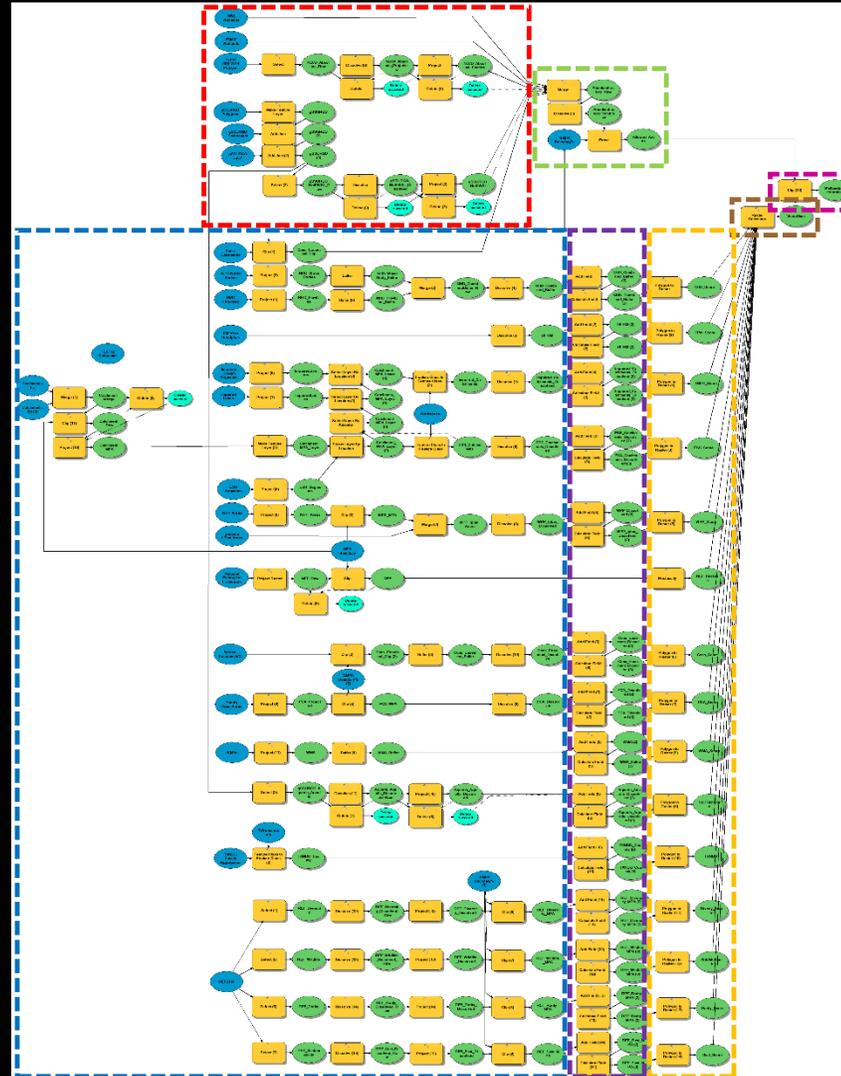
- National Hydrography Dataset (USGS)
- DFIRM floodplains (FEMA)
- Category 4 and 5 Impaired Water Segments (TCEQ)
- Ecologically Significant Stream Segments (TPWD)
- WPPs and Bacteria I-Plan (TCEQ, NCTCOG)
- National Ecological Framework (EPA Region 4)
- Conservation Easements (National Conservation Easement Database)
- Priority Conservation Areas (The Nature Conservancy)
- Wildlife Management Area (TPWD)
- Soil taxonomy (NRCS)
- Texas Natural Diversity Database, Species of Greatest Conservation Need (TPWD)
- REF Diversity, Wildlife Habitat, Rarity, and Sustainability (NCTCOG)

Mitigation Site Identification



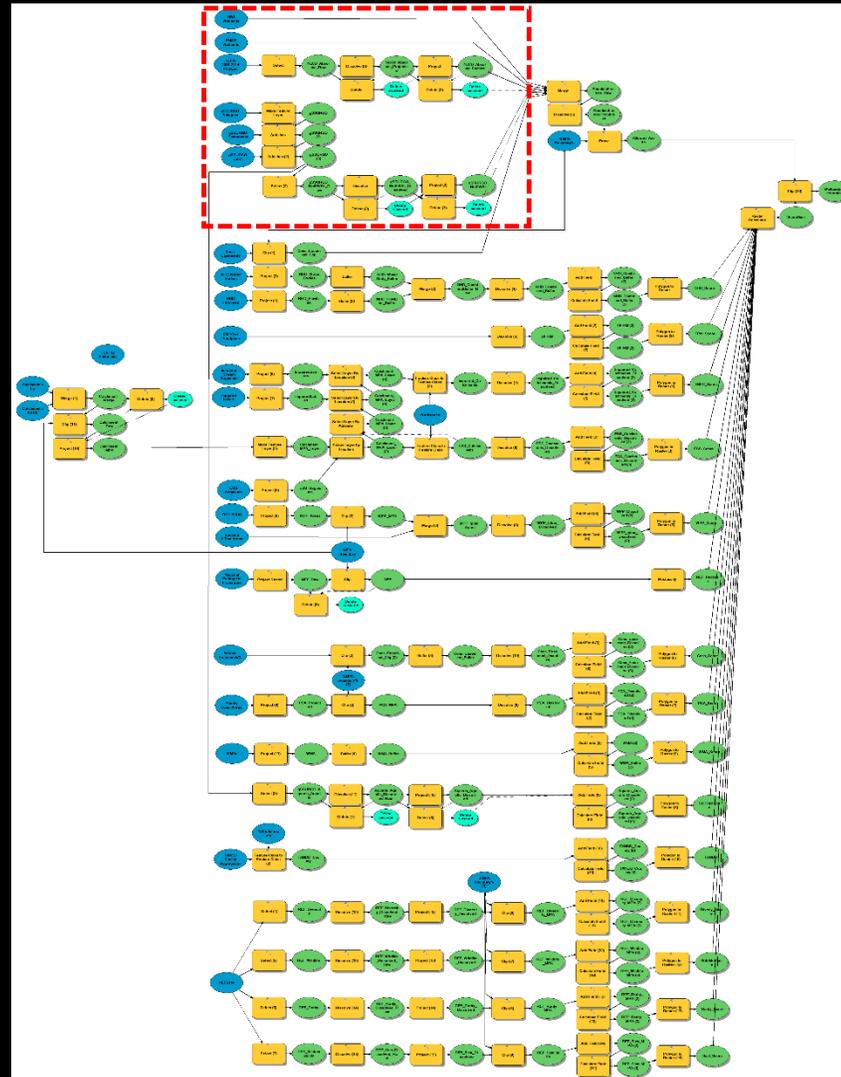
Mitigation Site Identification

1. Preprocessing for absolute factors
2. Merging absolute factors
3. Preprocessing for relative factors
4. Scoring of relative factors
5. Raster conversion/
reclassification of relative factors
6. Summation of relative factor score (Raster Calculator)
7. Clipping relative factor raster output by absolute factors



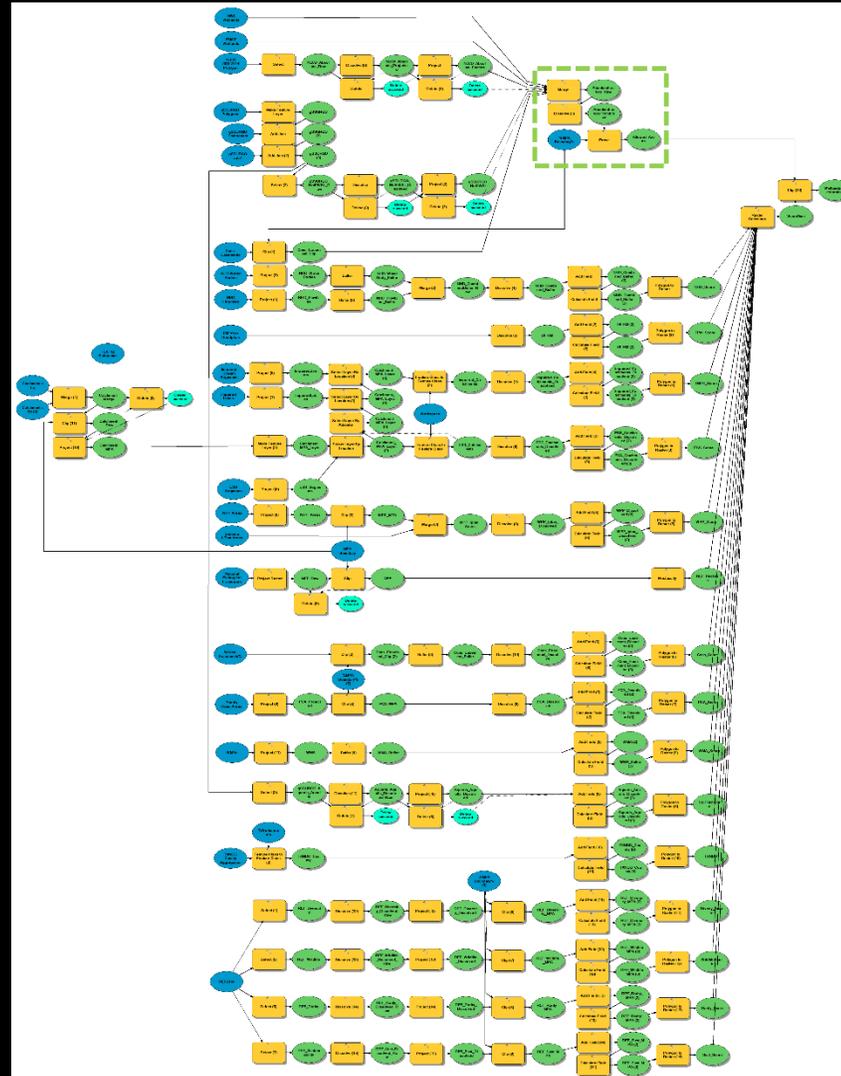
Mitigation Site Identification

1. Preprocessing for absolute factors



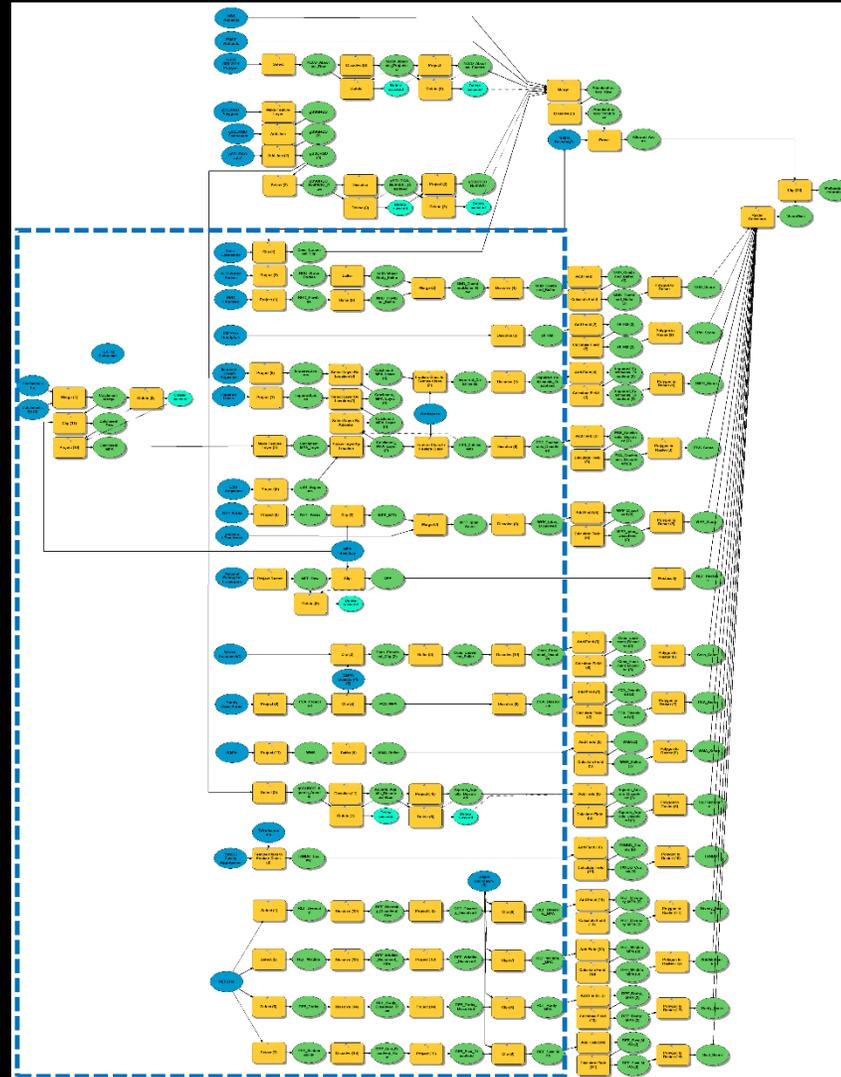
Mitigation Site Identification

2. Merging absolute factors



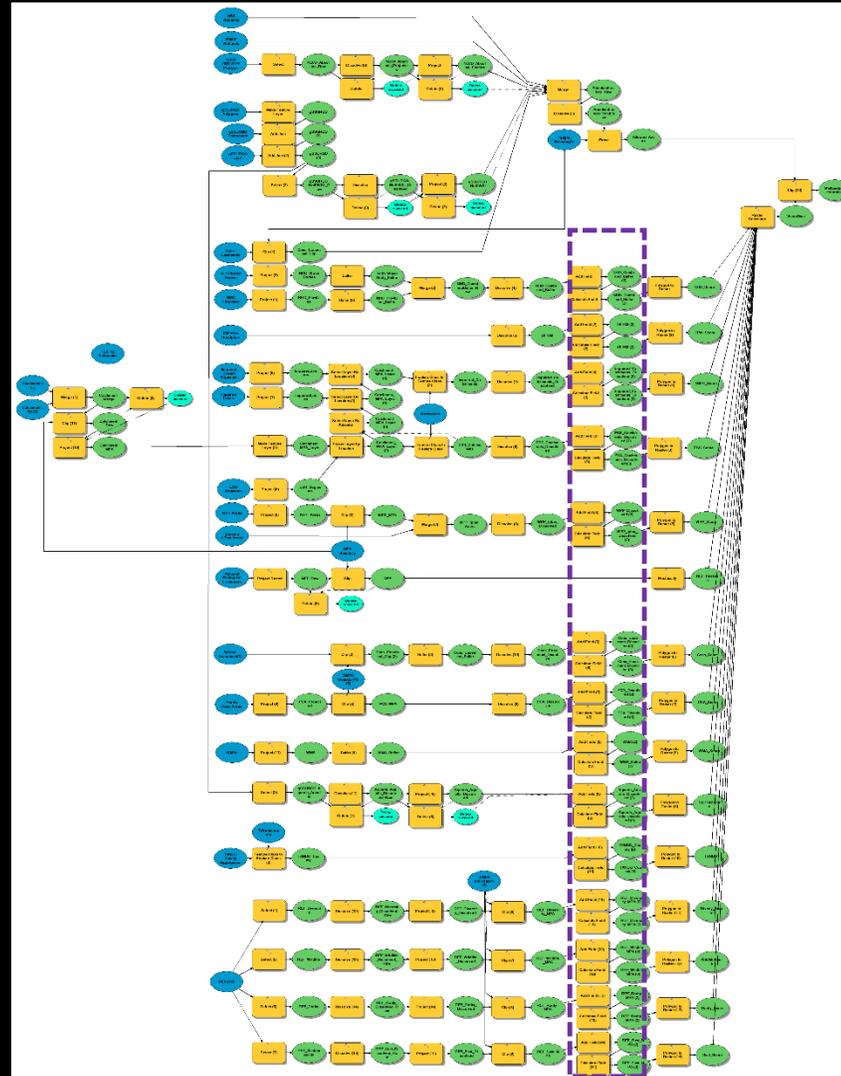
Mitigation Site Identification

3. Preprocessing for relative factors



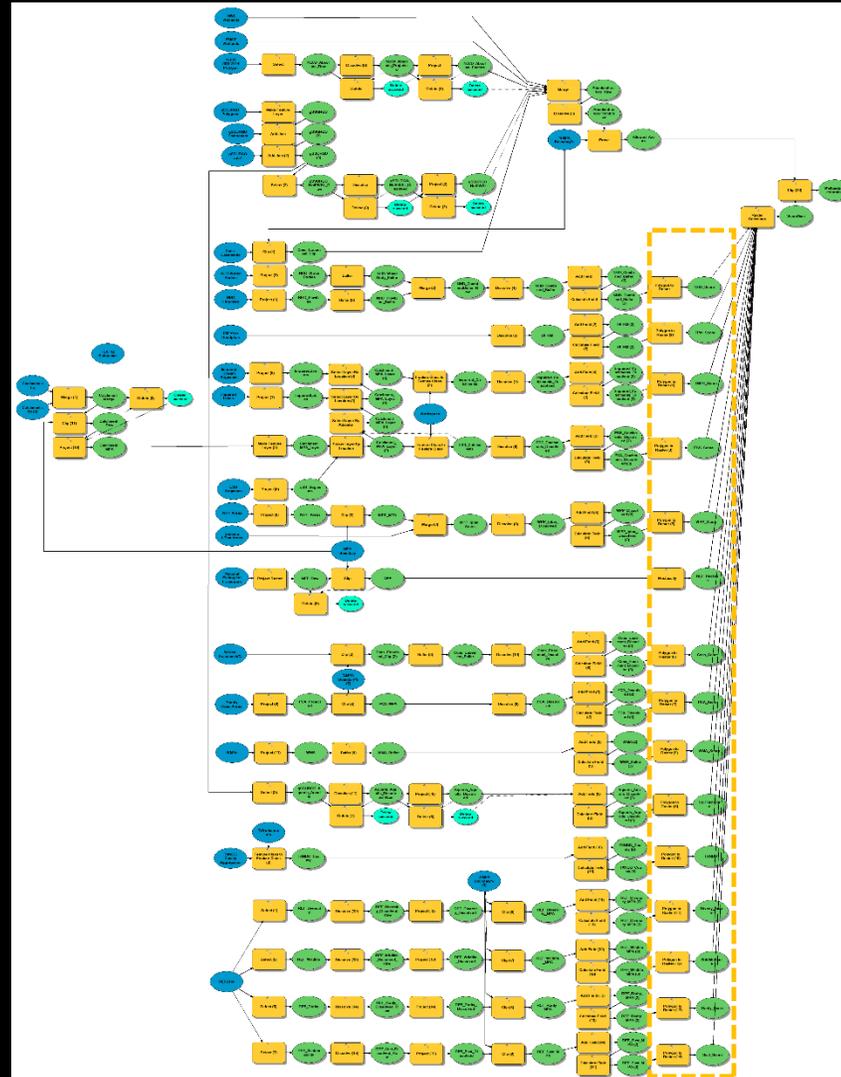
Mitigation Site Identification

4. Scoring of relative factors



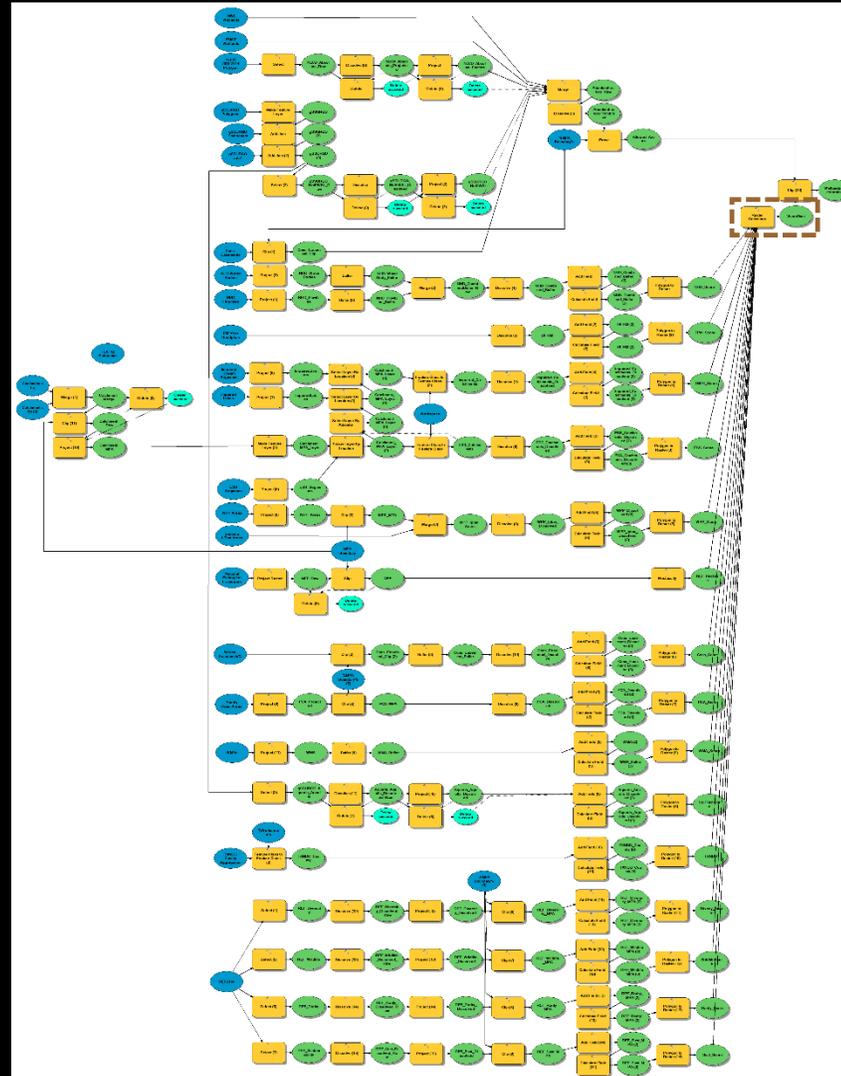
Mitigation Site Identification

5. Raster conversion/ reclassification of relative factors



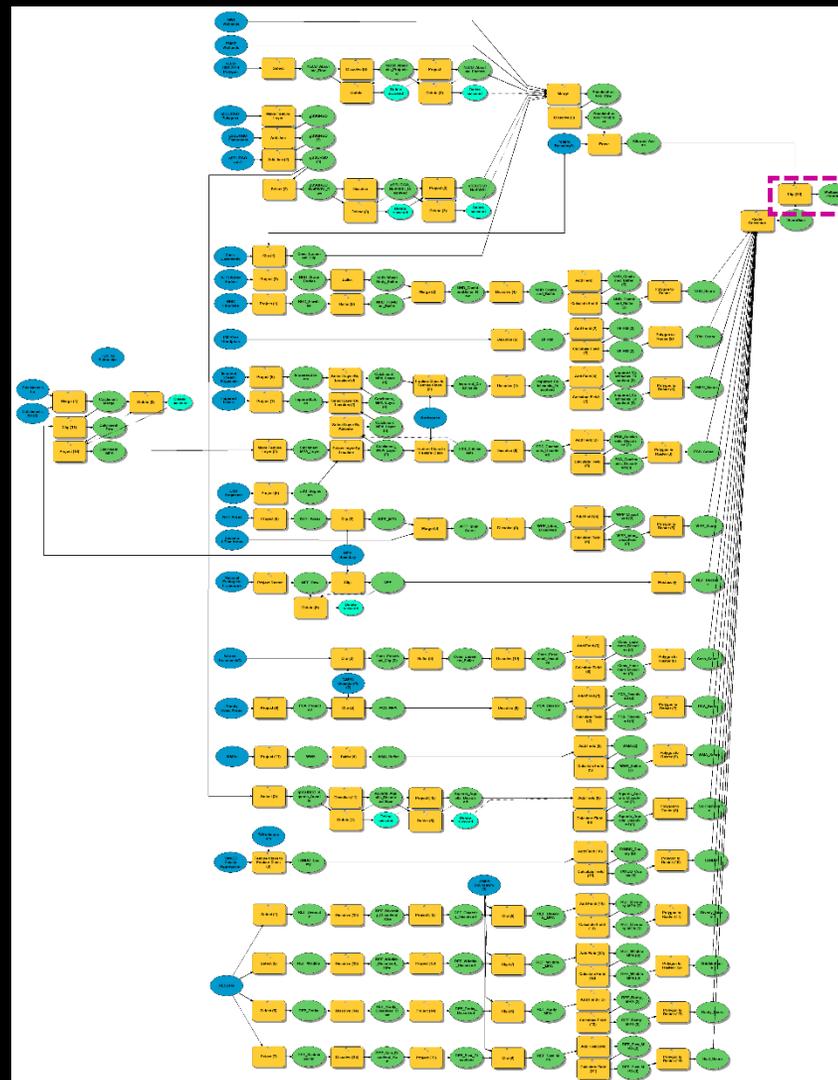
Mitigation Site Identification

6. Summation of relative factor score (Raster Calculator)



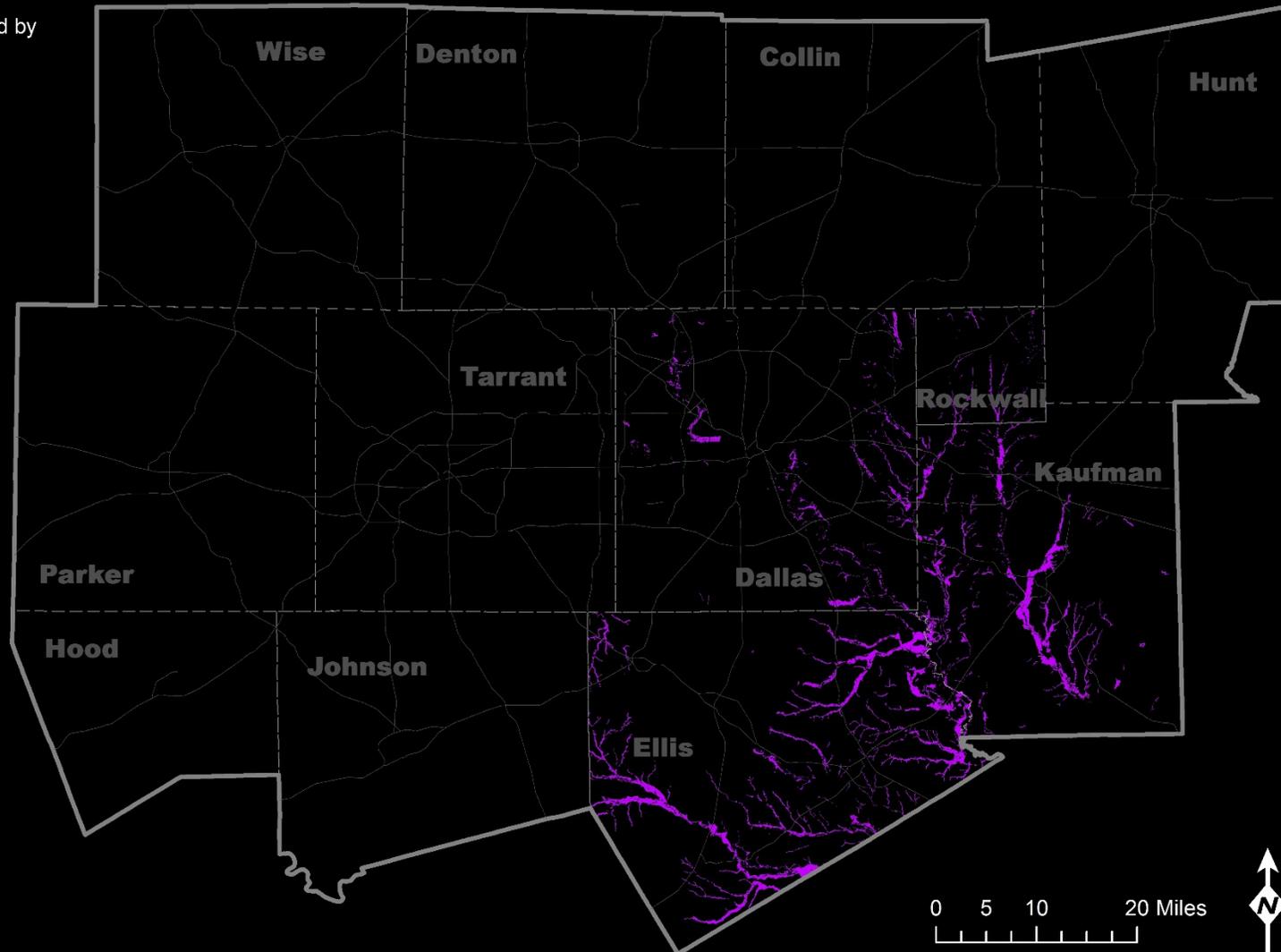
Mitigation Site Identification

7. Clipping relative factor raster output by absolute factors

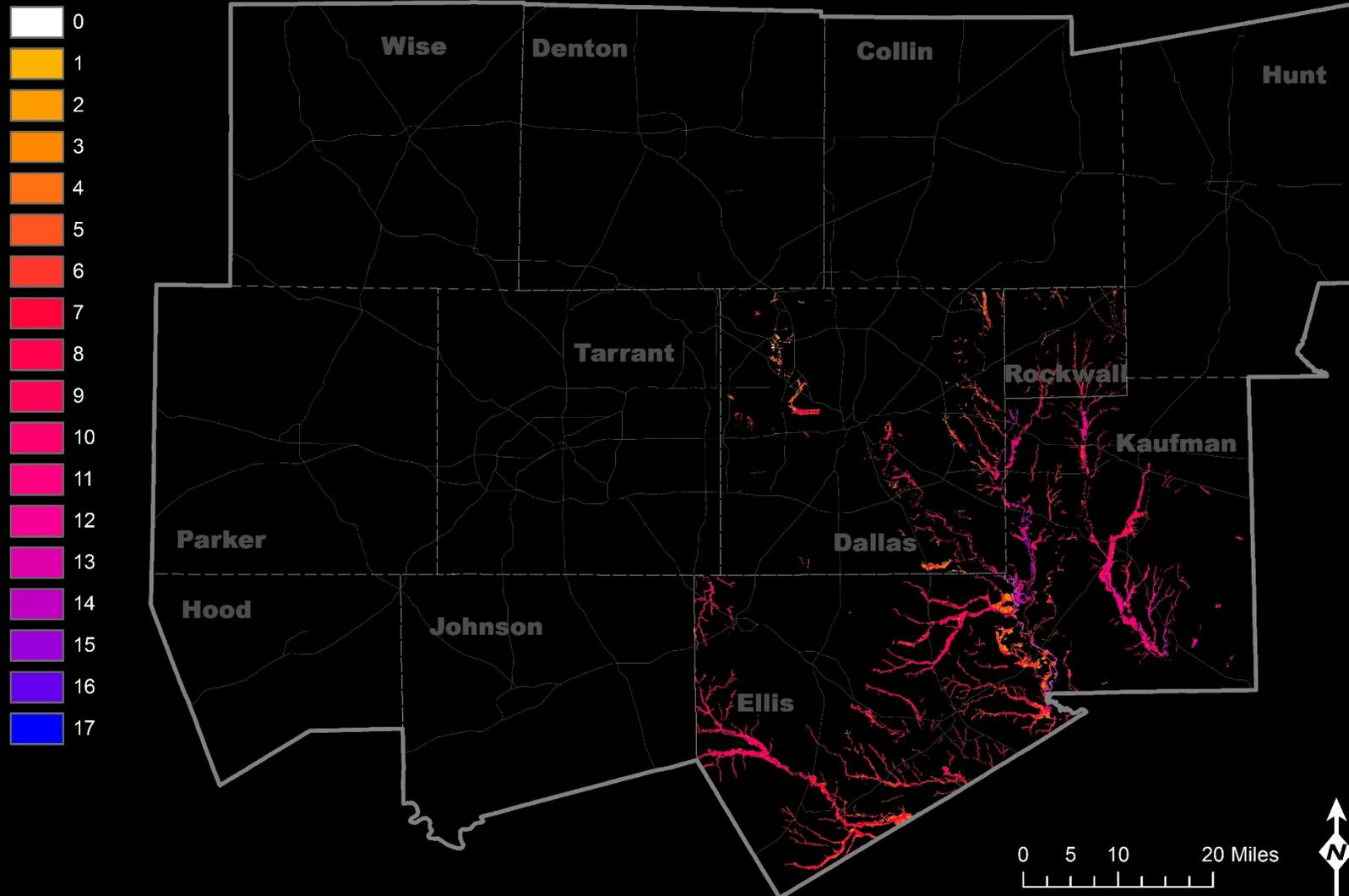


Wetland Restoration Absolute Factors

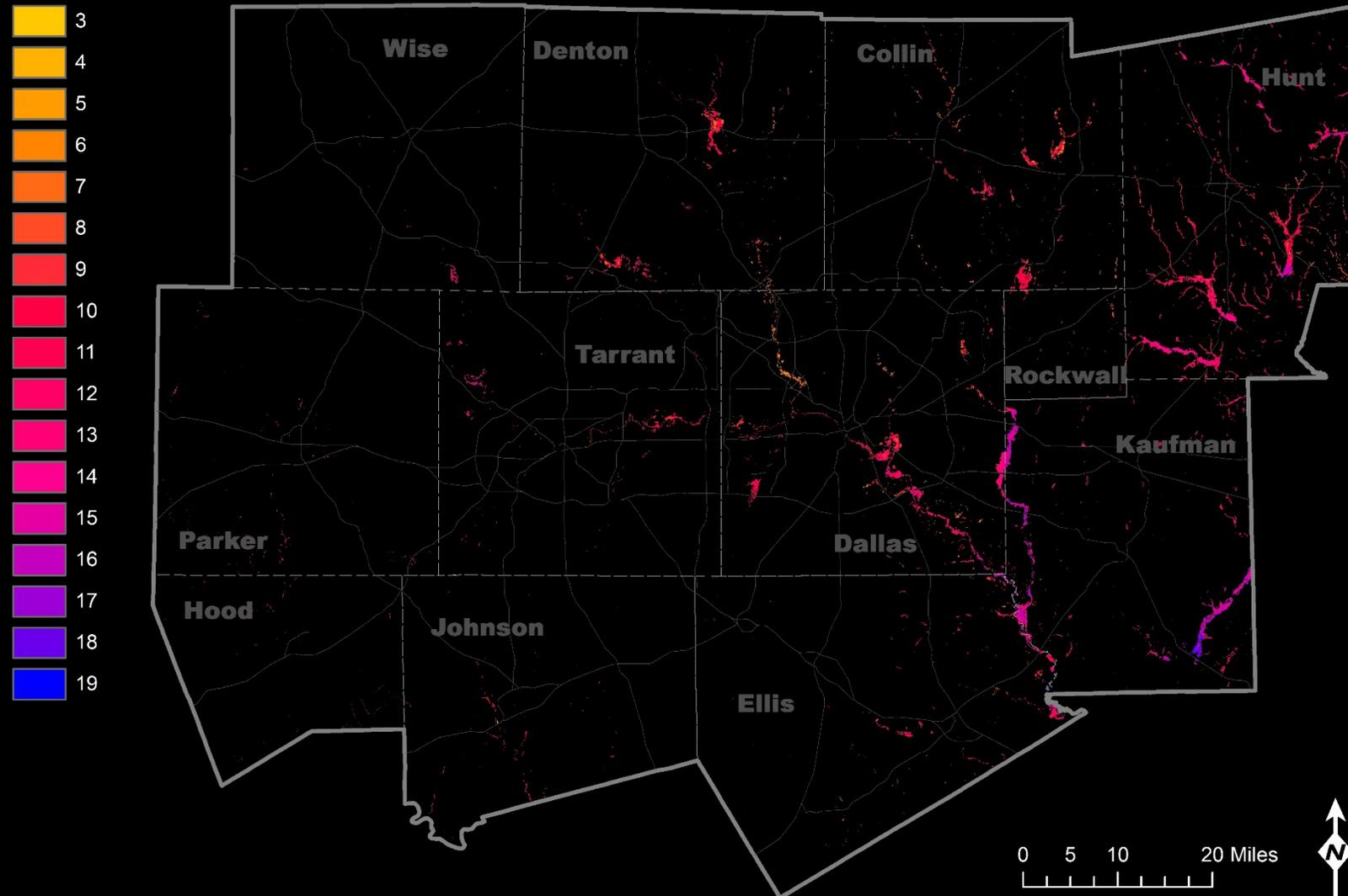
Areas not Eliminated by Absolute Factors



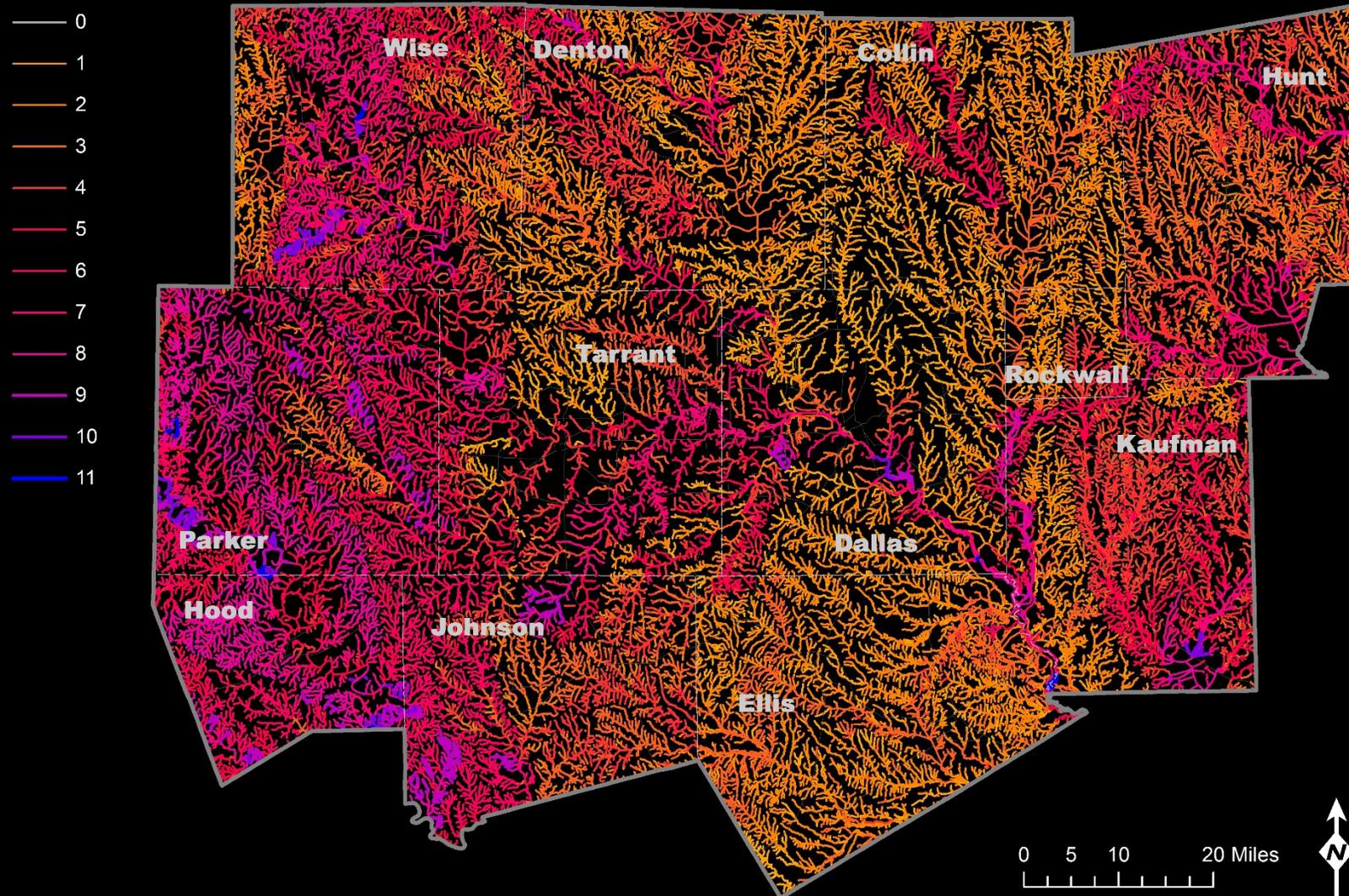
Wetland Restoration Viability



Wetland Enhancement Viability



Stream Enhancement Viability

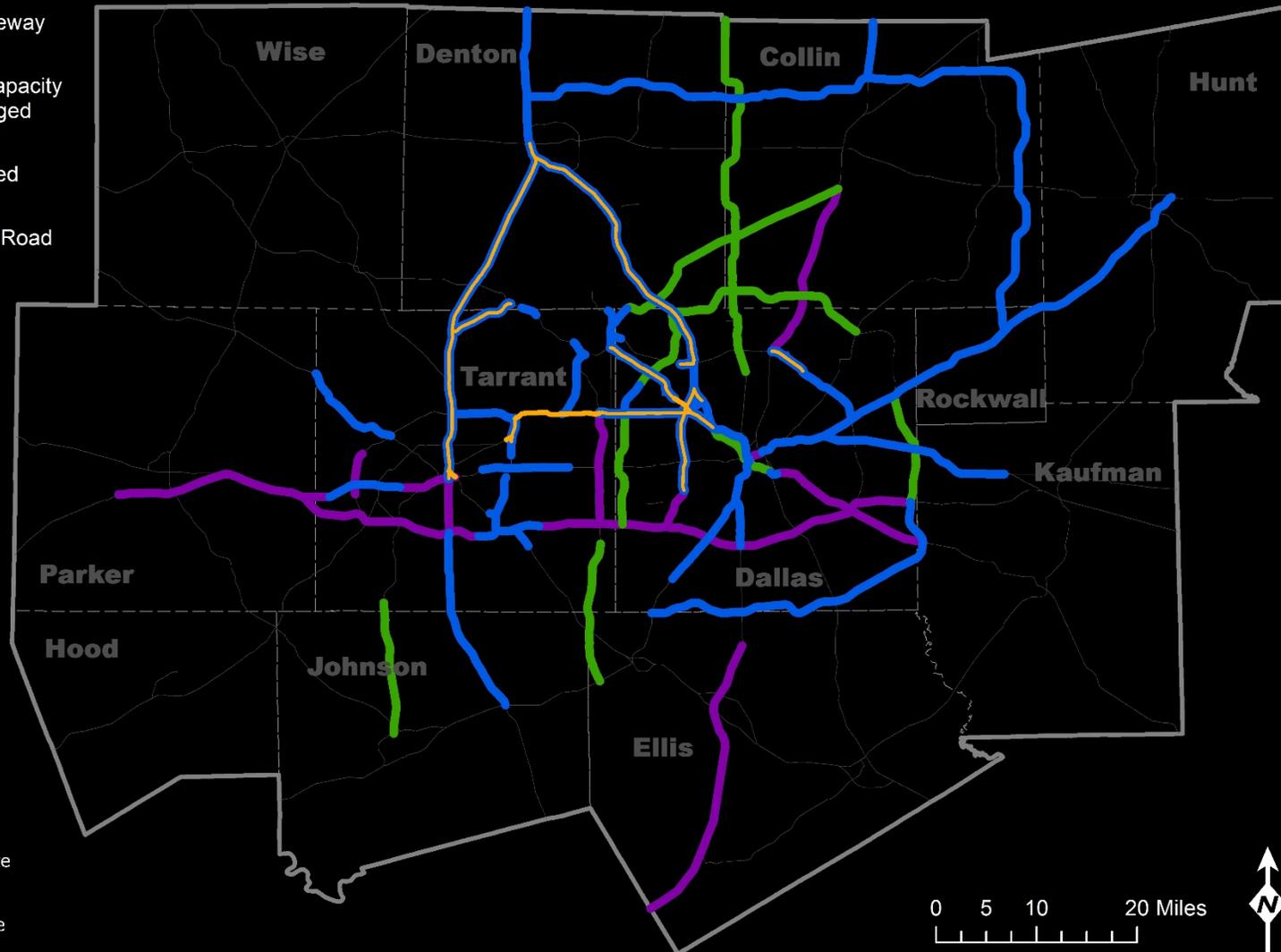


Mobility 2040 Project Impacts

- **Developed standard widths for roadway projects based on number of lanes and other roadway attributes**
- **Applied these standard widths to Mobility 2040 projects**
 - **Present width and future width (by 2040)**
- **Areas affected by project in 2040 but not today assumed to be areas of new impact**
- **These areas intersected with wetlands and streams to estimate impact of each project**
- **Performed for existing wetlands, perennial streams, and intermittent streams**
- **Total impacts aggregated into groups (Low, Medium, High impact)**

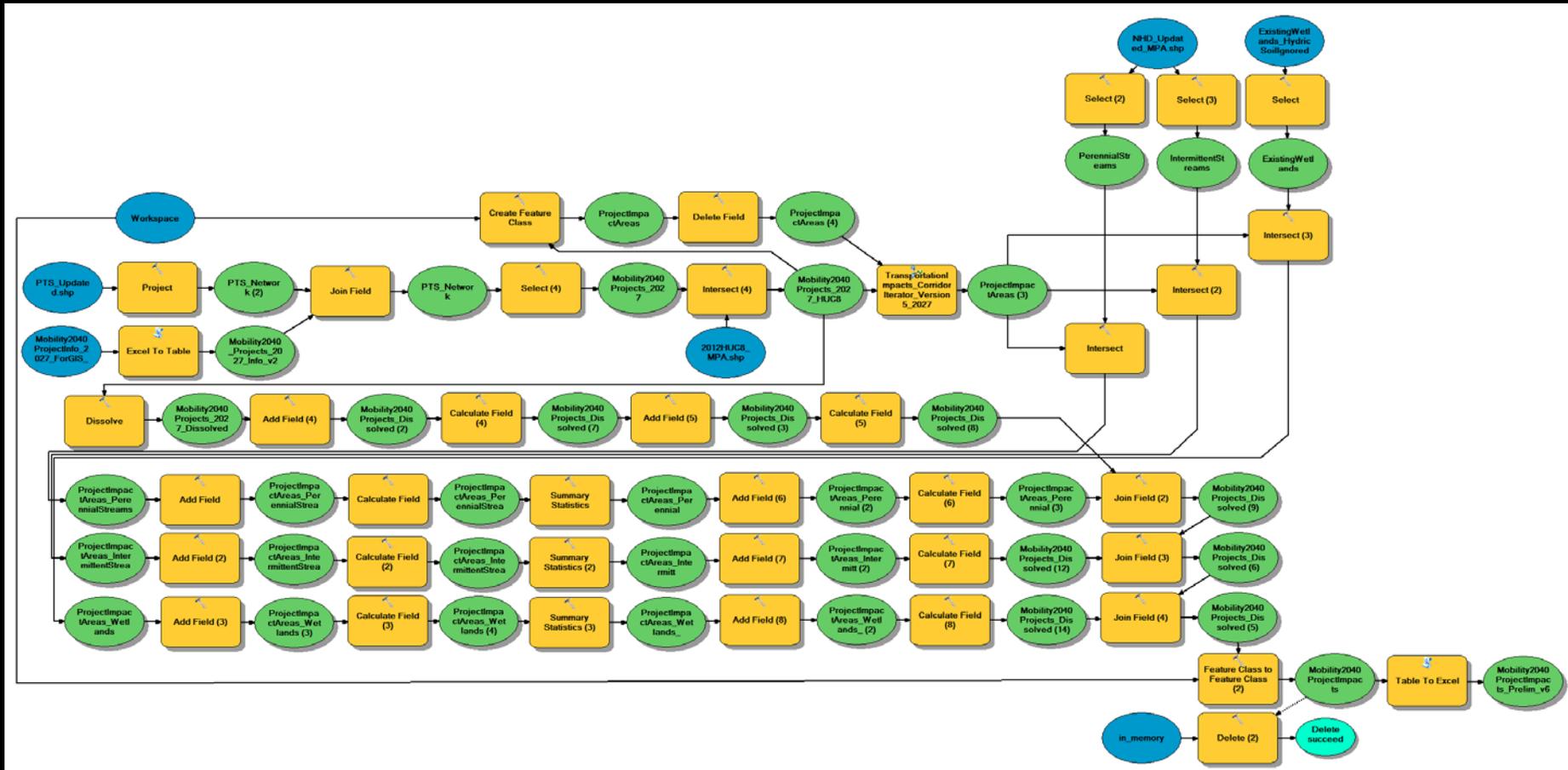
Mobility 2040 Roadway Recommendations

-  New or Additional Freeway Capacity
-  Additional Freeway Capacity and New Tolled Managed Lanes
-  New or Additional Tolled Managed Capacity
-  New or Additional Toll Road Capacity
-  Cap/Main



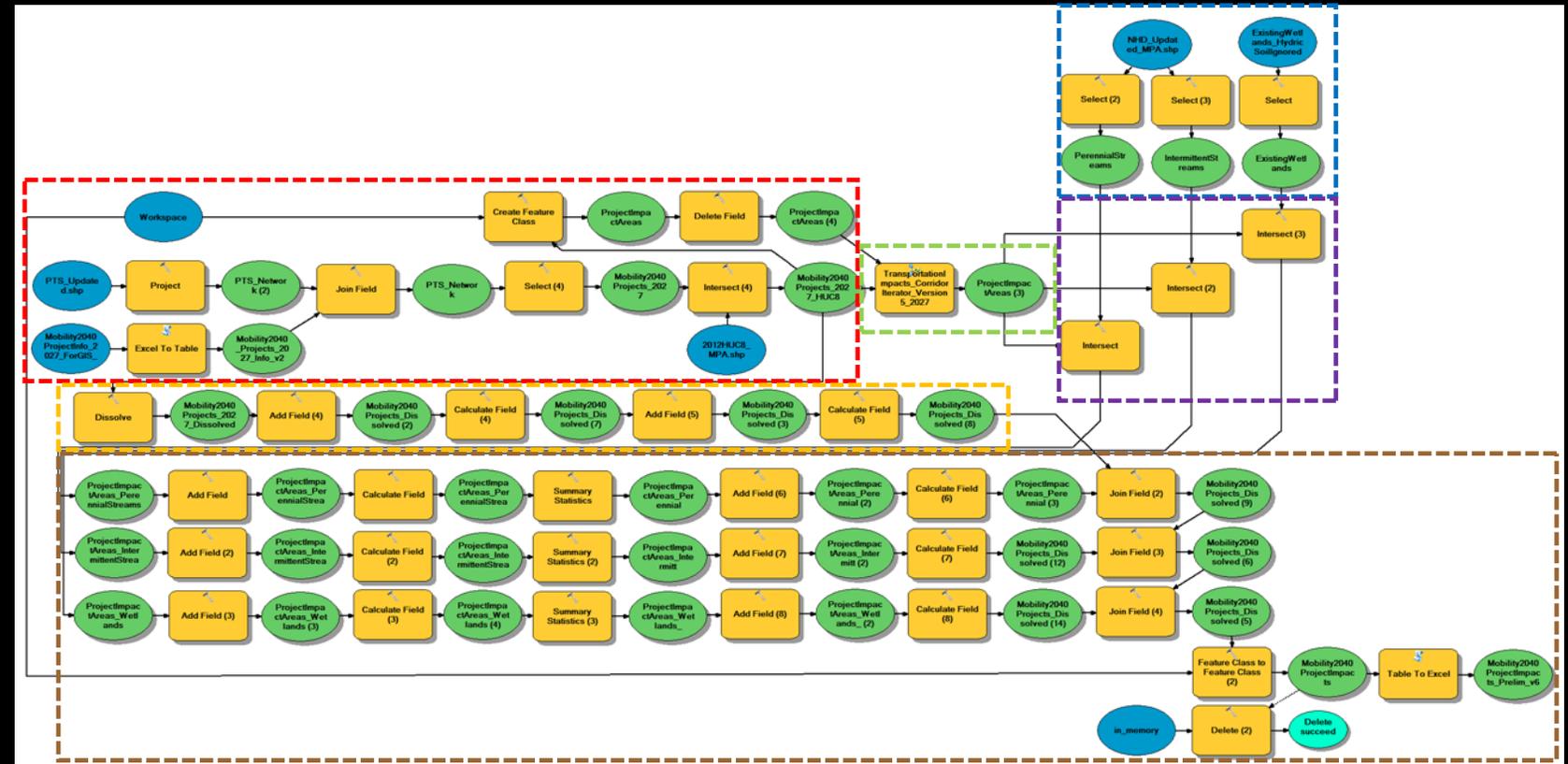
Facility recommendations indicate transportation need. Corridor-specific alignment, design, and operational characteristics will be determined through ongoing project development.

Mobility 2040 Project Impacts



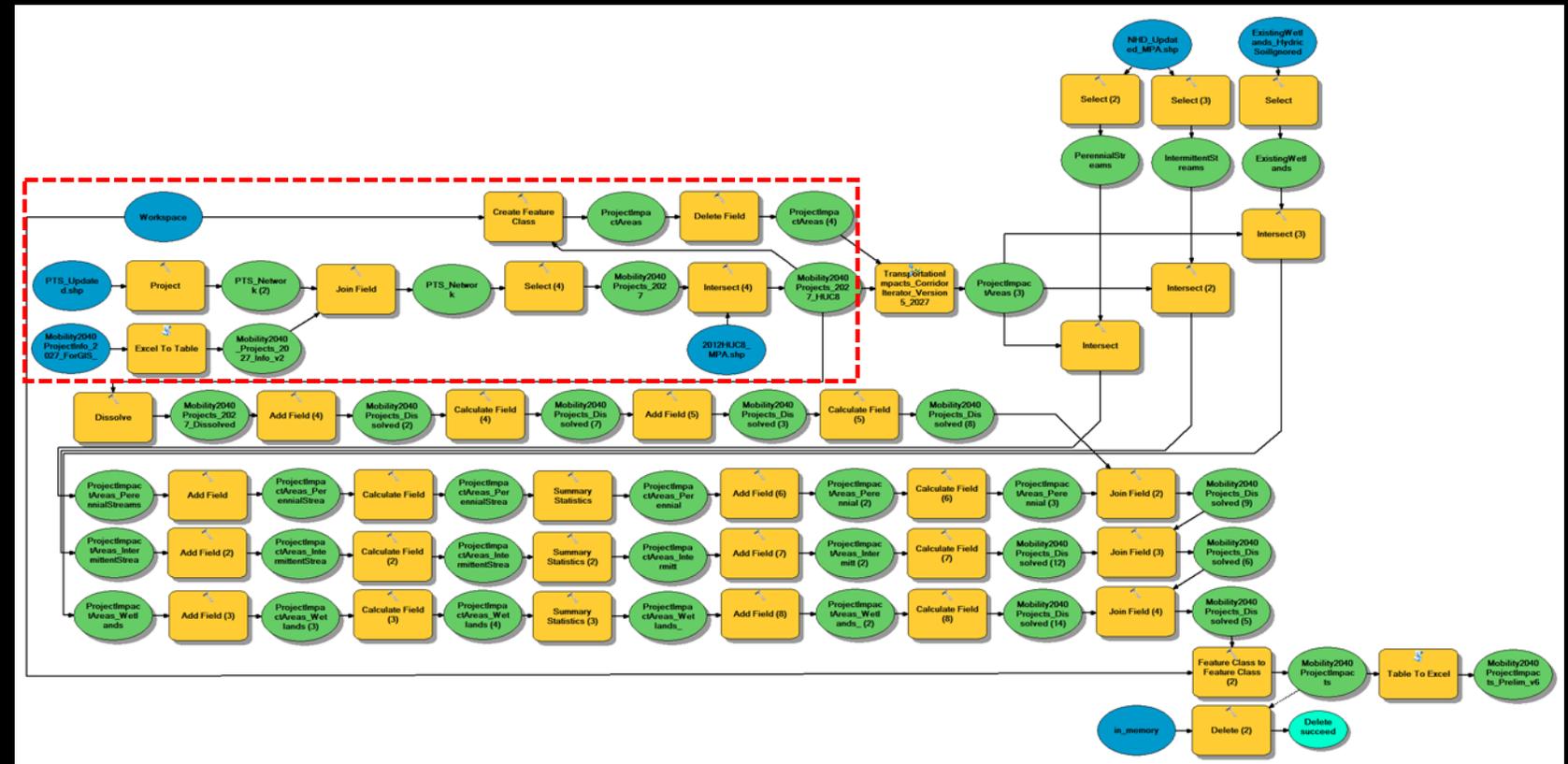
Mobility 2040 Project Impacts

1. Preprocessing for project network
2. Preprocessing for NHD and wetlands
3. Project buffer iteration
4. Intersecting project network with NHD and wetlands
5. Postprocessing for project network
6. Postprocessing for intersected NHD and wetlands (including summation)



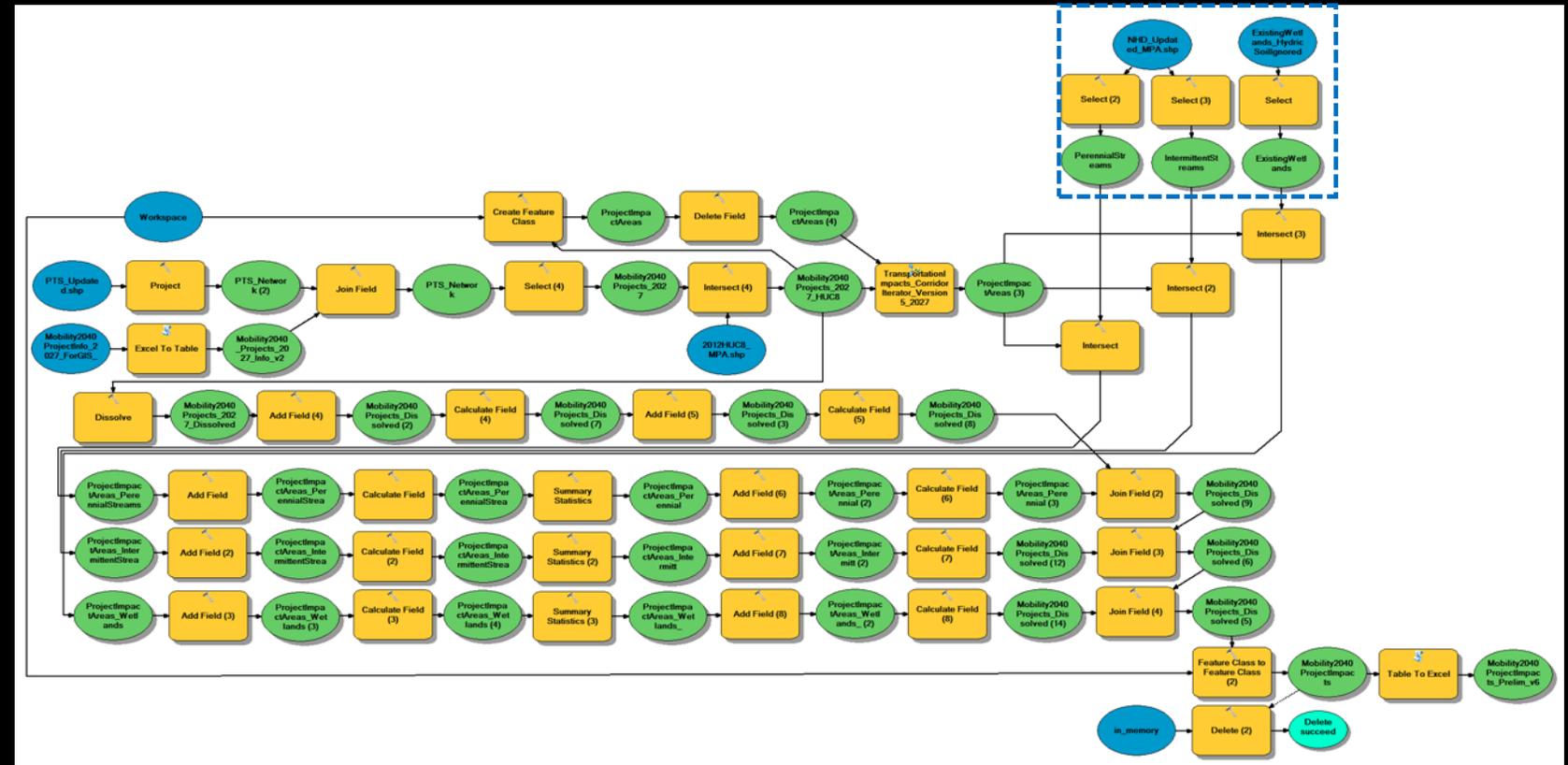
Mobility 2040 Project Impacts

1. Preprocessing for project network



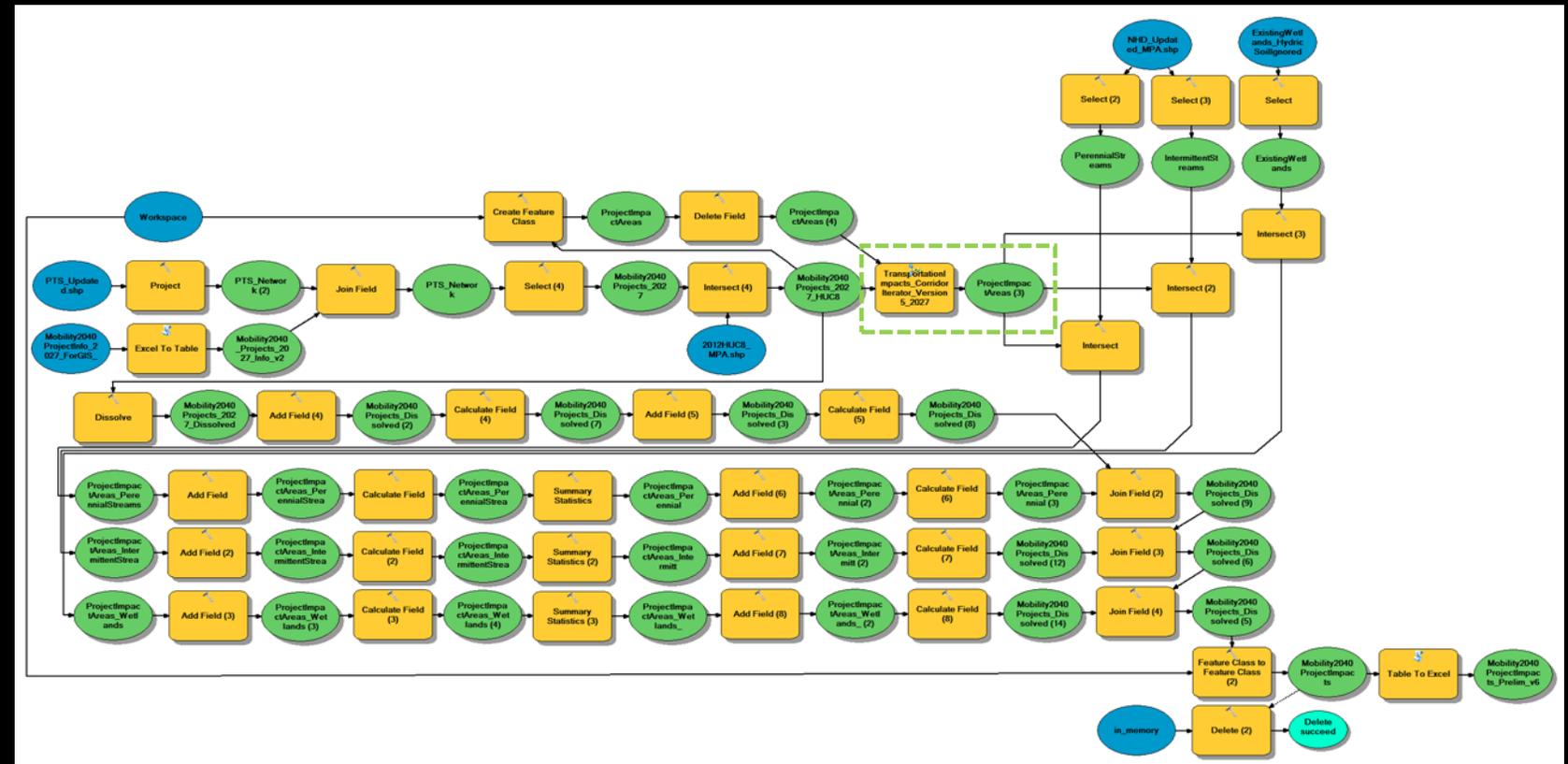
Mobility 2040 Project Impacts

2. Preprocessing for NHD and wetlands

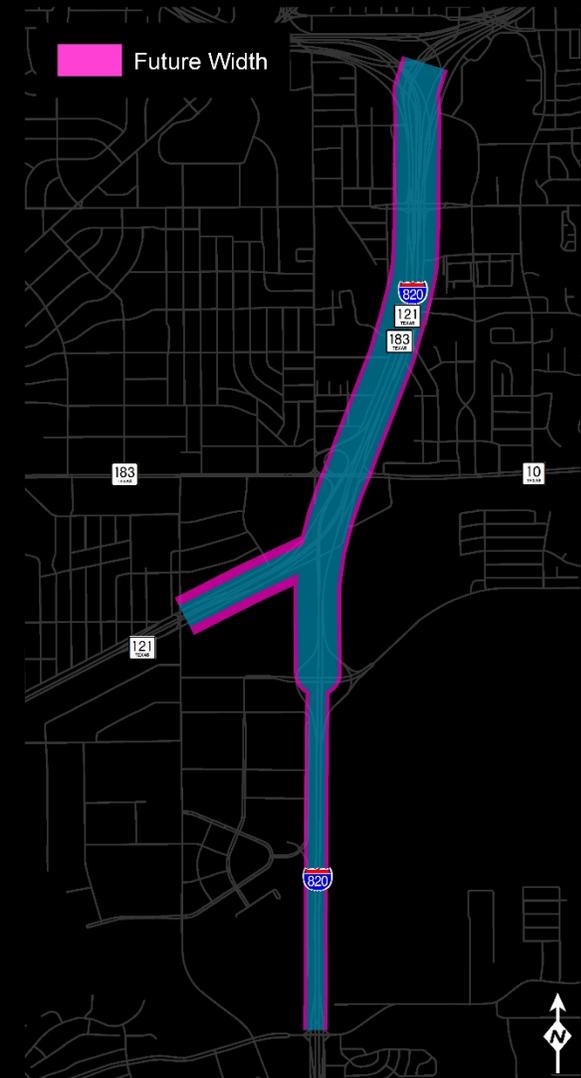
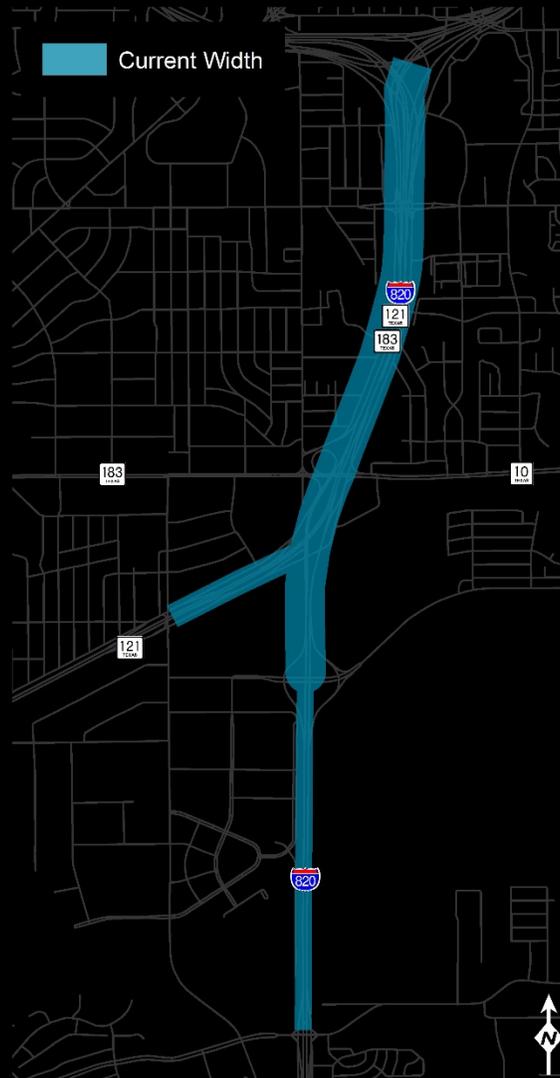
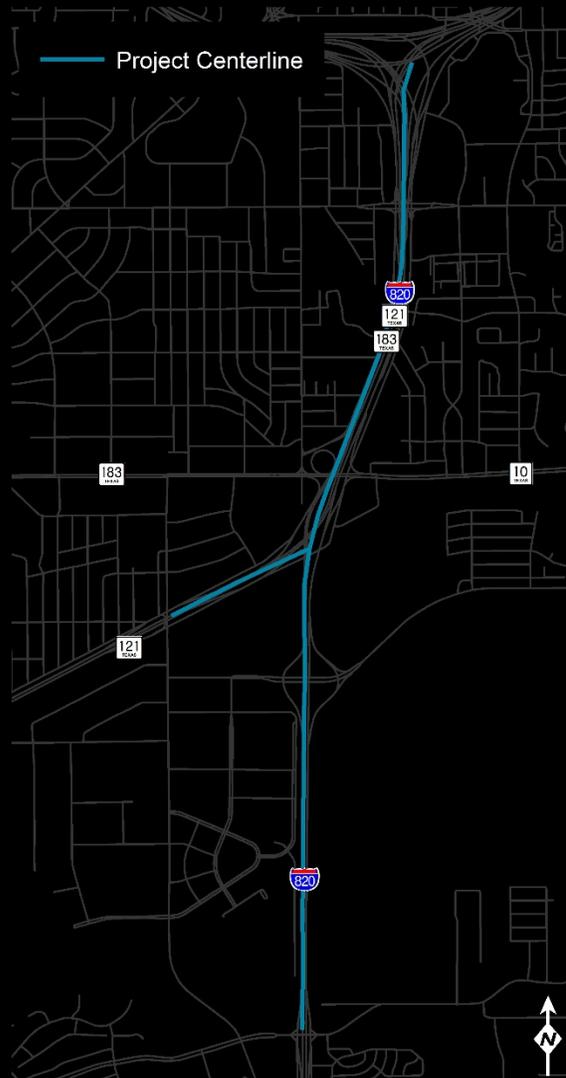


Mobility 2040 Project Impacts

3. Project buffer iteration

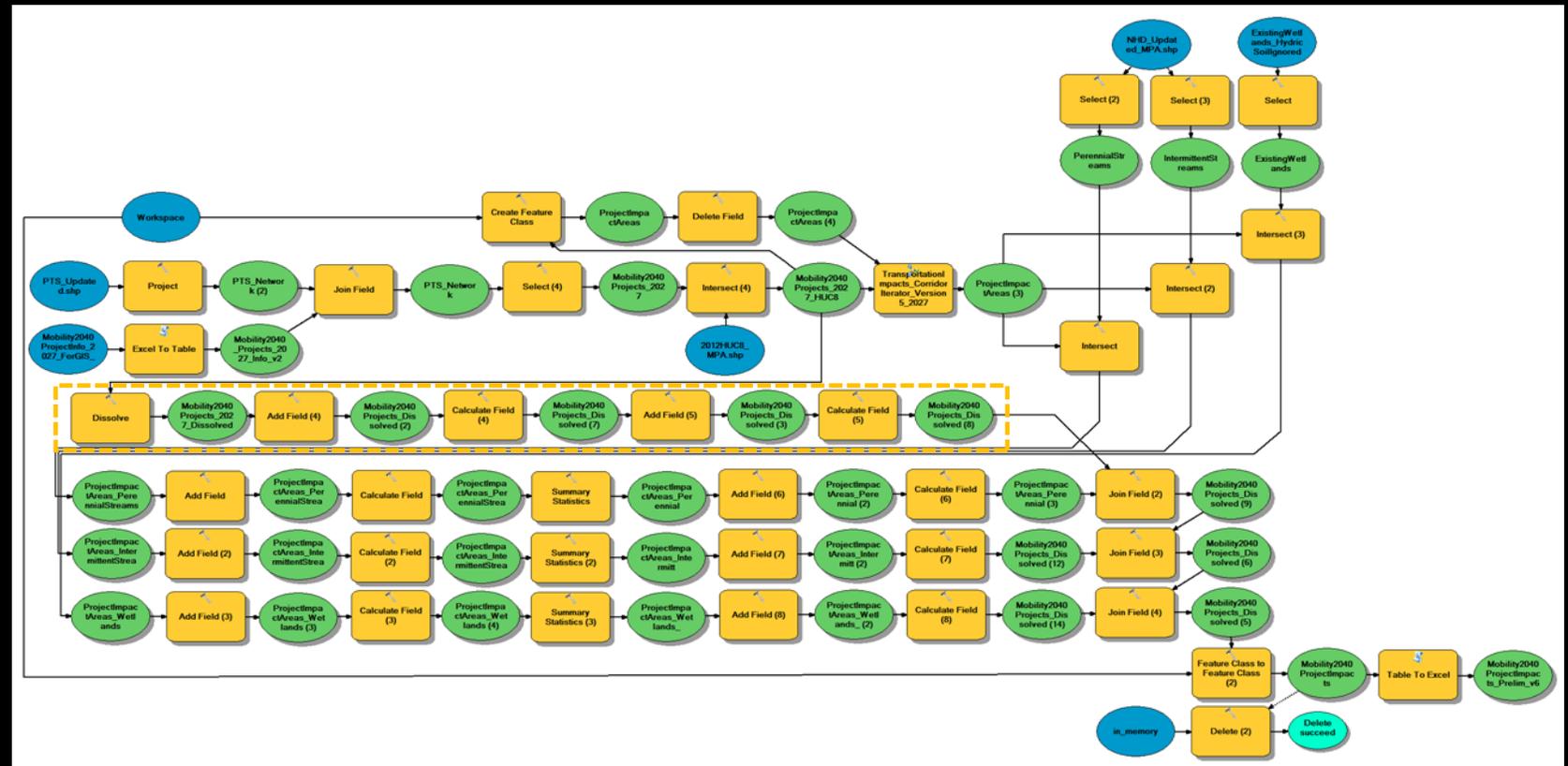


Mobility 2040 Project Impacts



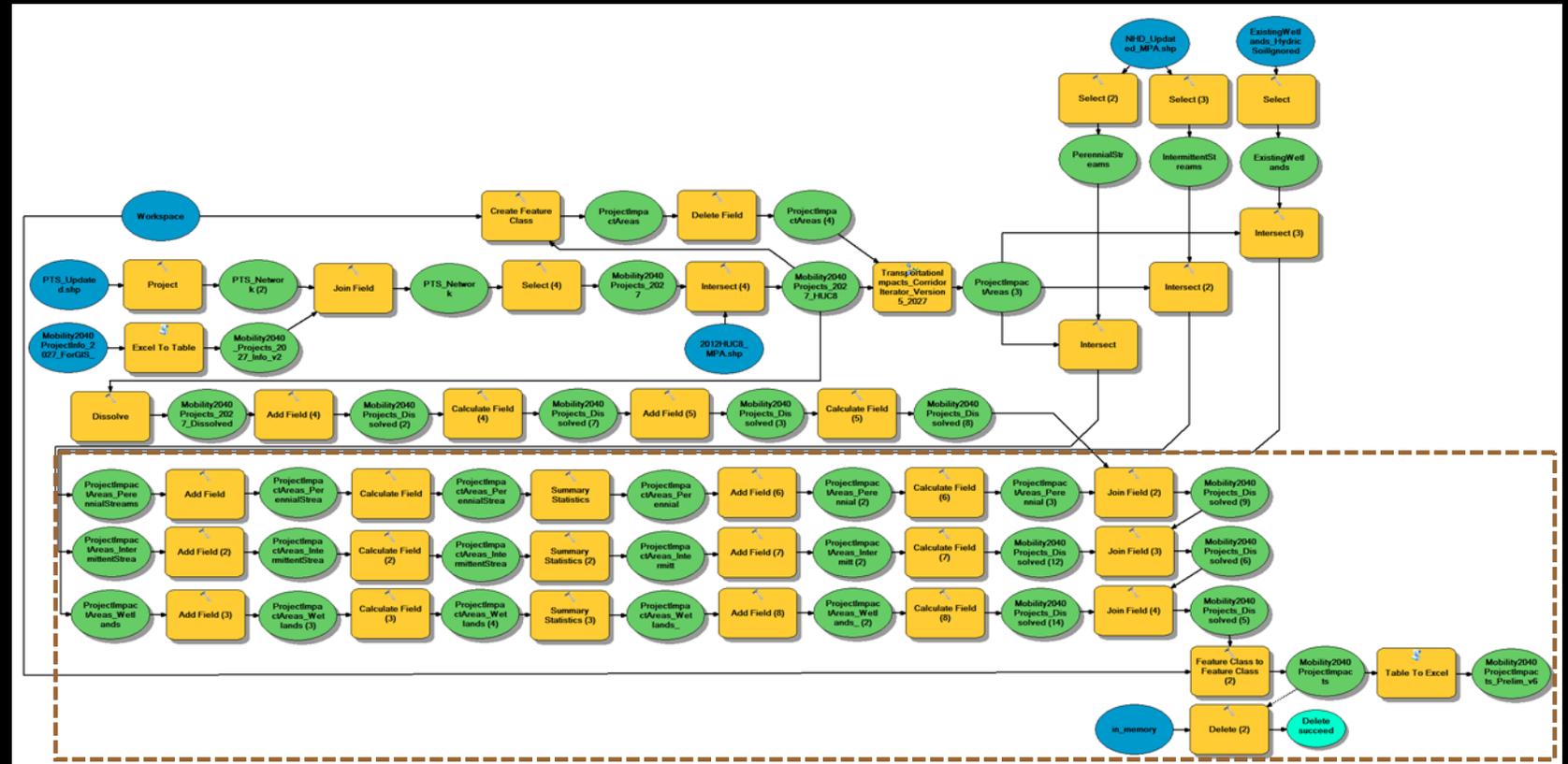
Mobility 2040 Project Impacts

5. Postprocessing for project network

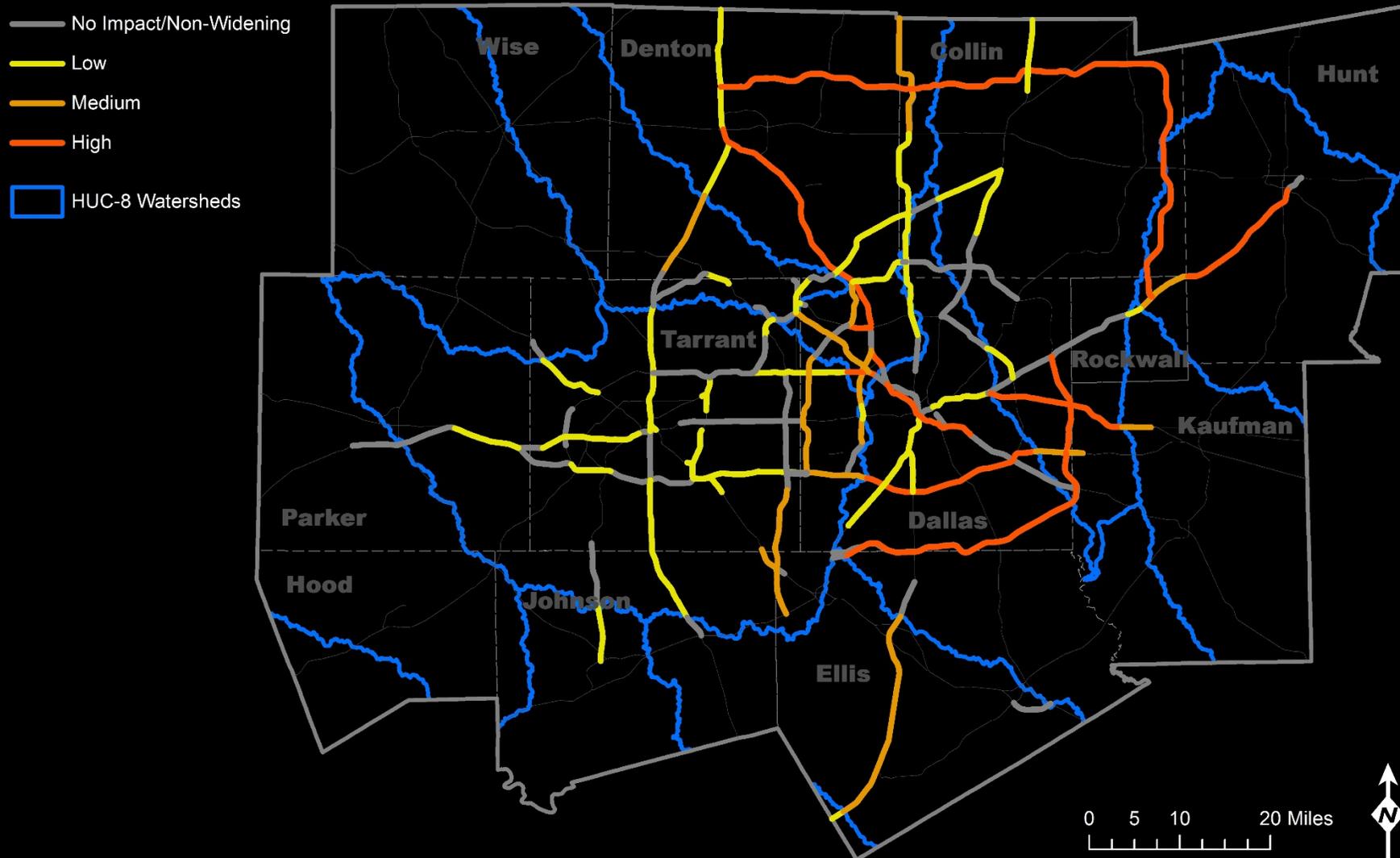


Mobility 2040 Project Impacts

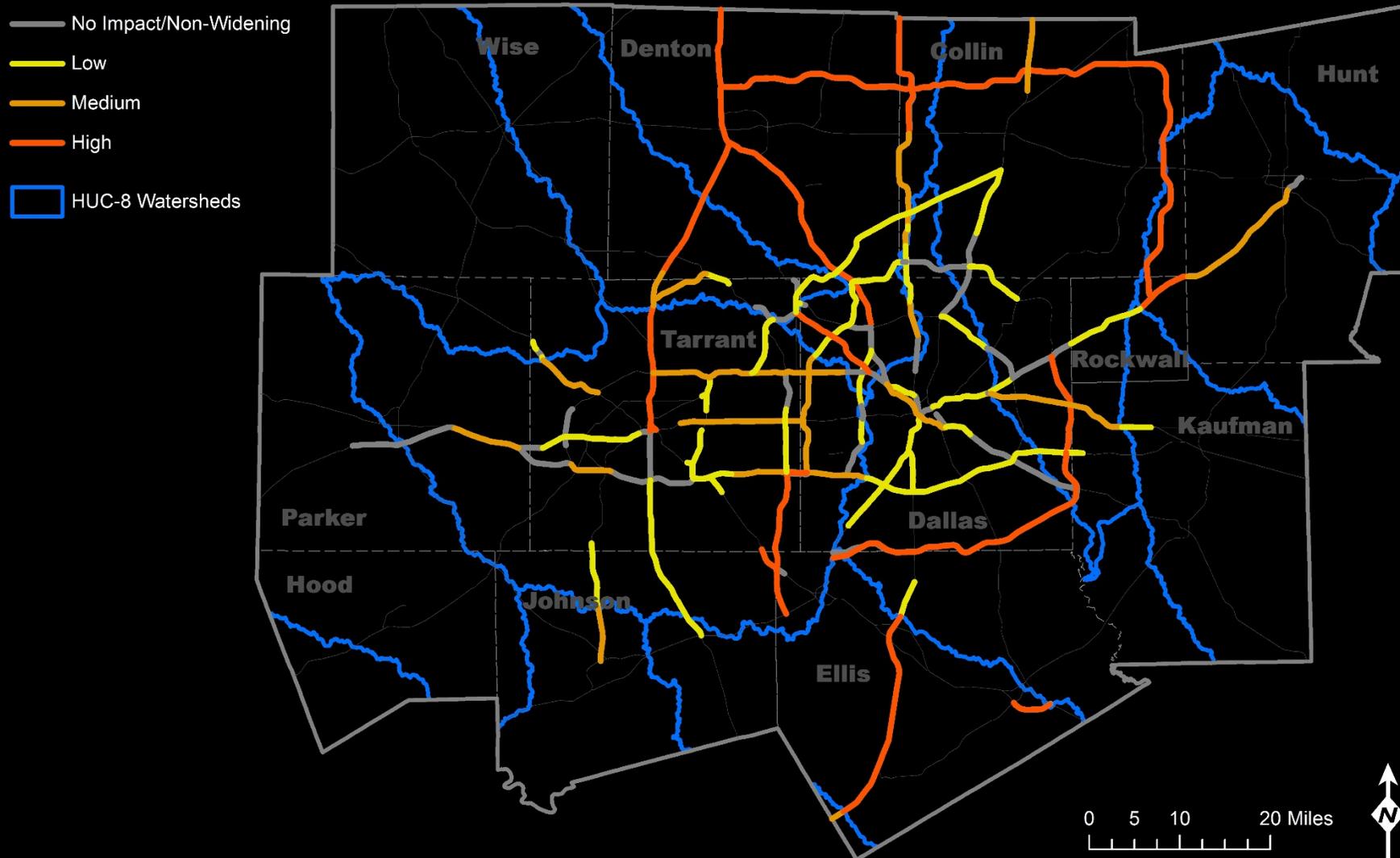
6. Postprocessing for intersected NHD and wetlands (including summation)



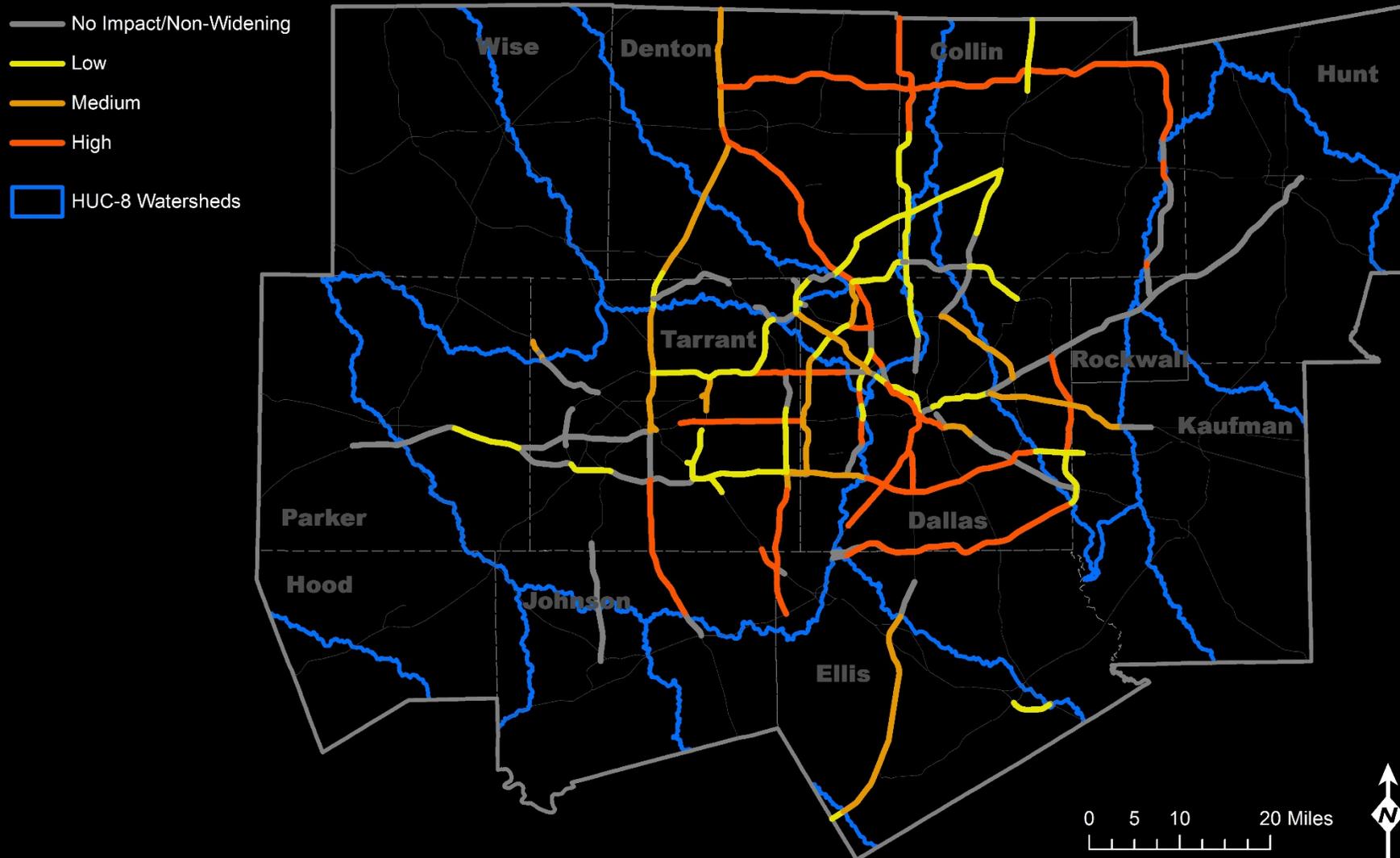
Mobility 2040 Wetland Impacts



Mobility 2040 Intermittent Stream Impacts



Mobility 2040 Perennial Stream Impacts



Wetland Impacts and Enhancement Viability

— No Impact/Non-Widening

— Low

— Medium

— High

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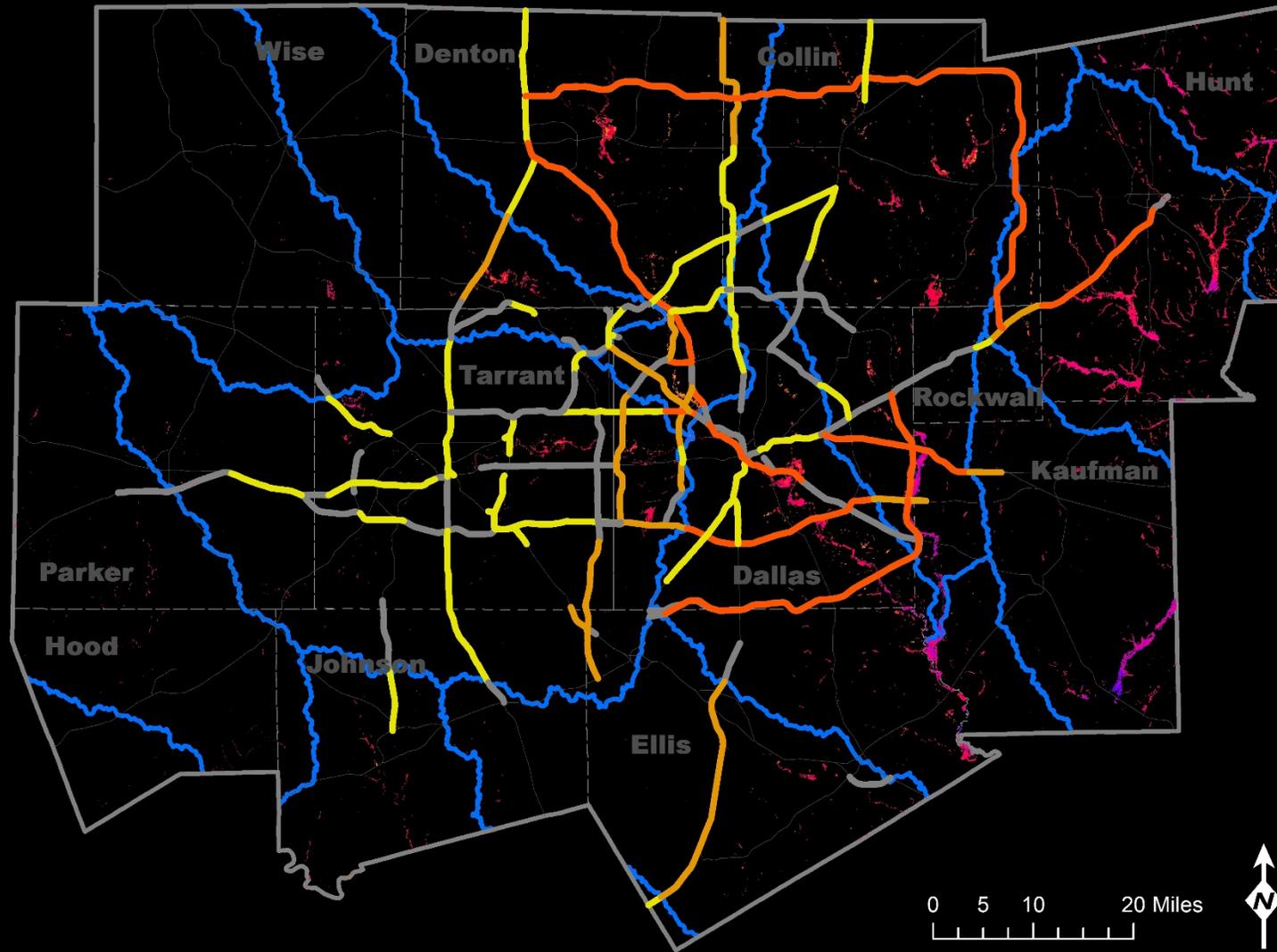
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— HUC-8 Watersheds



Conclusions

- **Streams and wetlands will be significantly impacted by Mobility 2040 roadway projects**
- **There is a supply of potential mitigation sites in the region**
- **Areas identified as potential mitigation sites will require more detailed individual investigation before they can be developed into mitigation banks**
- **This is an estimation process, which means that directly comparing supply of sites to mitigation demand is risky**
- **More detailed data is needed to refine this analysis**

Next Steps

- **Further integrate mitigation planning into long-range transportation planning processes**
- **Continue to acquire relevant environmental data and adjust scoring weights as necessary**
- **Tweak representative widths as more information about planned projects comes in**

Questions?

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