

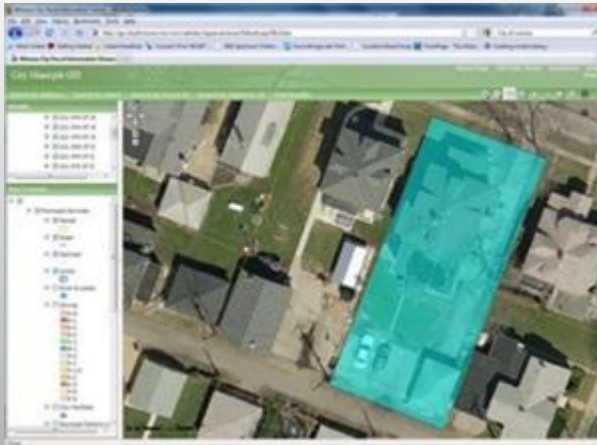


WOTUS:

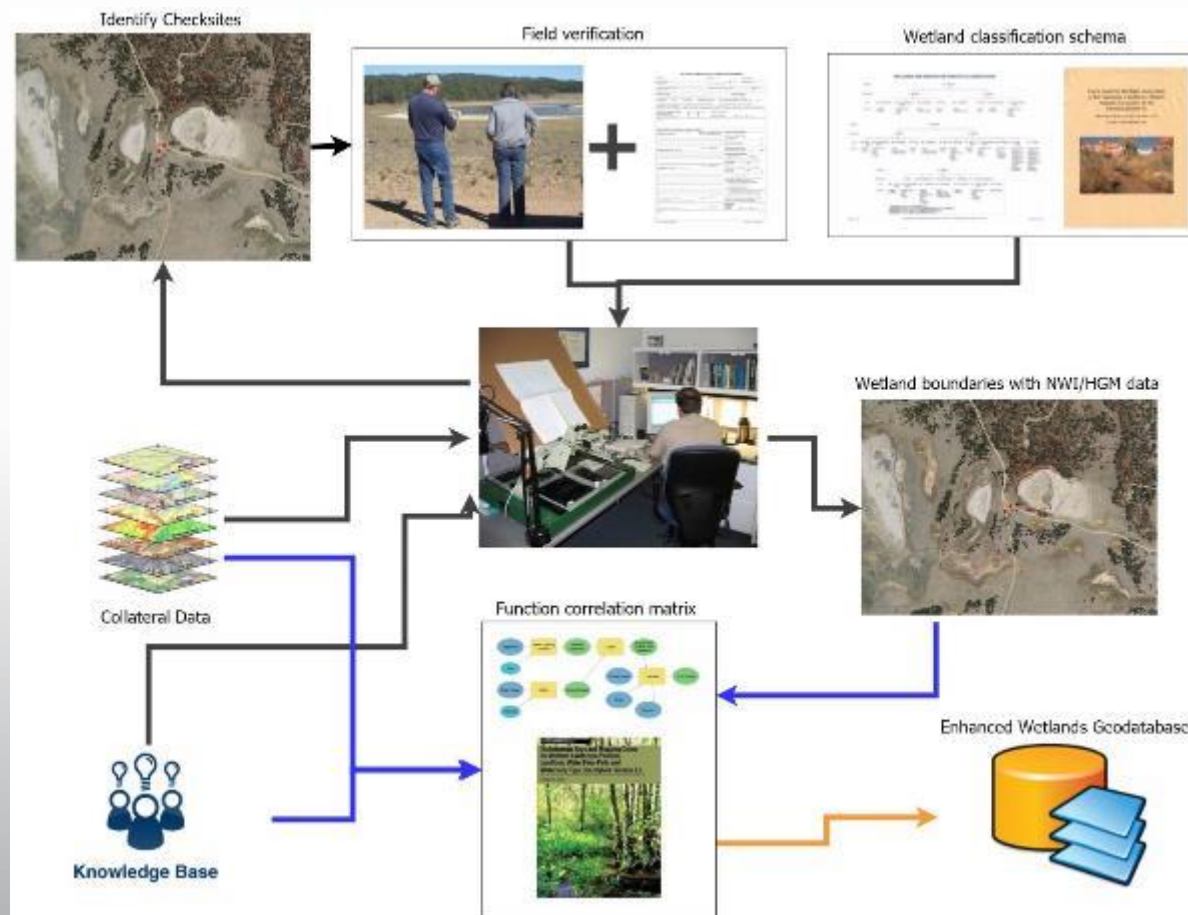
**Modelling Federally Protected Waters
and Wetlands Using GIS and
ESRI Story Maps**

GeoSpatial Services (GSS)

- Project Center
 - Winona and Minneapolis, MN
- Core Services
 - Program Development
 - Data Design and Application
 - Data Visualization



Wetland Inventory and Functional Assessment Data Development



WOTUS Project Objectives

- Develop a GIS based model to conduct a comparative analysis of the spatial extent of protected and non protected wetlands using different scenarios with varying levels of restriction.
- Compare and contrast these scenario results across 3 geographically diverse case study watersheds.
- Develop effective methods to quantify, summarize and communicate model results to a diverse audience.

WOTUS Project Objectives

- **Most Restrictive Scenario** - This scenario limits protection of wetlands to those directly adjacent to perennial (permanent) streams/rivers only.
- **Very Restrictive Scenario** - This scenario limits protection of wetlands to those adjacent to protected perennial (permanent) and intermittent (seasonal) streams/rivers.
- **Less Restrictive Scenario** - This is the least restrictive of the modeled scenarios and limits protection of wetlands to those adjacent to protected perennial, intermittent and ephemeral (temporary) streams, and ditched or channelized streams.

Project Advisory Team

- Advisory team assembled for advisement on development of technical aspects of model, modeling requirements, and summarizing and communicating model results
- Consisted of modelers, GIS professionals, natural resource managers, wetland scientists and lawyers
- Members: ASWM, NRDC, NWF, CNHP, TNC, SMUMN, NMED, Ryan-Kuehler Law Office

Model Requirements

- Model should allow users to compare protection of wetlands under more and very restrictive scenarios and a less restrictive scenario.
- Parameters should be user interactive.
- Model should be simple, transparent and easy to explain to a general audience.
- Model should use nationally available GIS datasets.
- Model should be transferable and utilize a process that can be reproduced for other watersheds.

“Most and Very” Restrictive Model

- Wetlands with a “continuous surface connection” to TNW and RPW are adjacent and protected.
- Lake RPWs - NWI attribute like L and not K
- Stream/River RPWs - NHD Perennials (Most) or perennial and intermittent (Very) connected by flow to the nearest TNW.
- Wetlands intersecting RPW lakes and RPW streams/rivers are protected.
- Exclude NWI palustrine wetlands with K, d, x or f

“Less” Restrictive Model

- Adjacency is defined by specific distance criteria in the CWR
- Lake RPWs - NWI attribute like L and not K
- Stream/River RPWs - NHD perennial, intermittent, ephemeral and ditches connected by flow to the nearest downstream TNW.
- Wetlands intersecting within 100ft of RPW lakes and RPW streams/rivers are protected.
- Wetlands intersecting floodplain and within 1500ft of a RPW are protected.
- Option for wetland to wetland connectivity (i.e., all adjacent to adjacent of initial selection set using user specified distance).
- Exclude NWI palustrine wetlands with K or f

Significant Nexus

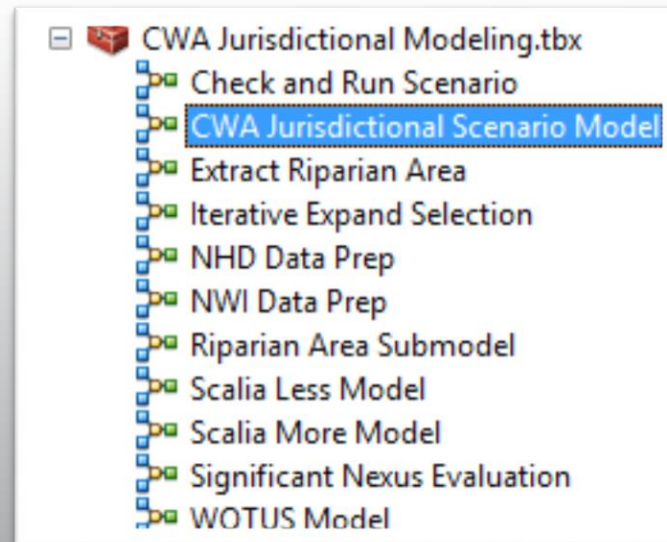
Two categories of wetlands should have significant nexus evaluation according to 2015 CWR:

1. Categorical significant nexus wetlands
 - Prairie potholes, Carolina Bays, Delmarva Bays, pocosins, Western vernal pools and Texas coastal prairie wetlands.
 - Categorical significant nexus wetlands identified by using a user specified attribute query in the model.
2. Wetlands intersecting floodplain and < 4000ft and > 1,500ft from RPW are flagged for significant nexus.

*All significant nexus wetlands flagged with value of 1 if they meet above criteria.

Model Development

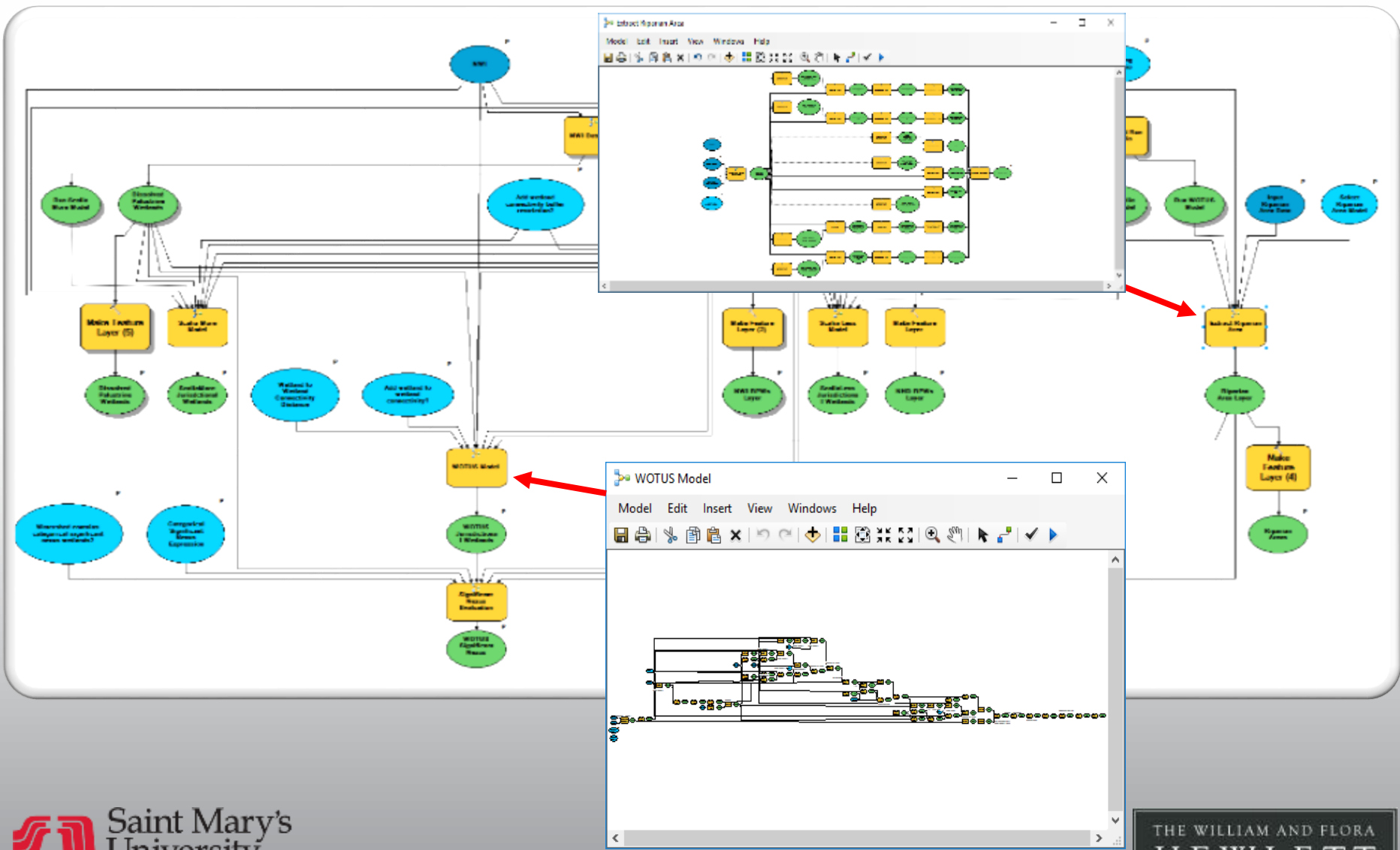
- ArcGIS ModelBuilder
 - Visual programming environment
 - Modular processes linked together in a geoprocessing workflow
 - Interactive and transparent



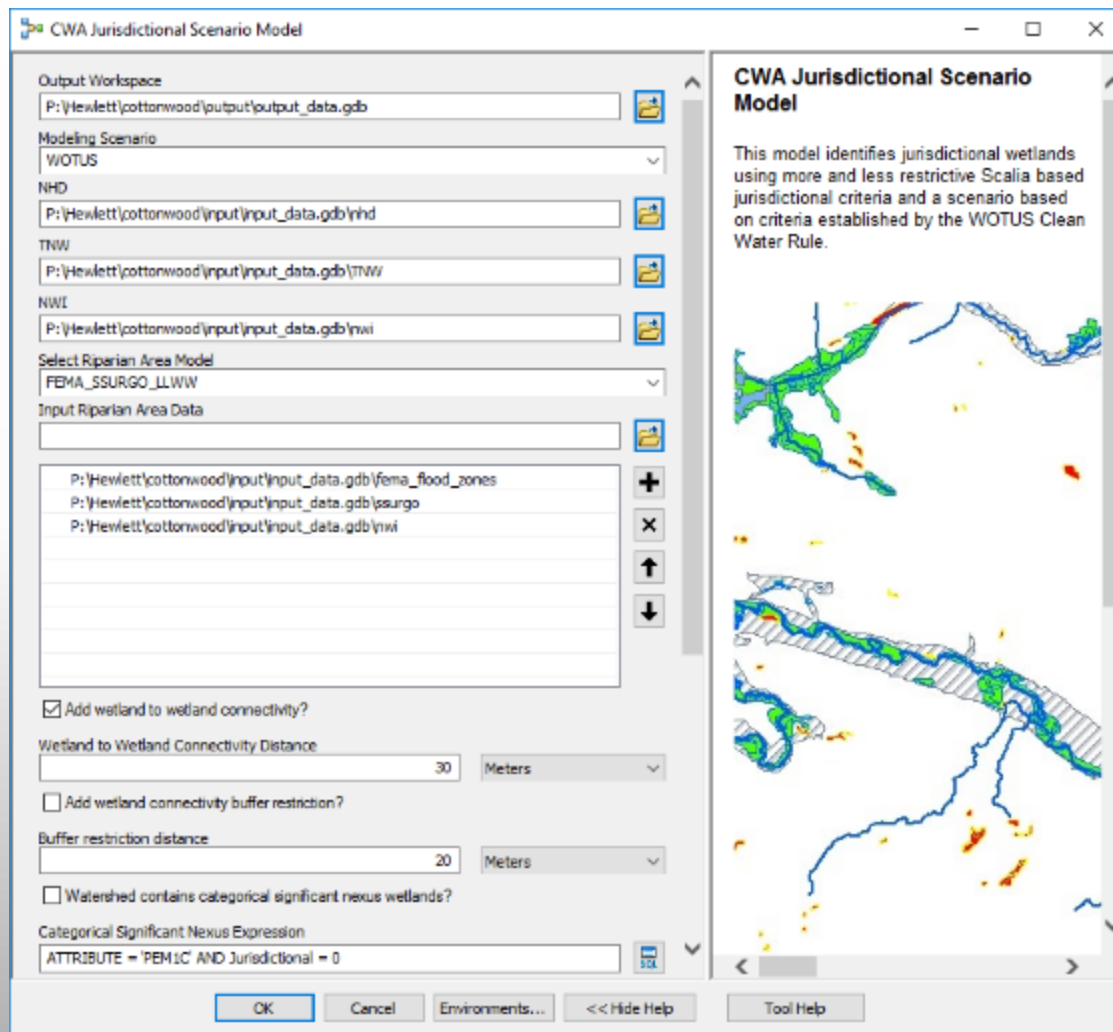
Model Input Data

- NWI/LLWW
- NHD
- TNW
 - Feature representing nearest downstream TNW
- FEMA, SSURGO, and LLWW (lotic)
 - Modelling riparian areas for WOTUS scenario

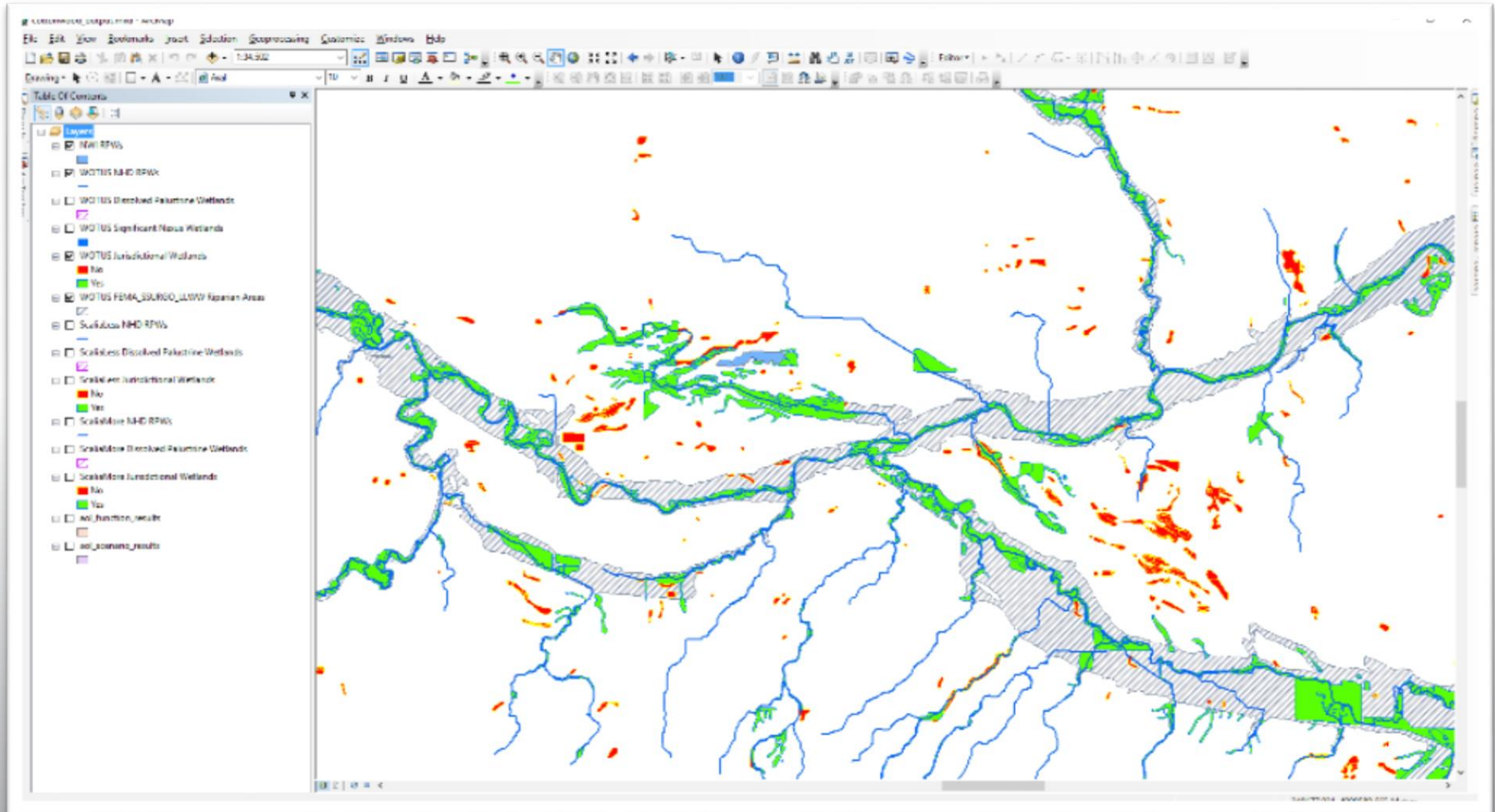
Less Restrictive Scenario Model



User Interface

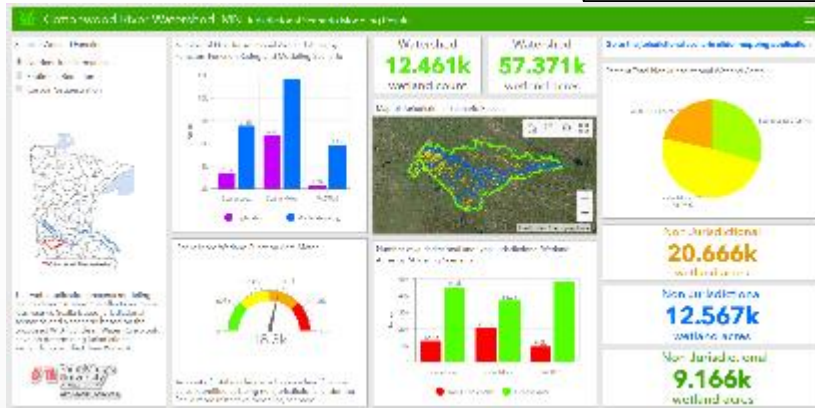


Model Output



Communicating Results

Operations Dashboard



Custom Web Application



Story Map





Andy Robertson
Executive Director
GeoSpatial Services
Saint Mary's University of Minnesota
aroberts@smumn.edu
507-457-8756