MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Missouri Nutrient Modeling

Missouri Department of Natural Resources
Soil and Water Conservation Program
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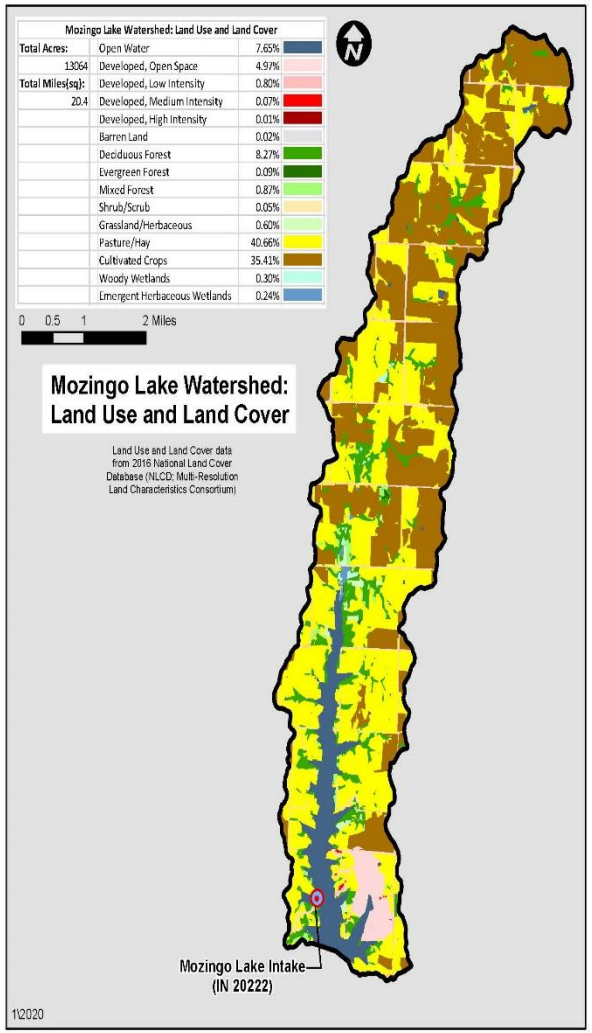
Modeling Efforts

- SWCP is modeling the nutrient and sediment reductions from cost-share projects completed in specific HUC 8 watersheds, which correspond to current RCPP Targeted Watershed projects.
  - Watersheds included are:
    - 10300104 Blackwater
    - 07110006 South Fork Salt
    - 07140101 Cahokia-Joachim
    - 10290103 Little Osage
    - 10280102 Thompson
- Mozingo, 10240013-0303, modeling is in addition to the RCPP watersheds.


Omaha
Iowa
Illinois
Peoria
Thompson
Mozingo
Quincy
St Joseph
Illinois
Springfield
Decat
South Fork Salt
Kansas City
Topeka
Lawrence
Columbia
Blackwater
Jefferson City
St Louis
Missouri
Little Osage
Cahokia-Joachim
Cape Girardeau
Springfield
Joplin
Missouri
Rogers
Tulsa
Springdale
Fayetteville

Nutrient Modeling – the Beginning

- Mozingo Lake is a reservoir in NW MO containing 1006 acres of water, and has about 30,000 users
- This 13,064 acre watershed lake is broken out into:
  - Urban – 3000 acres
  - Forest – 2000 acres
  - Crops – 2832 acres
  - Grass – 3248 acres
- In January 2020, Mozingo Lake had elevated levels of cyanobacteria showing up in the raw water tests, high enough to trigger warning signs at the lake to limit use.
- Since 2020, there has not been another excessive level of cyanobacteria.



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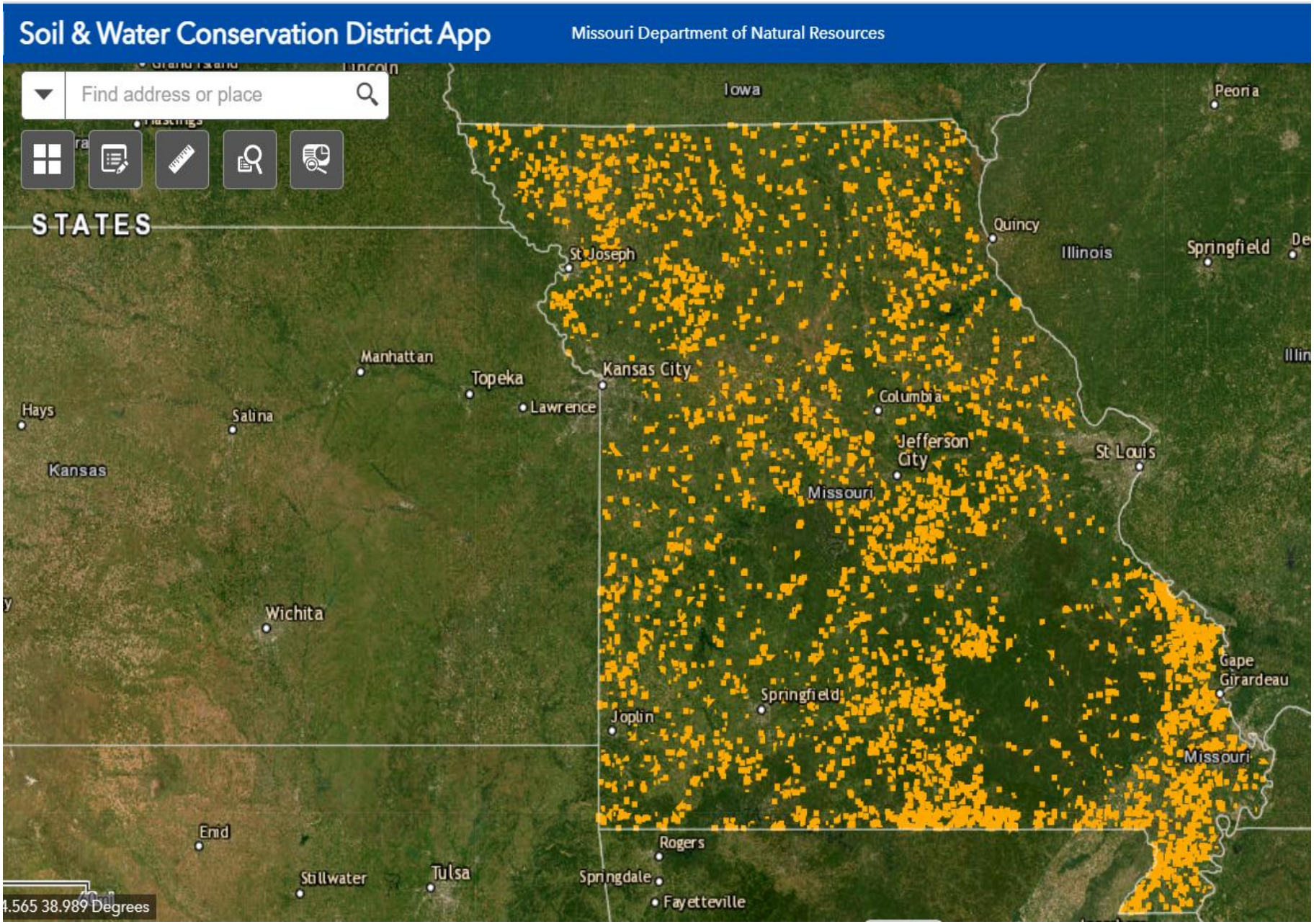
WHY

- USGS has stream gauges that contain auto samplers that are able to measure many types of water analysis, including pH, DO, conductance, turbidity, N, P, etc.
- Two of these auto samplers are located at Mozingo Lake. One is at the inflow and another one at the dam.
- Because of current and future targeted watershed assistance, and the ability to achieve actual results of sediment and nutrients within the lake, it was determined that MO SWCP needed to invest in nutrient modeling as the next step.
- The modeling and actual data results can assist in determining which of the SWCP 50+ practices may be most effective.
- This can determine BMPs for the future for various scenarios.

HOW

- MO has developed its own mapping program where every practice, since the beginning of FY2022 (July 2021) has been input and can be tied to specific contracts.
- This locates a specific practice in a specific watershed, and has other potential data such as erosion reduction information and acres served available for data analysis.
- The following image shows just the farms in Missouri that have applied conservation practices through MO SWCP since July 2021.
- This image reflects 12,625 contracts paid for a total of $79,224,890 of payments.
- Only 66% of MO is considered AG land.


Soil & Water Conservation District App
Missouri Department of Natural Resources
Find address or place
STATES
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Quincy
Illinois
Springfield
St Joseph
Manhattan
Topeka
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Lawrence
Columbia
Hays
Salina
Jefferson City
St Louis
Kansas
Missouri
Wichita
Cape Girardeau
Springfield
Joplin
Missouri
Enid
Rogers
Stillwater
Tulsa
Springdale
Fayetteville
4.565 38.989 Degrees

HOW

- MO SWCP started by using an online EPA designed model called PLET (Pollutant Load Estimate Tool), which replaces EPA STEPL.
- This model has been further refined by a contracted engineering firm to take the default values in the PLET and adjust it for the soils and environments found in MO.
- The modeling numbers are now more representative of conditions found in each specific HUC8.
- Program staff are adjusting PLET default values for the P-value and R-value within the USLE formula and the % Nitrogen and % Phosphorus in the soil for each HUC 12.

Modeling Efforts – RCPP CY 2022

- Preliminary results from calendar year 2022 from five completed RCPP HUC 8 watersheds. Data is combined:
    - 255 BMP practices
    - 9272.06 acres impacted
    - $1,880,530.54 in state cost share assistance
    - Total Nitrogen reduction: 44,886.89 lbs/year
    - Total Phosphorus reduction: 11,798.54 lbs/year
    - Total Sediment reduction: 4,143.04 TONS/year

Modeling Efforts - Mozingo

- Preliminary combined results from January 2020 - June 30, 2023 for Mozingo data.
    - 43 BMP practices
    - 2202.4 acres impacted
    - $417,025.41 in state cost share assistance
    - Total Nitrogen reduction: 7197.68 lbs/year
    - Total Phosphorus reduction: 2367.74 lbs/year
    - Total Sediment reduction: 1149.9 TONS/year

Future Plans

- Continue to model the existing RCPP watersheds as data is developed and Mozingo Lake.
- Work with MO State targeted HUC 12 watersheds that will be modeled.
- The hope is to have modeling for all cost-share eventually.
- Use of modeling data to drive the selection of future projects.