Wetland Decision Management Tool

Missouri Department of Conservation

Science Branch Staff

Presented by C. Diane True

Missouri Department of Conservation Mission

- to protect and manage the forest, fish, and wildlife resources of the state

- to facilitate and provide opportunities for all citizens to use, enjoy, and learn about these resources.

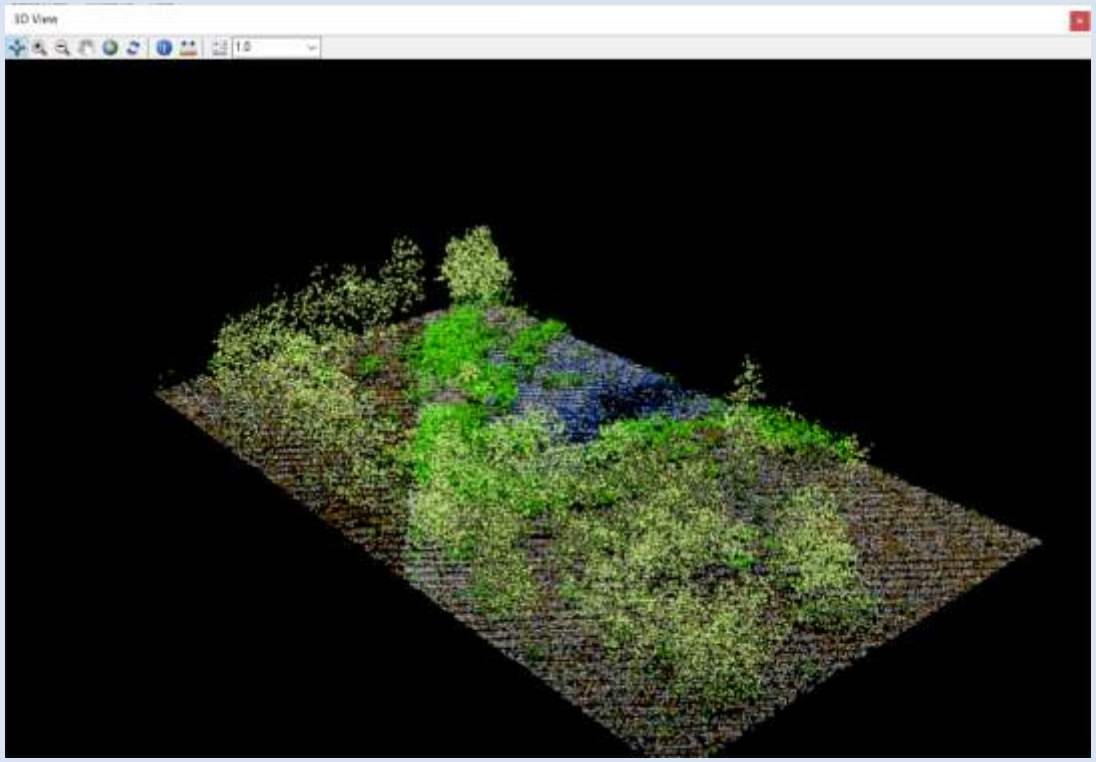
Importance of Wetlands

- Home to large numbers of plants and animals
- Provide important habitat for migratory birds and overwintering waterfowl
- Missouri is part of main migration corridor for migratory waterbirds

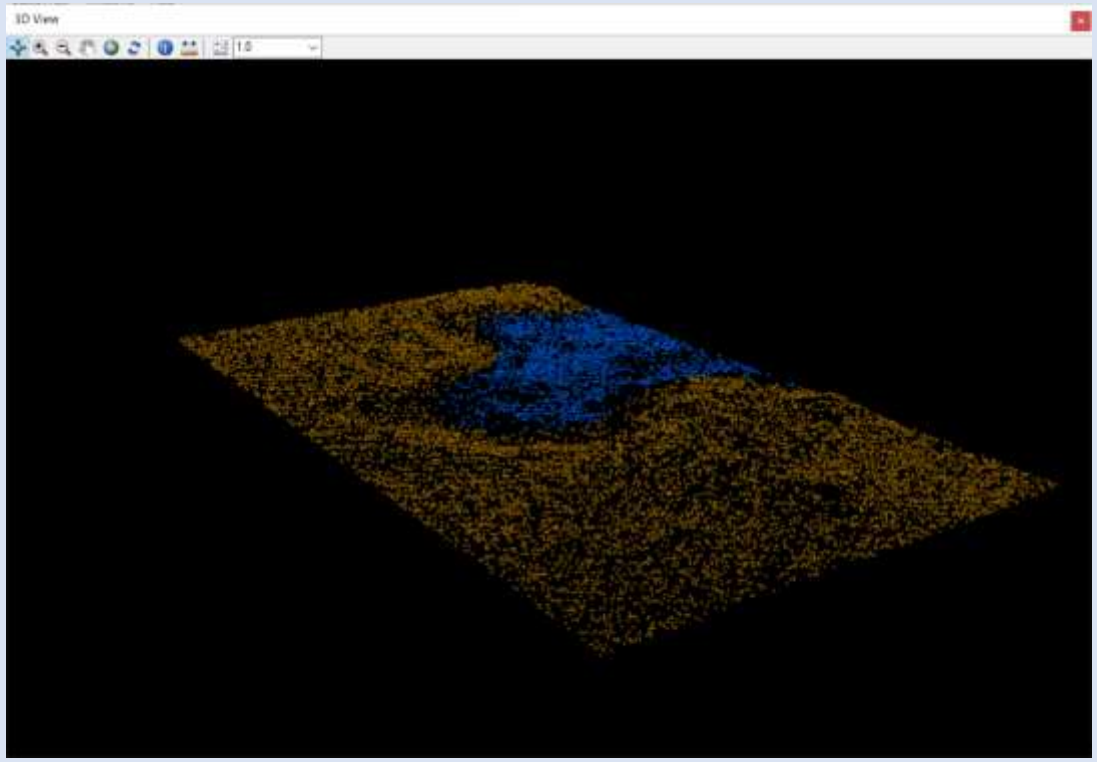
Wetland Decision Management Tool

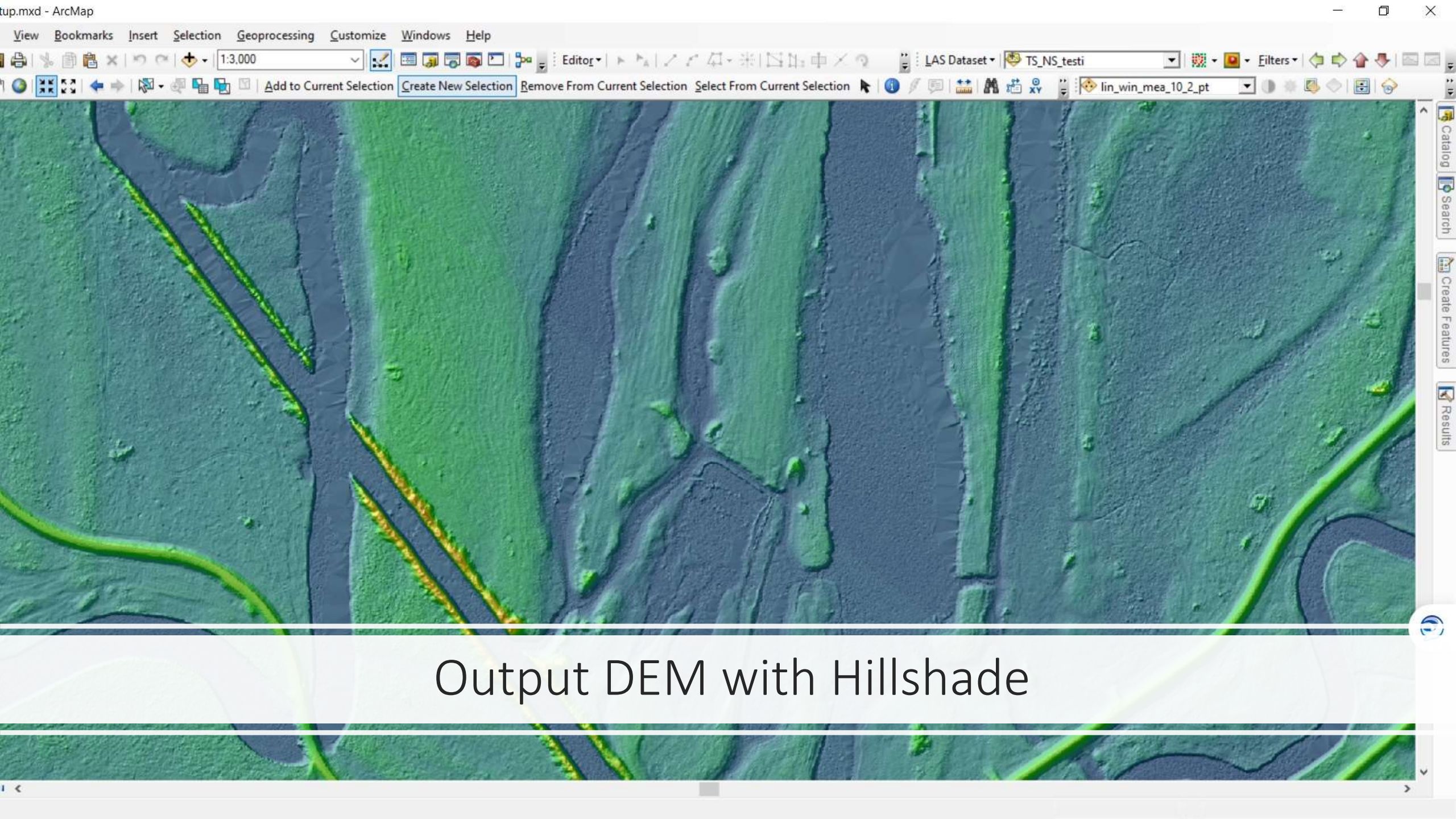
- Developed by Science Branch of MDC
- To optimize water level management
- Creates a visualization of incremental pool flooding
- How much water at a given depth classification at a given gauge level

LiDAR point cloud



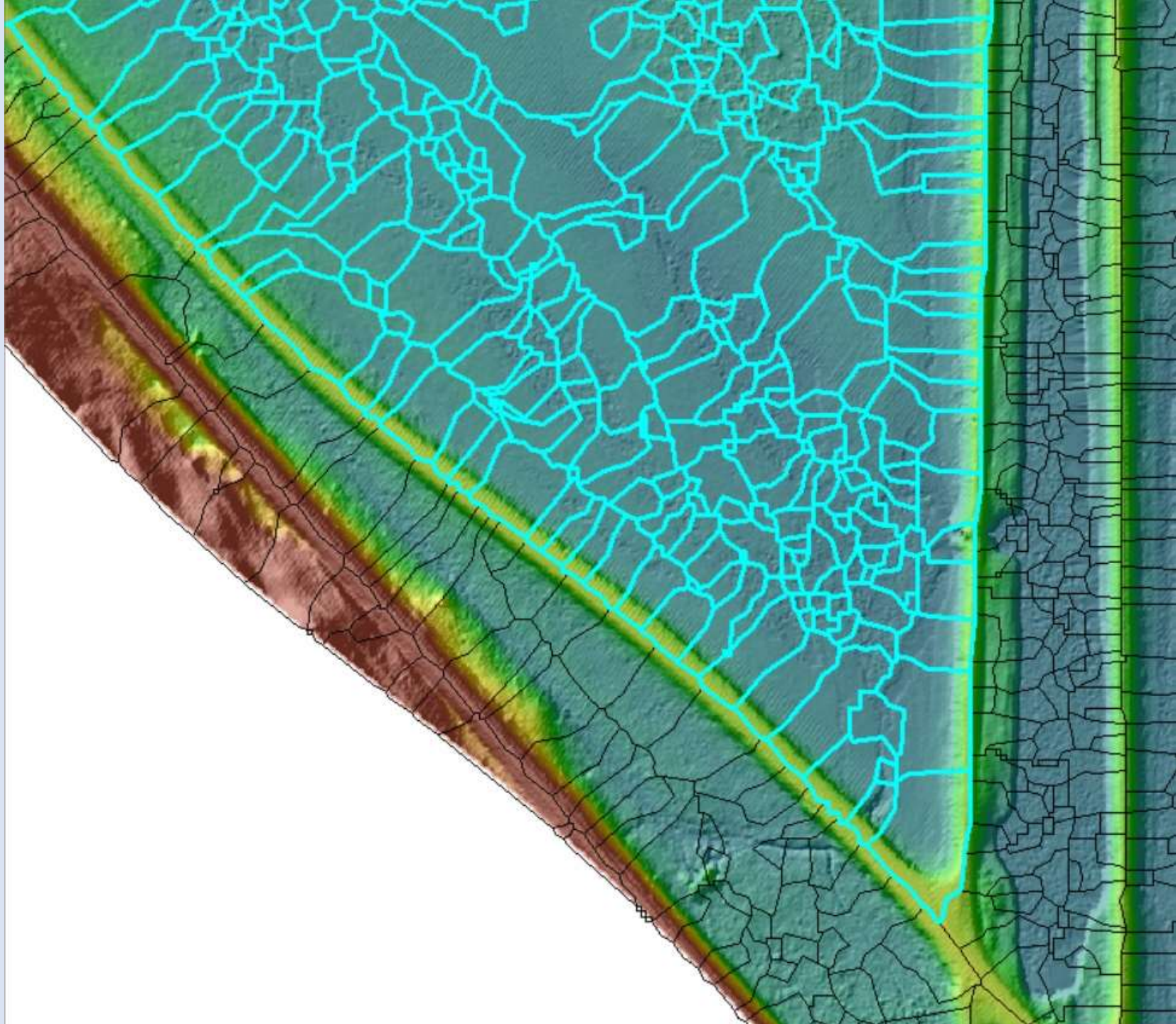
Bare Earth with water





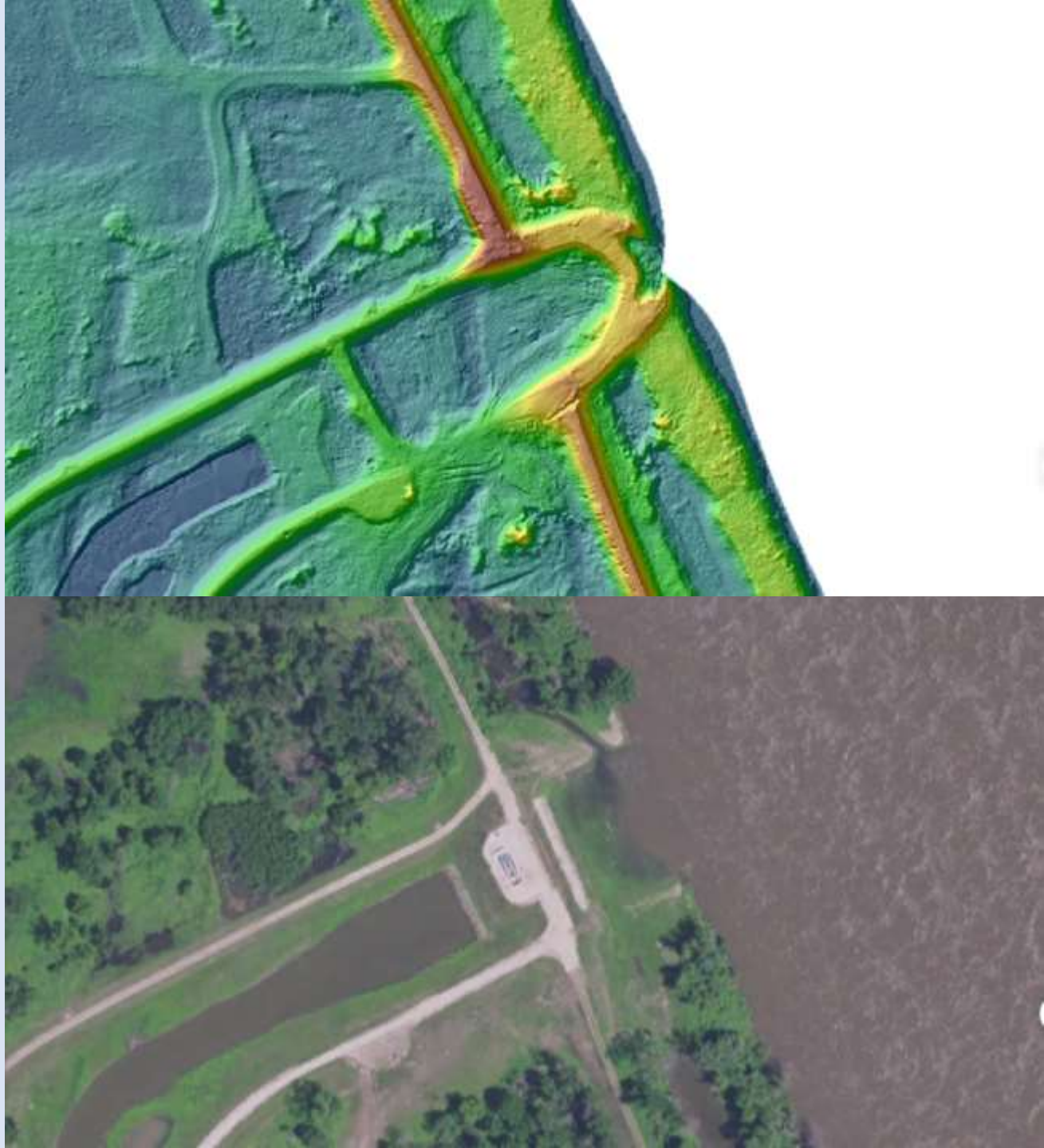
Output DEM with Hillshade

Hydrologically correct pool boundaries



Limitations

- Date of LiDAR collection



Limitations

- LiDAR cannot penetrate dense vegetation

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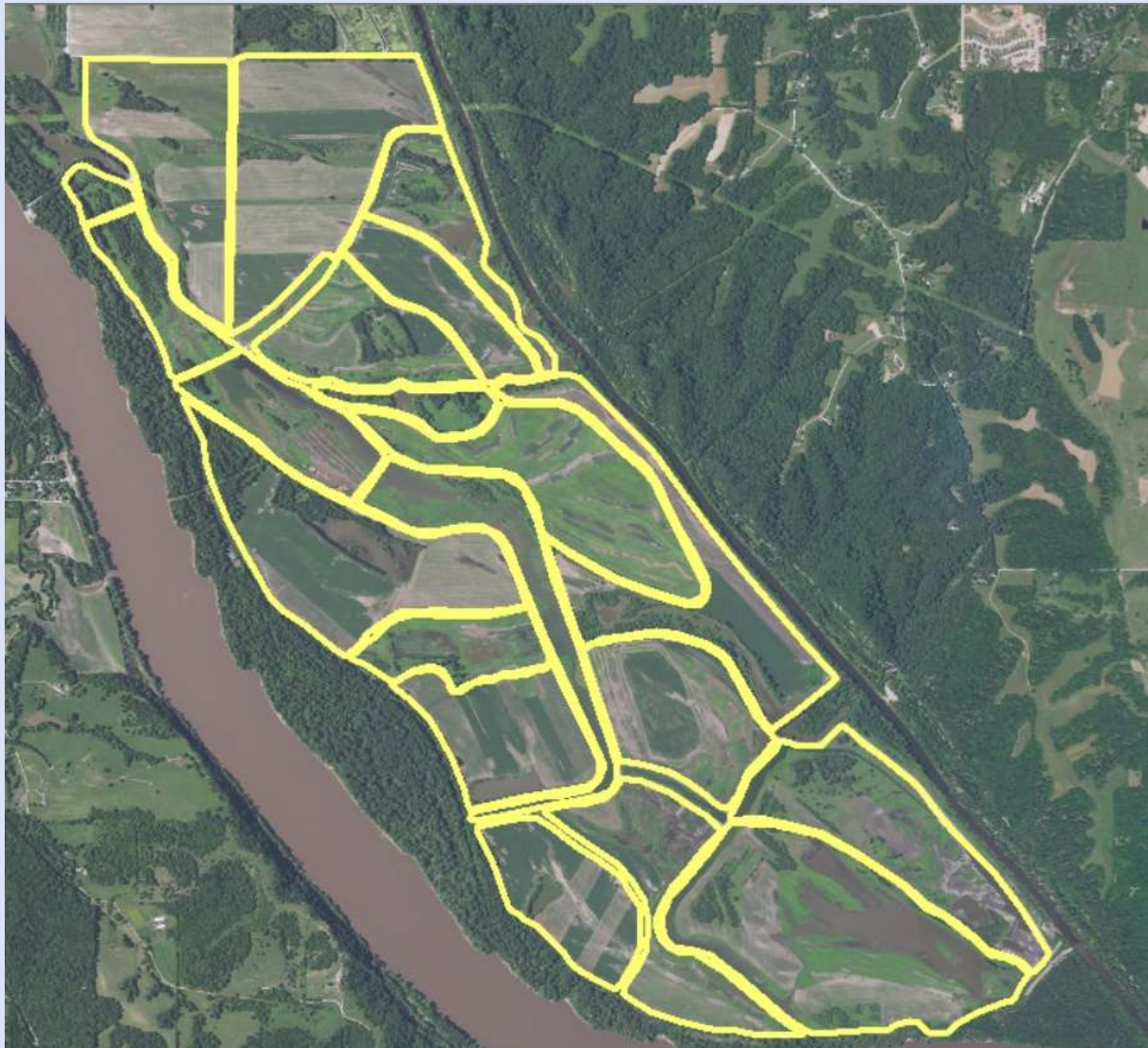
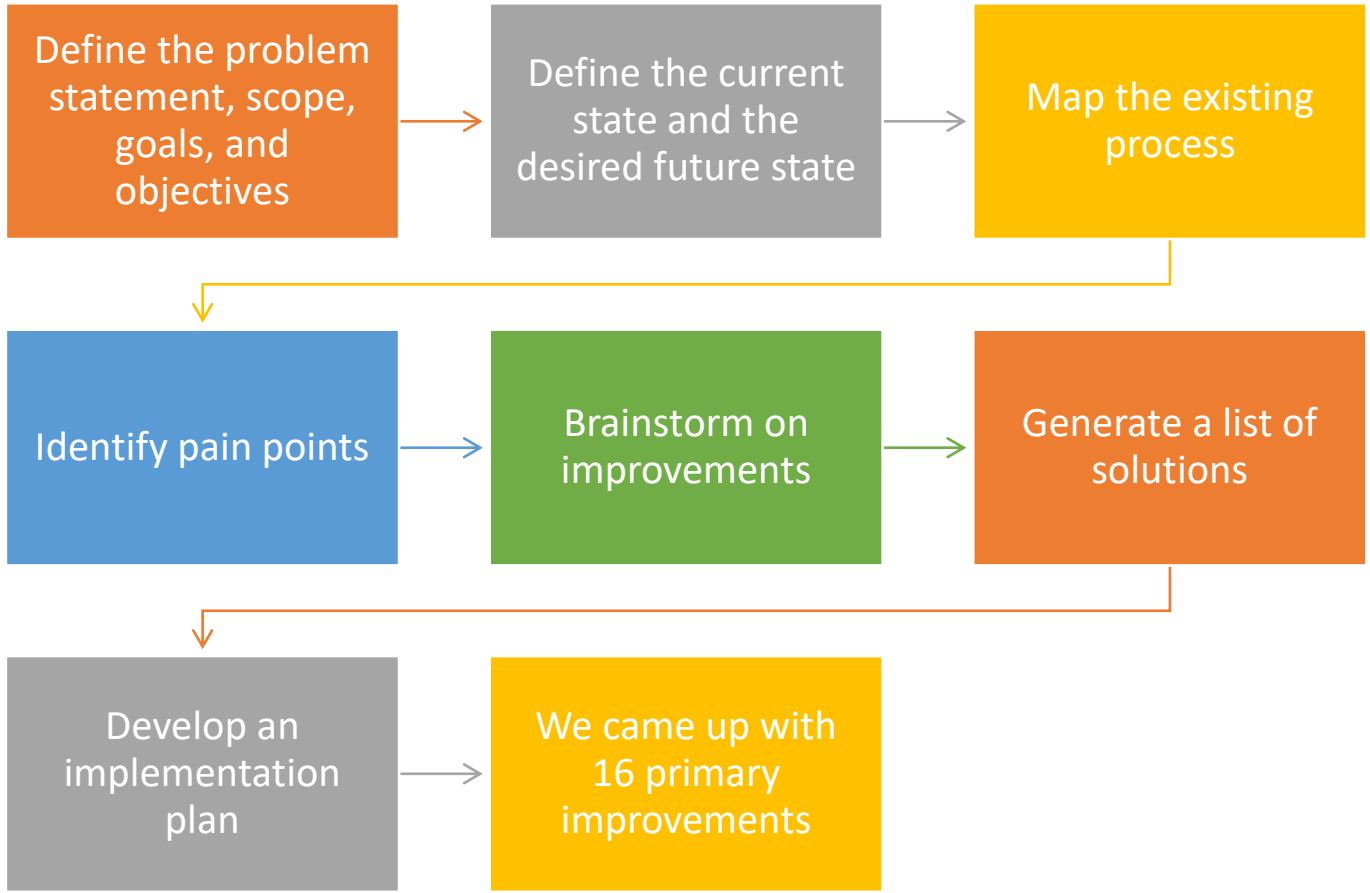
Many Wetlands in Missouri

- MDC manages 15 wetlands
- 10-30 pools per wetland
- Some pools have multiple water control structures (WCS)
- 5-30 hours per WCS to process

This is too much time!



Lean Process Improvement



Main Time Savers

1.) Hire an experienced Python programmer

2.) Switch from one foot DEM to two foot DEM,

3.) Calculate acreage at ¼ foot interval instead of at 1/10 foot,

4.) Rewrite the way connectivity is calculated as water flows from the WCS,

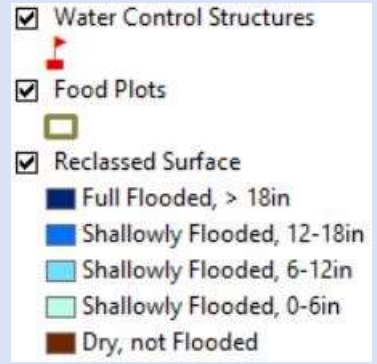
5.) Stop the loop iterations when %95 of the pool is filled to at least 18 inches

How water flow connectivity is calculated

1. Find daylight elevation based on WCS location
2. Calculate area of pool below that elevation
3. Convert to polygons
4. Select polygons within 5 feet of WCS
5. Add 3 inches to elevation
    1. Calculate area of pool below that elevation
    2. Convert to polygons
    3. Select polygons within 5 feet of previous area
    4. Add 3 inches to elevation
    5. Calculate area of pool below that elevation
    6. Convert to polygons
    7. Select polygons within 5 feet of previous area
    8. Add 3 inches to elevation
6. Repeat until 95% of pool has at least 18 inches of water

Gauge 450.0


3D


Water Control Structures
Food Plots
Reclassed Surface
Full Flooded, > 18in
Shallowly Flooded, 12-18in
Shallowly Flooded, 6-12in
Shallowly Flooded, 0-6in
Dry, not Flooded

Gauge 450.25


3D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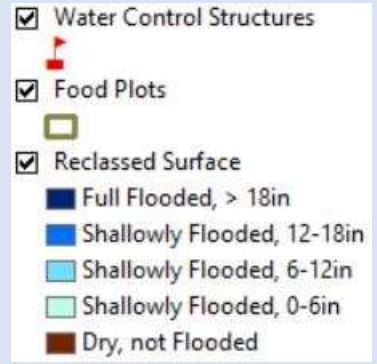
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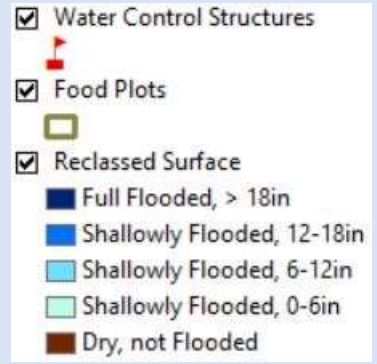
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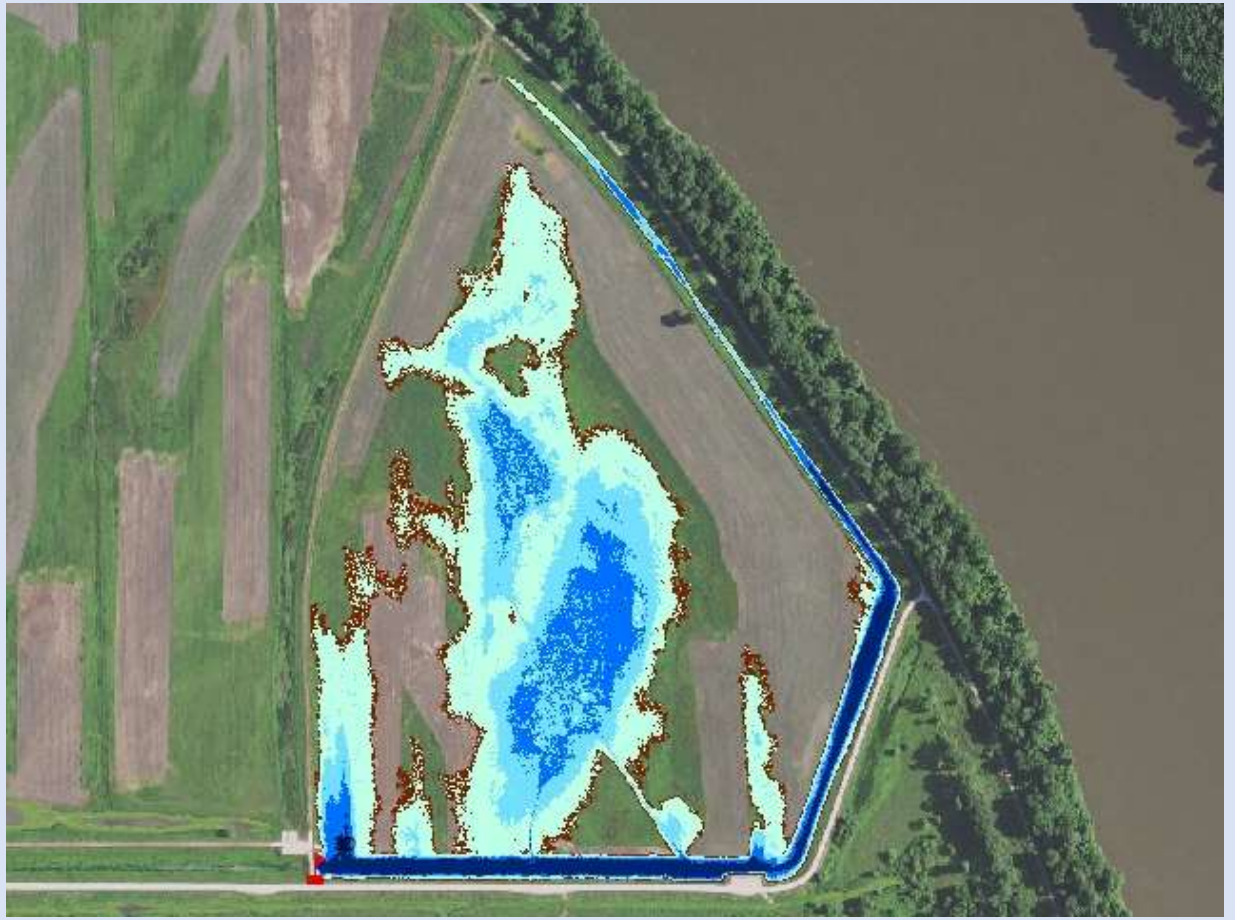


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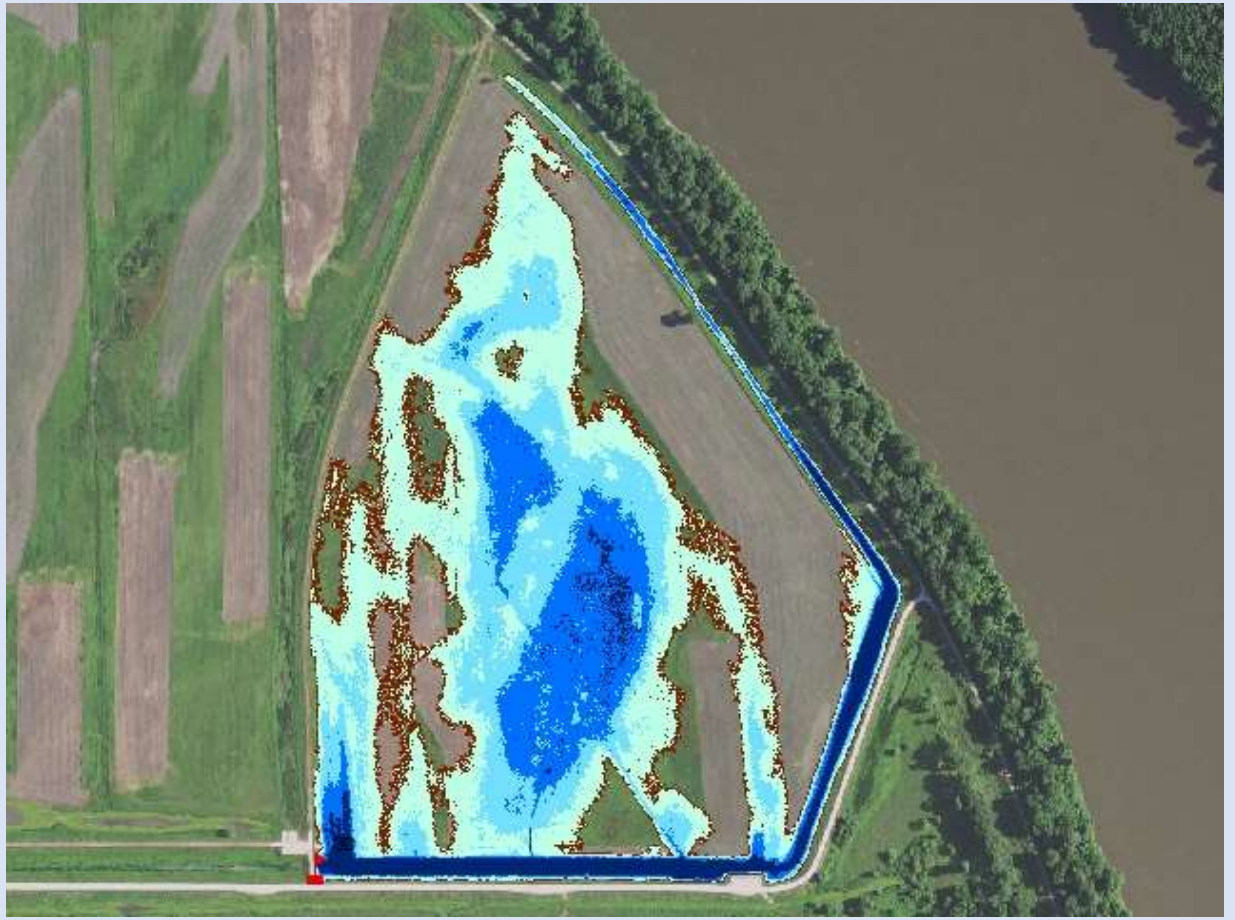


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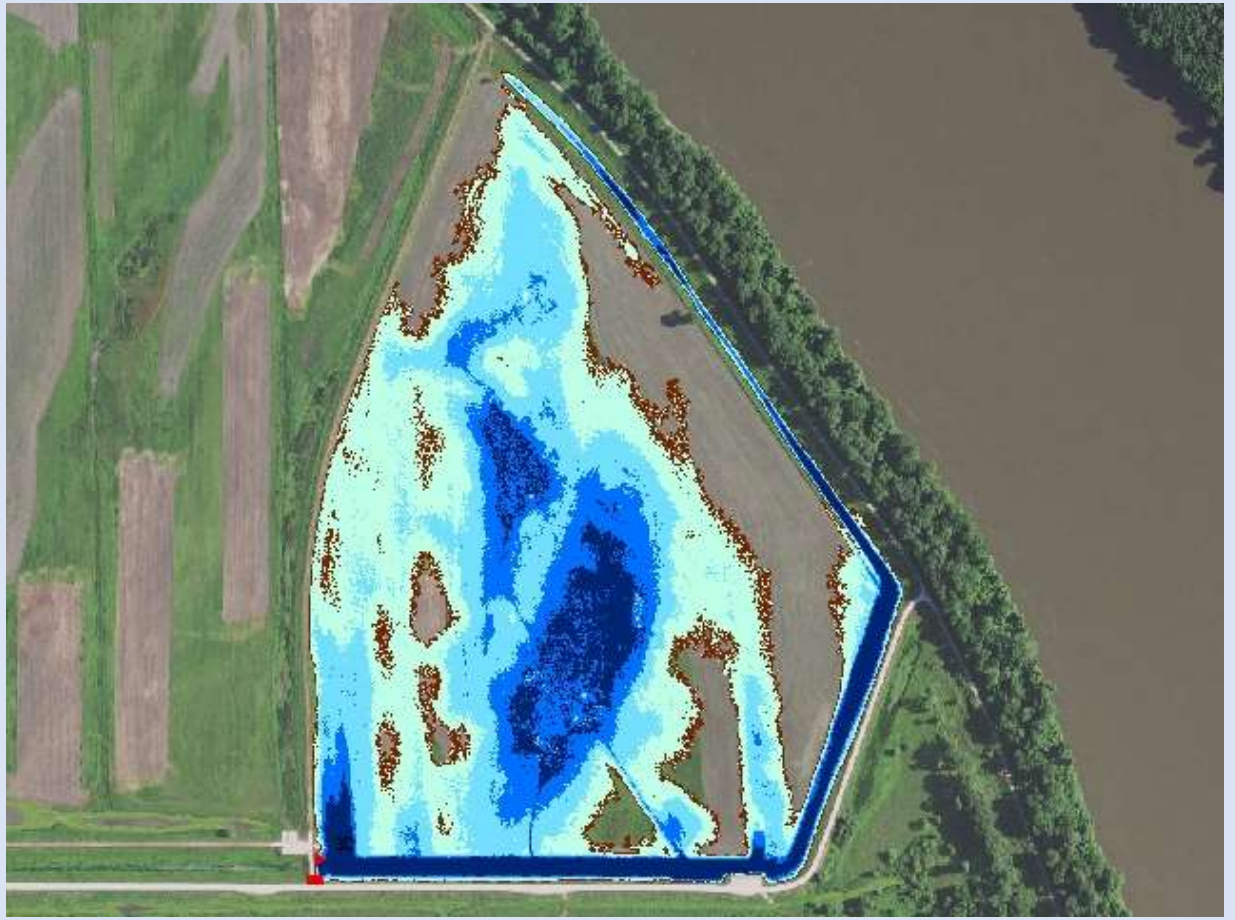


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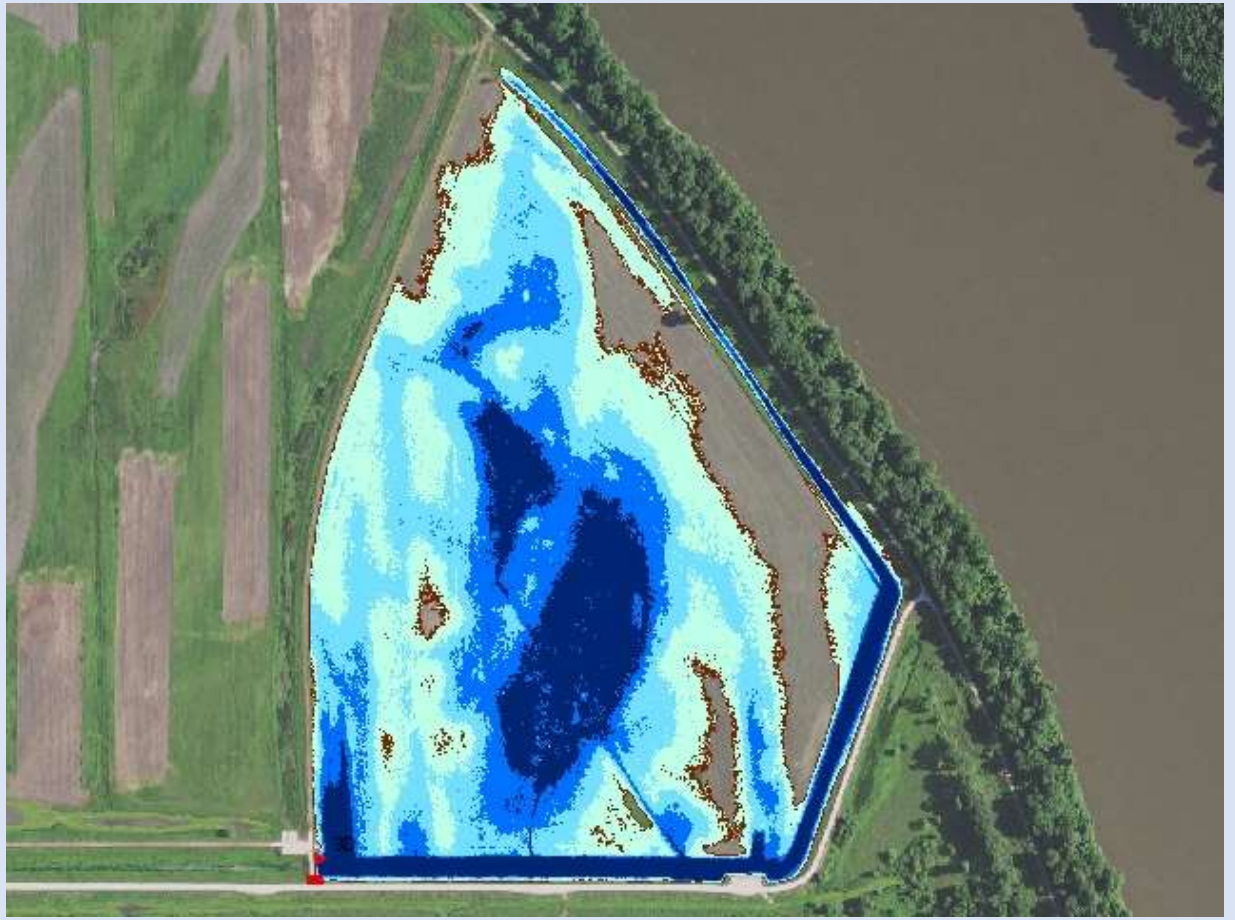


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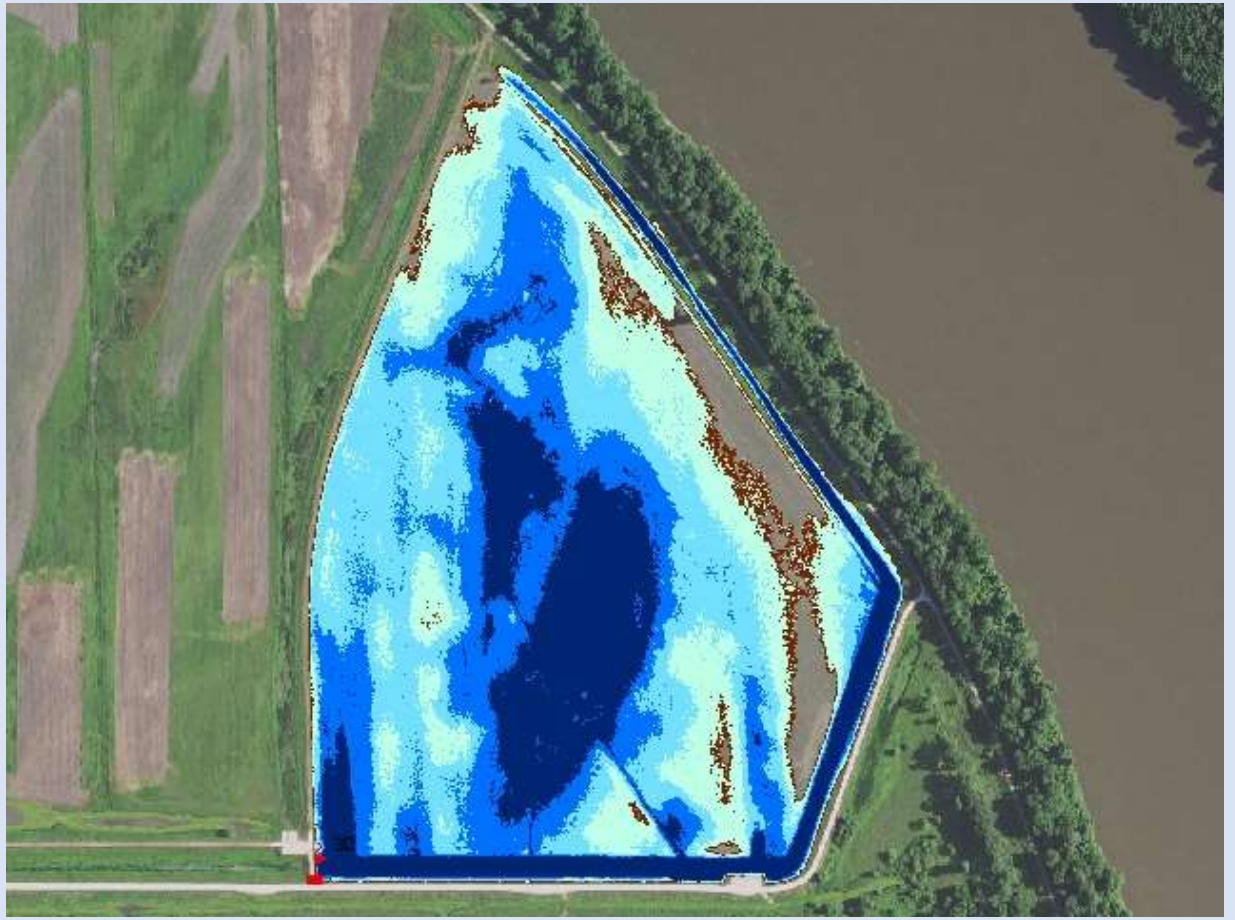


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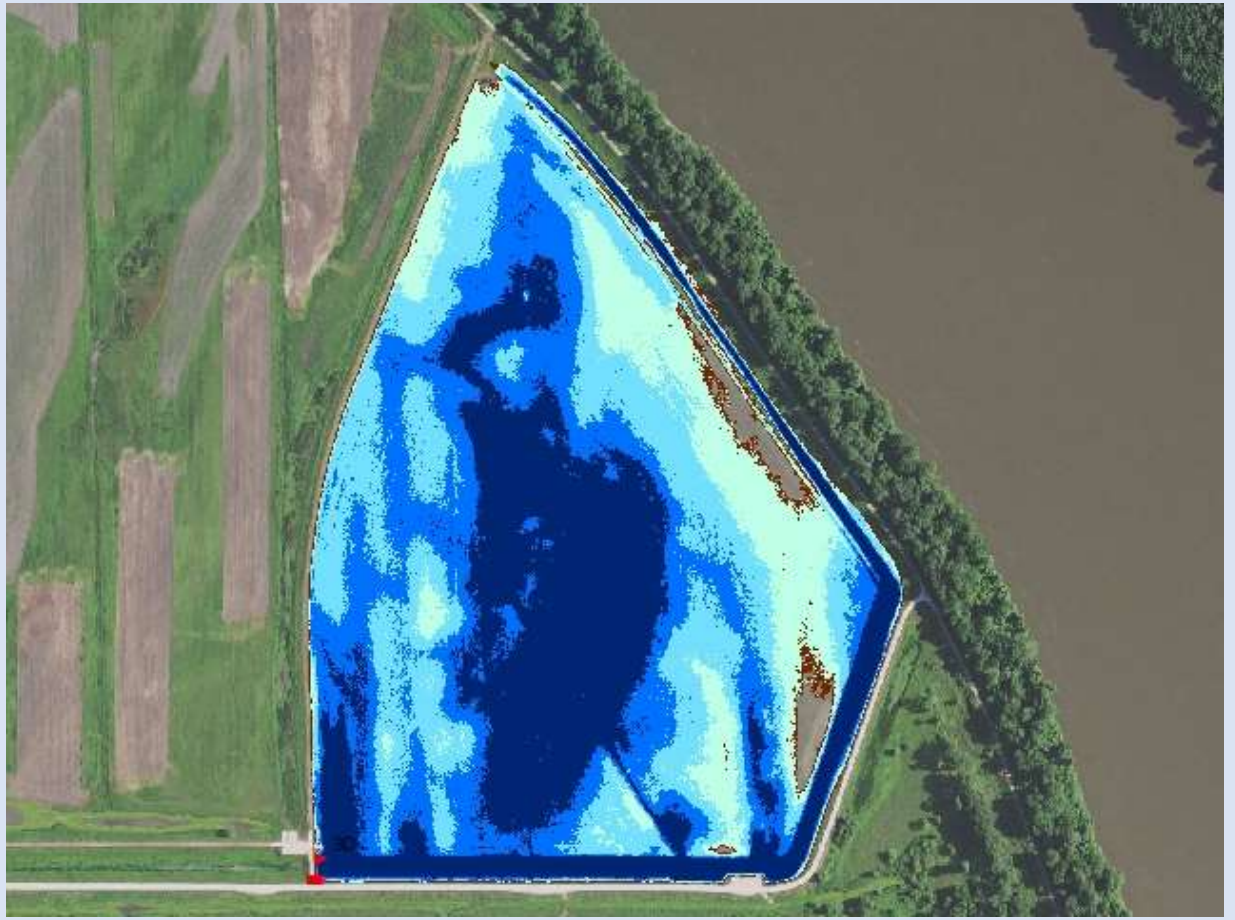


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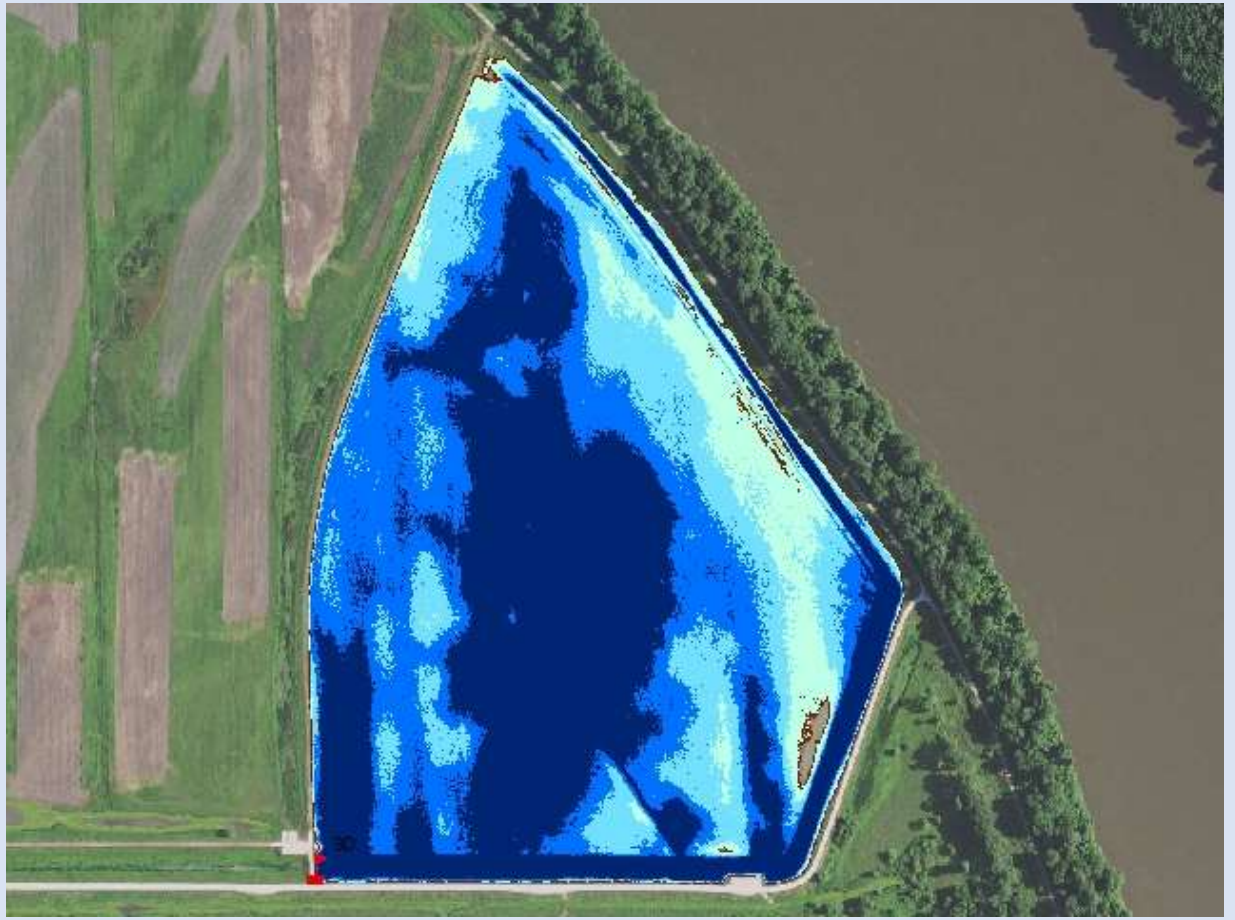


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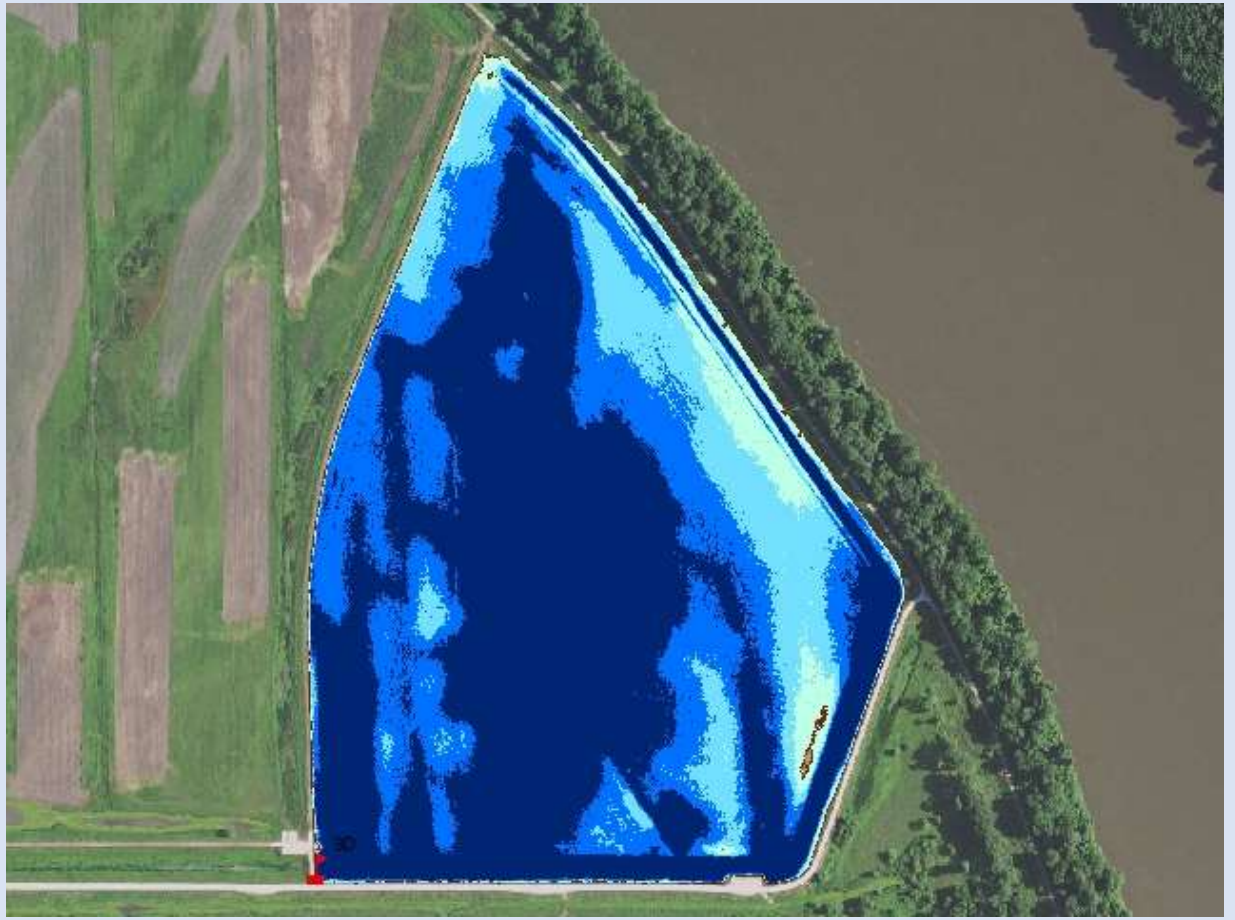


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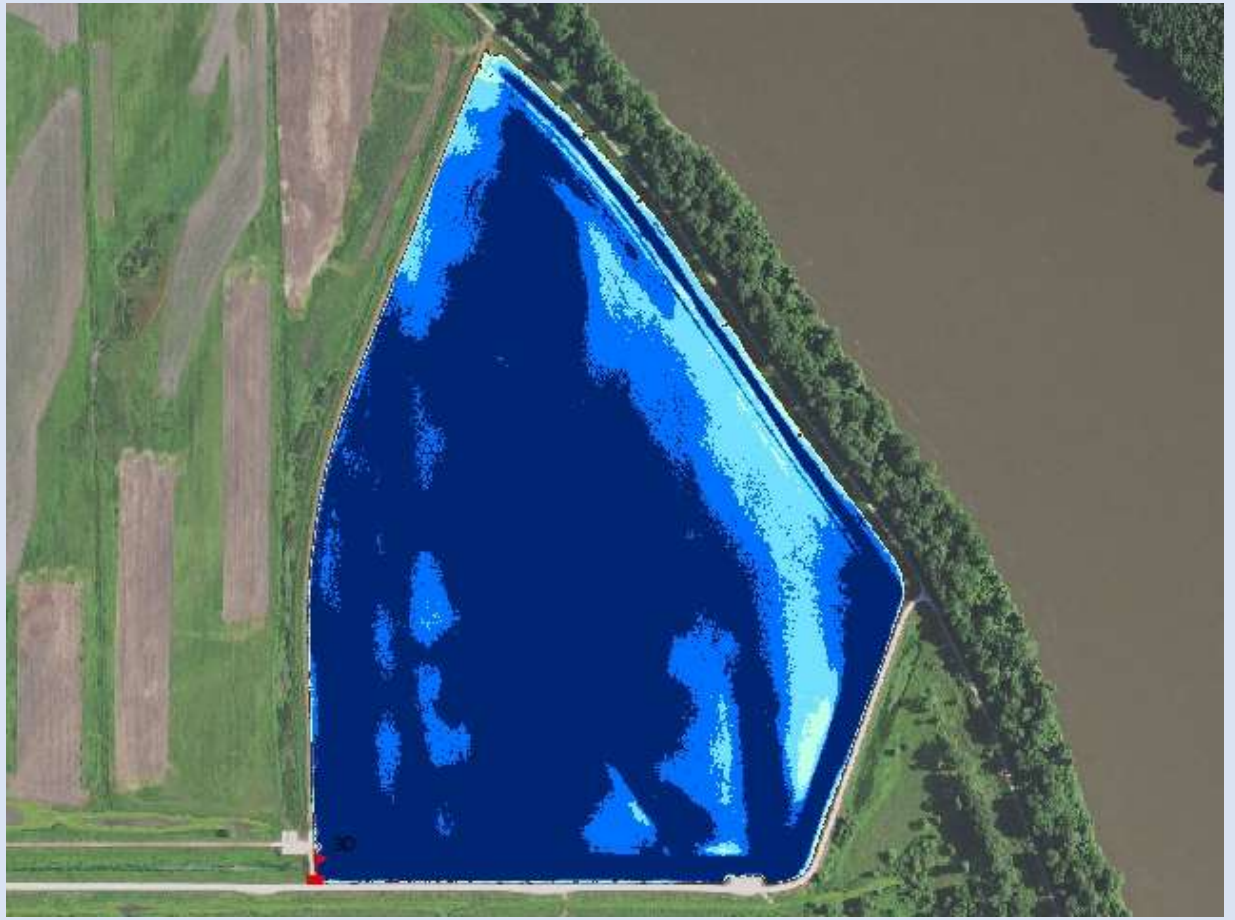


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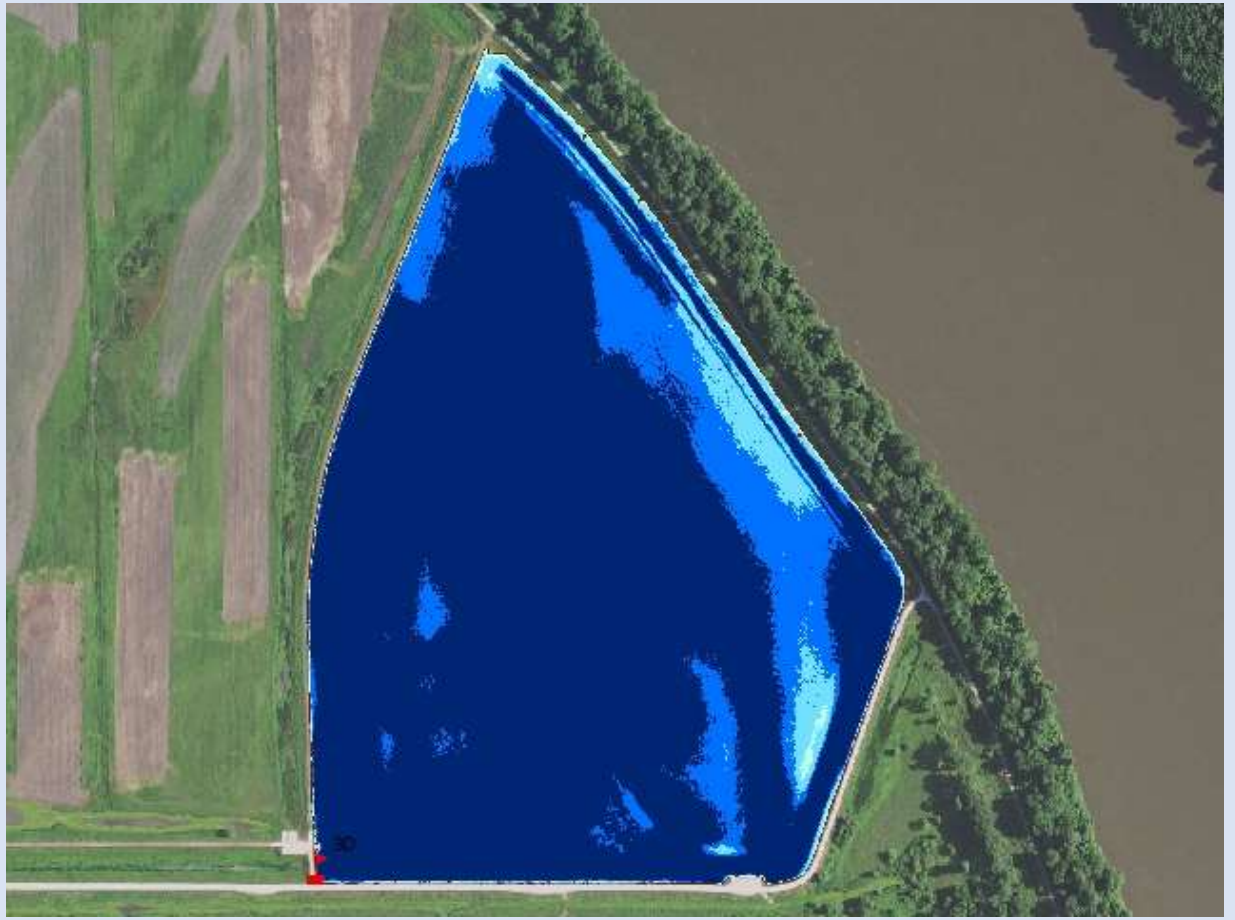


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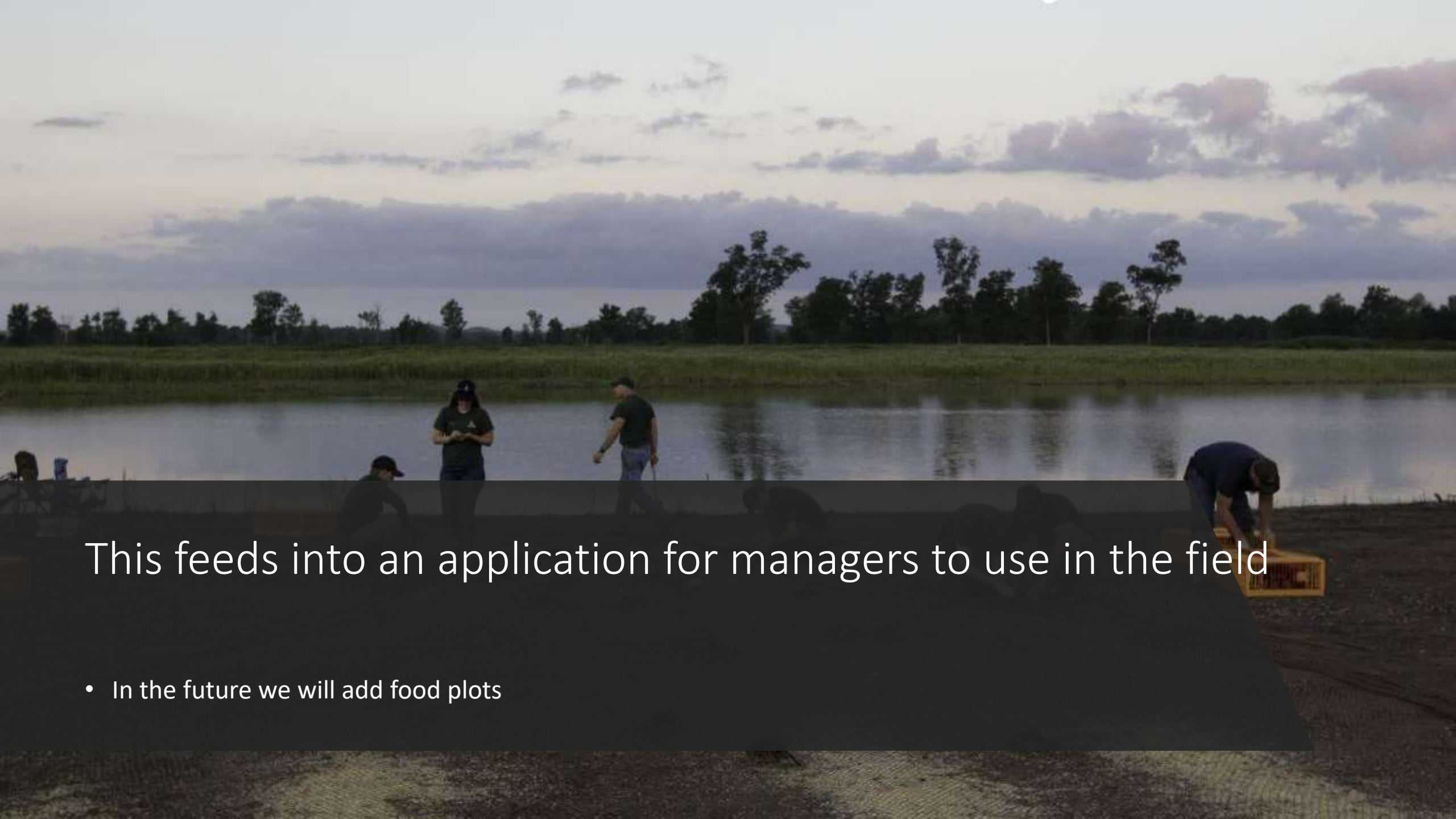
Tables available in application

Calculating at elevation: 454.5

Area Fully Flooded, >18in	(Acres): 6.9
Area Shallowly Flooded, 12-18in	(Acres): 4.1
Area Shallowly Flooded, 6-12in	(Acres): 4.4
Area Shallowly Flooded, 0-6in	(Acres): 5.2
Area Dry, not flooded	(Acres): 2.5



This feeds into an application for managers to use in the field

- In the future we will add food plots





Thank You

- Cynthia.True@mdc.mo.gov