BCWMC Hydrology & Hydraulics Modeling Effort

BCWMC Commission Meeting

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Outline

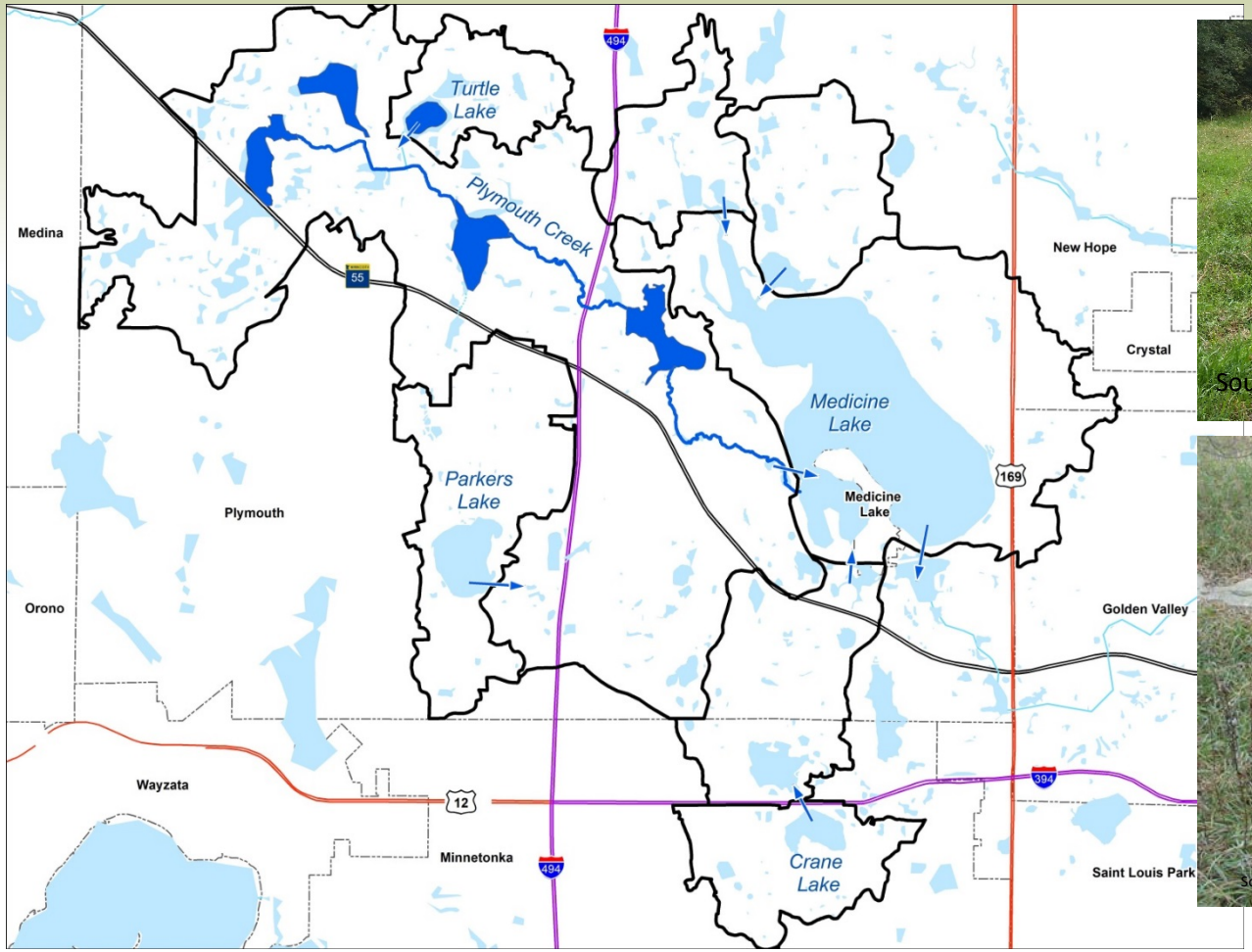
- Project Goal
- Hydrology & hydraulics
- General discussion of modeling
- BCWMC Phase 1 XP-SWMM model (2012)
- Modifications to the BCWMC Phase 2 XP-SWMM model
- Model calibration
- Results 100-year design storm event
- Next steps

Project Goal

- Develop a tool that can be utilized by the BCWMC, member cities, and others to help evaluate projects, establish flood elevations, and make more informed management decisions as they relate to the watershed, Bassett Creek, and other water resources (lakes, ponds, wetlands)

Hydrology: Rainfall & Runoff

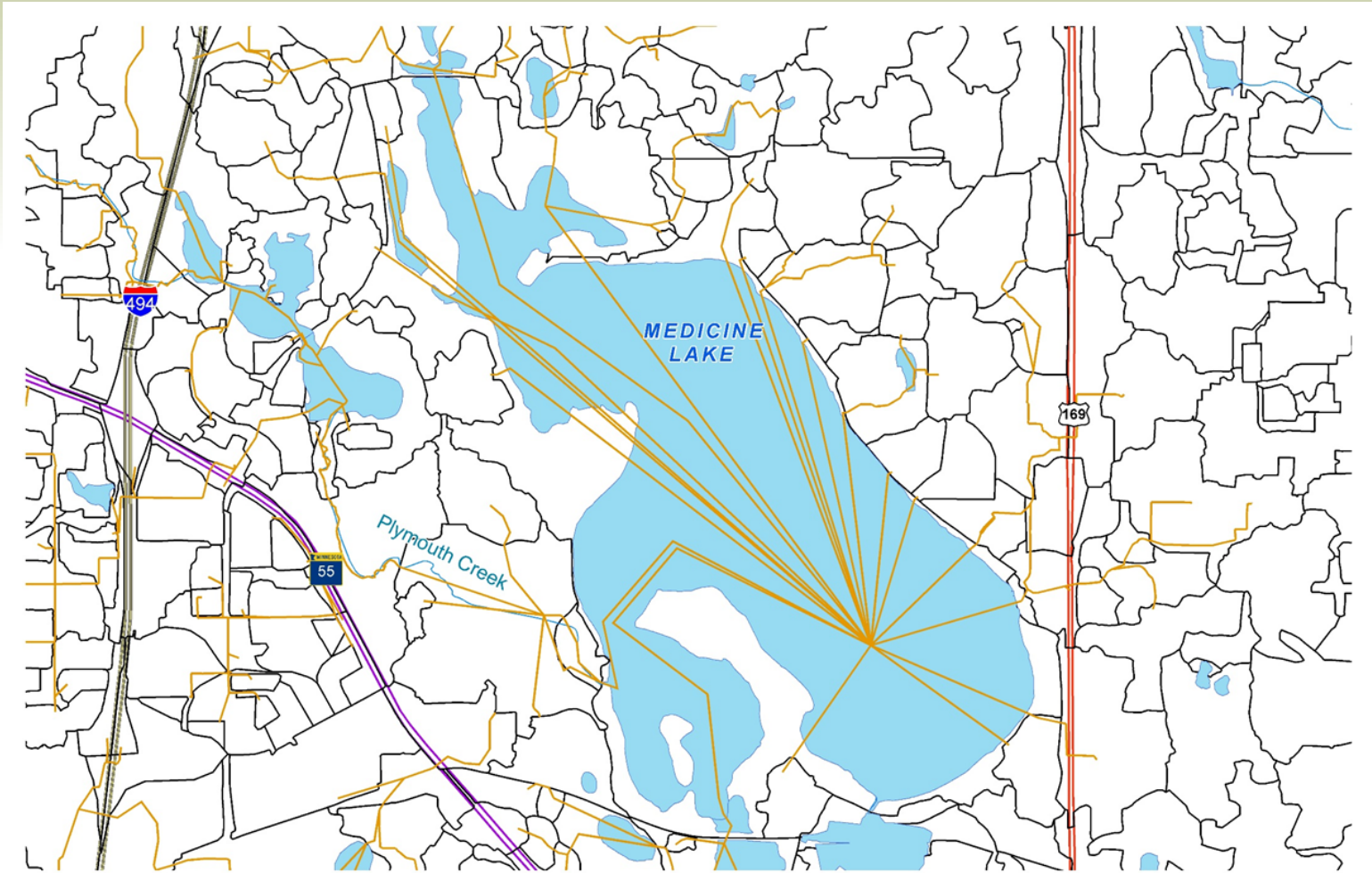
Hydraulics: Storage & Conveyance



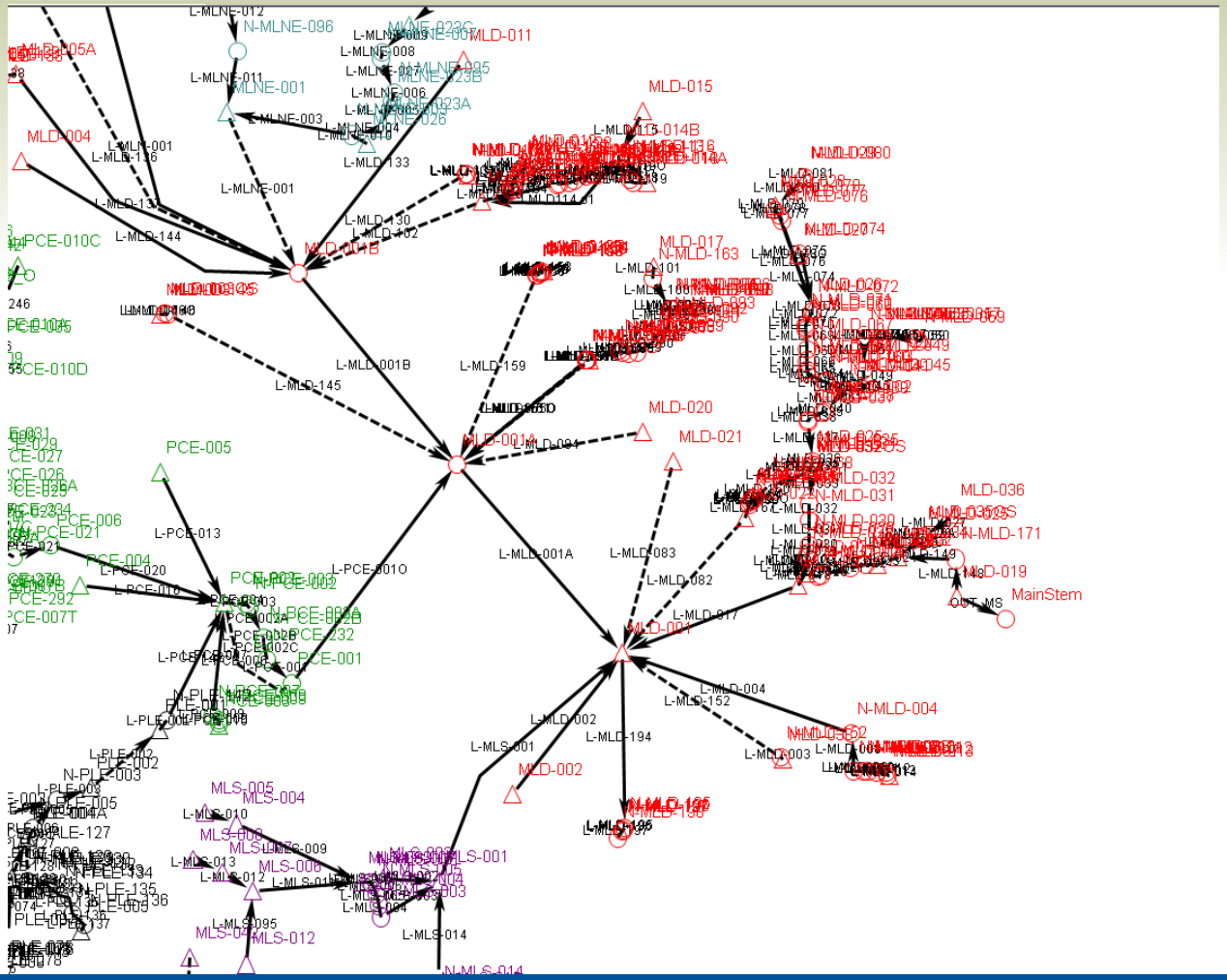
Modeling – the "tool" to evaluate hydrology and hydraulics

- Software (XPSWMM) using numerical methods (equations) to estimate watershed runoff and route water through a conveyance network
- Examples of inputs:
  - Precipitation (depths, intensity, variability)
  - Watershed Inputs (area, soil types, imperviousness)
  - Pipe (elevations, pipe size & length, slope, material)
  - Creek (cross section shape, cover type)
  - Storage in ponds and wetlands

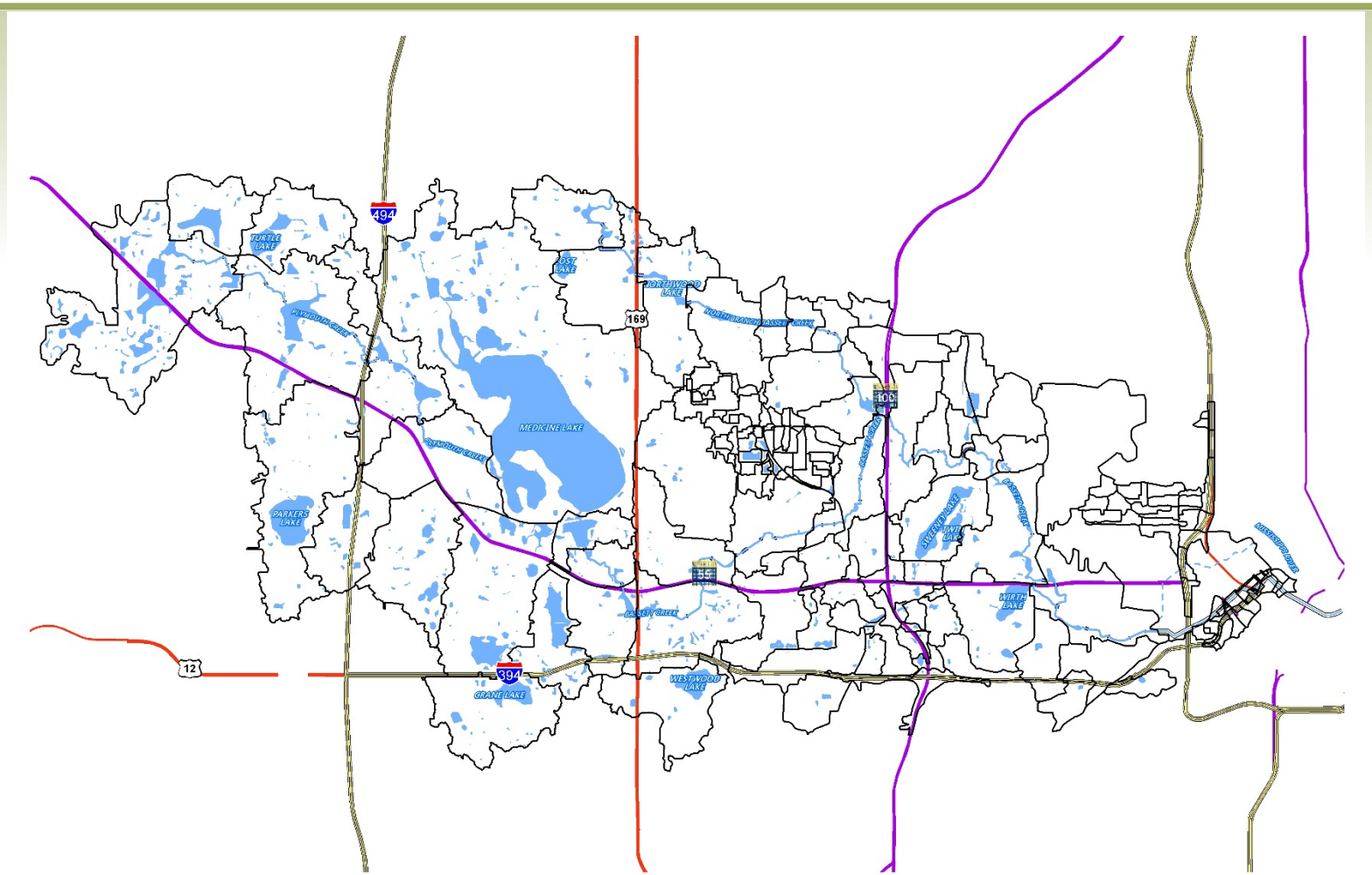
Modeling – How we evaluate hydrology and hydraulics



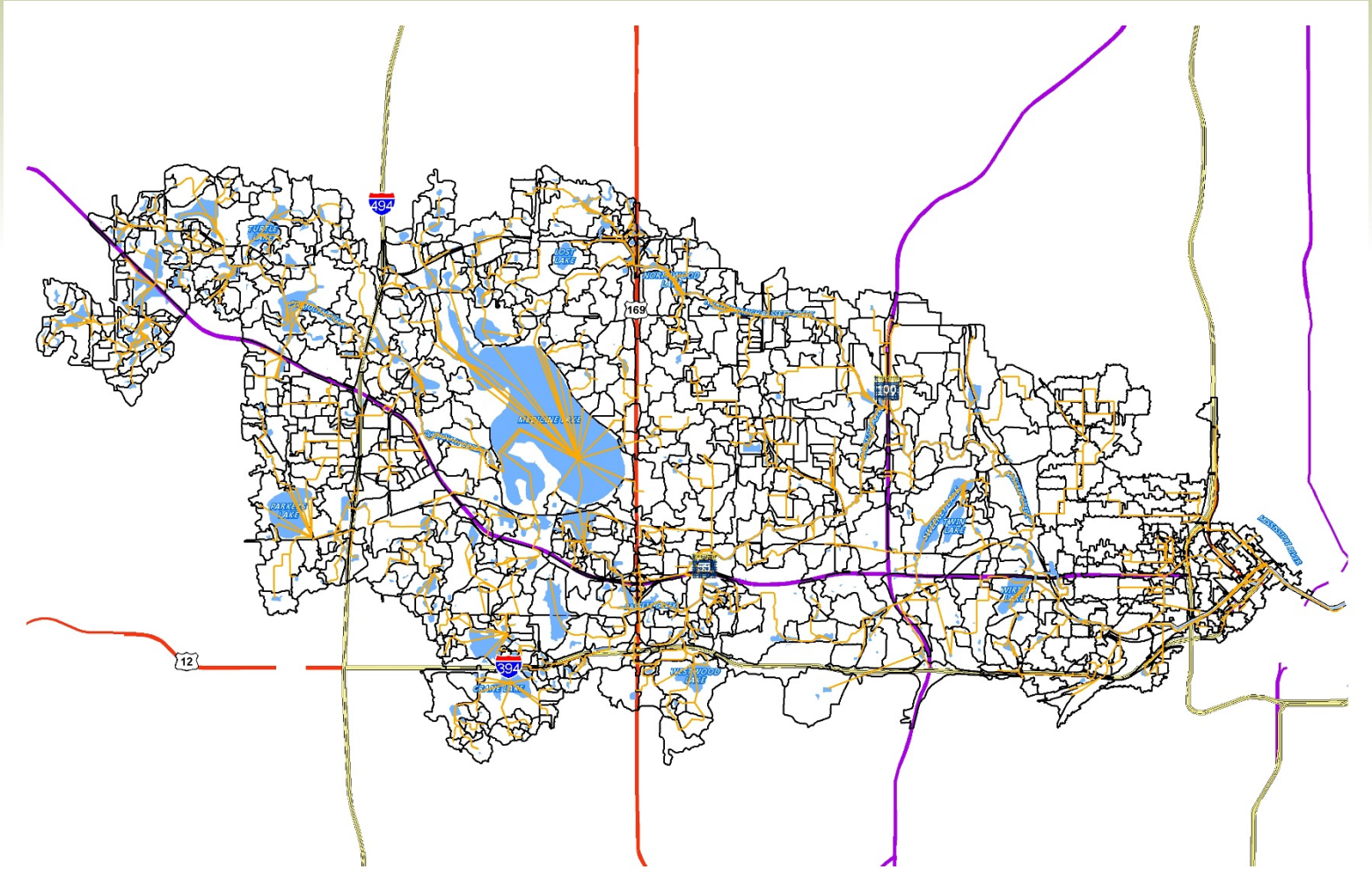
Modeling – How we evaluate hydrology and hydraulics



BCWMC Phase 1 Model (2012)



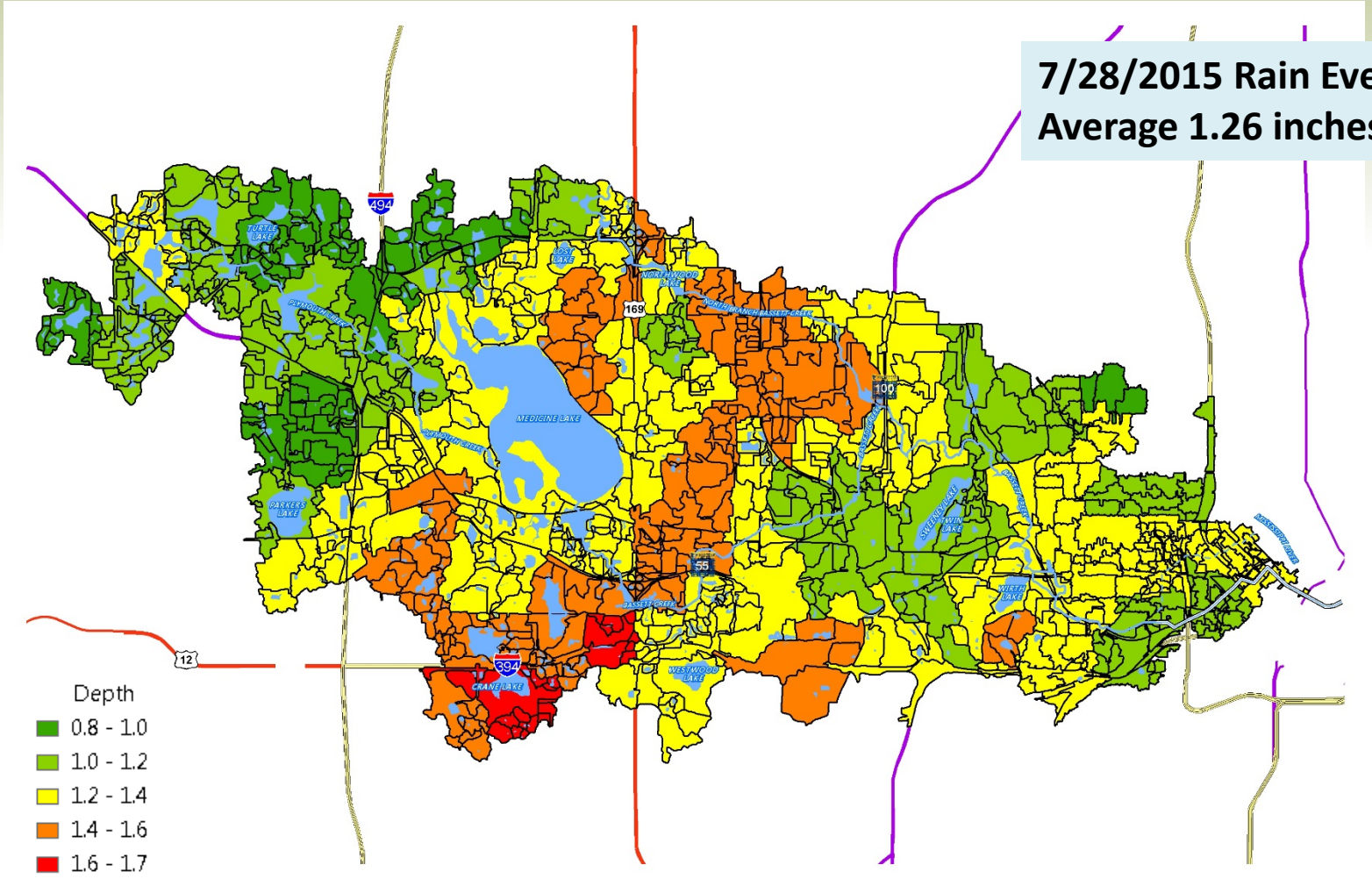
BCWMC Phase 2 Model (2017)



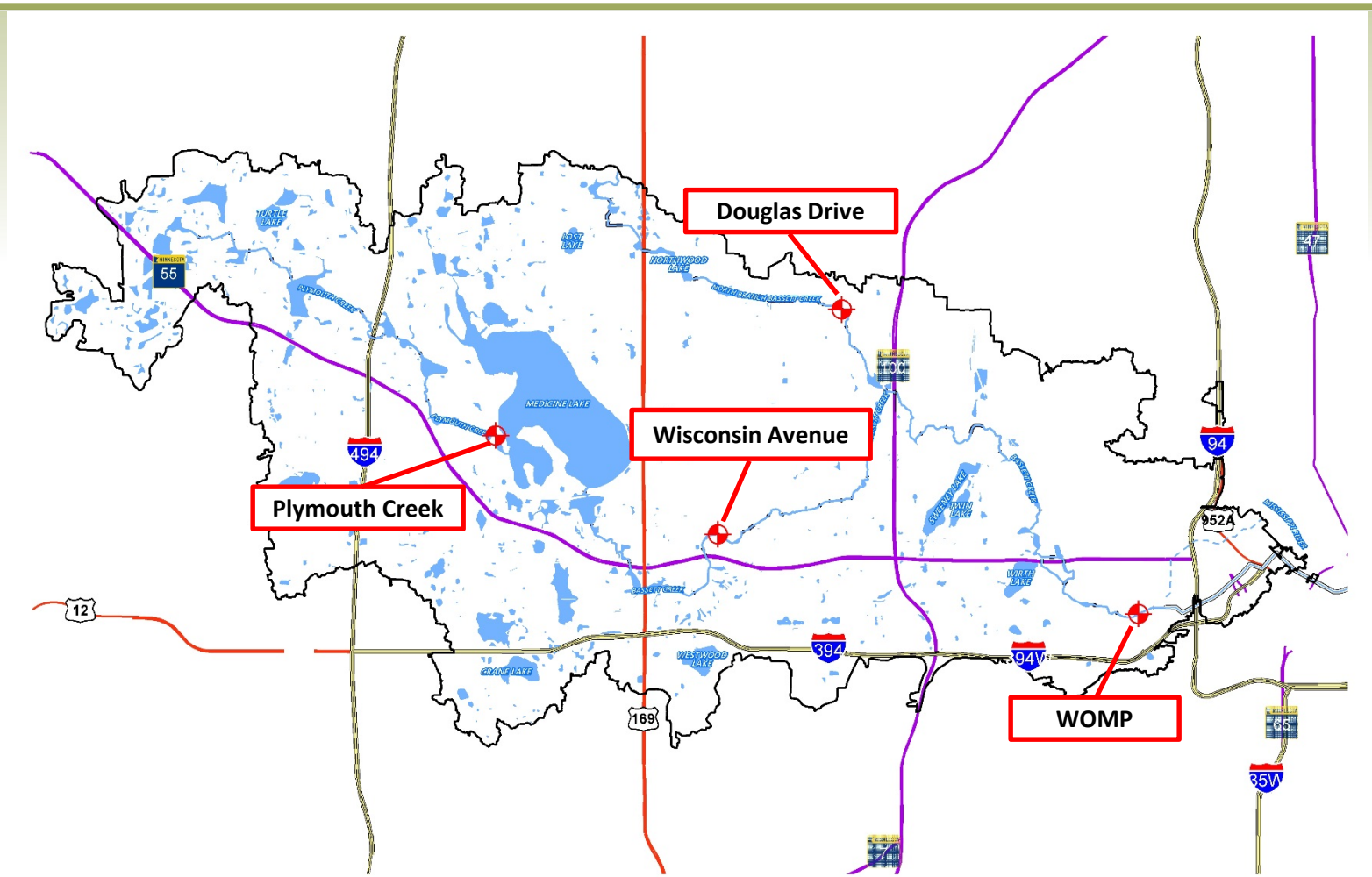
BCWMC Phase 2 Model

- Changes from Phase 1 to Phase 2:
  - Refining the watersheds (Phase 1 – 55 watersheds vs. Phase 2 – 1,100+ watersheds)
  - Additional storage in ponds and wetlands
  - Incorporation of storm sewer between ponds/wetlands & creek
  - Incorporation of updated soils data
  - Calibration to available monitoring data
  - Evaluation of Atlas 14 precipitation data (6.0 inch vs 7.42 inch & more intense)

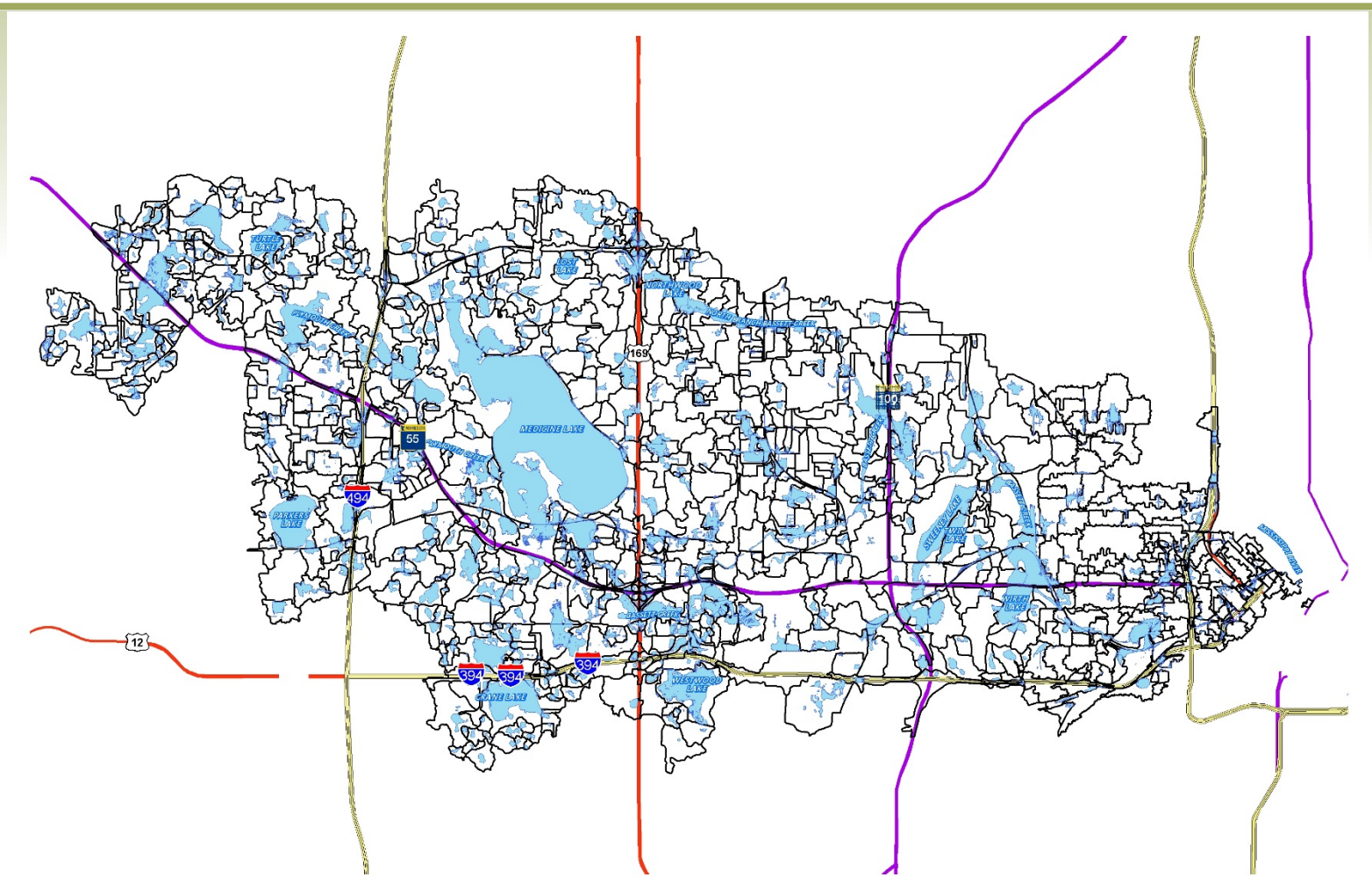
Rainfall can vary across the watershed



Calibration: Modeling versus Monitoring



100-year flood inundation mapping



100-year flood elevations

Location	Original 100-year Flood Elevation (TP-40) (feet MSL (88))	Phase 2 100-year Flood Elevation (Atlas 14) (feet MSL (88))	Change (feet MSL (88))
Crane Lake	920.7	920.2	**-0.5**
Medicine Lake	890.5	890.3	**-0.2**
Wisconsin Ave.	888.2	887.7	**-0.5**
Northwood Lake	889.7	891.4	**1.7**
Bassett Creek Park Pond	849.7	851.5	**1.8**
Sweeney Lake	831.7	832.0	**0.3**
Highway 55	826.2	826.9	**0.7**
New Tunnel Inlet	807.3	811.0	**3.7**

Staff Recommendations

- Approve draft report and finalize after comments received
- Request TAC to review new 100-yr flood elevations and recommendations for adoption of the flood elevations
  - How to handle locations where new flood elevations are lower than existing
  - "Ground truthing" locations with significant change or flooding

Next Steps

- Review & comment by the BCWMC TAC
- Incorporate comments from the Commission and TAC
- Finalize modeling and report
- Adoption of 100-year flood elevations
- Development of BCWMC conditional use agreement (?)
- Use and distribution of the XPSWMM model (as requested)

Questions?

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