

BCWMC 2021 XP-SWMM Update

BCWMC TAC Meeting June 1, 2022



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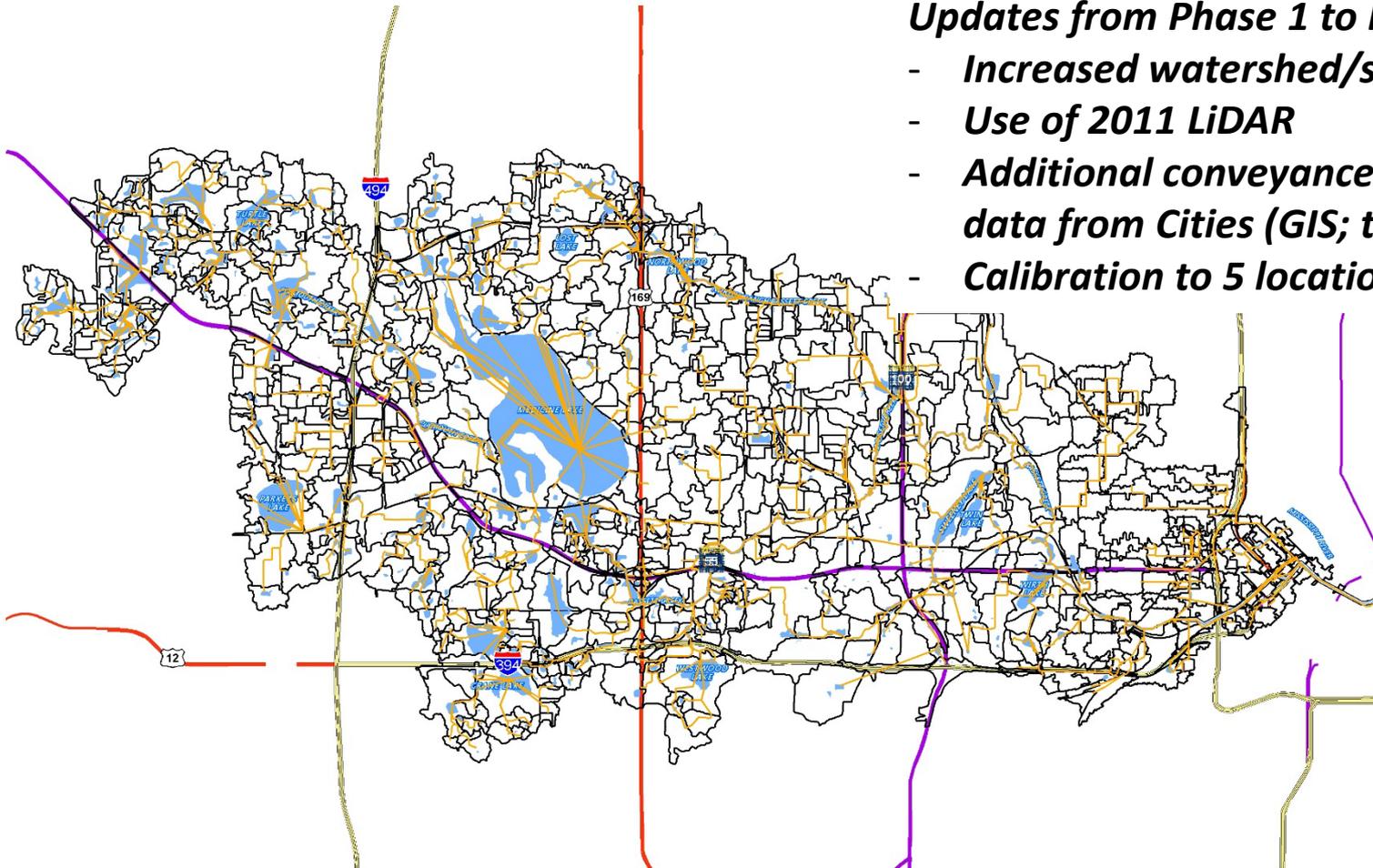
Outline

- Recap modifications to the BCWMC XP-SWMM model as part of 2021 update
- Review results for 100-year design storm event (in comparison to Phase 2 model)
- Outline of areas where results differ along BCWMC trunk system
- Discussion

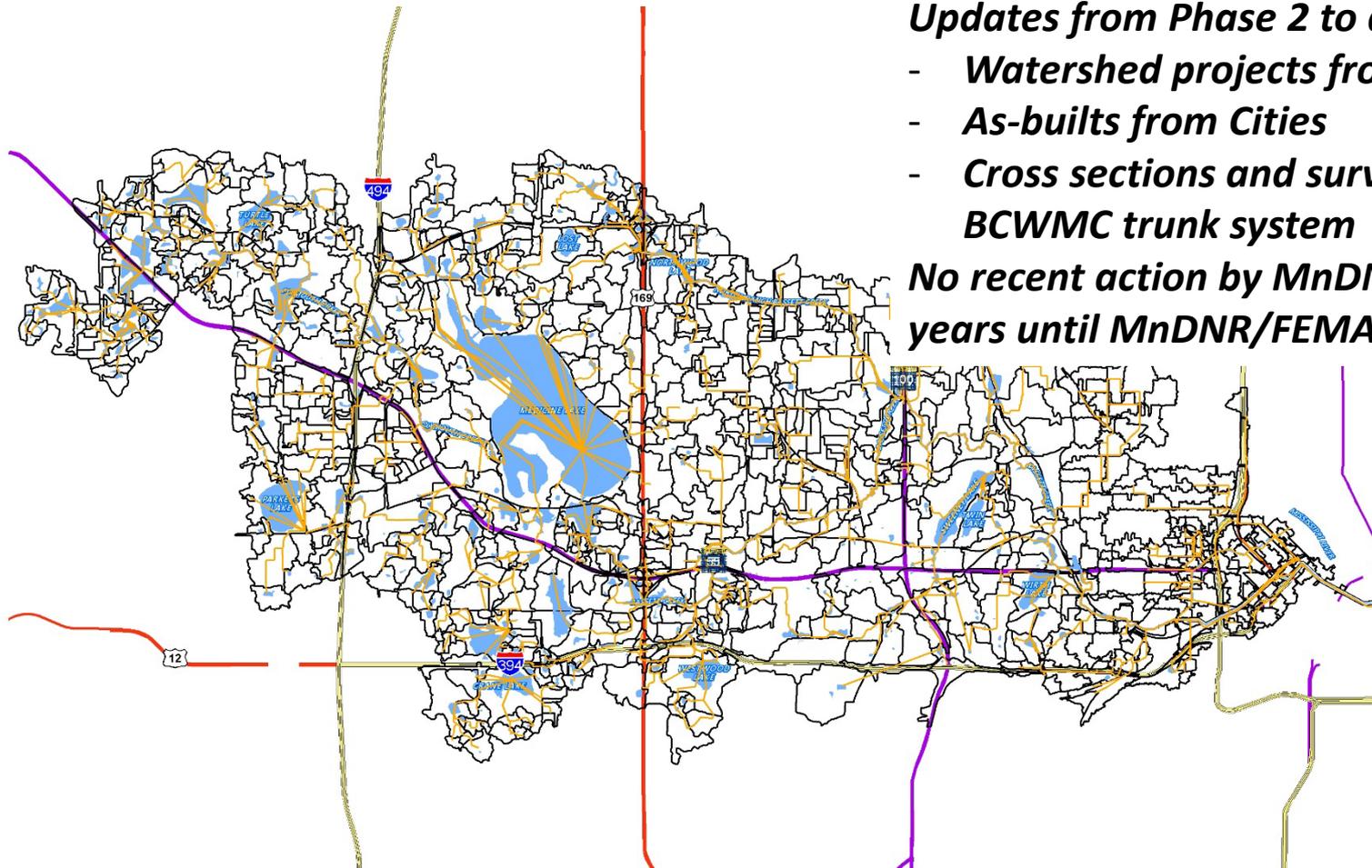
BCWMC Phase 2 XP-SWMM Model (August 2017)

Updates from Phase 1 to Phase 2:

- ***Increased watershed/storage resolution***
- ***Use of 2011 LiDAR***
- ***Additional conveyance detail based on data from Cities (GIS; through ~2015)***
- ***Calibration to 5 locations in watershed***



BCWMC DRAFT FEMA XP-SWMM Model (July 2020)



- Updates from Phase 2 to draft FEMA:**
- **Watershed projects from 2015-2018**
 - **As-builts from Cities**
 - **Cross sections and survey of sections of BCWMC trunk system**
- No recent action by MnDNR, At least 1-2 years until MnDNR/FEMA approval**

BCWMC 2021 XP-SWMM Update

Start with BCWMC DRAFT FEMA XP-SWMM Model
(July 2020) – all existing storage included

Requested projects submitted by Cities in late 2021 and
reviewed & incorporated “significant” projects into the XP-
SWMM model (23 projects between 2018-2021)

BCWMC 2021 XP-SWMM Model Update
(April 2022)



BCWMC 2021 XP-SWMM Update

- “Significant Project Criteria”
 - Change along BCWMC trunk system
 - Project within or adjacent to the BCWMC floodplain
 - Project takes up a large portion of the XP-SWMM watershed area
 - Project that is located along a segment of conveyance we are modeling in the XP-SWMM model that changes conveyance/storage along conveyance etc.
 - Changes drainage patterns in the watershed (watershed divides/drainage direction)
 - “Big” projects that result in big changes in water quality volume/flood storage/landuse (e.g. Hollydale development, CIP projects)
 - Not all road projects are significant – unless it triggers some of the above items (e.g. if storm sewer replaced that we weren’t previously modeling and it is generally flowing in the same direction, may not be significant)

BCWMC 2021 XP-SWMM Update

Results Comparison of Phase 2 (July 2017), 2020 DRAFT FEMA (July 2020), and DRAFT 2021 Model Update (April 2022) - Flood Elevations and Peak Discharges

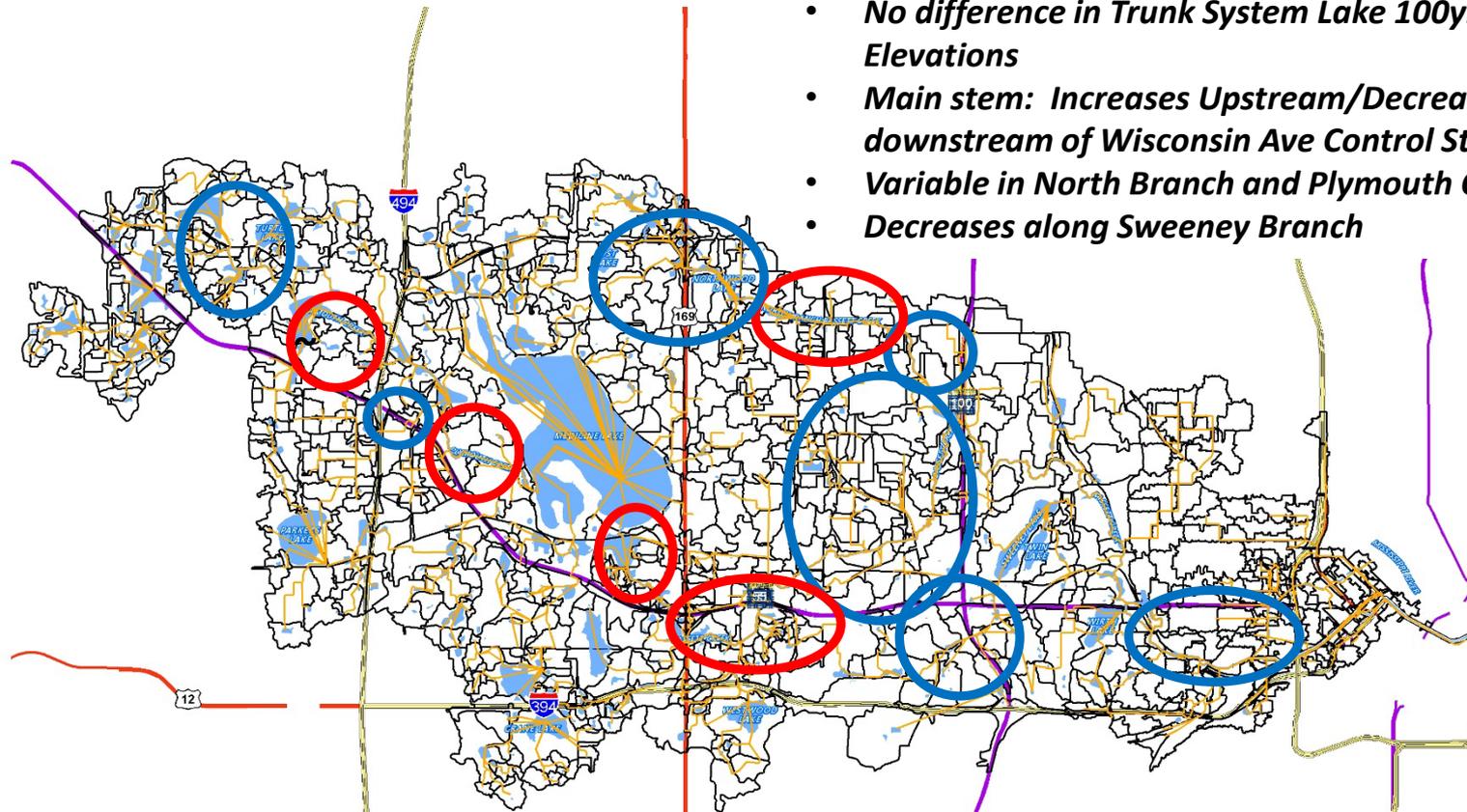
Location	Creek Distance, See Reach Reference (feet)	Normal Water Level (NAVD88 feet)	BCWMC Historic Flood Profiles ¹		Phase 2 XPSWMM Model ²		2020 DRAFT FEMA Model ⁷						DRAFT 2021 Model Update					
			100-yr		100-yr		2-yr		10-yr		100-yr		2-yr		10-yr		100-yr	
			Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate	Flood Elevation	Flow Rate
			(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)	(NAVD88 feet)	(cfs)
BASSETT CREEK MAIN STEM (Creek Distance Upstream of Mississippi River)																		
Tunnel Inlet	8,000		807.3	1,220	810.9	1,380	802.3	400	804.9	690	810.3	1,310	802.4	420	804.8	678	809.8	1,276
Van White Memorial Blvd (DS)	---		---	---	811.0	1,400	802.9	400	805.1	690	810.3	1,310	803.0	402	805.0	661	809.9	1,275
Van White Memorial Blvd (US)	---		---	---	811.0	1,530	803.0	400	805.2	660	810.3	1,400	803.1	402	805.0	661	809.9	1,409
Irving Avenue Bridge (DS)	9,800		808.6	1,135	811.2	1,380	805.5	400	806.7	700	810.4	1,320	805.5	420	806.7	678	809.9	1,276
Irving Avenue Bridge (US)	---		809.3	1,135	811.3	1,380	805.9	400	807.0	660	810.5	1,400	805.9	402	807.0	660	809.9	1,395
Cedar Lake Rd (DS)	---		---	---	812.9	1,380	809.5	400	810.7	660	812.9	1,400	809.5	402	810.7	660	812.9	1,394
Cedar Lake Rd (Bridge)	10,900		812.9	945	813.3	1,380	809.7	400	810.9	660	813.1	1,400	809.7	402	810.9	660	813.1	1,394
MN&S RR Bridge (Downstream)	---		---	---	813.7	1,370	810.2	400	811.5	660	813.7	1,400	810.2	402	811.5	660	813.7	1,394
MN&S RR Bridge	11,600		814.8	945	814.5	1,370	810.3	400	811.5	660	813.8	1,400	810.3	402	811.5	660	813.8	1,394
Penn Ave Culvert & Bridge (DS)	12,410		814.9	705	814.5	1,370	810.8	400	812.1	660	812.9	1,390	810.8	402	812.1	660	812.9	1,393
Penn Ave Culvert & Bridge (US)	---		815.2	705	814.5	1,370	811.9	400	813.5	660	814.8	1,390	811.9	402	813.5	660	814.8	1,393
BN RR Bridge(DS)	---		---	---	814.4	1,370	811.9	400	813.5	660	814.7	1,390	811.9	402	813.5	660	814.7	1,393

Bold Blue: Peak elev reduced by 0.1 ft+ when compared to BCWMC Phase 2 Model

Bold Red: Peak elev increased by 0.1 ft+ when compared to BCWMC Phase 2 Model



Difference between Phase 2 and Draft 2021 Update



- *No difference in Trunk System Lake 100yr Flood Elevations*
- *Main stem: Increases Upstream/Decreases downstream of Wisconsin Ave Control Structure*
- *Variable in North Branch and Plymouth Creek*
- *Decreases along Sweeney Branch*

Bold Blue: Peak elev reduced by 0.1 ft+ when compared to BCWMC Phase 2 Model

Bold Red: Peak elev increased by 0.1 ft+ when compared to BCWMC Phase 2 Model

Discussion Items

1) Does the TAC recommend that the BCWMC adopt the updated model and associated flood elevations?

Discussion Items

2) Is developing inundation mapping for the trunk system (using FEMA-mapping methodology) necessary/useful based on 2021 model update? Upstream areas? Or just incorporation of the trunk system flood event summary table into the BCWMC plan?

Discussion Items

3) Future model update information requests:
Original approach was to rely on city to provide information for project to be implement;
however, after going through this process,
opportunity to streamline approach.

Discussion Items

4) Future model requests of 2021 updated model will be the same process as for Phase 2 model (users request through cities, model use agreement execution, etc.).

Questions?

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