

Regional Stormwater Implementation

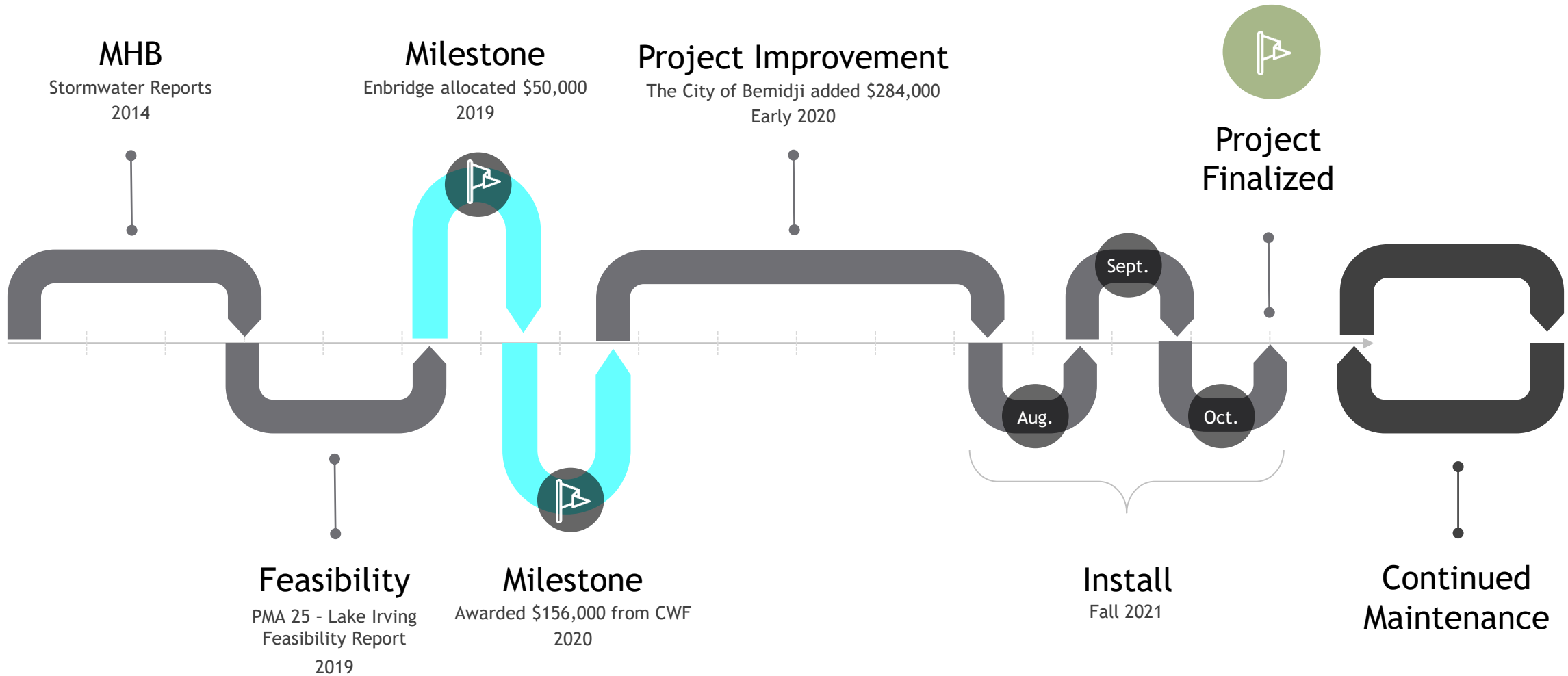
Bemidji, MN – Lake Irving Protection Project



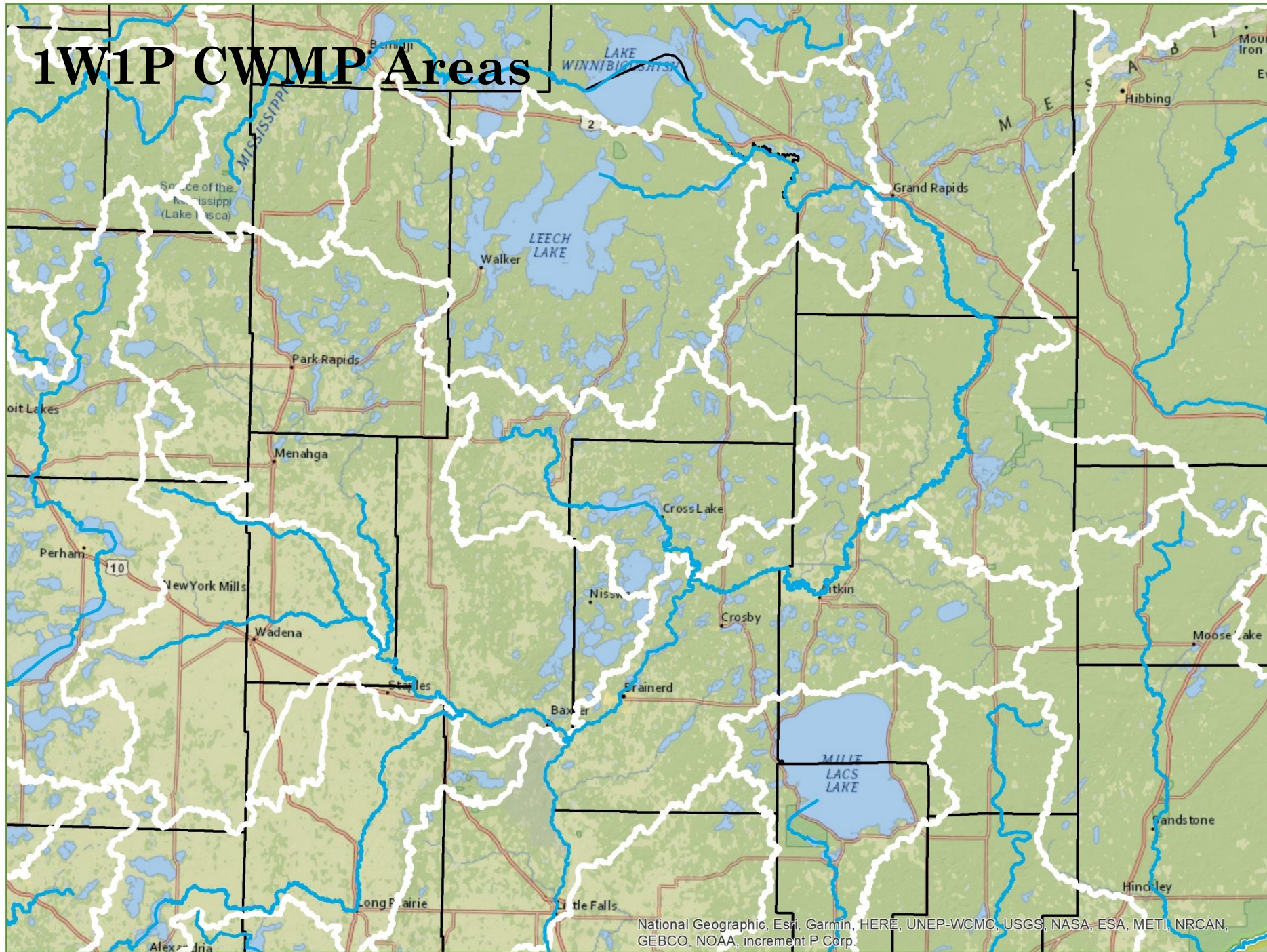
PROTECTING THE FIRST 400 MILES



Funding and Implementation

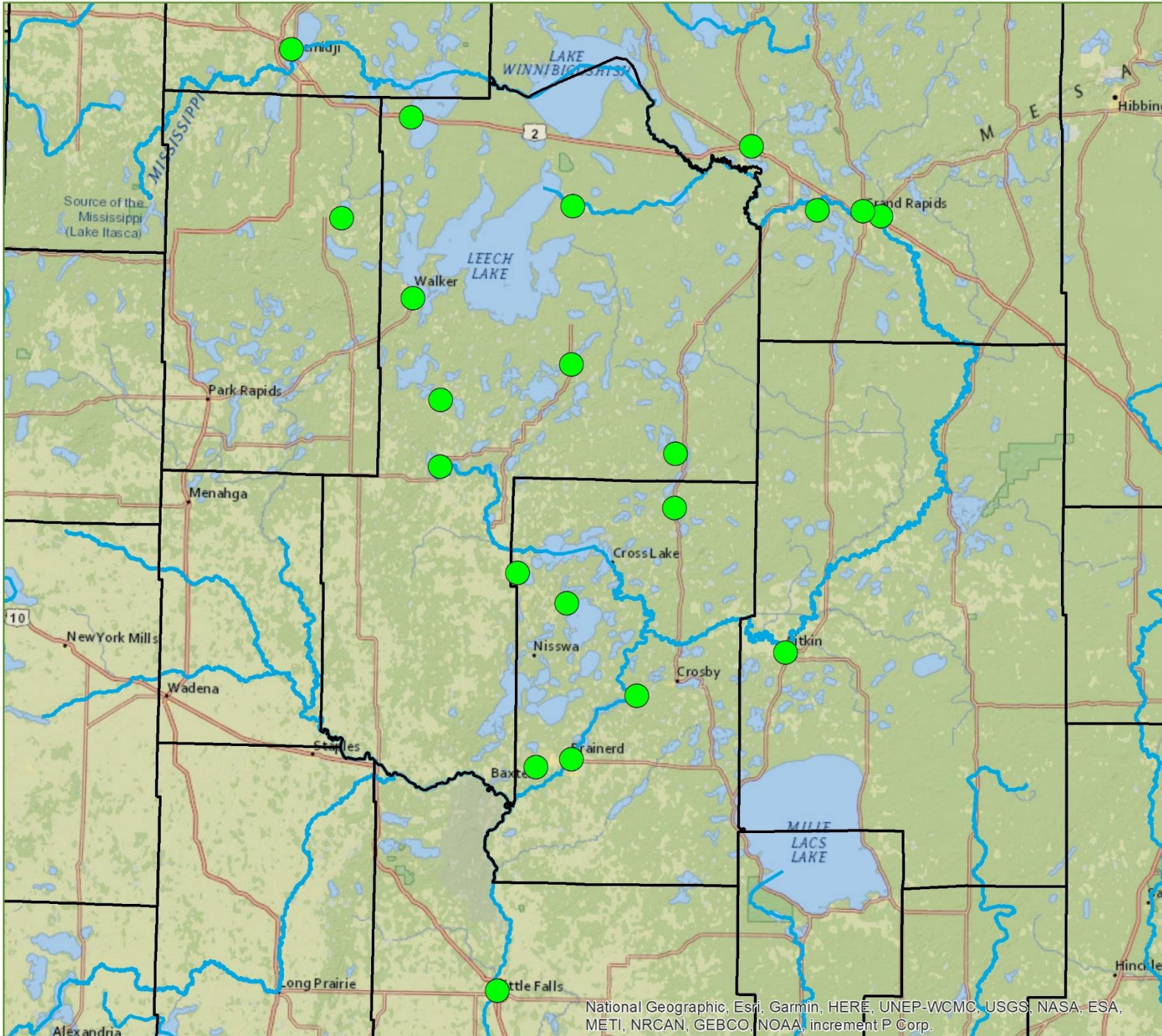


1W1P CWMP Areas



National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

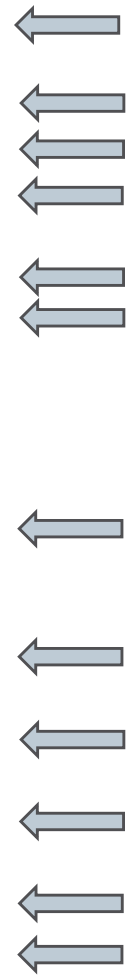




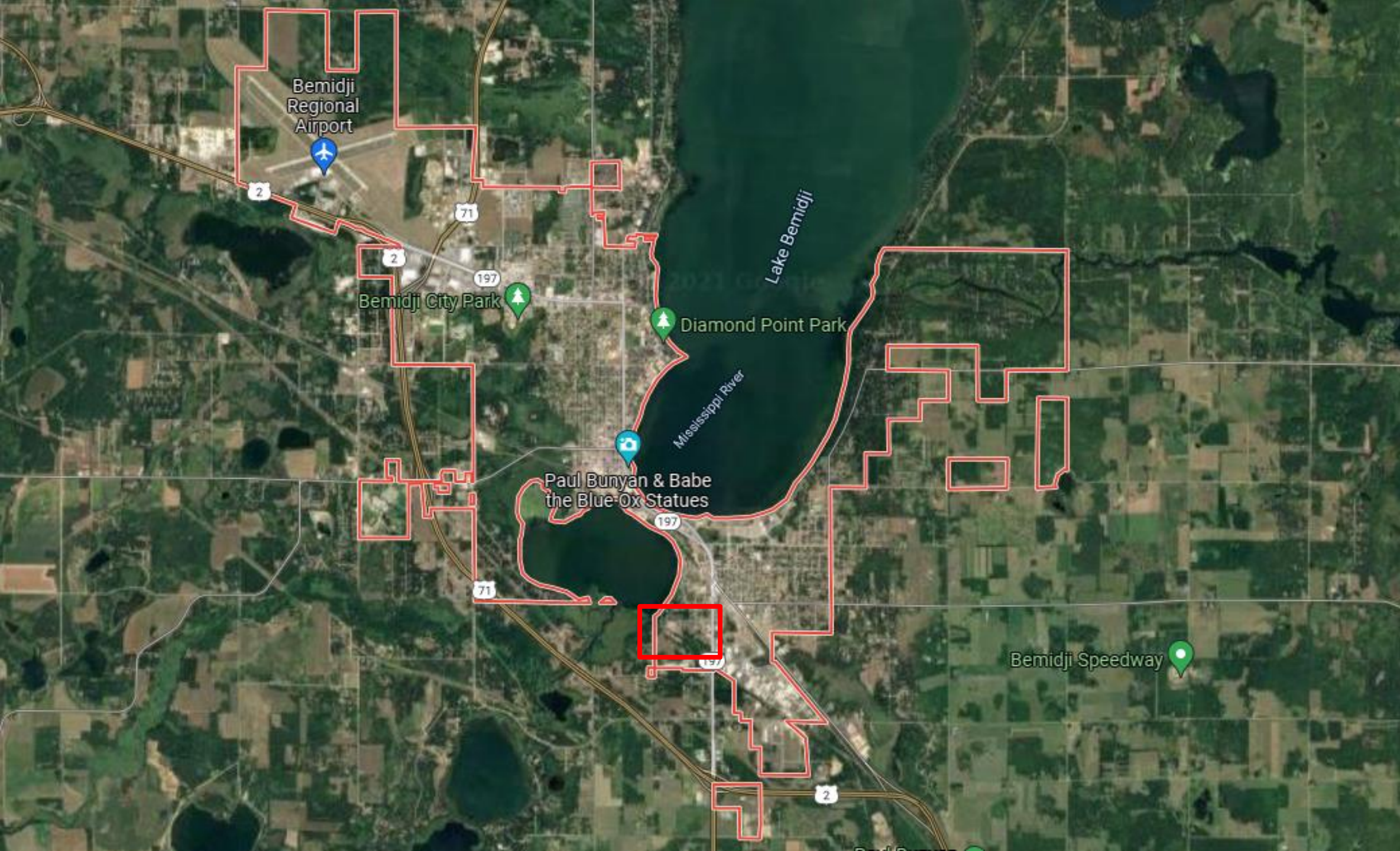
STORMWATER RETROFIT ANALYSIS CITIES



- Aitkin
- Backus
- Baxter
- Bemidji
- Brainerd
- Breezy point
- Cass lake
- Cohasset
- Crooked lake
- Deer River
- Emily
- Federal Dam
- Grand Rapids
- Hackensack
- Jenkins
- La Prairie
- Laporte
- Little Falls
- Longville
- Pallsade
- Pine River
- Riverton
- Walker



National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

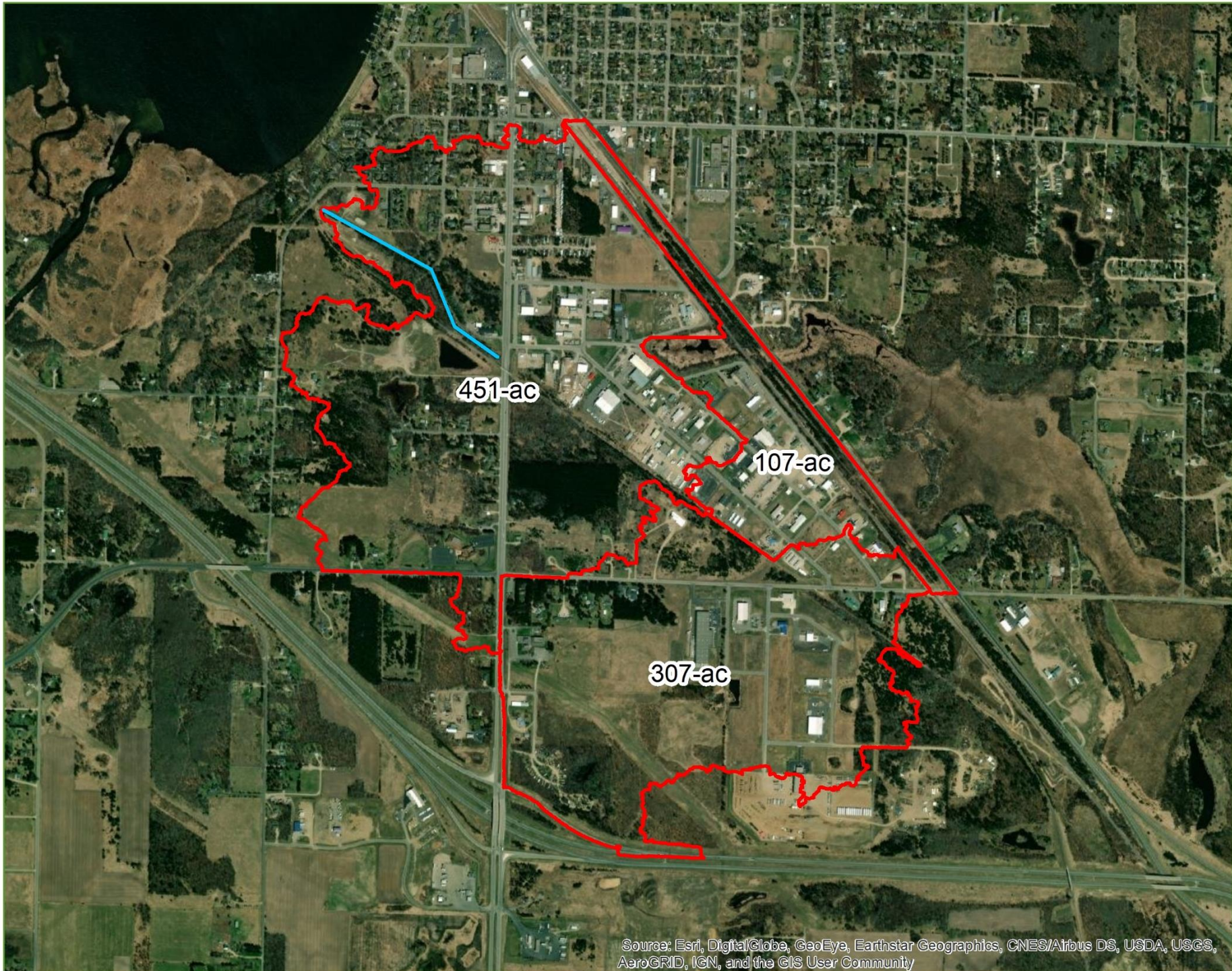


Lake Irving Protection Project

- 866-acre drainage area
- Lake Irving on 303d impaired list
- TMDL in 2018
- 2014 MHB Study
 - 12 cities
 - 59 identified projects, ranked
 - Irving ranked #7 overall (for phosphorous)
 - Largest single load reduction project for Lake Irving

TABLE 3. POTENTIAL ALTERNATIVES SCREENING METRIC RESULTS

Alternative	Site Suitability (Y/N)	Special Permit (Y/N)	Wetland Mitigation (None, M, H)	Impact on Developable Land (L, M, H)	Treatment Capacity (L, M, H)		Conductive to Spill Management (Y/N)	Cost (L, M, H)				Construction Ease (L, M, H)	O&M Ease (L, M, H)
					TSS	TP		Design	Permit	Build	O&M		
Within Ditch													
Dry Pond	N	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wet Pond	Y	N	M	M	M	L	T	M	M	M/H	M	H	M/H
Single wetland	Y	N	M	M	M	M	Y	M	M	M/H	M	M	M/H
Wetland Cells at culvert(s)	Y	N	H	L	M	M	Y	M	H	M	M	L	M/H
Surface sand/soil/enhanced filters	Y	N	M	L	M	H	N	M	M	L/M	H	M	H
Infiltration basin	N	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Infiltration trench (BENCH)	N	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bioretention (BENCH)	Y	N	L	L	M	M	N	L	L	L/M	M	M	M
<u>Bioinfiltration</u> (BENCH)	N	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biofiltration (BENCH)	Y	N	L	L	M	M	N	L	L	L/M	M	M	M
In-stream-injection system	Y	Y	None	L	L	H	N	H	L	M/H	H	M	H
Pond + dosing system	Y	Y	M	M	M	H	Y	H	M	H	H	H	H
Above Ditch													
Dry Pond	Y	N	N	M	H	H	N	M	N/A	M	M	M	M
Wet Pond	Y	N	N	M	M	L	N	M	N/A	M	M	M	M
Single wetland	Y	N	N	M	M	M	N	M	N/A	M	M	M	M
Surface sand/soil/enhanced filters	Y	N	N	M	M	H	N	M	N/A	L	M	M	M
Infiltration basin	Y	N	N	M	H	H	N	M	N/A	L	M	M	M
Infiltration trench	Y	N	N	M	H	H	N	M	N/A	L	M	M	M
Bioretention	Y	N	N	M	H	H	N	L	N/A	L	M	M	M
<u>Bioinfiltration</u>	Y	N	N	M	H	H	N	L	N/A	L	M	M	M
Biofiltration	Y	N	N	M	H	H	N	L	N/A	L	M	M	M
Pond dosing system	Y	Y	N	M	M	H	N	H	M	H	H	H	H



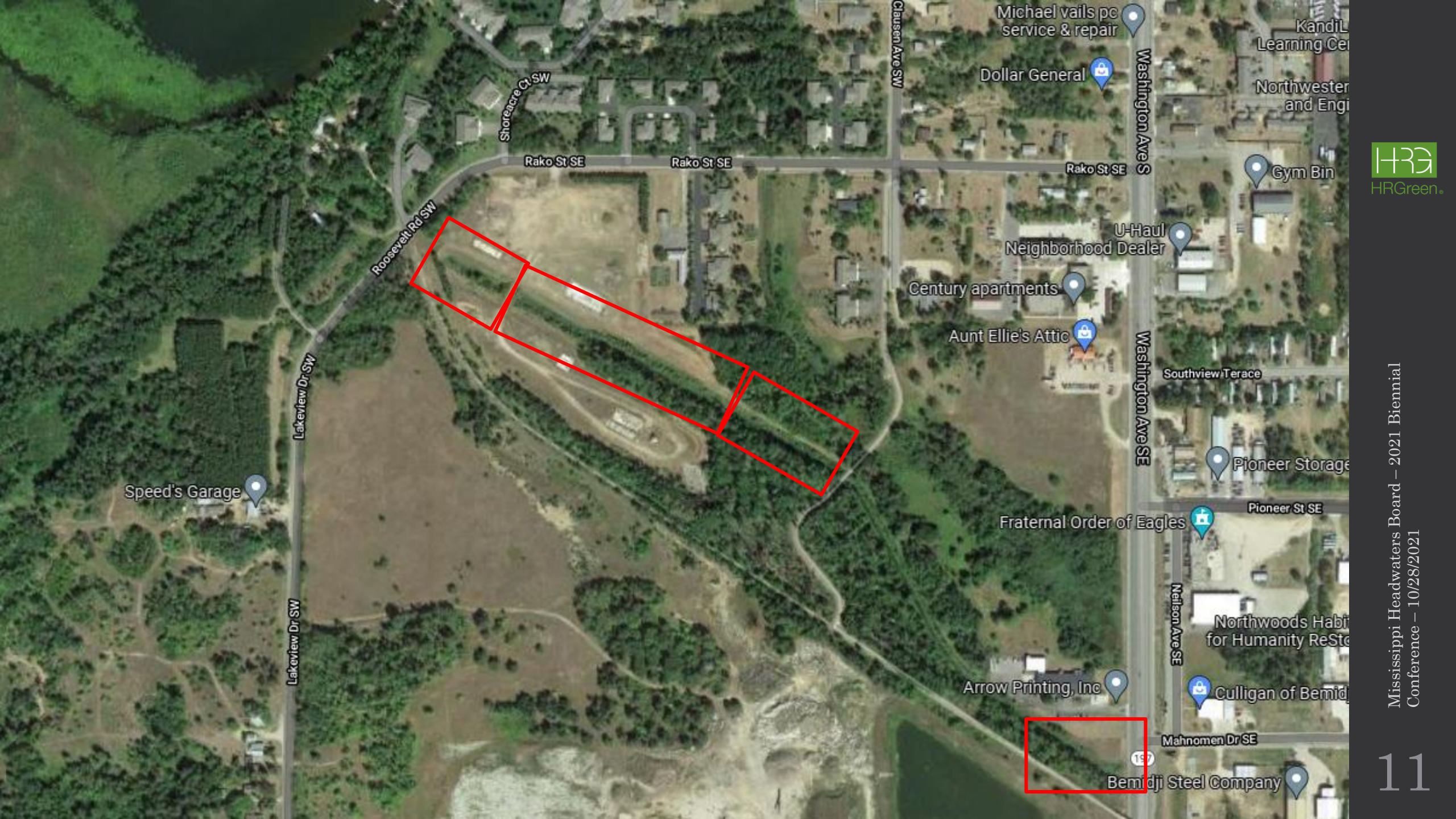
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

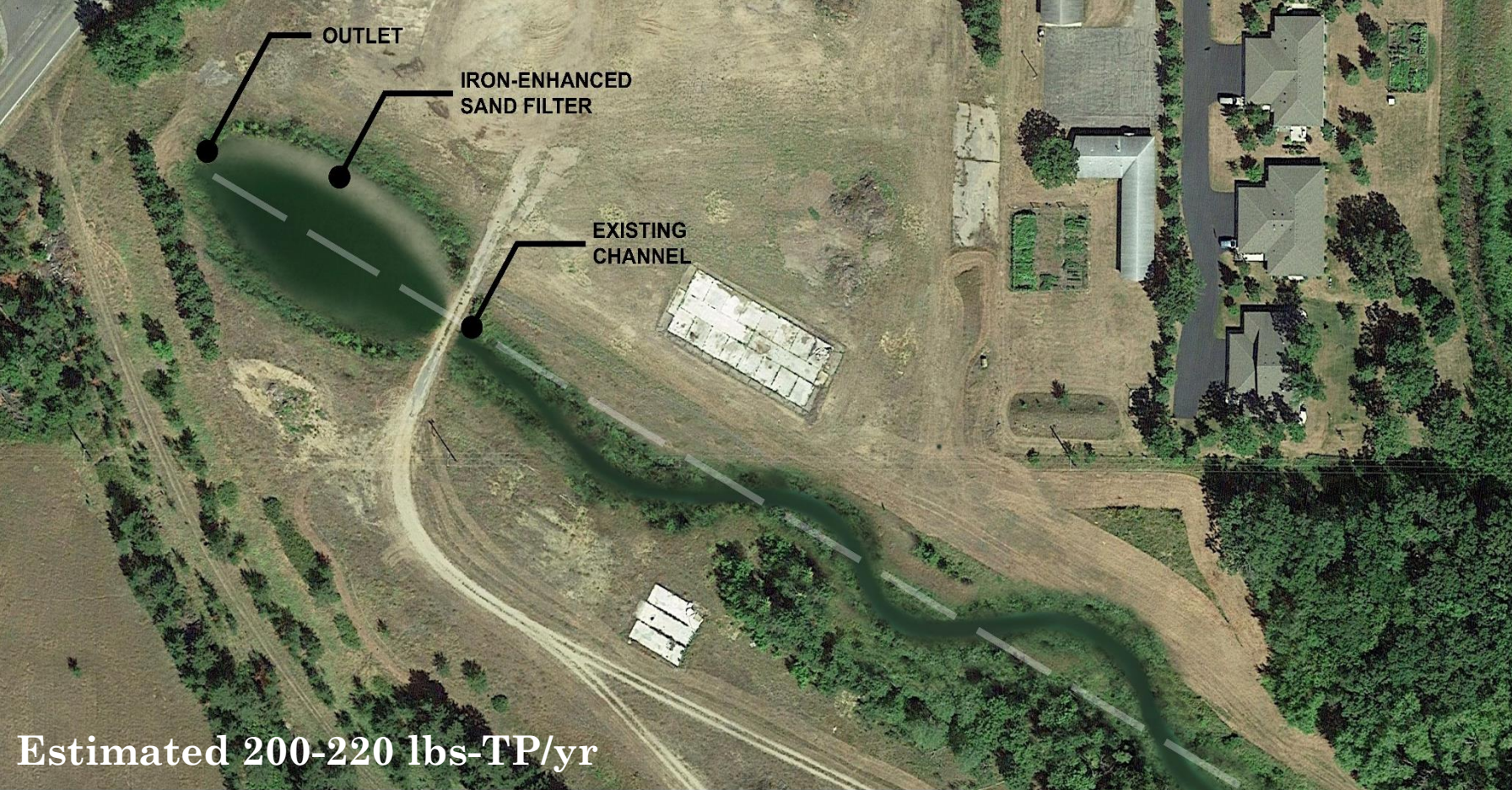


10/25/2021



Mississippi Headwaters Board – 2021 Biennial
Conference – 10/28/2021

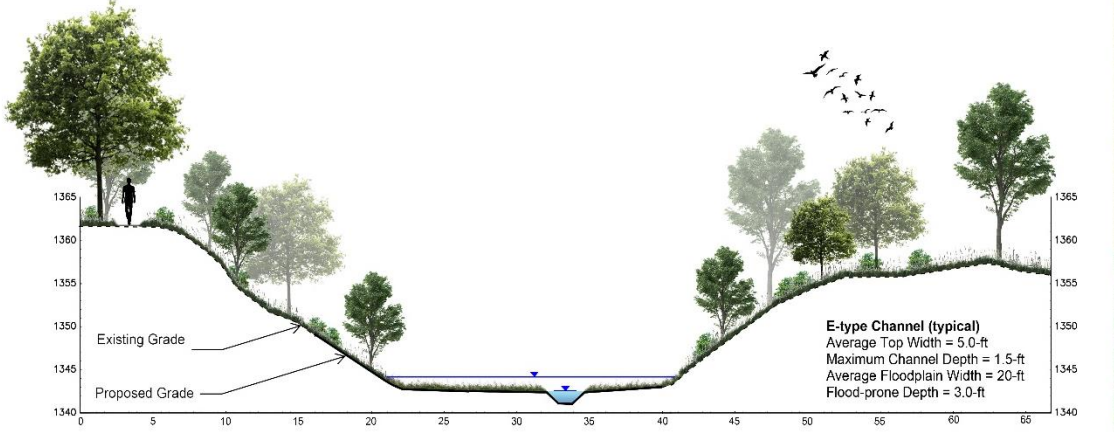




*FOR VISUAL PURPOSES ONLY
(PHOTO: DAVE ROSEGEN)

Estimated 200-220 lbs-TP/yr

SECTION RENDERING



Lake Irving Protection Project

- Conversion of ditch to perennial stream channel
- Extended detention pond
- Iron-enhanced sand filter
- Restoration of emergent, transitional and upland habitats
- Lake protection
- Functional lift of channel



Project Challenges

- Sandy, erodible soils in upland and valley
- Muck in channel areas
- Steep slopes
- Groundwater
- On-line construction (stormwater flow)

Project Funding

- Total project cost \$490,000
- \$326,129 (Northern Paving)
- CWF Grant \$156,000
- Enbridge Grant \$50,000
- Bemidji
 - Design and Construction Observation \$128,438
 - Construction \$284,000

DRONE FOOTAGE

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