RAMSEY-WASHINGTON
METRO WATERSHED DISTRICT

Twin Lake neighborhood informational meeting

October 8, 2018

Ramsey-Washington Metro Watershed District

Paige Ahlborg, RWMWD

Brandon Barnes, Barr

BARR

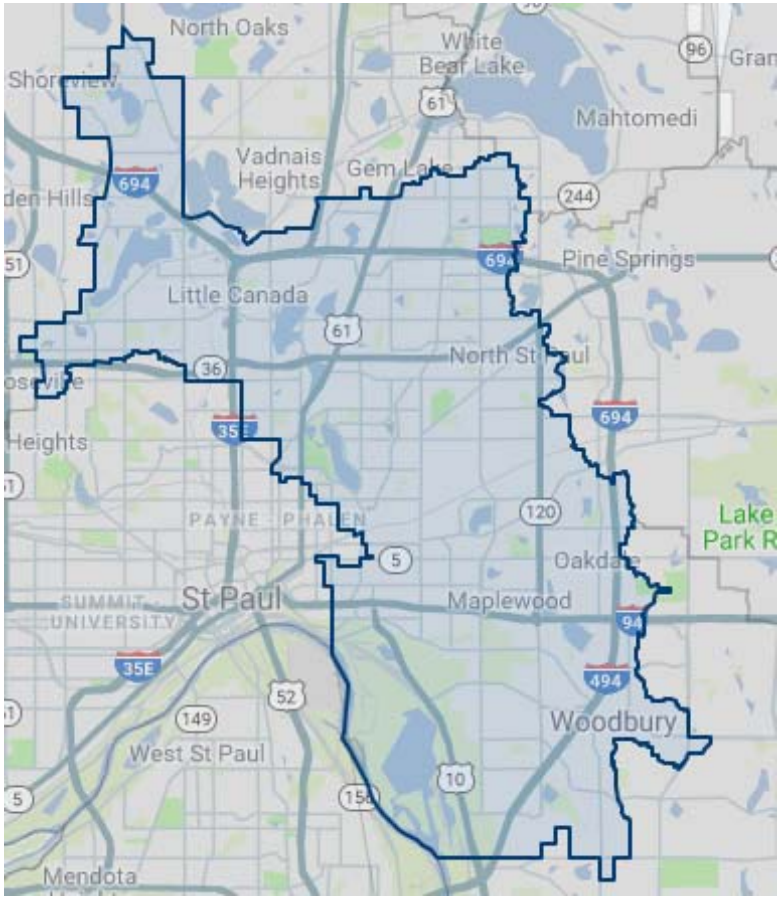
purpose

- provide information on:
  - RWMWD background & programs
  - subwatershed & drainage system
  - historic precipitation
  - regional groundwater
  - water quality
  - monitoring

RWMWD background & programs

RWMWD background

- established in 1975
- coordinates watershed management efforts between city, county, and state agencies
- contribute funding and technical expertise to water infrastructure projects
- help regulate development through permitting, manage natural resources and educate the public on watershed issues
- RWMWD includes
  - 12 cities
  - ~65 sq mi
  - 20 lakes
  - 5 streams
  - thousands of wetlands



RWMWD Programs

- water quality monitoring
- permitting
- natural resources
- capital improvements
- watershed education
- stewardship grants

Twin Lake subwatershed and drainage system

Twin Lake watershed

- 192 acres
- primary land uses are single family residential, open space, and manufactured housing
- landlocked basin

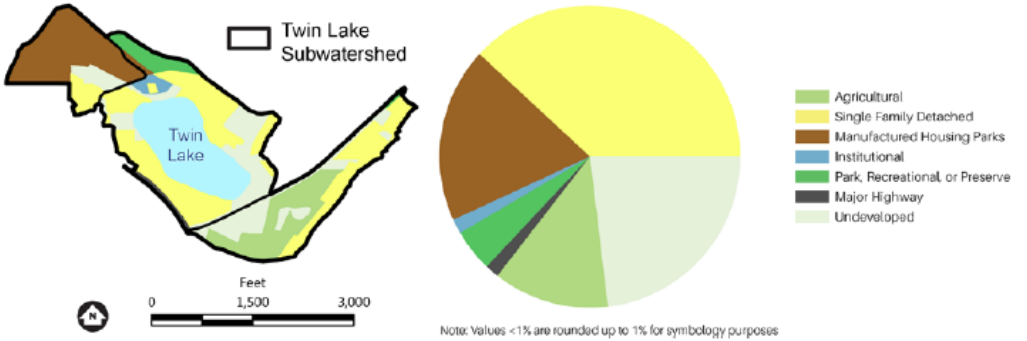


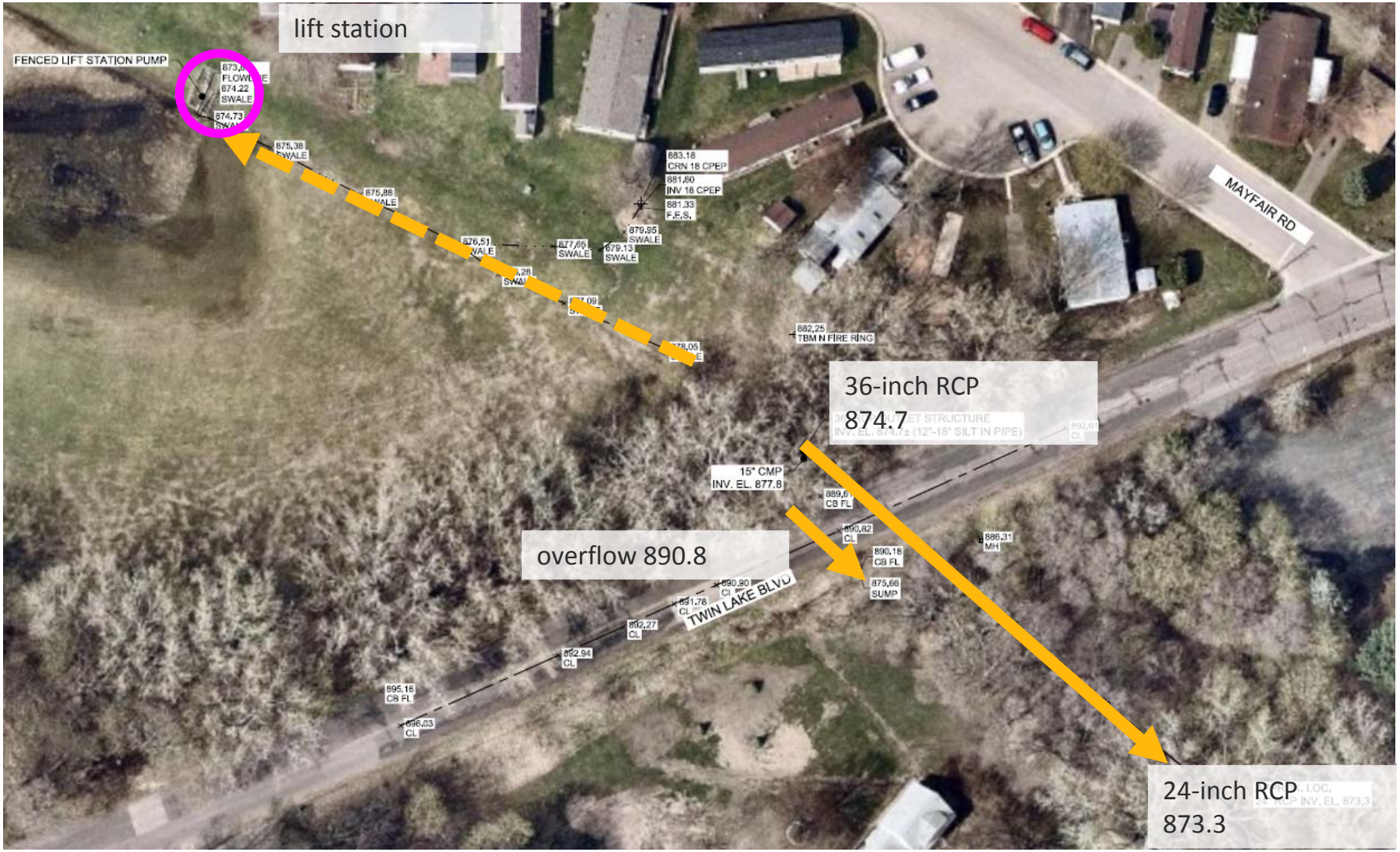
Figure 2.4-2 Breakdown of land uses throughout the Twin Lake Subwatershed (2010 Metropolitan Council)

Twin Lake watershed

- landlocked basins have no outlet
- groundwater and evaporation are main outflows
- other landlocked lakes in the area
  - Snail Lake, White Bear Lake
- change back to “normal” can be slow (several years, assuming no additional abnormally wet years)

drainage patterns

location 1


lift station
FENCED LIFT STATION PUMP
MAYFAIR RD
36-inch RCP
874.7
overflow 890.8
TWIN LAKE BLVD
24-inch RCP
873.3

location 1

lift station
FENCED LIFT STATION PUMP
874.22
SWALE
874.73
875.38
SWALE
875.86
883.18
CRN 18 CPEP
881.60
INV 18 CPEP
881.33
F.F.S.
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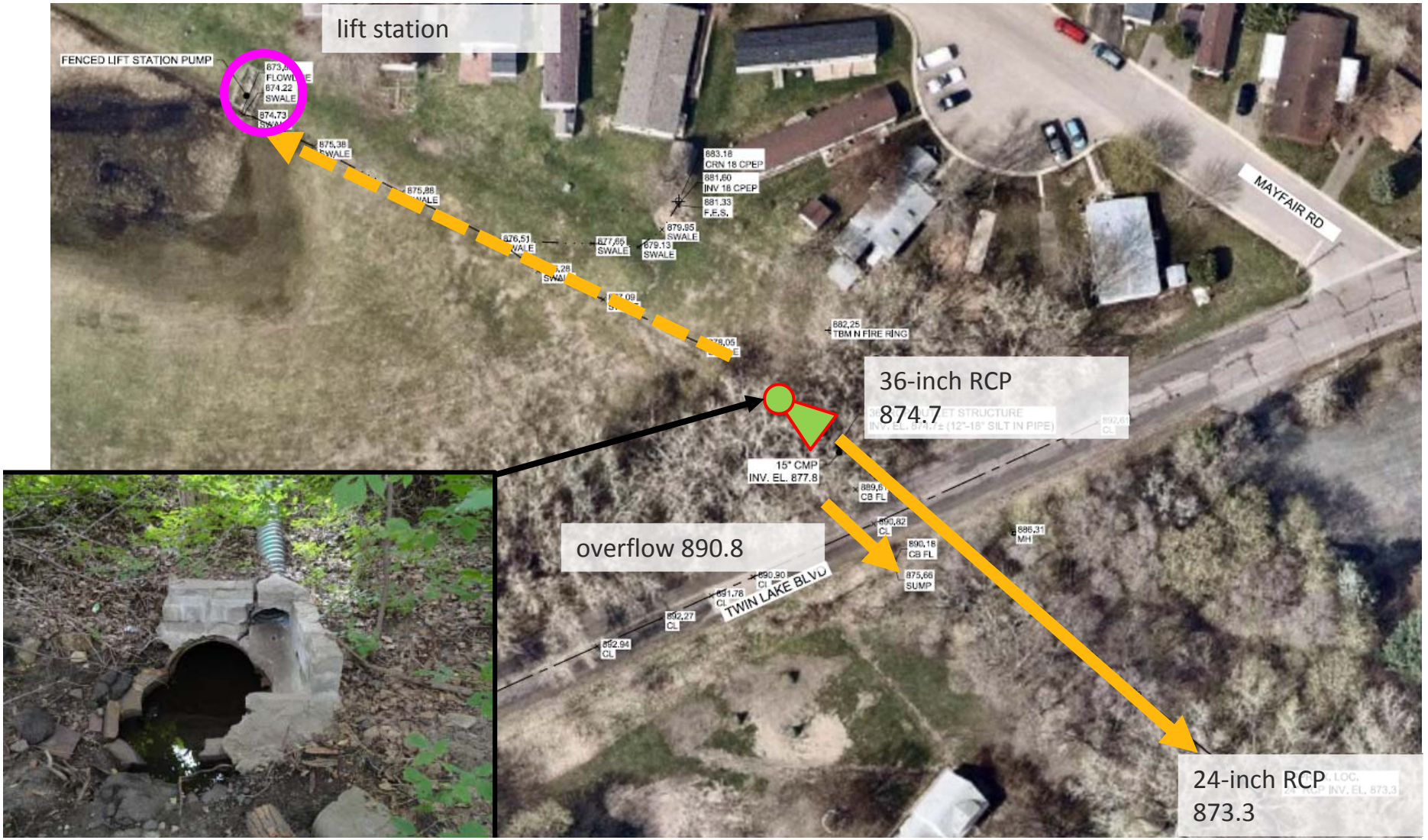
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location 5

14x21-inch CMP
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DS: 871.7
42-inch PEP
US: 874.9
DS: 872.3
18-inch PVC
US: 872.5
DS: 871.7
RAILROAD TRACKS
overflow RR 880.8
873.53 G
872.17 INV 14 X21
879.36 INV 874.94 CRN 48 RCP
872.18 G
876.05 CRN 42 PEP SLEEVE
872.30 INV 42 PEP
872.51 INV 18 PVC
871.71 INV 18 PVC
883.49 CL RR
882.95 CL RR
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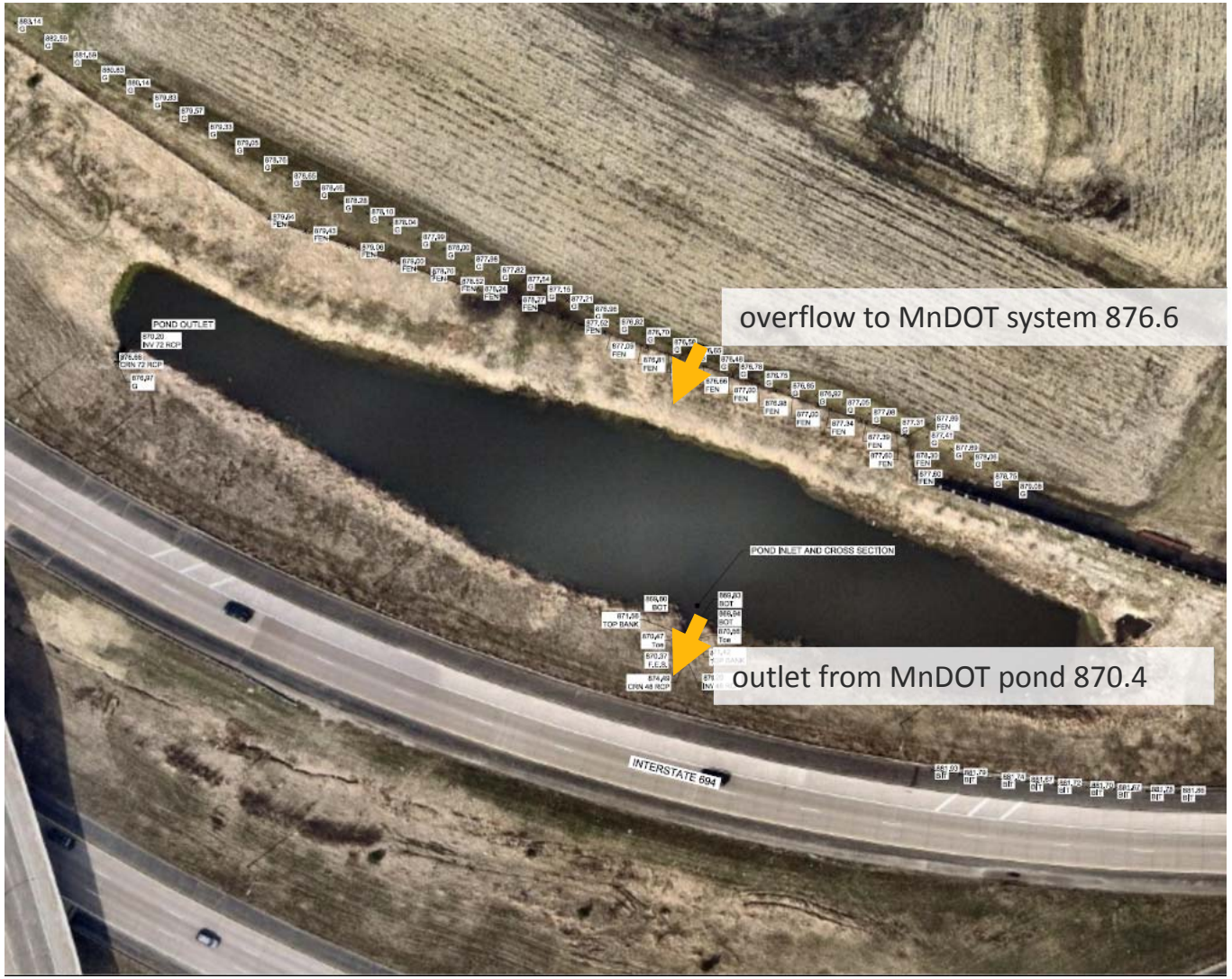
overflow to MnDOT system 876.6
outlet from MnDOT pond 870.4
POND OUTLET
POND INLET AND CROSS SECTION
INTERSTATE 694

drainage patterns

historic precipitation

precipitation

- blue are wettest 30th percentile
- green are 30th to 70th percentile
- red are driest 30th percentile

Year-to-Year Data															
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	WARM	ANN	WAT
2018	1.18	1.48	1.49	2.55	2.93	5.58	4.16R	3.61R							
2017	0.99	0.67	0.65	3.39	6.01	3.10	2.53	6.44	1.48	4.97	0.54	0.85	19.56	31.62	32.87
2016	0.38	0.85	2.31	3.44	2.34	5.72	6.47	9.11	6.47	3.17	2.38	2.06	30.11	44.70	47.43
2015	0.34	0.36	0.66	2.14	5.82	5.16	6.81	2.92	5.12	3.16	4.84	2.34	25.83	39.67	33.15
2014	1.38	1.40	0.91	7.22	4.67	9.82	2.23	4.07	2.56	1.49	1.15	1.18	23.35	38.08	40.57
2013	0.80	1.45	2.44	4.59	5.99	7.89	2.92	0.94	1.42	4.14	0.53	1.64	19.16	34.75	32.10
2012	0.53	1.84	1.89	3.00	8.58	4.06	5.58	1.13	0.52	1.34	0.77	1.55	19.87	30.79	29.14
2011	0.91	1.05	2.46	3.24	4.16	4.05	10.53	4.45	0.57	0.85	0.27	0.89	23.76	33.43	38.32
2010	0.63	0.78	0.69	2.31	2.97	5.74	4.46	5.68	5.43	1.59	2.35	2.96	24.28	35.59	37.65
2009	0.52	1.10	1.48	1.32	0.52	3.07	2.33	7.00	0.39	6.18	0.43	2.35	13.31	26.69	22.89
2008	0.09	0.49	1.76	3.87	2.85	3.10	2.56	2.36	2.35	2.15	1.43	1.58	13.22	24.59	26.23

- MnDNR publishes monthly data
- data available 2018 – 1891 (127 complete years)

Minnesota State Climatology Office

State Climatology Office - DNR Division of Ecological and Water Resources University of Minnesota

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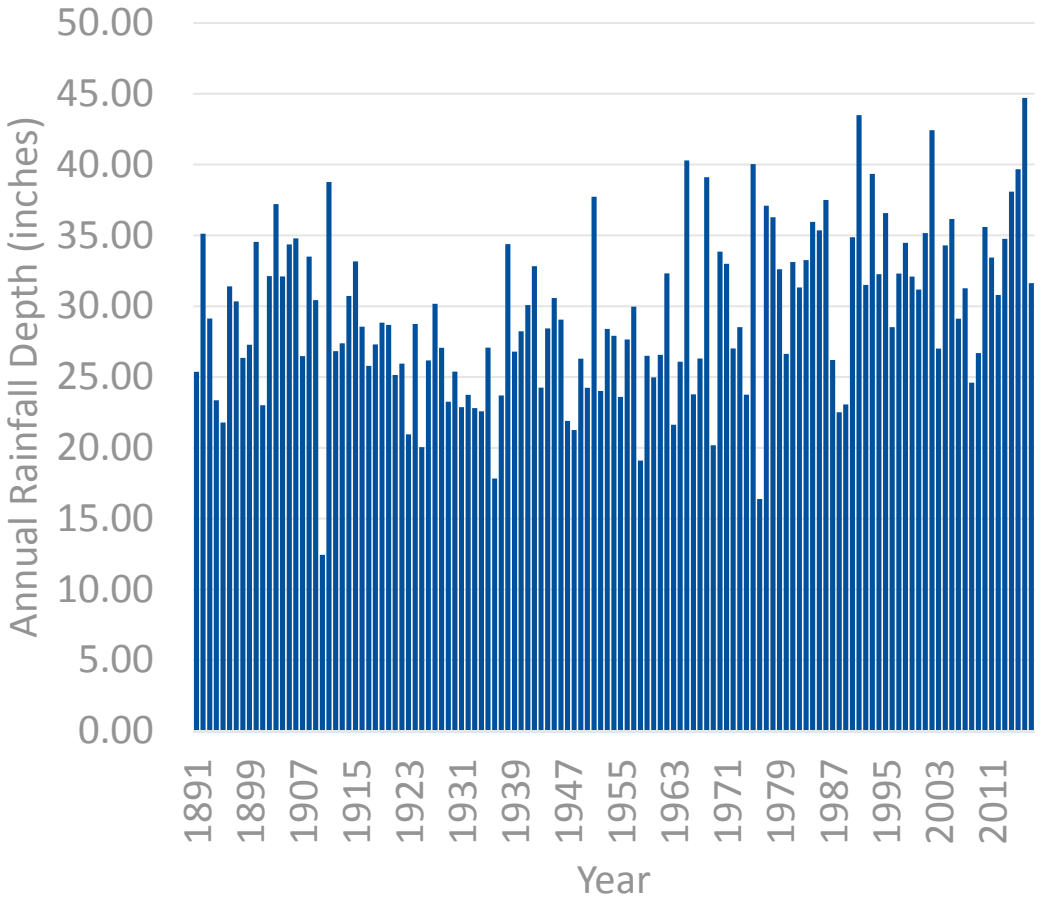
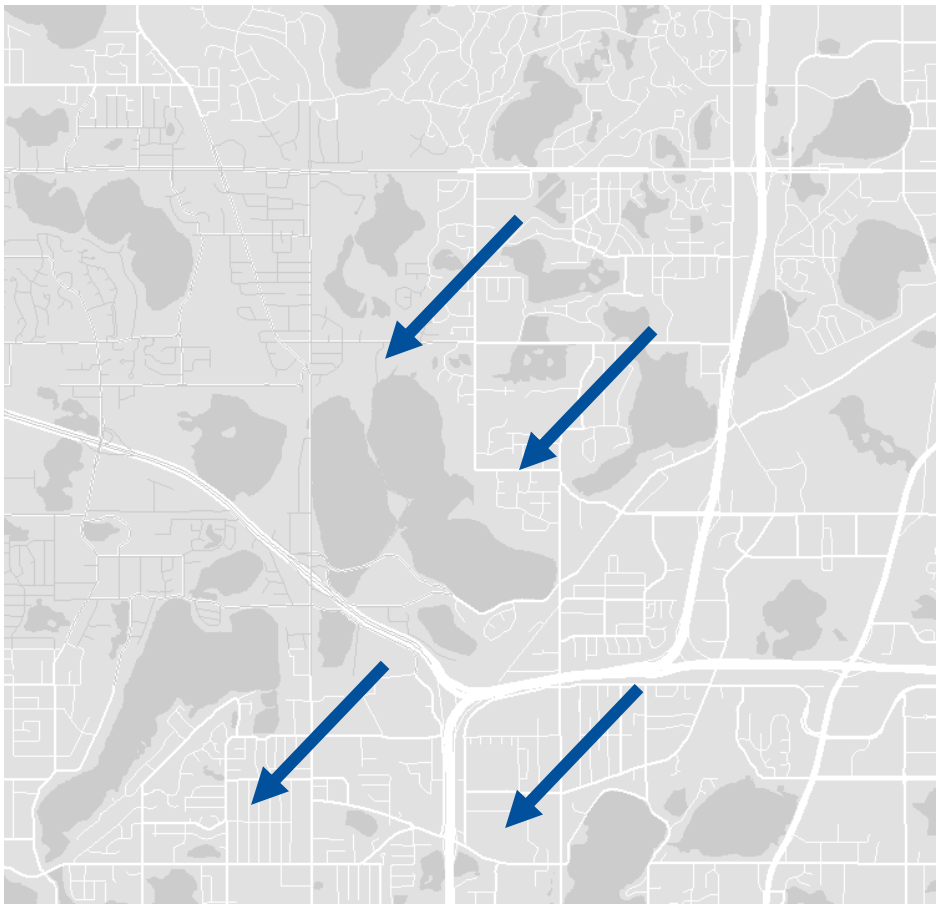
precipitation

- 2016 was wettest year in 127 year record
- 3 of 10 wettest years were 2014 – 2016
- 6 of 8 previous years were in top 30th percentile
- 2018 is tracking as an average year (data available through August)

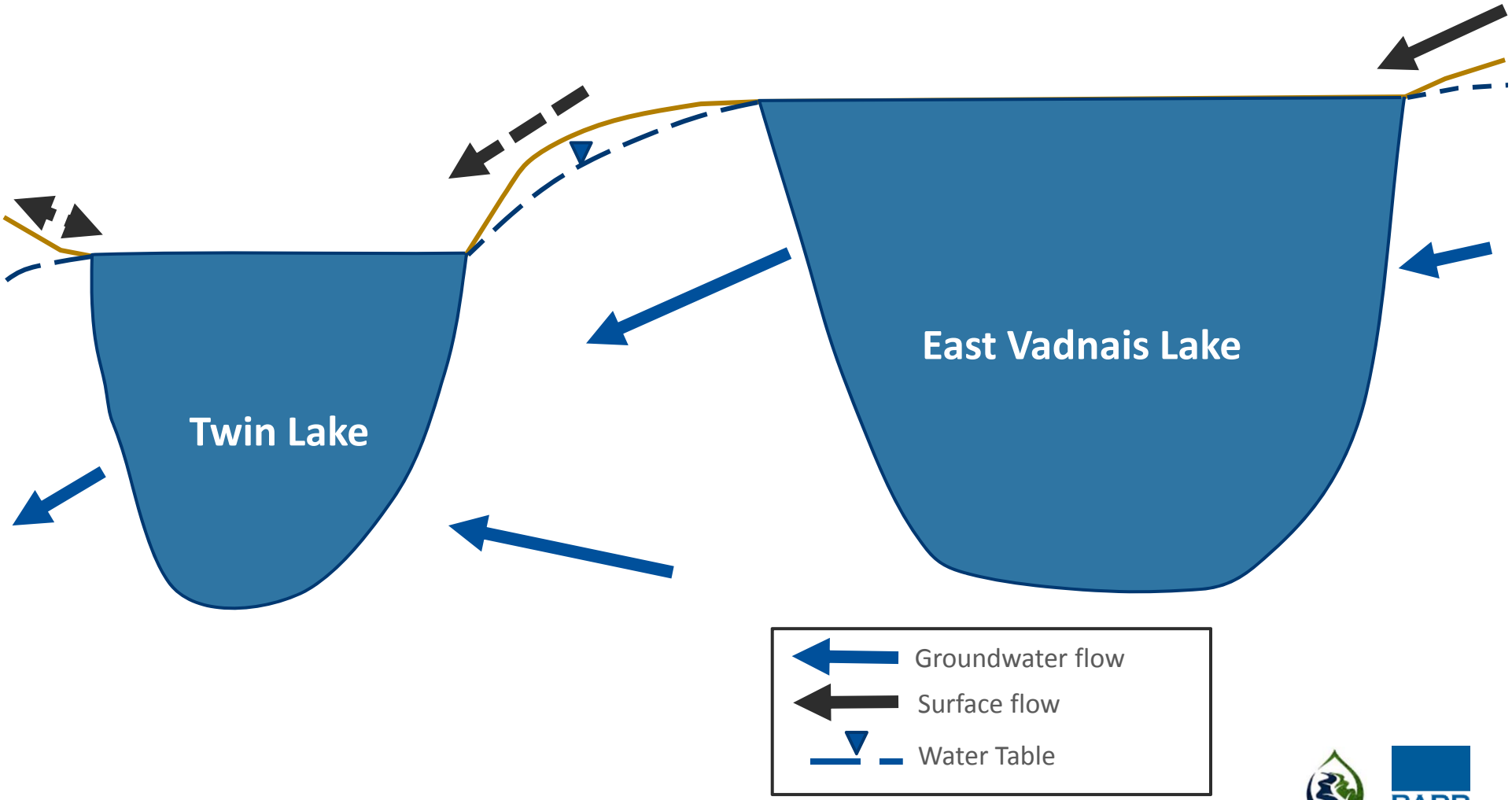


groundwater

regional groundwater flow from northeast to southwest



groundwater schematic



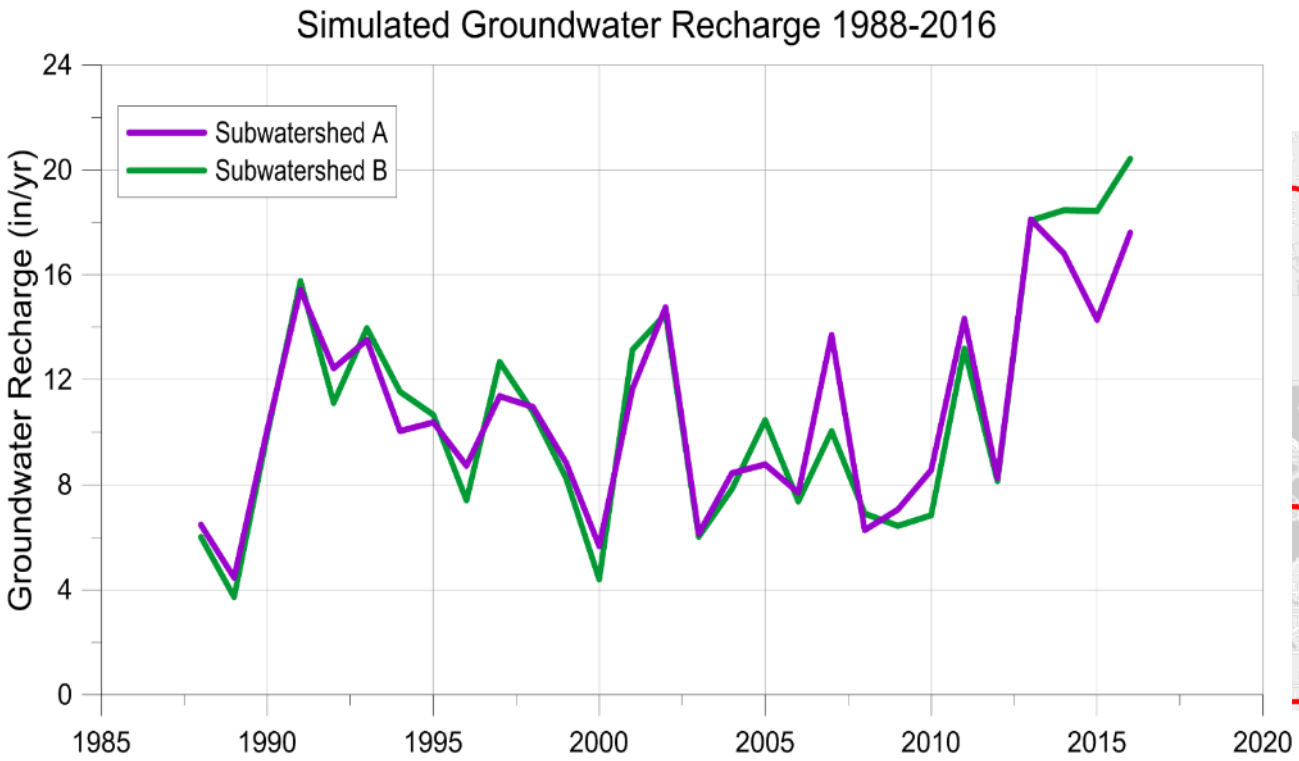
East Vadnais looses water to groundwater along the southern shore

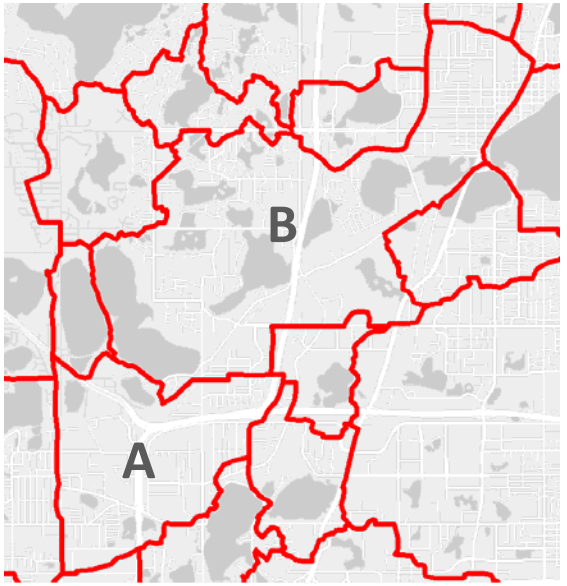
- 1994 USGS study estimated seepage from East Vadnais Lake to groundwater along the southern shore to be approximately 11 ft^3/min (0.18 cfs)
- The groundwater flow budget for Twin Lake is unknown but likely plays a significant role in the total water budget and resulting stage

higher groundwater in the region can affect Twin Lake

- Higher groundwater can result in:
  - 1) more groundwater inflow to the lake
  - 2) less water is able to leave via groundwater than typical
- Groundwater recharge was at record levels in 2014-2016 resulting in high groundwater
  - 2017 and 2018 data have not been analyzed but believed to be at or slightly above normal

groundwater recharge





groundwater recharge

- Normal water balance affected
  - For closed basin lakes groundwater and evaporation are main mechanism for water loss
    - Lakes that normally have groundwater inflow and outflow with no significant surface outflow are the most affected
  - Similar situation at other lakes in the area
    - Snail Lake, White Bear Lake
  - Change back to normal can be slow (several years, assuming no additional abnormally wet years)

water quality

water quality

Table 2.4-2 Twin Lake historic nutrient related water quality parameters

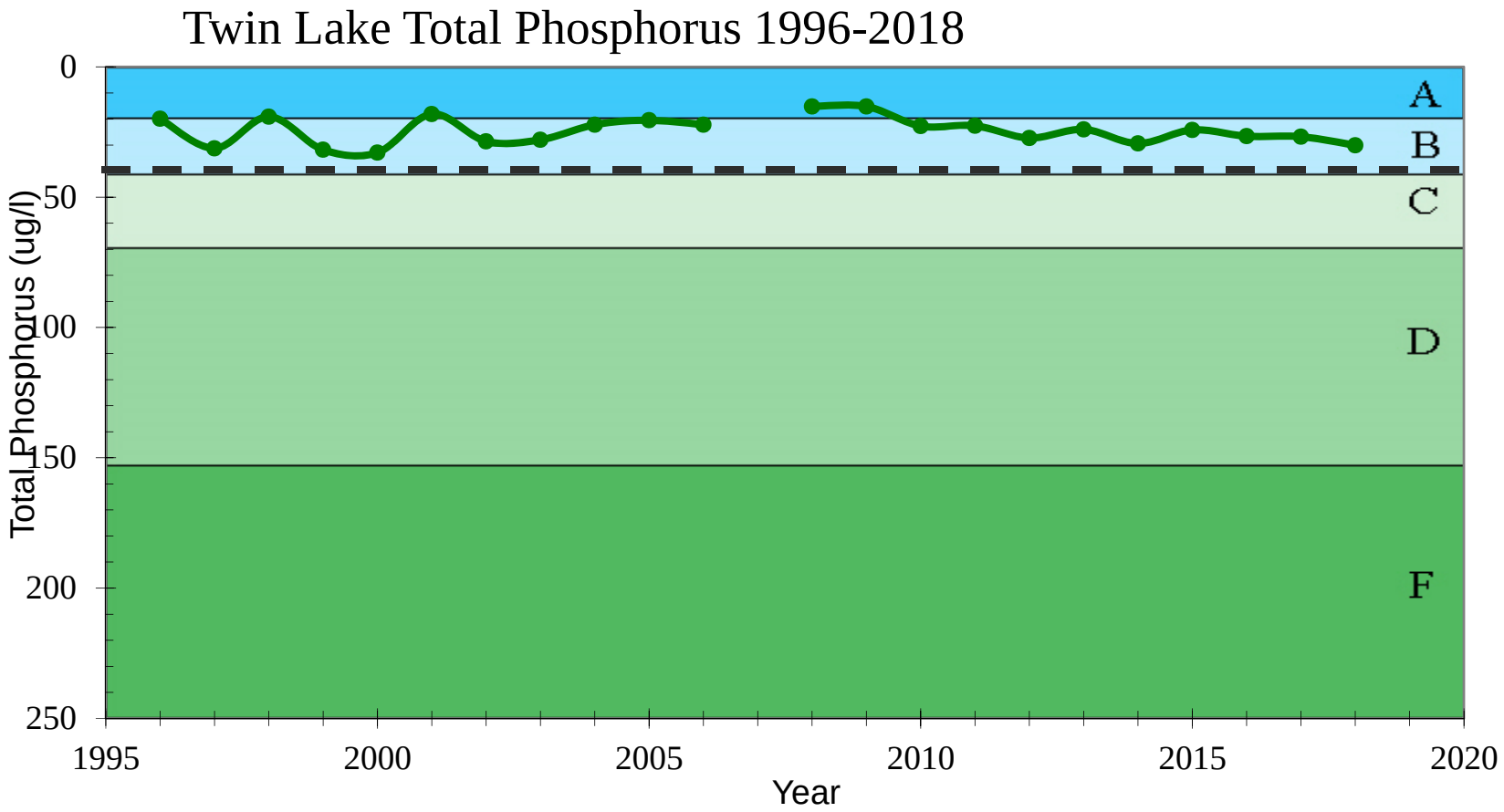
Water Quality Parameter	MPCA Deep Lake Eutrophication Standard (NCHF Ecoregion)	Twin Lake (2005-2014) Growing Season Average
Total Phosphorus (µg/L)	≤ 40	22.1
Chlorophyll-a (µg/L)	≤ 14	6.2
Secchi disk transparency (m)	≥ 1.4	2.9

Table 2.4-3 Trend Analysis Results for Twin Lake's Historical Water Quality Data

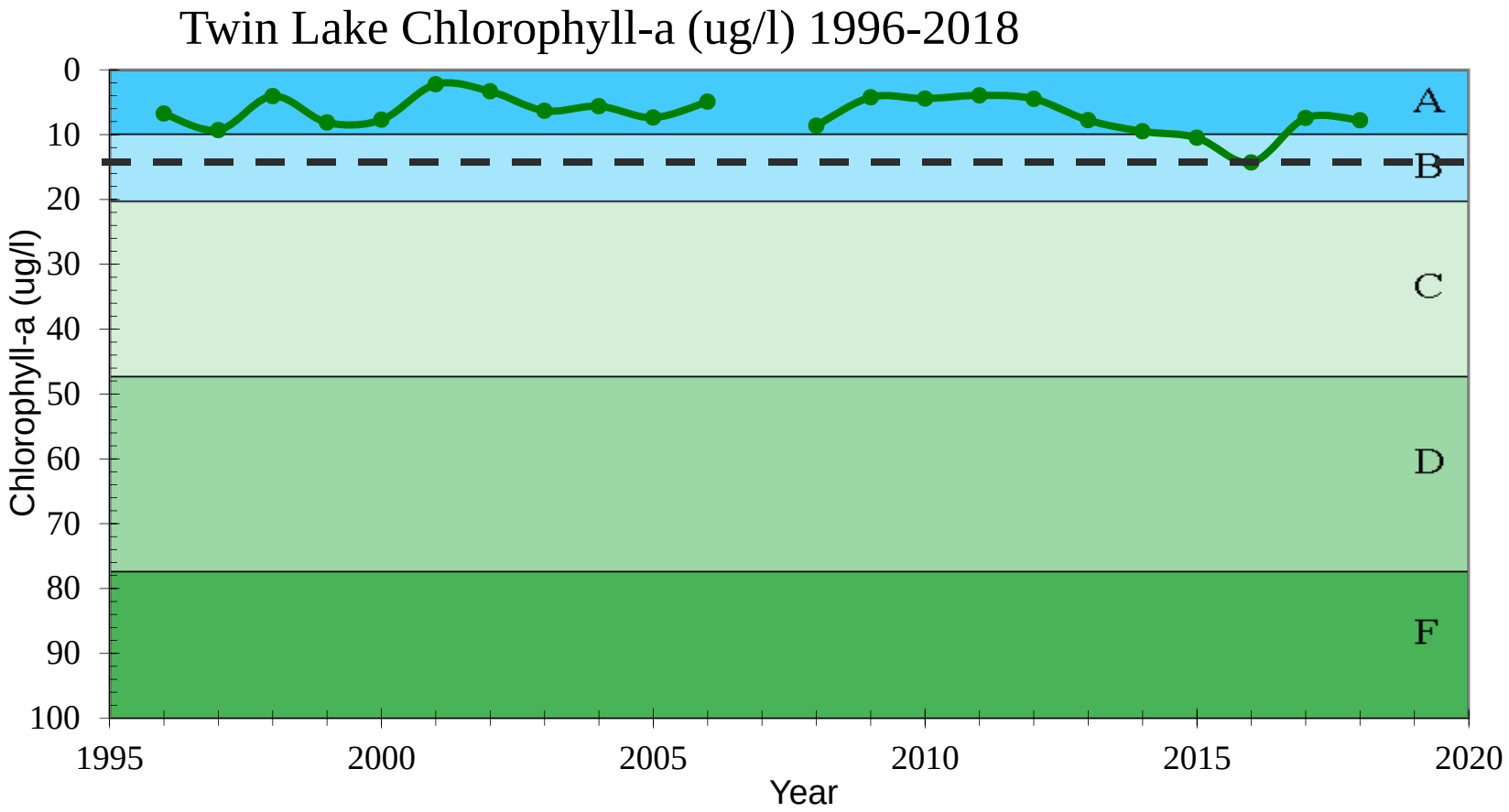
Waterbody	Dataset Date Range	Parameter	Trend, Entire Historic Dataset	Trend, Last 10 Years (2003-2012)
Twin Lake	1996 – 2012	Secchi Depth	No Trend	Improving*
		Total Phosphorus	No Trend	No Trend
		Chlorophyll *a*	No Trend	Improving*

* Trend was detectable, but was below the 95th percentile confidence interval
Green values indicate an improving trend in water quality for that parameter

water quality



water quality



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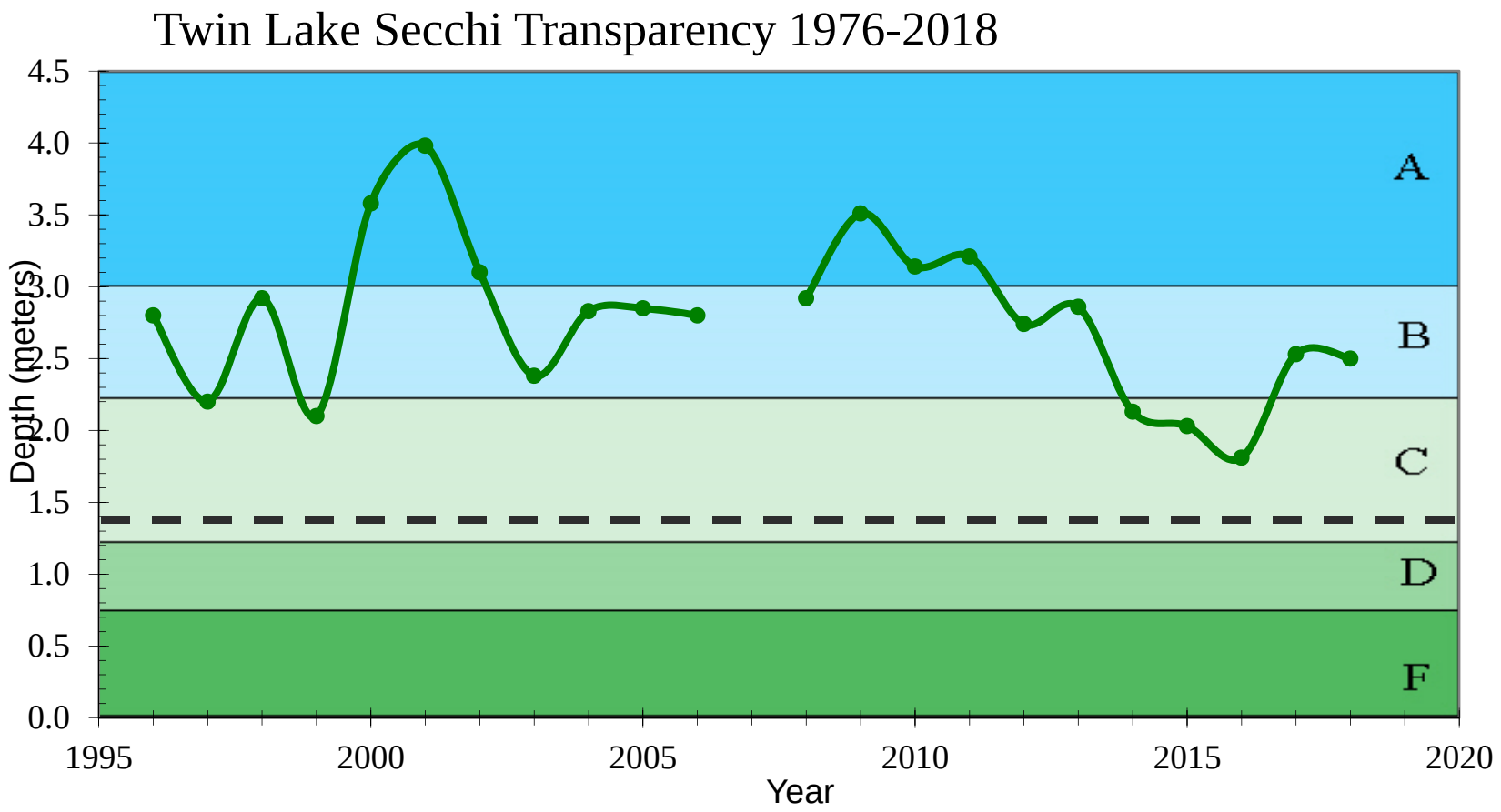
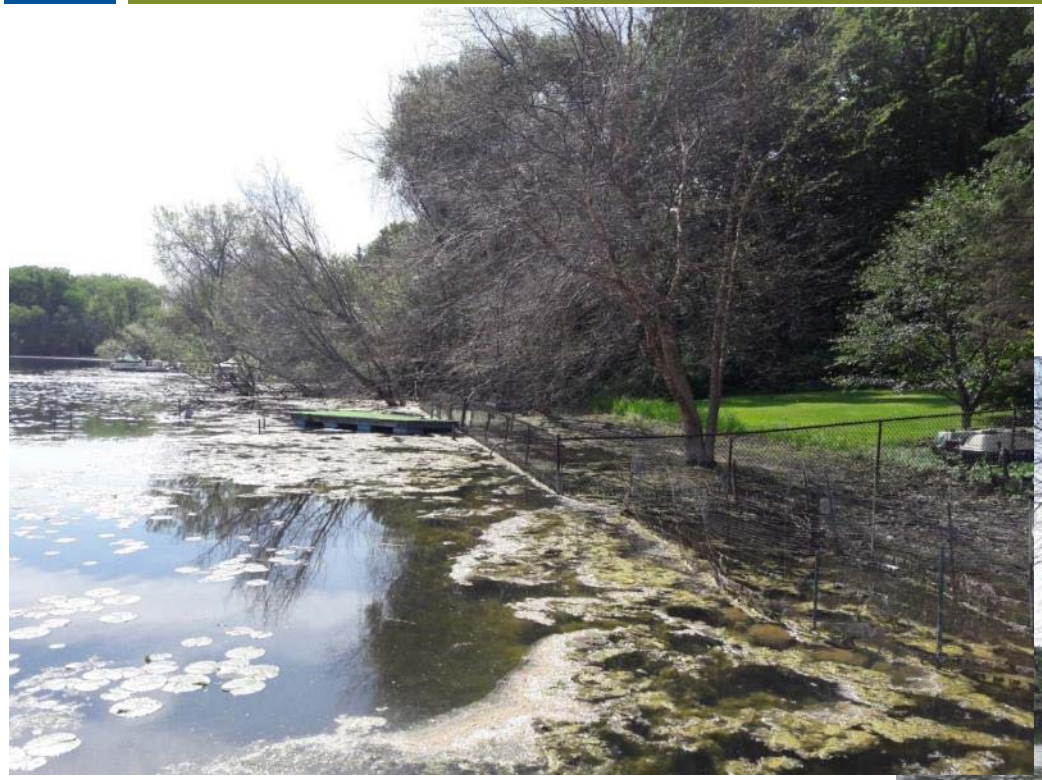


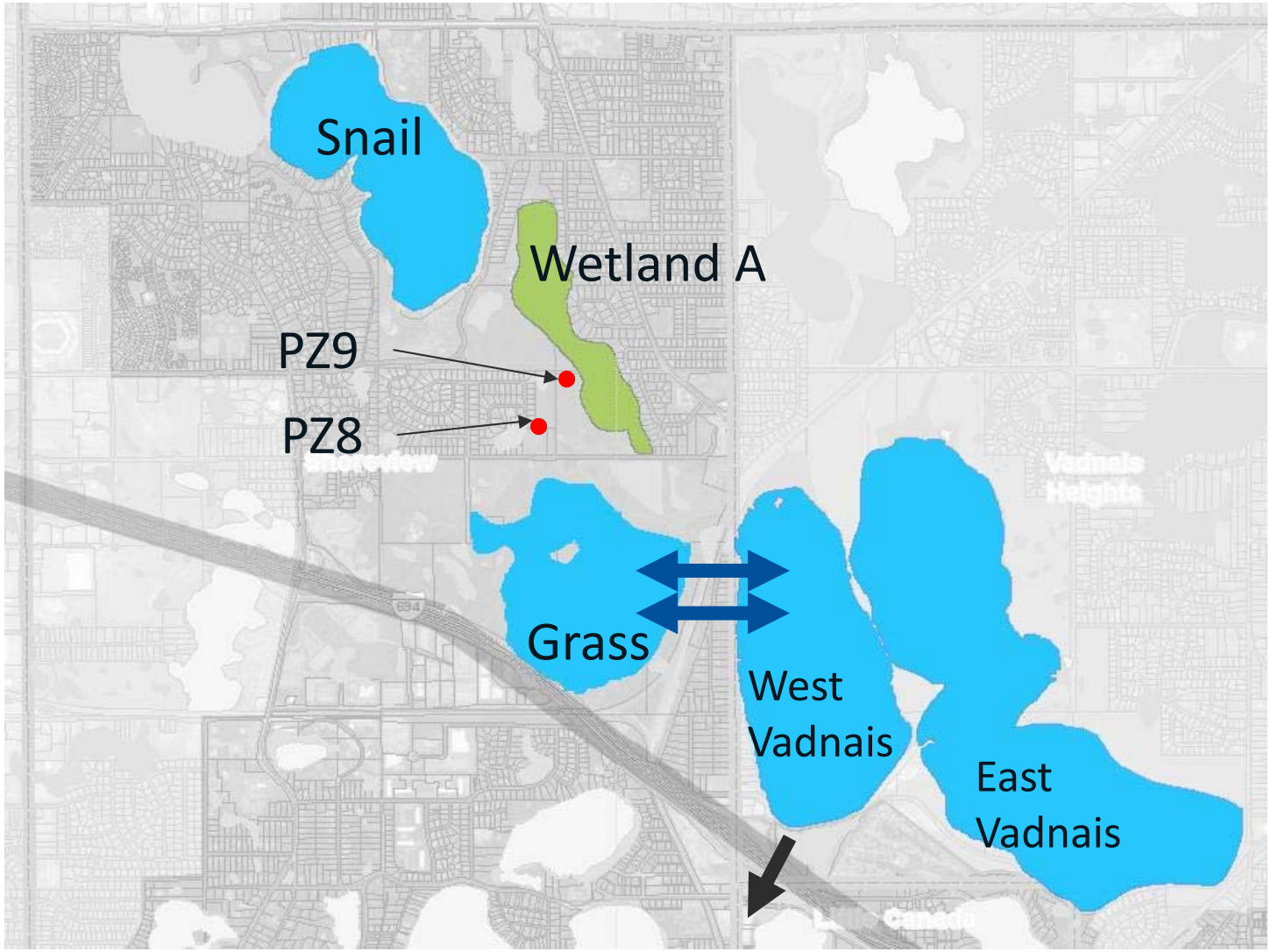
water quality



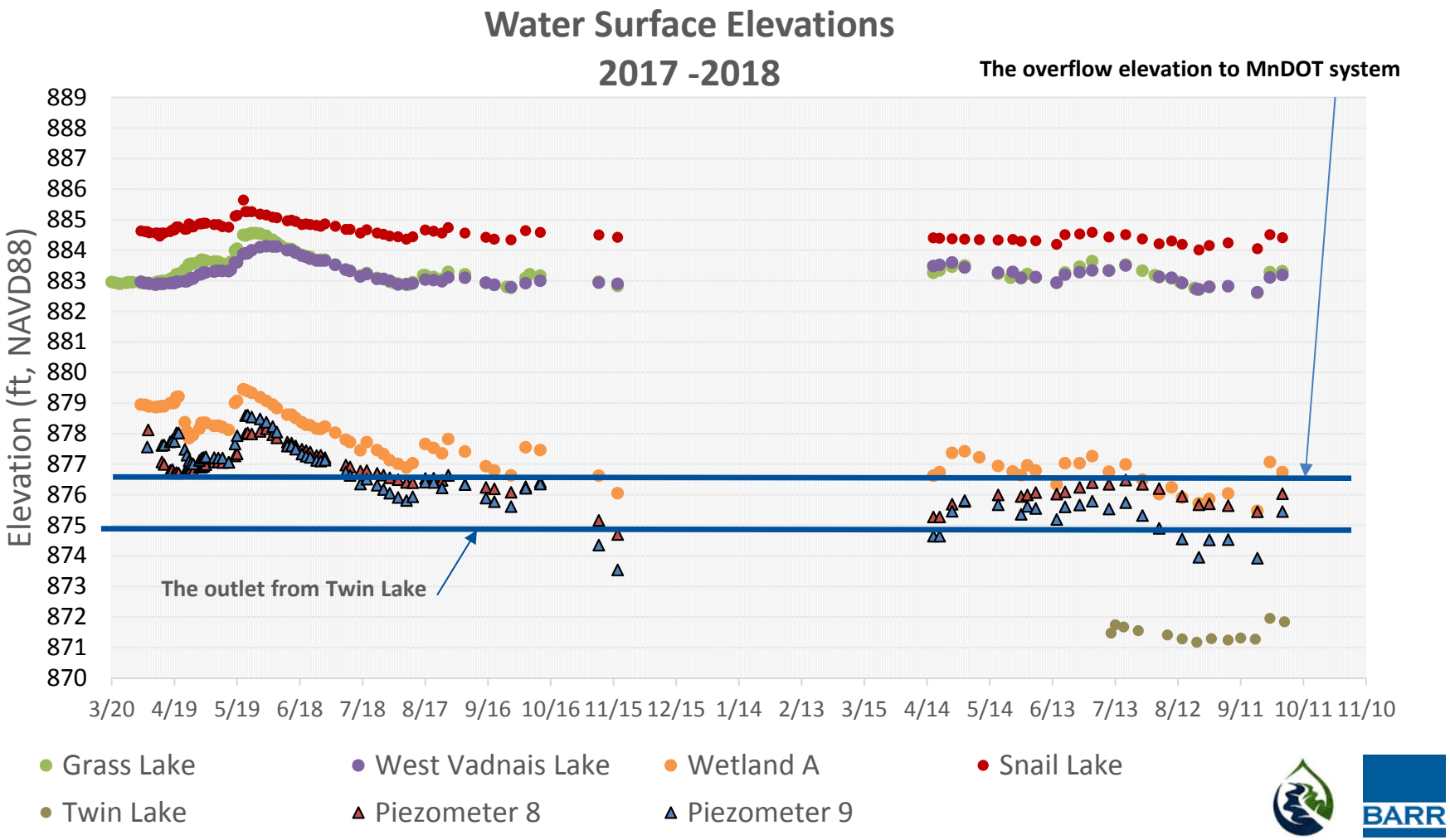
monitoring

Ramsey County Gage

location



water surface elevations from other landlocked water bodies



RWMWD programs

rwmwd stewardship grant program

Questions

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Brandon Barnes: BBarnes@barr.com or (952) 832-2737