Valley Creek Water Quality Summary

Jen Kostrzewski: MCES Principal Environmental Scientist
Karen Jensen: MCES Environmental Analyst

METROPOLITAN COUNCIL

who is the Metropolitan Council?

- The Metropolitan Council plans for the future of the seven-county Minneapolis-St. Paul metro area in partnership with 189 communities.
- We provide cost-effective transit and wastewater services, and assist communities as they plan for anticipated growth.
- Our mission is to foster efficient and economic growth for a prosperous metropolitan region.
  - Thrive MSP 2040
  - Water Resource Policy Plan
- MCES is the area-wide water quality planning agency under Section 208 of the Clean Water Act.

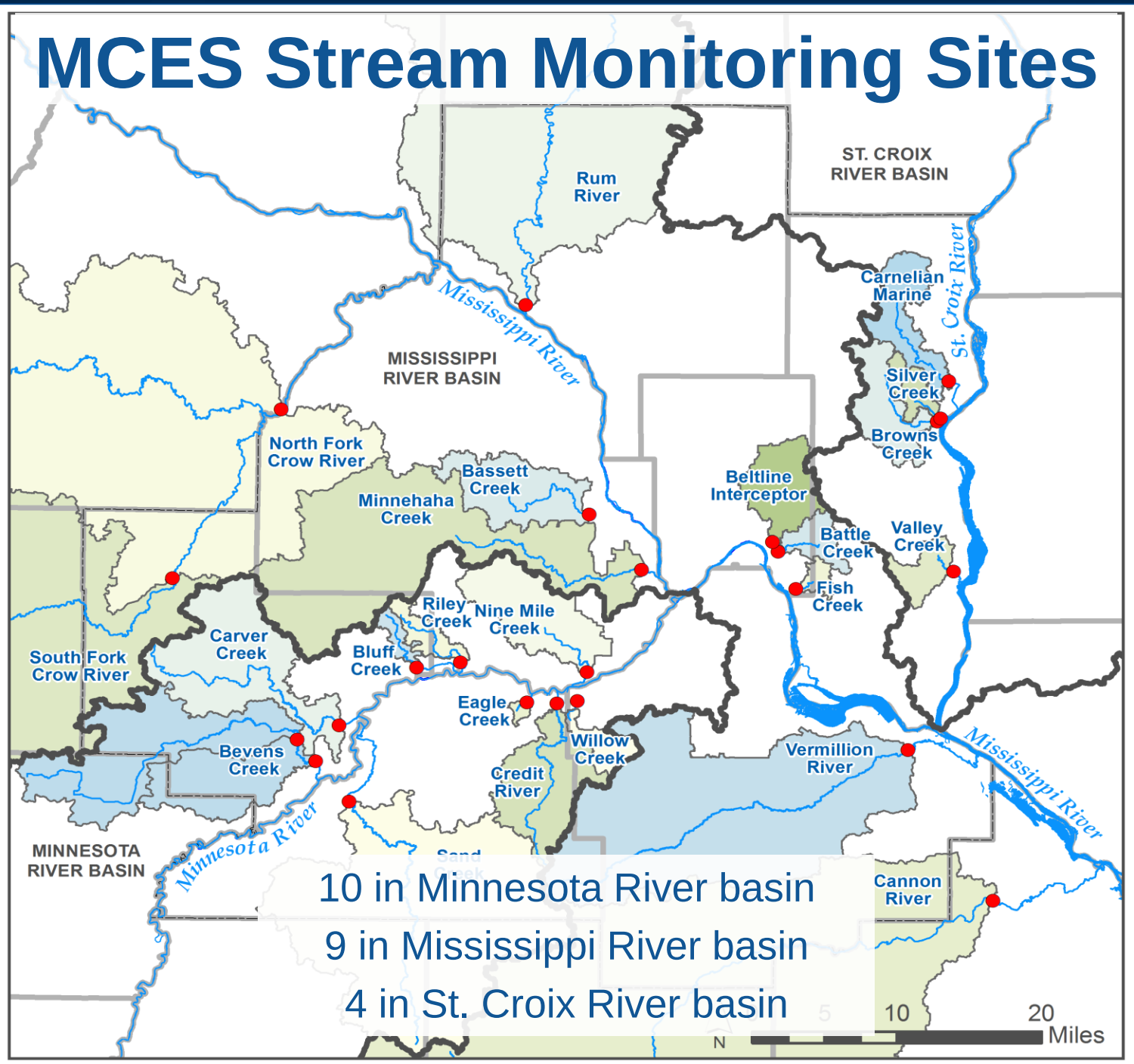
MCES Stream Monitoring Program

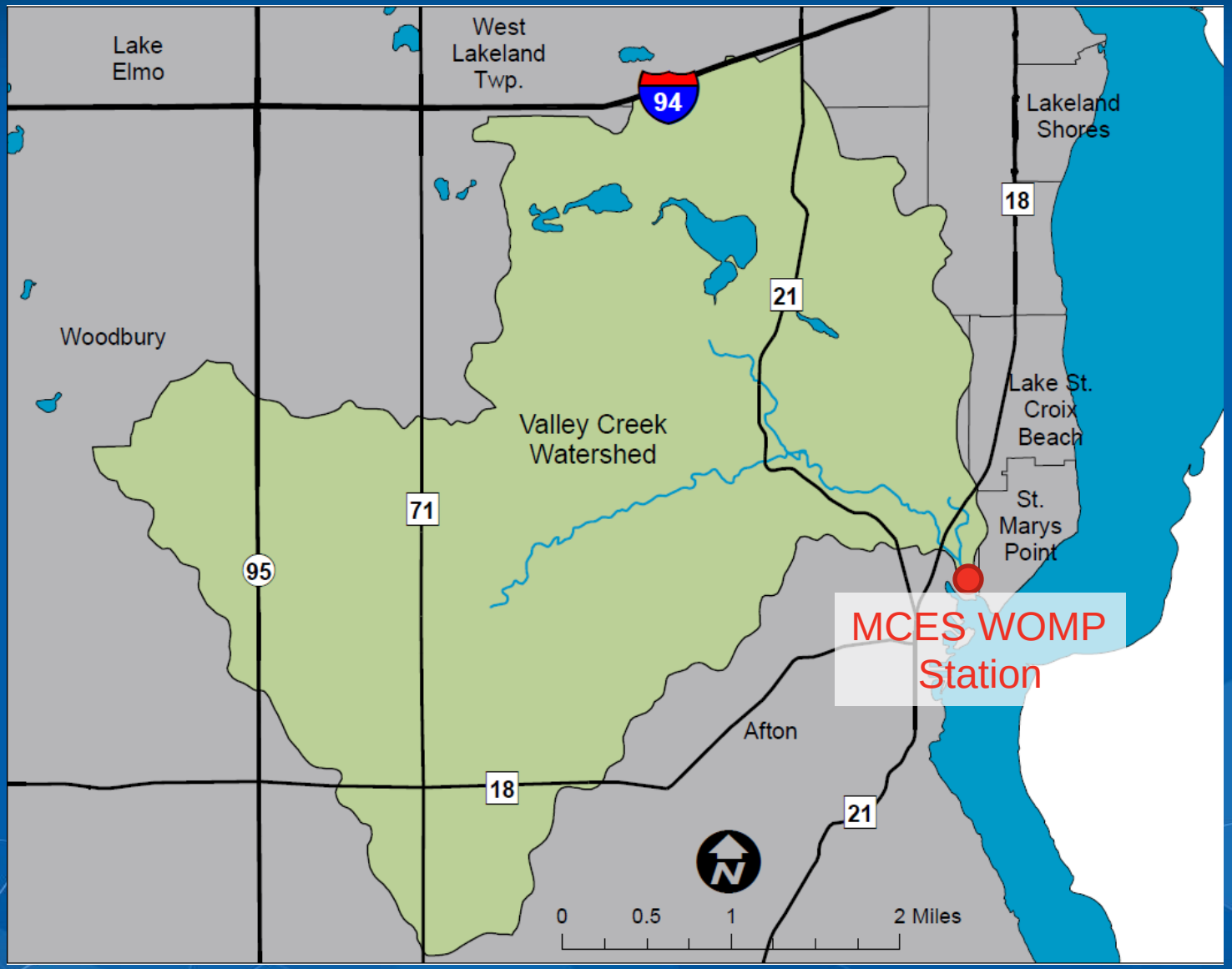
- Established in the late 1980's to determine the extent of non-point source pollution, to help with the development of TMDL plans, and to measure progress toward achievement of water quality standards.

- 23 Stream Sites
- Diverse in land use, hydrology, size, etc.
- Requires partnerships with local groups.
- Data records range from 12-24 years

METROPOLITAN COUNCIL

MCES Stream Monitoring Sites

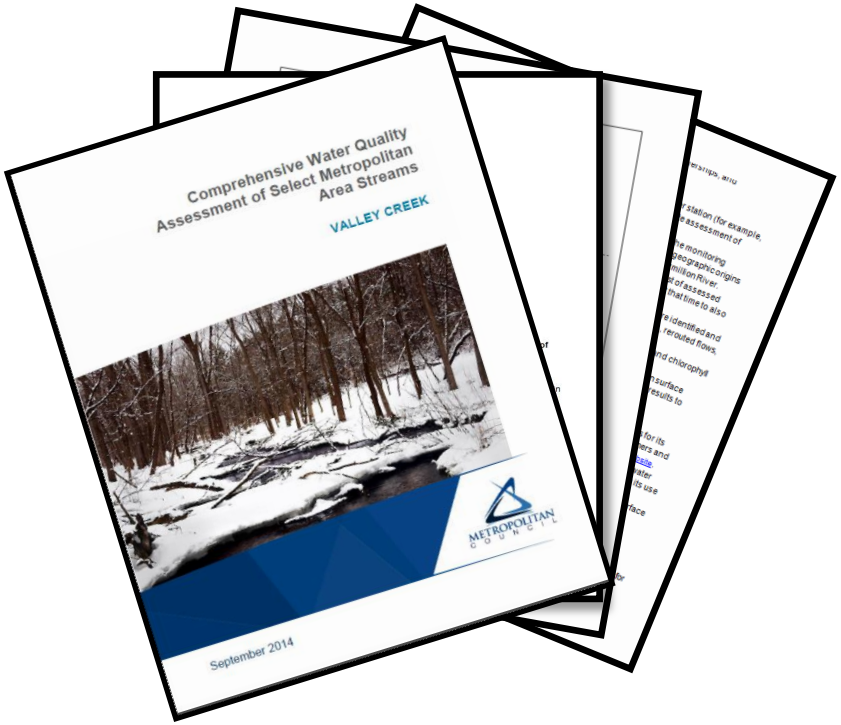




Valley Branch Watershed District Board Meeting

9/26/2014

Stream Report – Valley Creek Contents



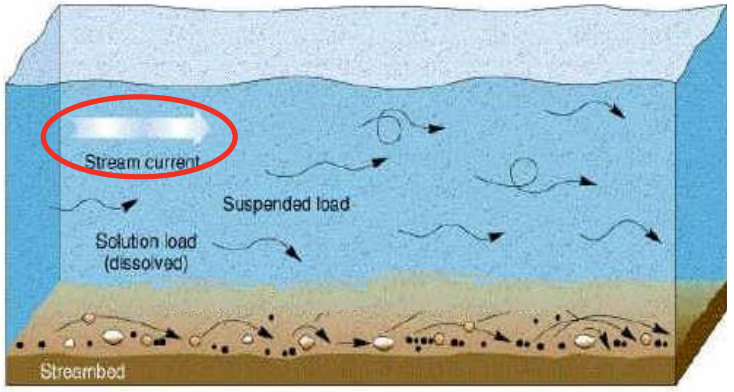
- Introduction
- Partnerships
- Monitoring Station, Stream, and Watershed Description
- Water Quality Impairments
- Hydrology
- QWTrend Analysis
- Flow and Load Duration Curves
- Pollutant Loads
- Biological Monitoring
- Metro-wide Comparisons
- Conclusions & Recommendations

For more information, please see the Valley Creek Section in the *Comprehensive Water Quality Assessment of Select Metropolitan Area Streams* at: *www.metrocouncil.org/streams*

METROPOLITAN COUNCIL

Hydrology

- How much water is in Valley Creek?
  - Valley Creek has an average flow rate of 16 cubic feet per second.
  - At this rate, it would take 16 days to fill the Target Center in Minneapolis.



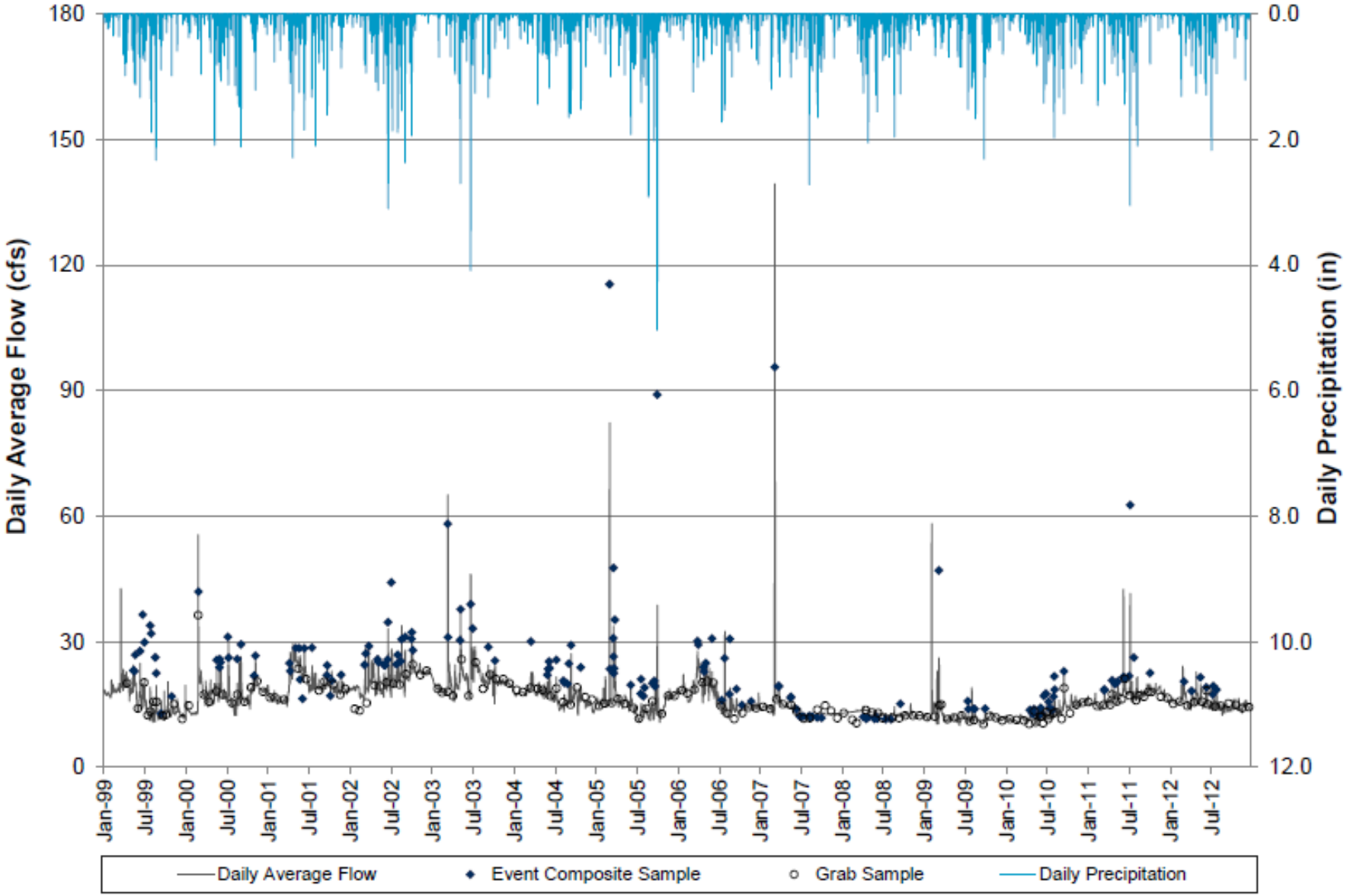
- Where does it come from?
  - The water in Valley Creek is a mixture of groundwater and surface water runoff from rain or snowmelt.
- How is it estimated?
  - We continuously monitor stream water level and velocity.
  - We (MCES & partners) take manual, discrete flow measurements.
  - We make a correlation to create a continuous record of flow.

Why is measuring flow important?

Stream flow, or the rate of water flowing in a stream, affects aquatic life and the ecosystem. High flows can lead to flooding, erosion, and the transport of pollutants.

METROPOLITAN COUNCIL

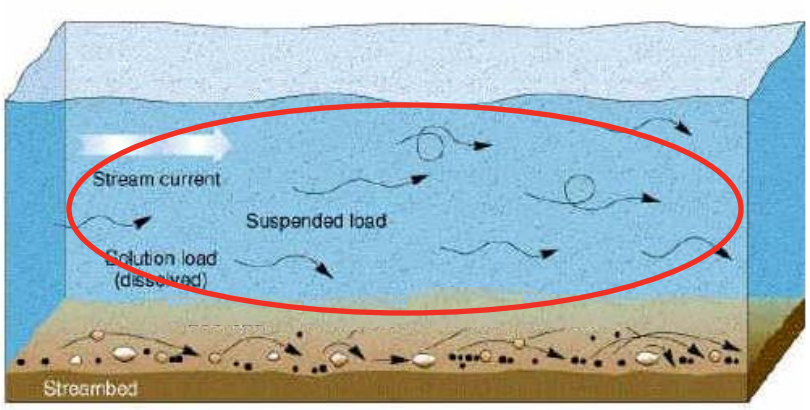
Figure VA-6: Valley Creek Daily Average Flow, Sample Flow, and Precipitation, 1999-2012*



*Precipitation record was acquired from NWS COOP stations: 218037-Stillwater 1 SE, 213567-Hastings Dam 2, and 218039-Stillwater 2SW

Concentration Trends

- What is a concentration trend?
  - The concentration trends show the changes in creek's water quality over time. The trend in concentration is flow-adjusted, so large storm events/droughts do not influence the trend.

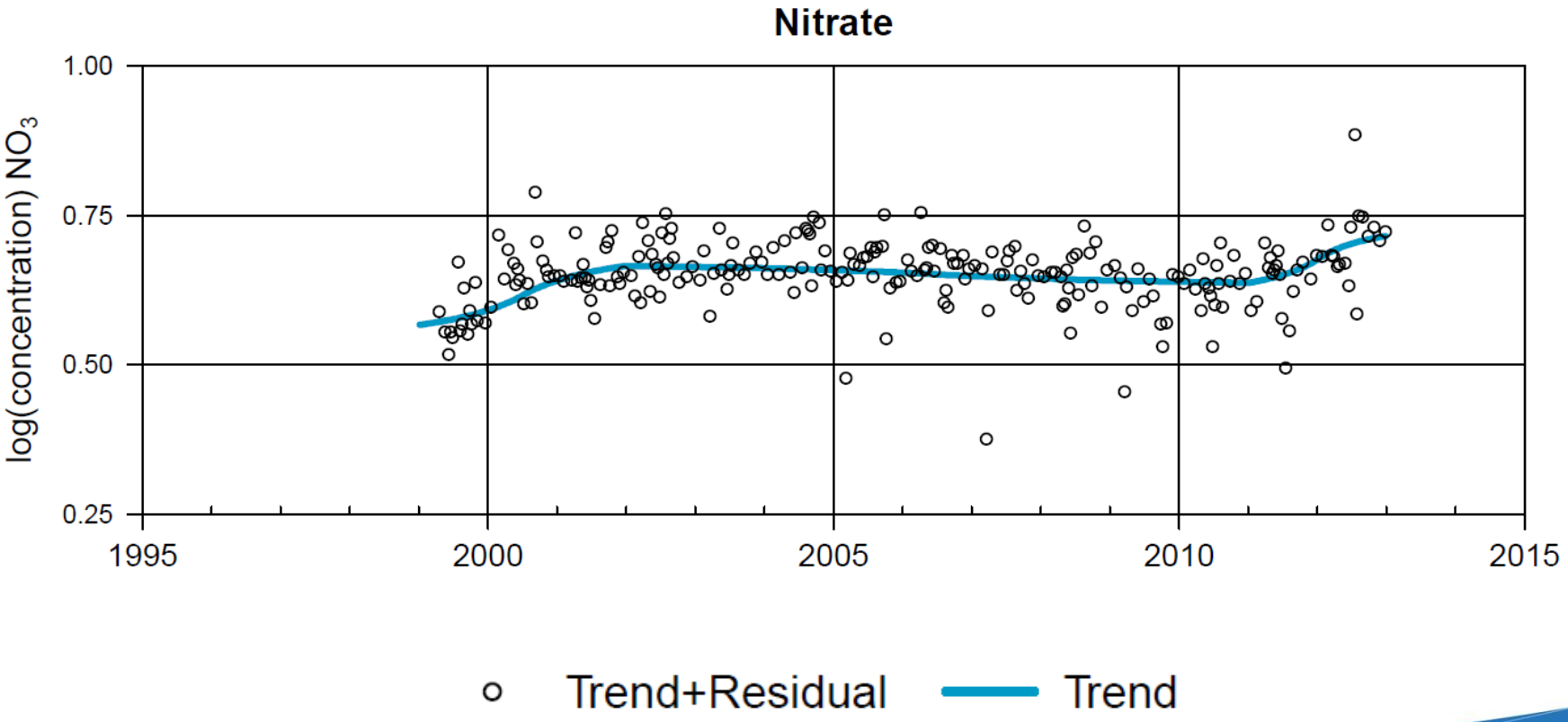


- How is it estimated?
  - We monitor streamflow.
  - We collect water samples to determine the pollutant concentration.
  - Once we have 10 years of data, we use the USGS QWTrend program to help us estimate trends.

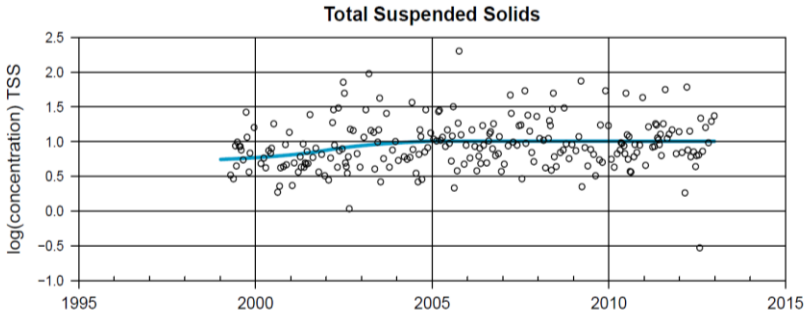
Why do we estimate trends?

Changes in stream concentrations affect the creatures that live in the water (fish, insects, etc.). Changes in the trends show us how land management and water quality improvement projects may affect these populations – and the creek as a whole.

Valley Creek Concentration Trends, 1999-2012

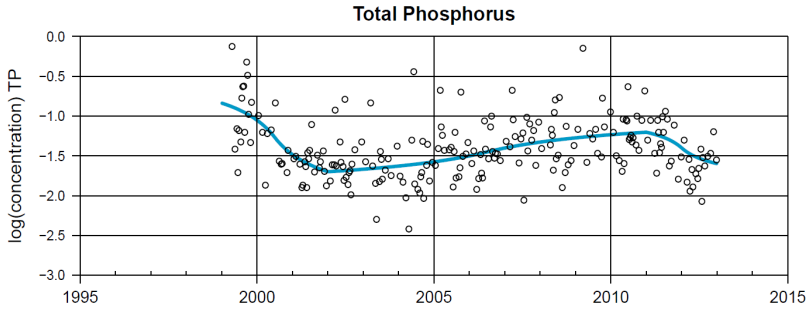


Valley Creek Concentration Trends, 1999-2012



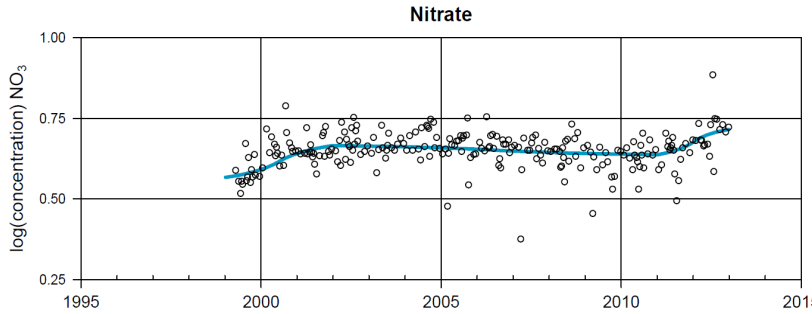
2 TSS Trends:

1. Increase (1999-2004)
2. Decrease (2004-2012)



3 TP Trends:

1. Decrease (1999-2001)
2. Increase (2001-2010)
3. Decrease (2010-2012)



3 Nitrate Trends:

1. Increase (1999-2001)
2. Decrease (2001-2010)
3. Increase (2010-2012)

METROPOLITAN COUNCIL

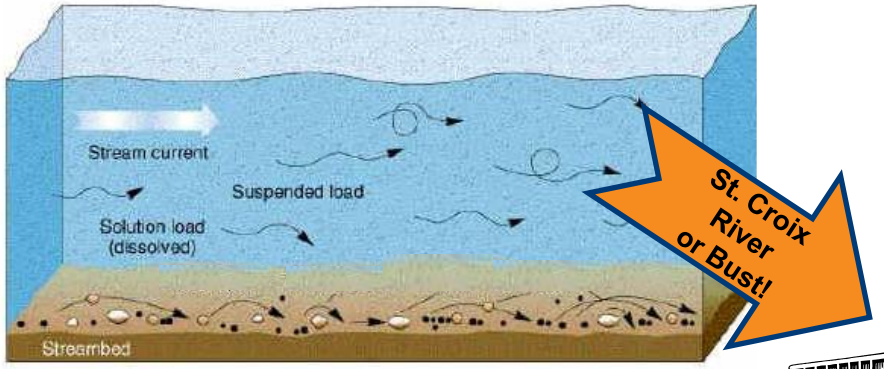
Valley Creek Stream Concentration Trends, 2008-2012

Parameter	Water Quality	Percent Change
Total Suspended Solids		-1%
Total Phosphorus		-46%
Nitrate		28%

METROPOLITAN COUNCIL

Pollutant Loads

- What is a load?
  - A pollutant load is the total weight of a pollutant transported by water over a set time period (for example, a month or year).

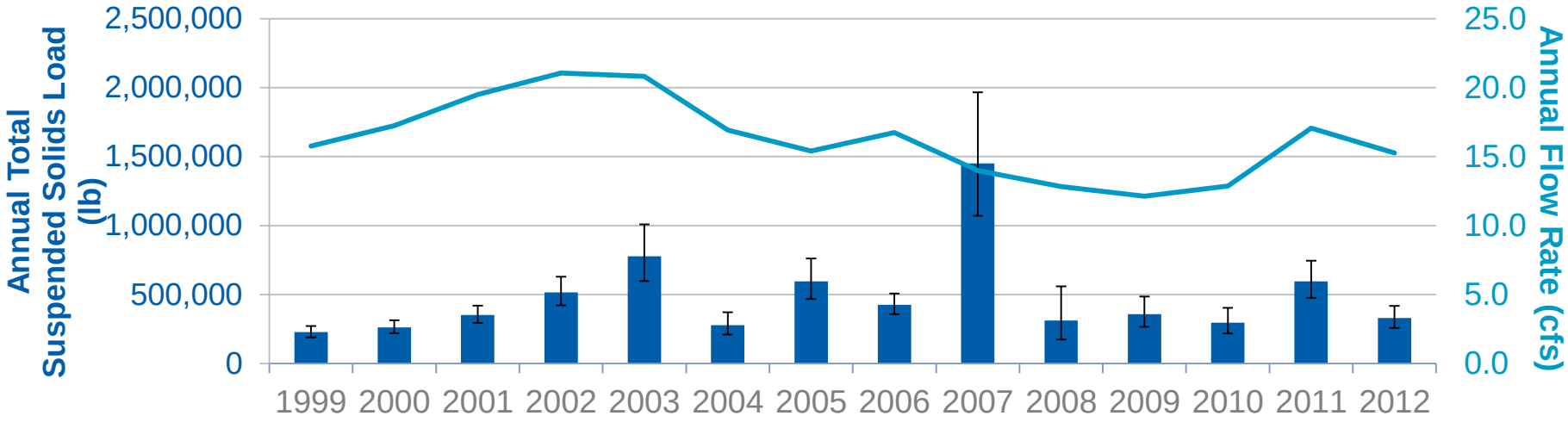


- How is it estimated?
  - We monitor streamflow.
  - We collect water samples to determine the pollutant concentration.
  - Stream Flow x Pollutant Concentration = Pollutant Load
  - We use the US Army Corps of Engineers Flux32 program to help us estimate loads.

Why do we estimate loads?

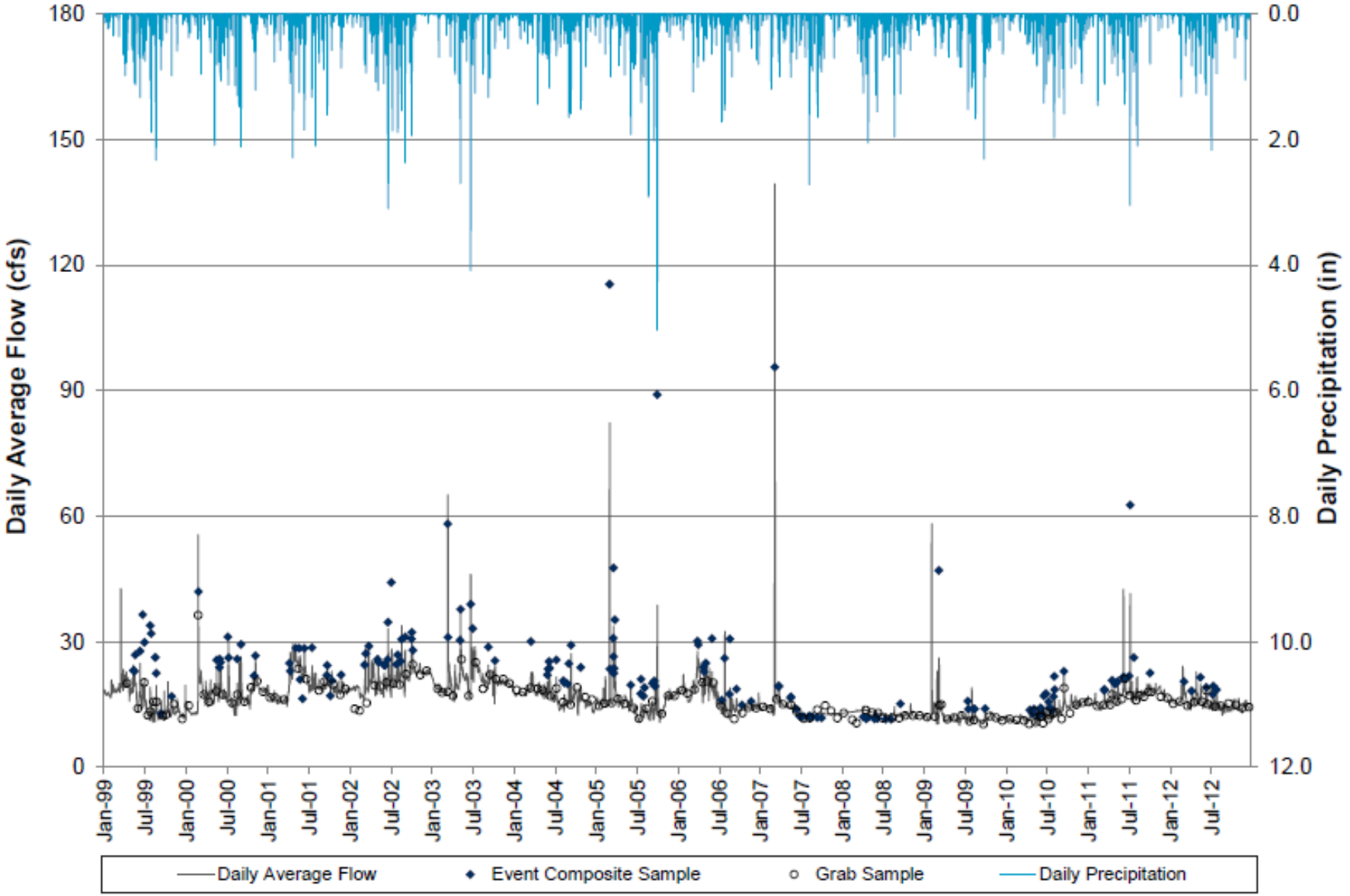
This tells us the amount of pollutants that are leaving the Valley Creek Watershed and entering the St. Croix River.

Valley Creek TSS Pollutant Loads



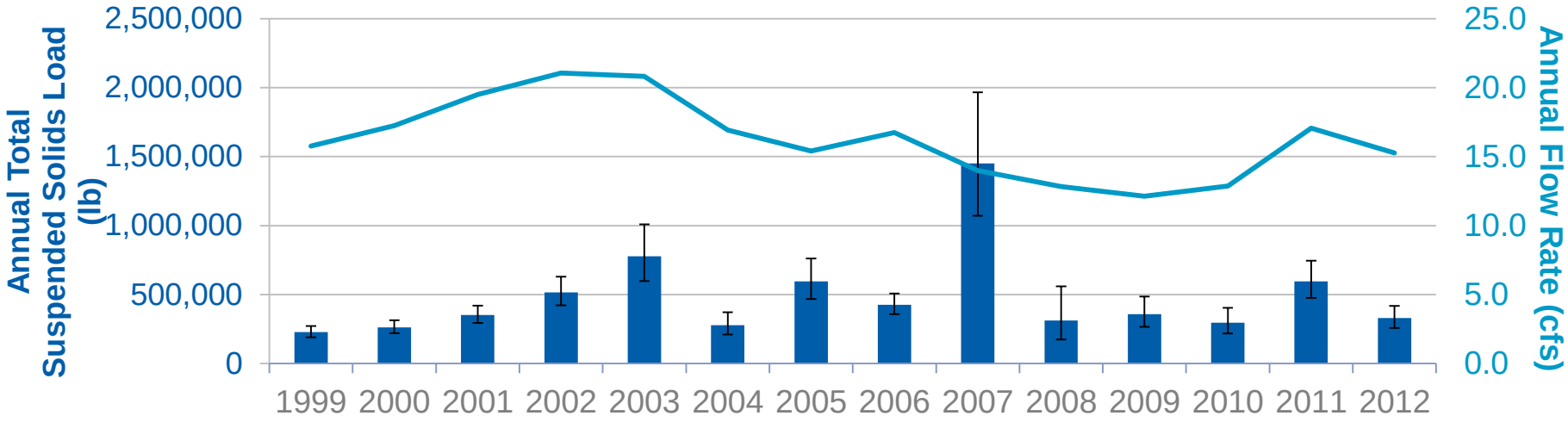
METROPOLITAN COUNCIL

Figure VA-6: Valley Creek Daily Average Flow, Sample Flow, and Precipitation, 1999-2012*



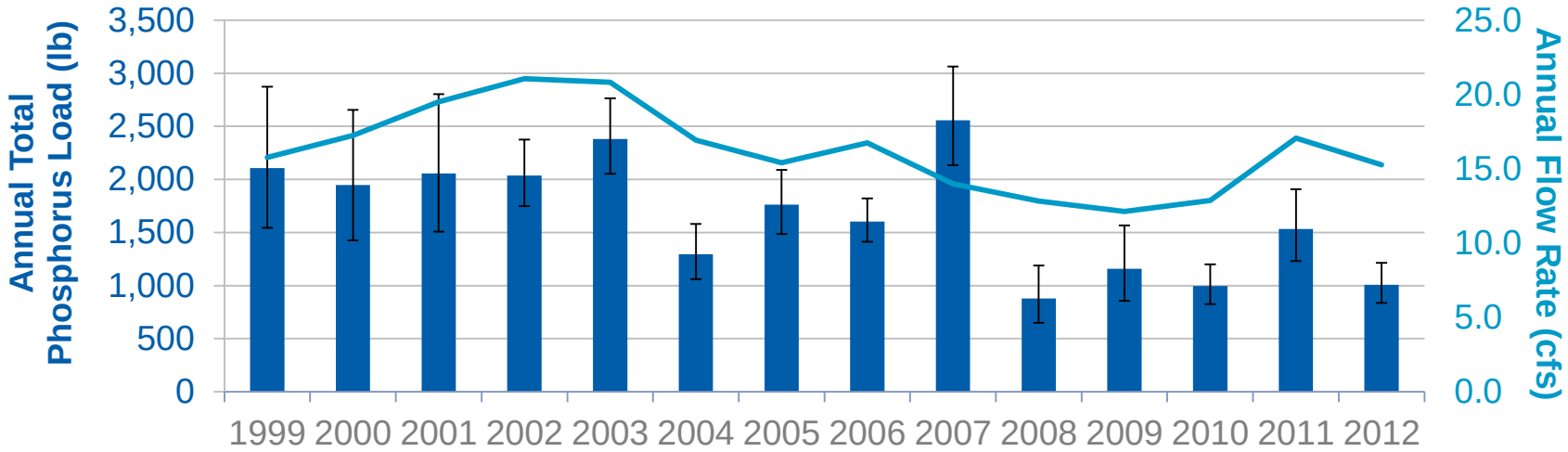
*Precipitation record was acquired from NWS COOP stations: 218037-Stillwater 1 SE, 213567-Hastings Dam 2, and 218039-Stillwater 2SW

Valley Creek TSS Pollutant Loads

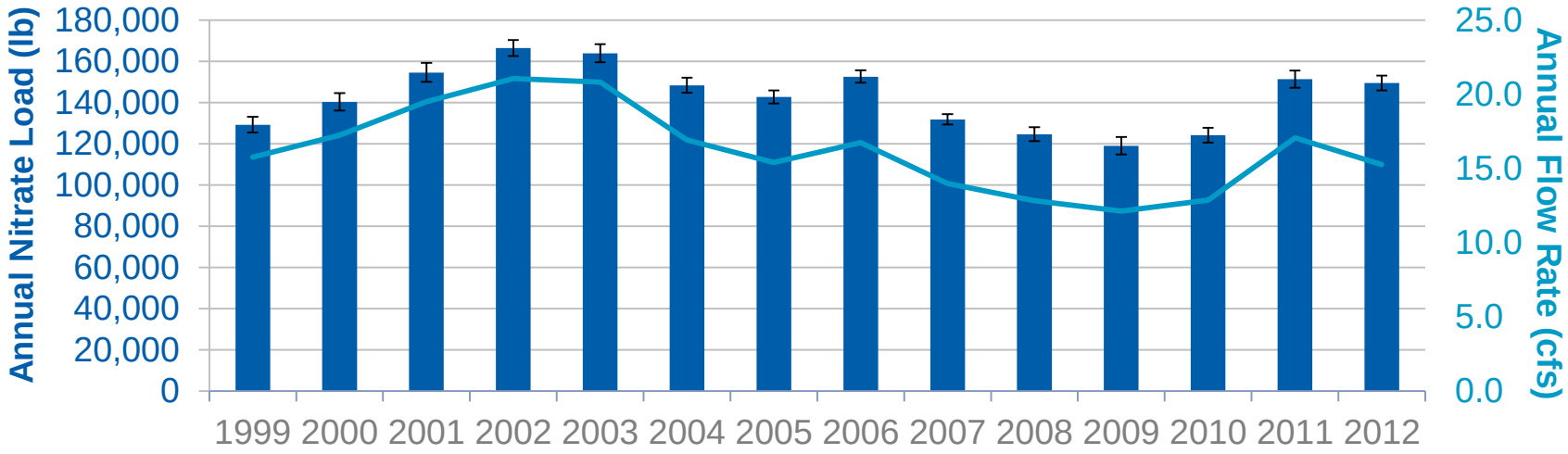


METROPOLITAN COUNCIL

Valley Creek TP Pollutant Loads

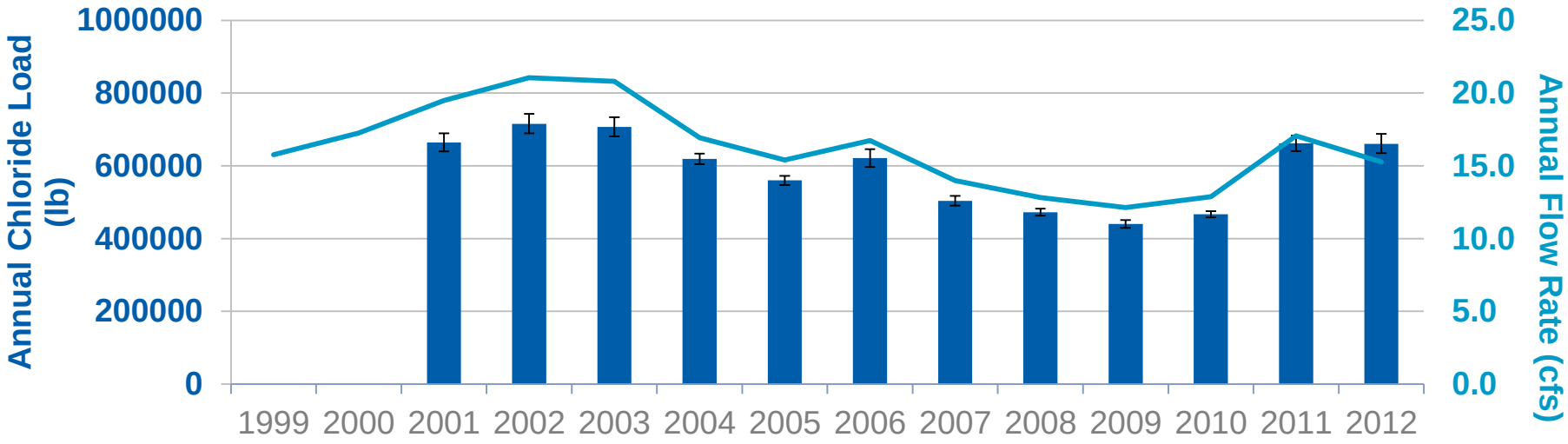


Valley Creek NO_3 Pollutant Loads



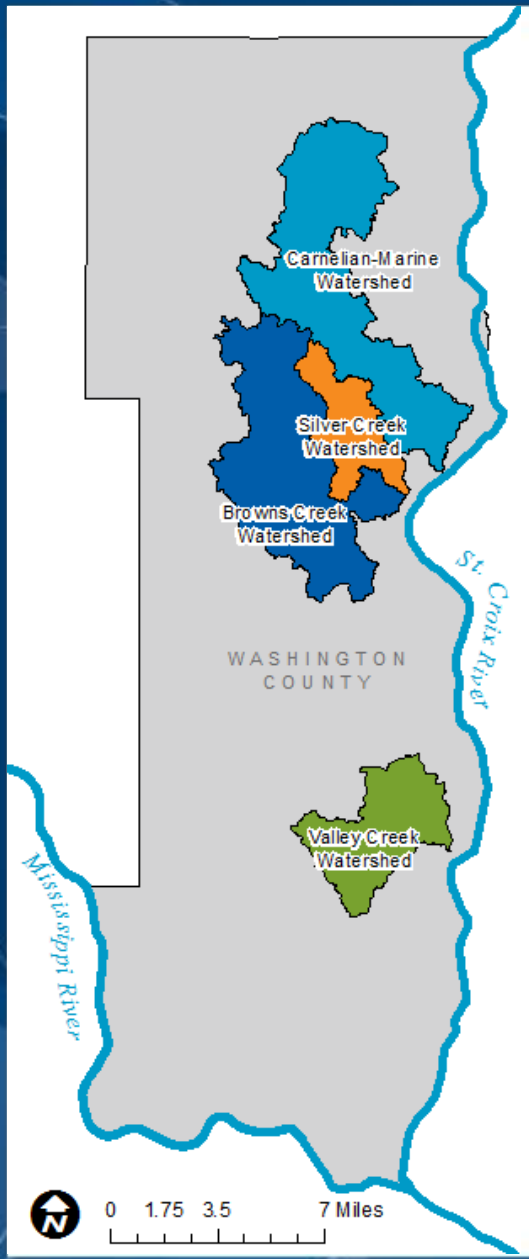
METROPOLITAN COUNCIL

Valley Creek Cl Pollutant Loads



METROPOLITAN COUNCIL

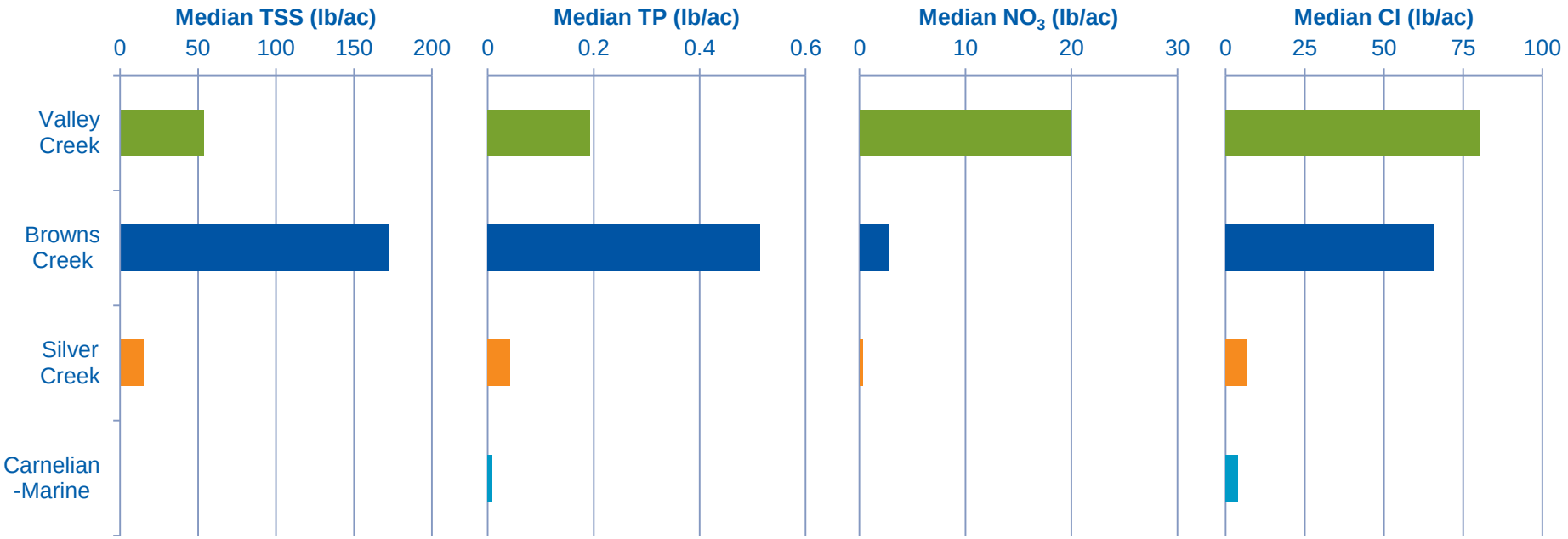
How Do Valley Creek Loads Compare to Other MCES Monitored St. Croix Tributaries?



- Carnelian-Marine Watershed
  - 17,880 acres (27.9 sq. miles)
- Silver Creek Watershed
  - 5,538 acres (8.7 sq. miles)
- Browns Creek Watershed
  - 4,577 acres (7.2 sq. miles)
- Valley Creek Watershed
  - 7,327 acres (11.4 sq. miles)

Annual Yield = lb/ac

How Do Valley Creek Loads Compare to Other MCES Monitored St. Croix Tributaries?



METROPOLITAN COUNCIL

Questions?

Jen Kostrzewski
(651) 602-1078
jennifer.kostrzewski@metc.state.mn.us

Karen Jensen
(651) 602-1401
karen.jensen@metc.state.mn.us

METROPOLITAN COUNCIL

For more information, please see the Valley Creek Section in the *Comprehensive Water Quality Assessment of Select Metropolitan Area Streams* at:

www.metrocouncil.org/streams