2019 Stream Monitoring Results

Carver County Water Management Organization

Stream Monitoring Overview

- In 2019 we monitored streams for:
  - Chemistry
    - *14 sites; 4 watersheds*
  - E. coli
    - *28 sites; 5 watersheds*
  - Biomonitoring; sampling on a three year rotation
    - *5 Sites; 3 watersheds*

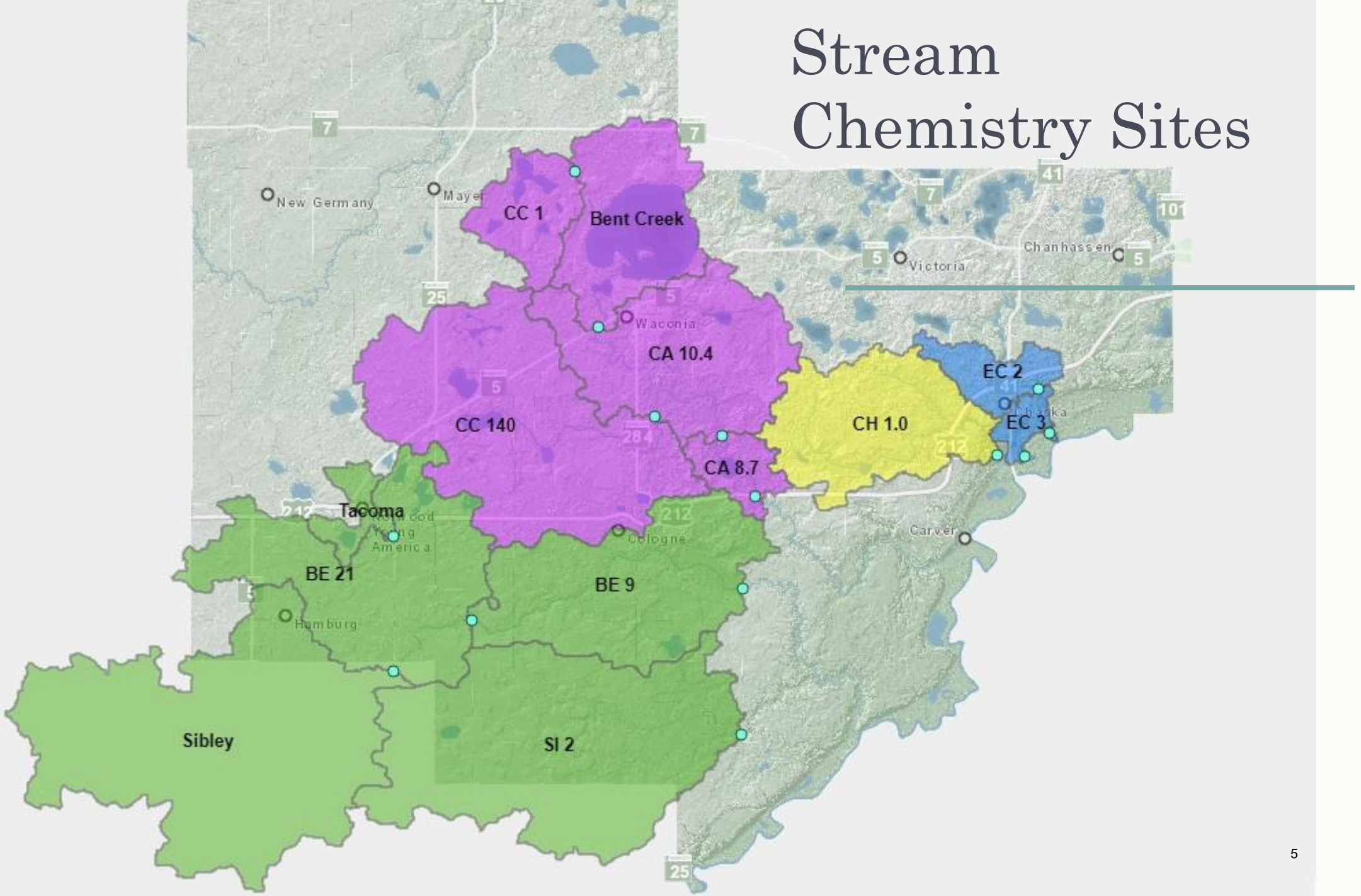
Monitoring Parameters

- Stream Chemistry
  - Total Phosphorus
  - Inorganic Nitrogen
  - Total Suspended Solids
- Stream E. coli
  - E. coli

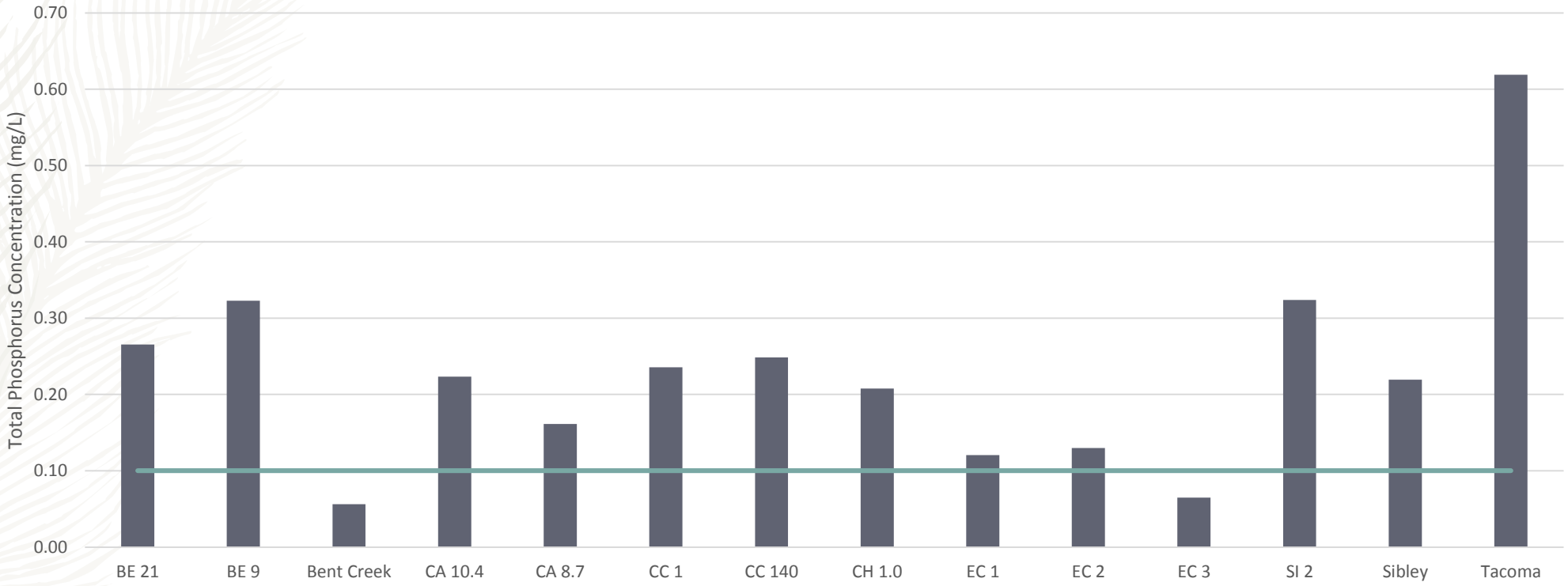
Total Phosphorus

- **What is phosphorus?**
  - Phosphorus is a natural element in aquatic ecosystems, essential for life.
- **Large concentrations can be harmful to streams by:**
  - Increase algae concentrations
    - *Decrease in dissolved oxygen when it dies*
- **Sources of Phosphorus**
  - Agricultural fields, stormwater runoff, and eroding streambanks

Stream Chemistry Sites



2019 Average Total Phosphorus Concentration



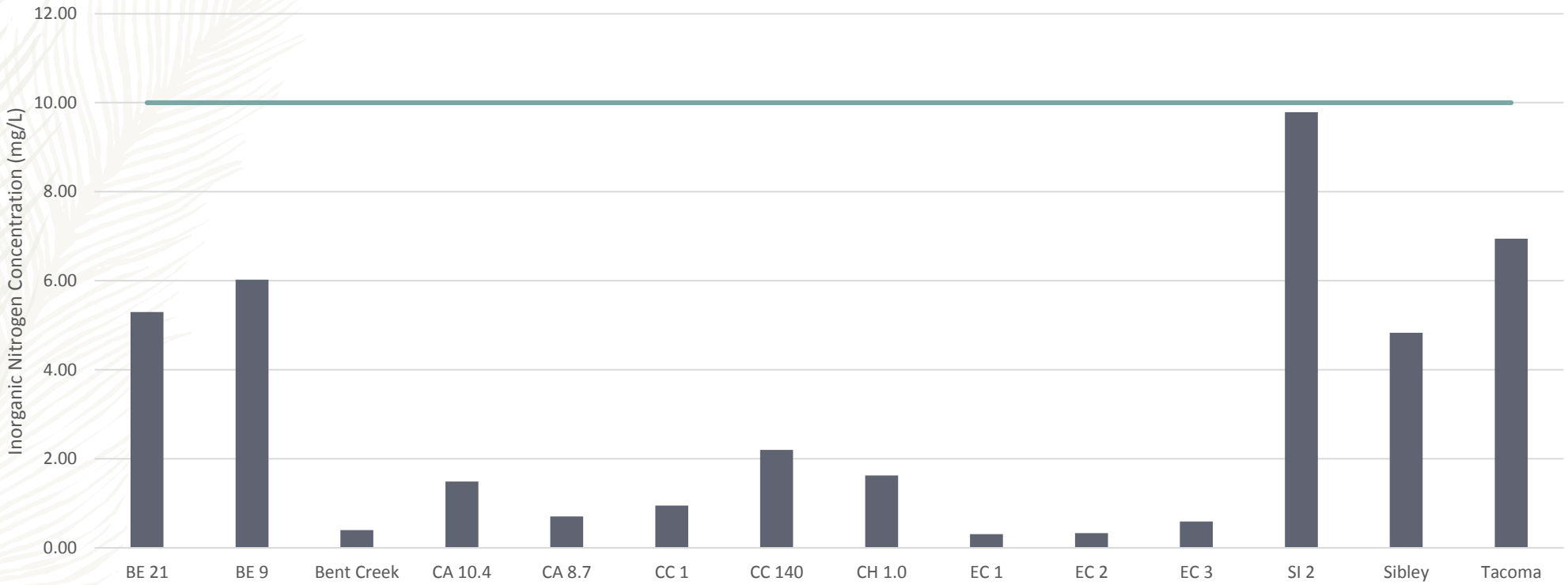
Annual Total Phosphorus Load

- **Load is the amount of phosphorus flowing through the stream site in a given year**
  - Stream Discharge
  - Amount of pollutant
- Notable loads
  - EC 3-73 pounds
  - CC 140- 17,500 pounds
  - BE 9- 39,500 pounds

Inorganic Nitrogen

- **What is inorganic nitrogen?**
  - The combination of nitrate and nitrite
    - *Both forms can be used by algae and aquatic plants*
- **High concentrations of inorganic nitrogen can**
  - Contribute to algal blooms
  - Harm fish and other aquatic organisms
  - Adversely effect human health if found in drinking/groundwater
- **Sources of inorganic nitrogen**
  - Fertilizer, livestock/human sewage, and the atmosphere

2019 Average Inorganic Nitrogen Concentration



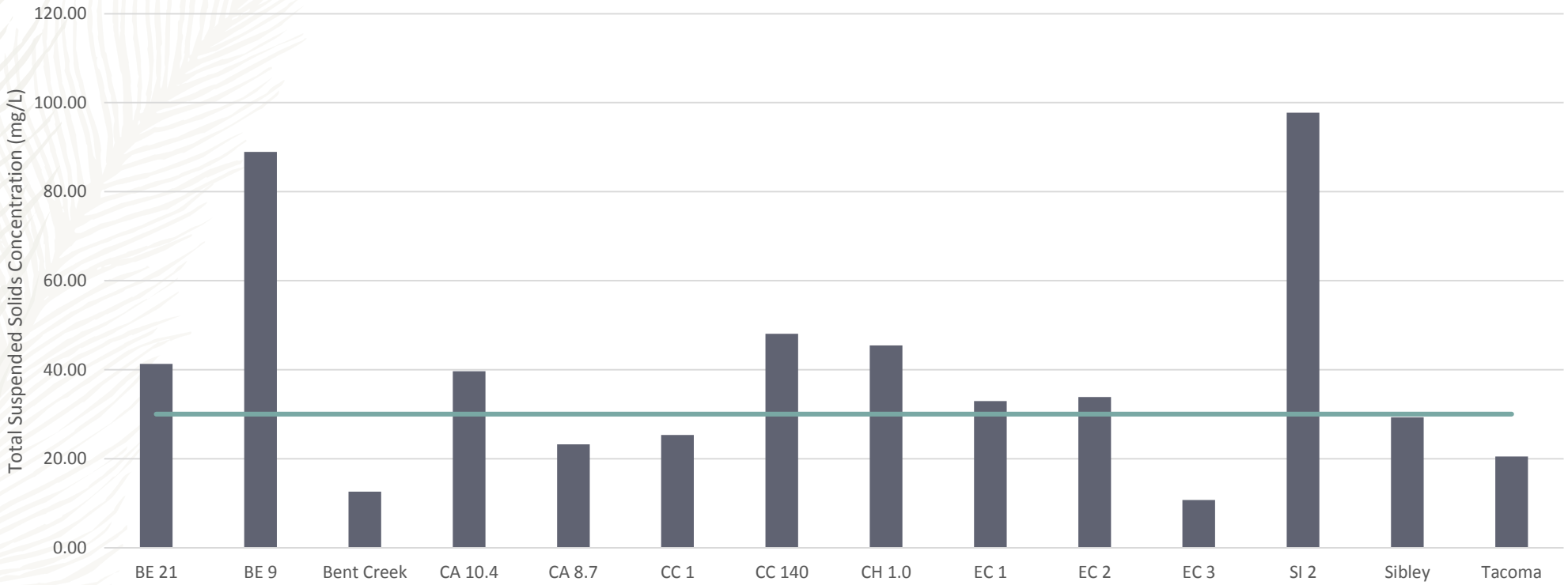
Annual Inorganic Nitrogen Load

- **Notable loads**
  - EC 3-650 pounds
  - CC 1- 10,400 pounds
  - CA 10.4- 191,000 pounds
  - BE 9- 688,000 pounds

Total Suspended Solids

- **What is Total Suspended Solids?**
  - Suspended particles that are transported by streams
- **High concentrations of suspended solids can**
  - Impair sight for feeding, predation, and reproduction
  - Smother bottom dwelling organisms
  - Alter habitats
- **Sources of Total Suspended Solids**
  - Eroding stream banks and agricultural and urban runoff.

2019 Average Total Suspended Solids Concentrations



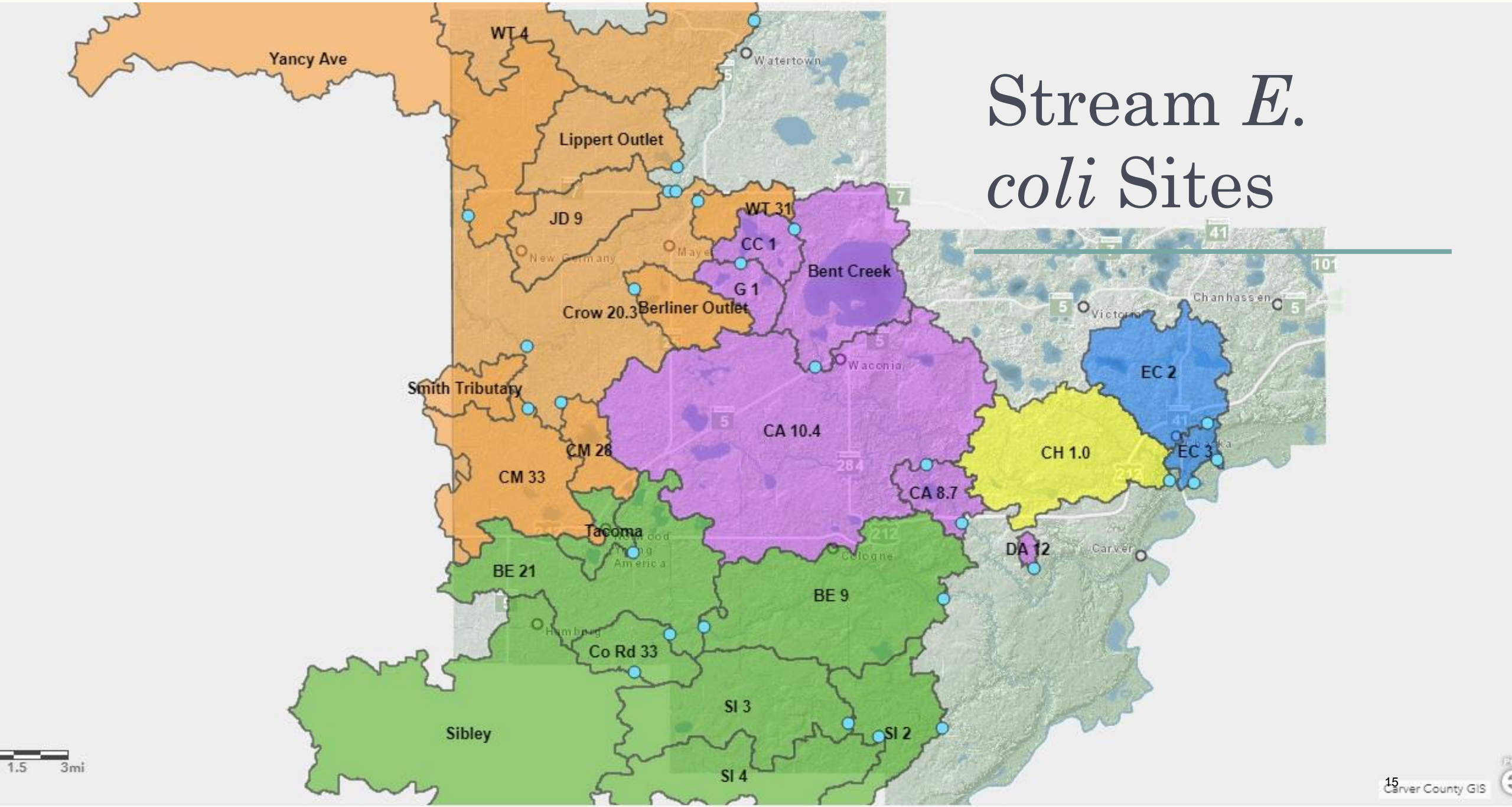
Annual Total Suspended Solids Load

- **Notable loads**
  - EC 3-7,500 pounds
  - SI 2- 2,900,000 pounds
  - CA 10.4- 5,900,000 pounds
  - BE 9- 9,900,000 pounds

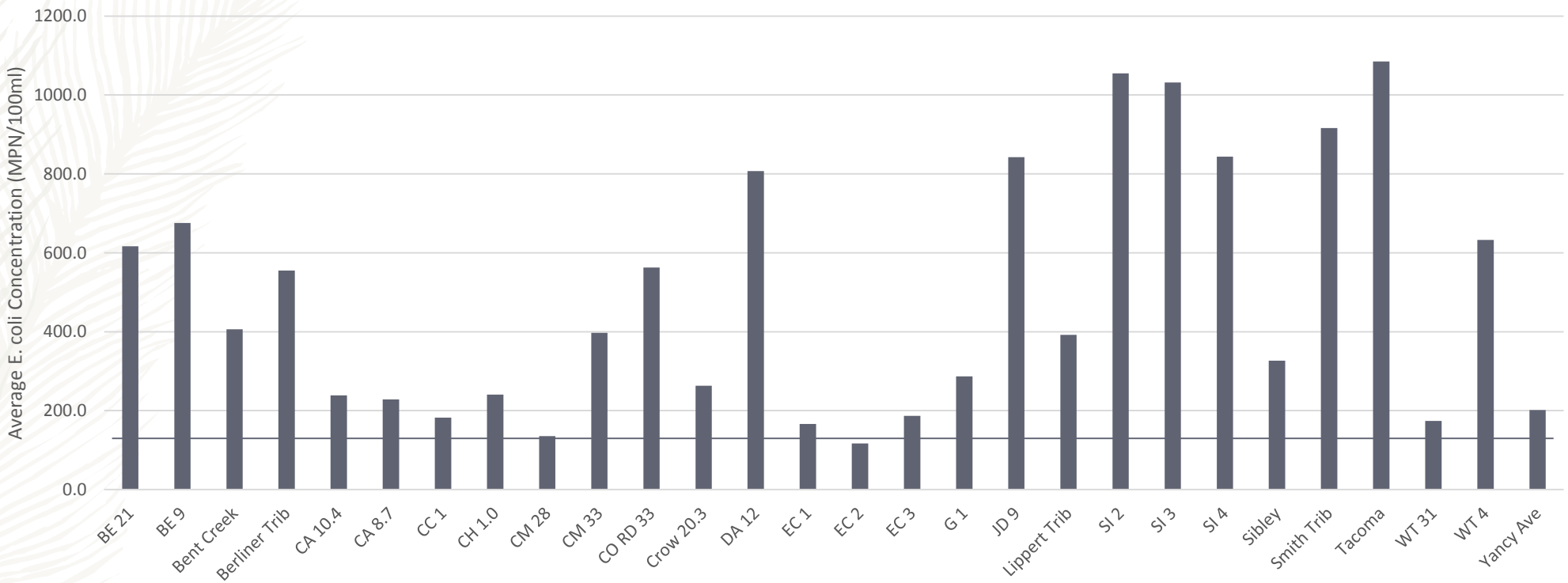
E. coli

- **What is E. coli?**
  - Common bacteria found in digestive systems in warm blooded animals.
- **Why Sample E. coli?**
  - In high concentrations E. coli and other harmful bacteria can cause illness
- **Sources of E. coli**
  - Failing septic systems, feedlots, pet waste, and manure application

Stream *E. coli* Sites



2019 Average *E. coli* Concentrations



10 Year Trends

- **Total Phosphorus**
  - CA 8.7 improving; CC 1 worsening
- **Inorganic Nitrogen**
  - CC 1, EC 1, and EC 3 improving
- **Total Suspended Solids**
  - EC 2 improving; EC 1 worsening
- ***E. coli***
  - Bent Creek improving; CA 10.4 worsening

Why do we sample macroinvertebrates?

- Macroinvertebrates are good indicators of water quality
  - *Certain groups of "bugs" have a lower tolerance to poor water quality*
- Can indicate habitat loss that can't be detected by normal water quality tests
  - *Certain groups live in very niche area of a stream*
    - Gravel beds
    - Woody vegetation
    - Overhanging vegetation
- State indices were developed to determine health of macroinvertebrate communities

Macroinvertebrate Results

	CH 1.0	EC 1	EC 2	EC 3	SI 2
FBI Score (Grade)	4.3 (B)	4.7 (B)	4.7 (B)	5.2 (B)	
EPT Score (Grade)	2 (D)	3 (D)	3 (D)	2 (D)	
Dominant Famiy	Baetidae	Hydrosychidae	Hydrosychidae	Baetidae	
Tolerance	4	4	4	4	
% of Dominant Family	35%	26%	19%	25%	
# of families	12 (Very Good)	18 (Very Good)	10 (Good)	13 (Very Good)	

Questions