Regulations and Standards – Vermont

- No promulgated standards specific to chloride
- USEPA ambient aquatic life water quality criteria used as guidance

  - To meet acute criteria, the 1- hour average concentration of chloride must not exceed 860 mg/L more than once every 3 years on average.
  - To meet chronic criteria, the 4-day average must not exceed 230 mg/L more than once every 3 years on average.

- The Vermont Department of Health has a Secondary Maximum Contaminant Level of 250 mg/l for drinking water.

- WQ stds specify
  - Protect and enhance the quality of surface waters
  - Prevent, abate or control activities harmful to water quality

Current strategies applied to chloride – Vermont

- **Agency of Transportation**

  - receives annual permit to apply salt/sand

  - submits biweekly summary of usage to WQ Division

  - pro-active in reducing amount of chloride used and utilizing new technologies

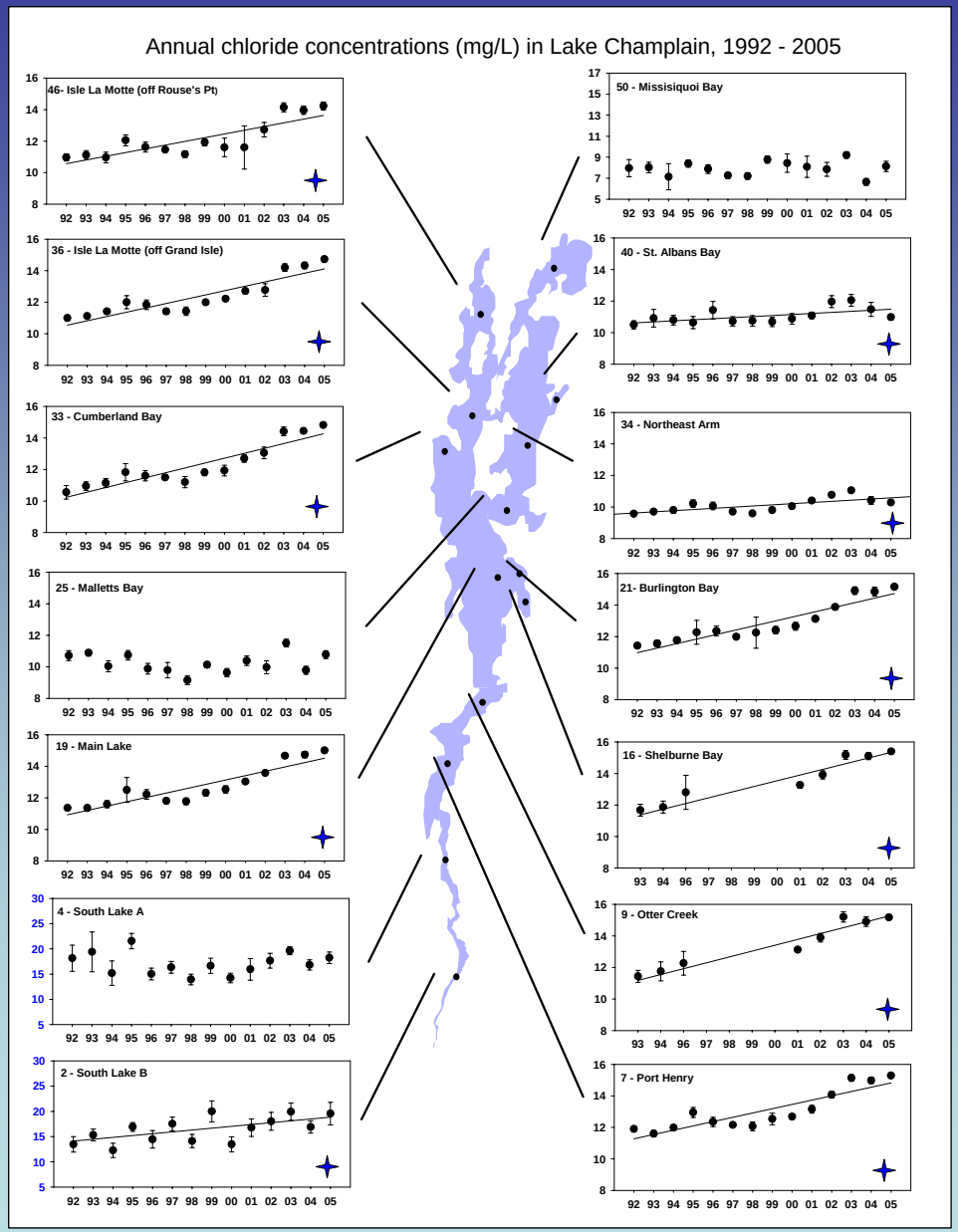
- **Regulated industrial facilities**

  - must cover salt piles and demonstrate no run-off as part of general permit requirements for the site

- **Non-regulated facilities have no requirements**

  - 11 MS4 municipalities and other entities have chosen to address chloride run-off reduction as part of site improvements and outreach activities

Long-term data from Lake Champlain



WQ monitoring began in 1992

Chloride used to model P transport

Small but steady increases noted in many areas of the lake

Not of biological concern in the lake but in the watershed?

Inferred Chloride in 6 "impaired" Urban Streams

June 2005 to January 2006

Location	Mean daily and total range of calculated chloride values in mg/l	Percent of daily mean chloride concentration values exceeding EPA chronic criterion
Allen Brook	78 (10-205)	0.0
Sunderland Brook	103 (3-199)	0.0
Bartlett Brook	121 (4-244)	0.7
Muddy Brook Trib	257 (14-490)	66.0
Sunnyside Brook	261 (82-449)	79.0
Centennial Brook	277 (53-754)	70.0

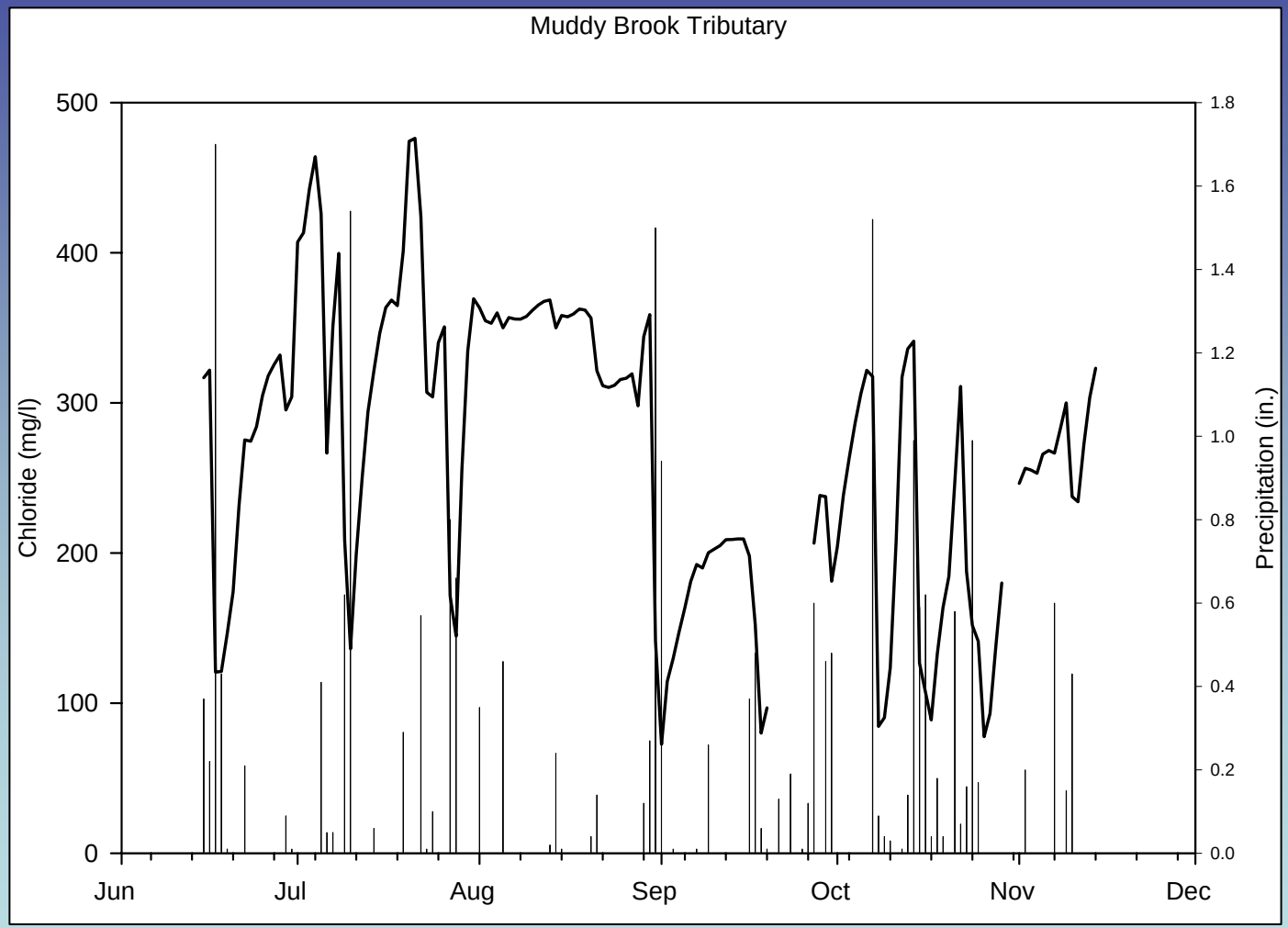
All streams were well above background (chloride <10 mg/L)

Half the streams consistently exceeded EPA chronic criterion

Elevated concentrations were observed consistently during summer low flow

Highest chloride documented during melting events following snowstorms

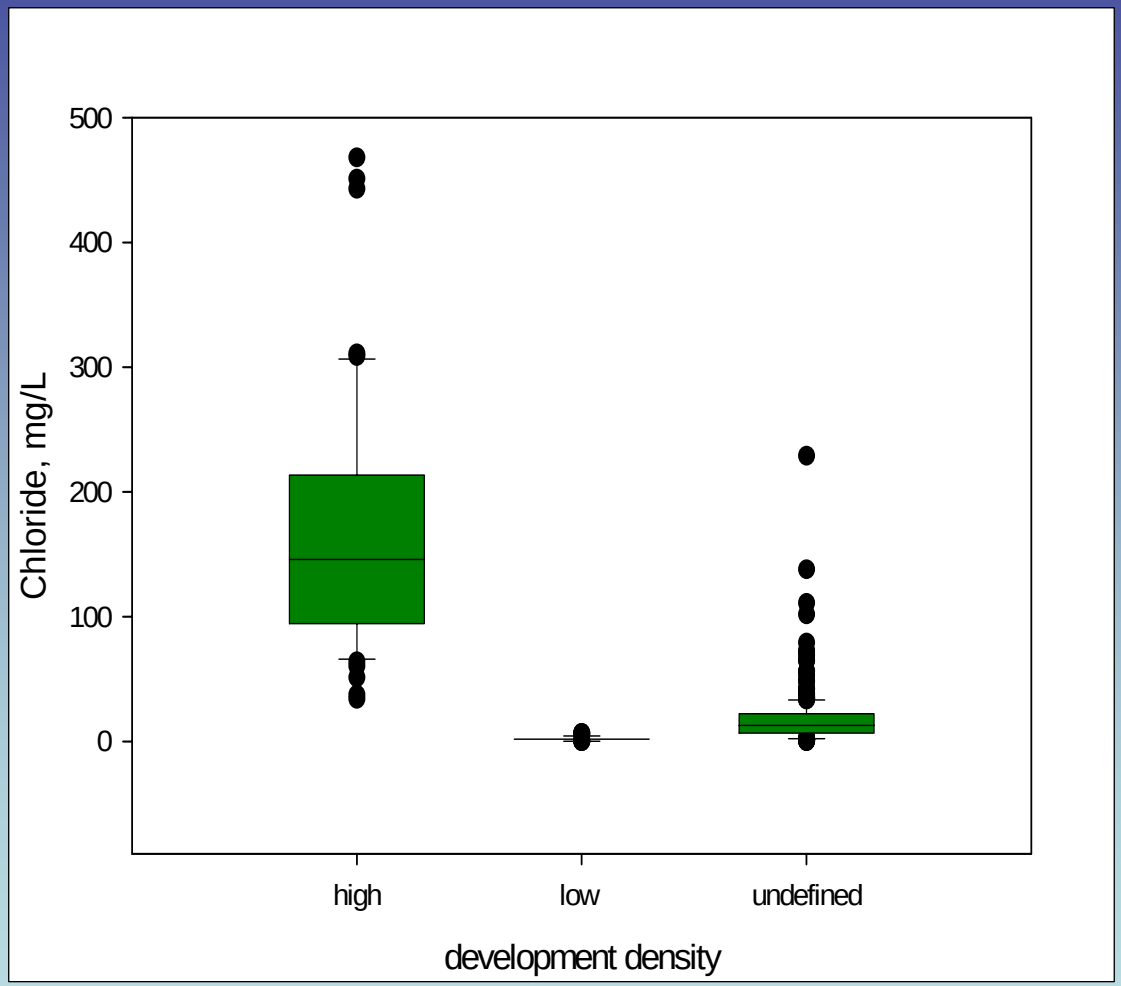
In-stream concentration relates strongly to precipitation and flow



- Summer rain events lead to rapid drops

- Winter thaws lead to chloride pulses

Chloride and Development Density in Vermont



2003 -2004 data

N= 431

Routine stream assessments

The Next Steps

- Determine whether chloride is leading to impairment
  - toxicity testing
  - review of existing biological data
- Identify levels that are cause for concern in Vermont
- Identify locations most at risk from chloride
- Identify practices of concern
- Identify effective BMPs
- Implement TMDLs in impaired watersheds
- Education
  - target at-risk areas and practices
  - raise awareness of negative effects