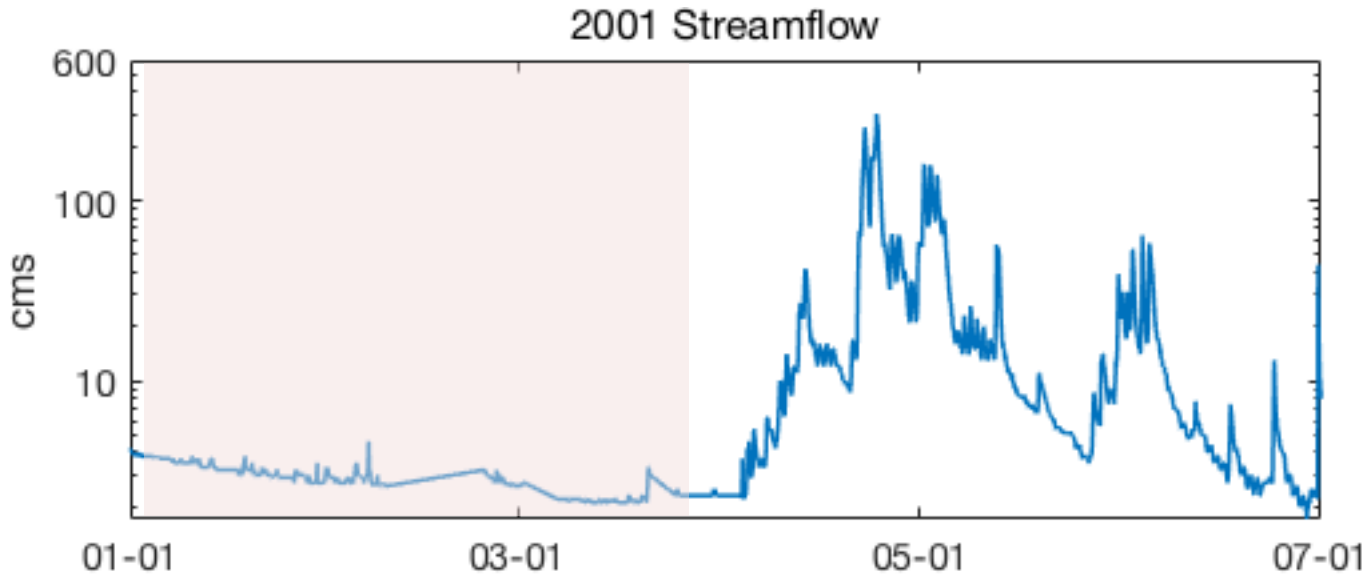
Effects of changing spring melt on nutrient export: Spring melt sampling campaign update

Erin Seybold

Hungerford Brook, agricultural site

Wade Brook, forested site

Ranch Brook, 2001



- Changes to snowmelt patterns?
  - Early thaw
  - Intermittent thaw events
  - Rain on snow events

- Biogeochemical consequences of changing snowmelt for nutrient delivery to lake ecosystem

National Climate Assessment, 2014

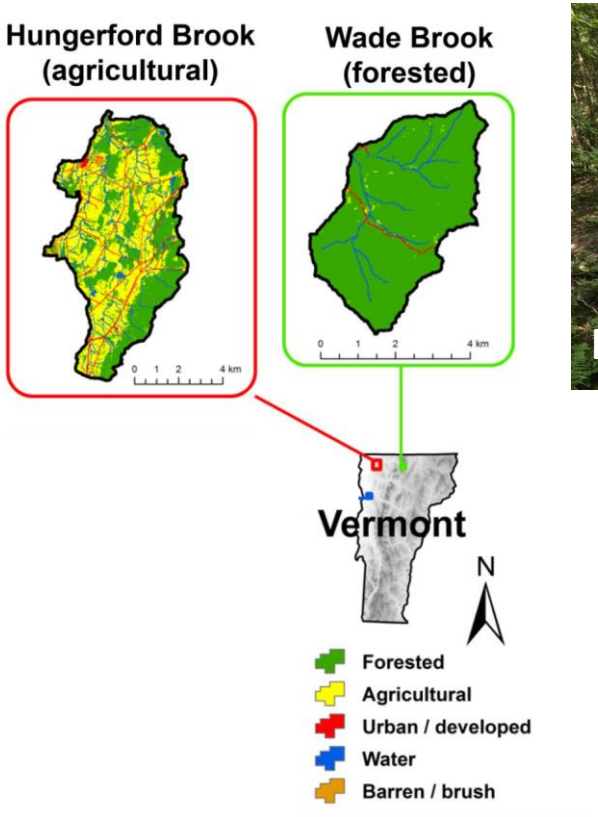
Question:

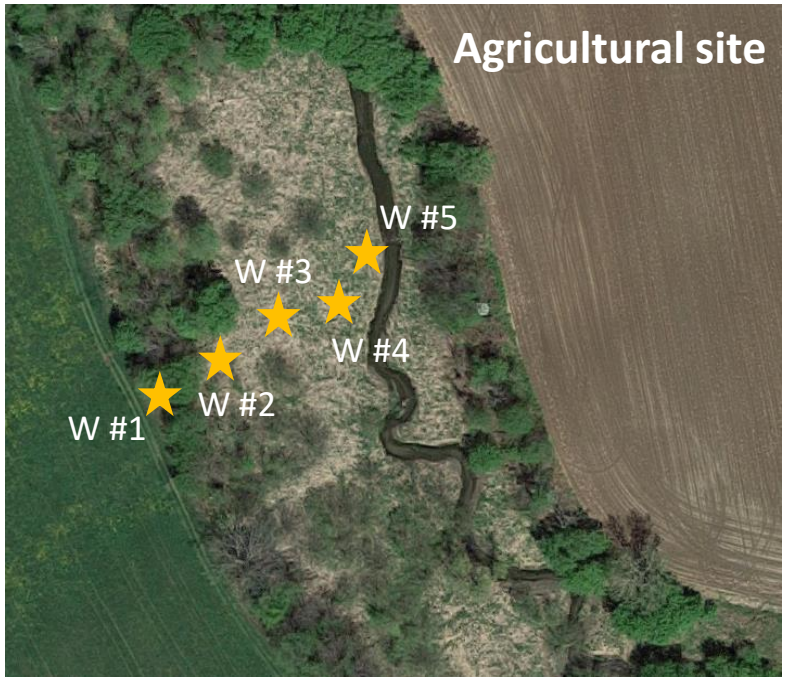
How do changes in spring snowmelt (early thaw, intermittent thaw, rain on snow) affect nutrient export to Lake Champlain?

Approach:

- Stream water export
- Nutrient dynamics in groundwater and soil water

Study sites



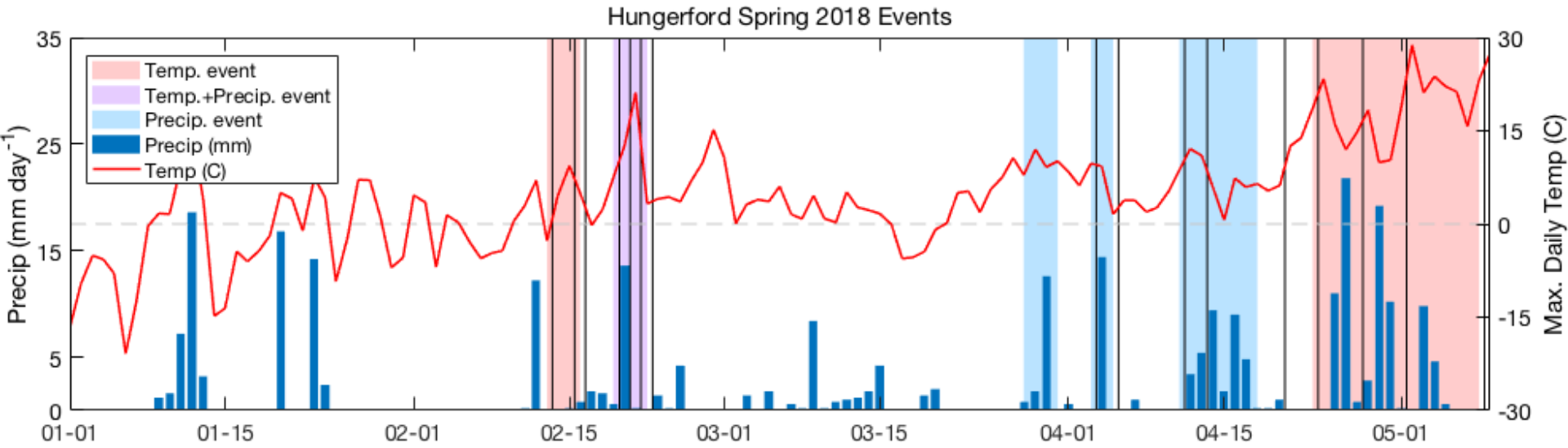


Research infrastructure:

- *In-situ* soil sensors
- GW wells
- Stream monitoring site

Map from Vaughan et al. 2017 (WRR)

Spring 2018 snowmelt timeline



- Event sampling starting in Feb. 2018
- Compare “event type”:
  - Temp. only
  - Temp + Precip.
  - Precip./Rain on snow
- Sensor deployments + pre/post event manual sampling

Data collection

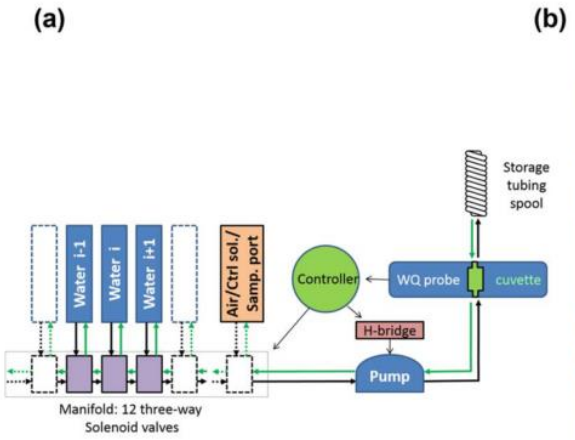
In-stream monitoring

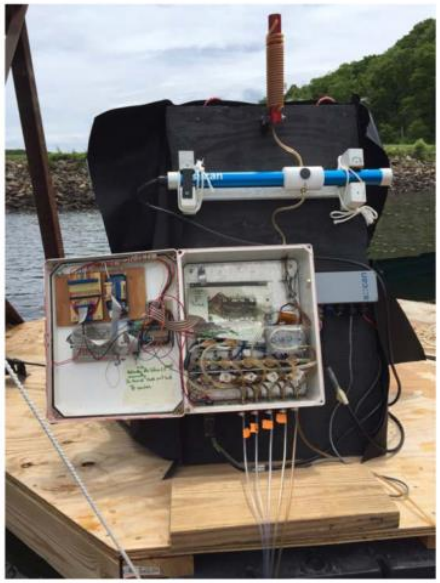
- Met. data and streamflow
- s::can spectrolyser
  - High-freq. [DOC], [NO_3], [P]
- ISCO samples

Riparian monitoring

- Water level loggers
- Grab samples from GW wells and soil water samplers
  - [C, N, P]
- s::can spectrolyser multiplexer pump manifold
  - [DOC], [NO_3], [P]

High-frequency GW chemistry

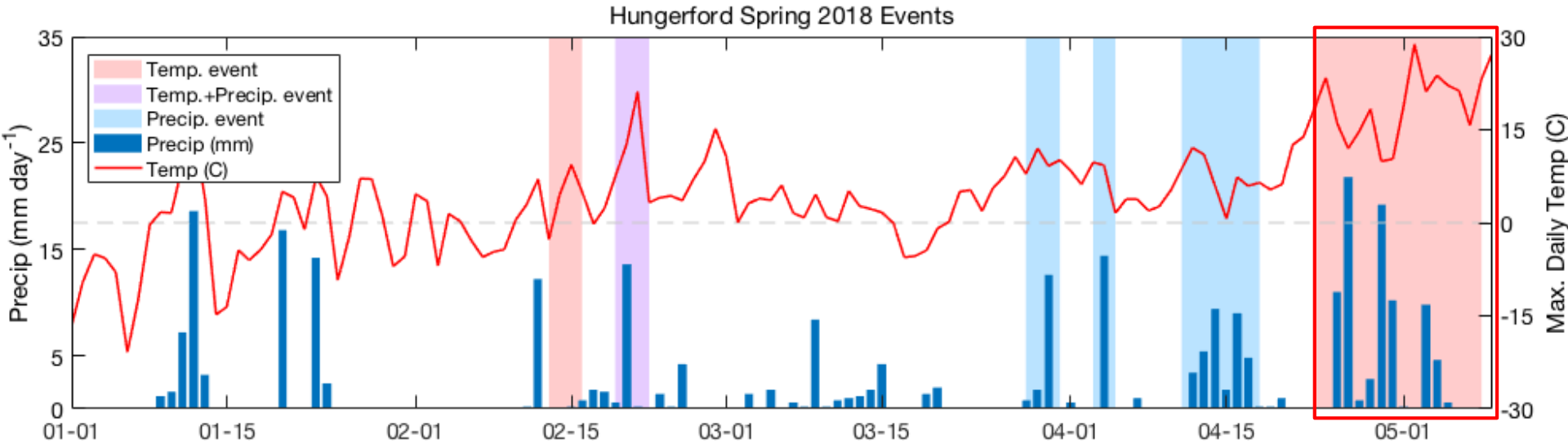




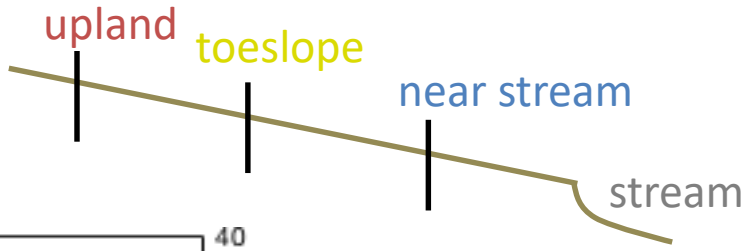
Use model to derive concentration of solutes (NO_3, DOC, SRP) from absorbance spectra

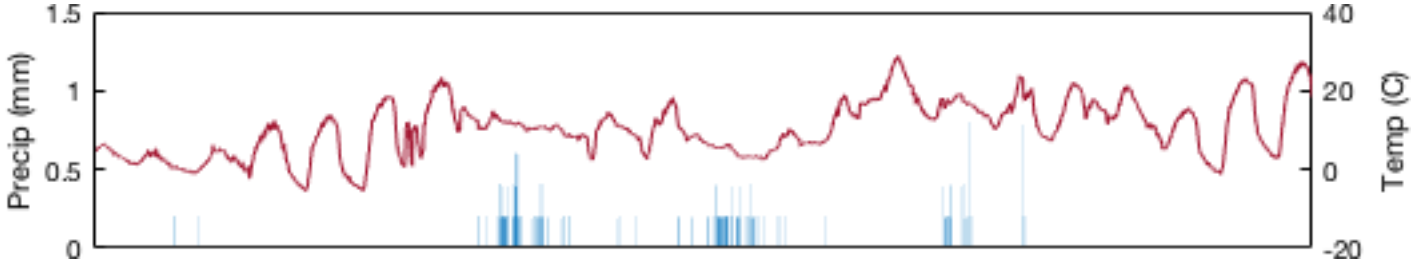
High-frequency measurements of [NO_3] and [SRP] in groundwater along riparian transect

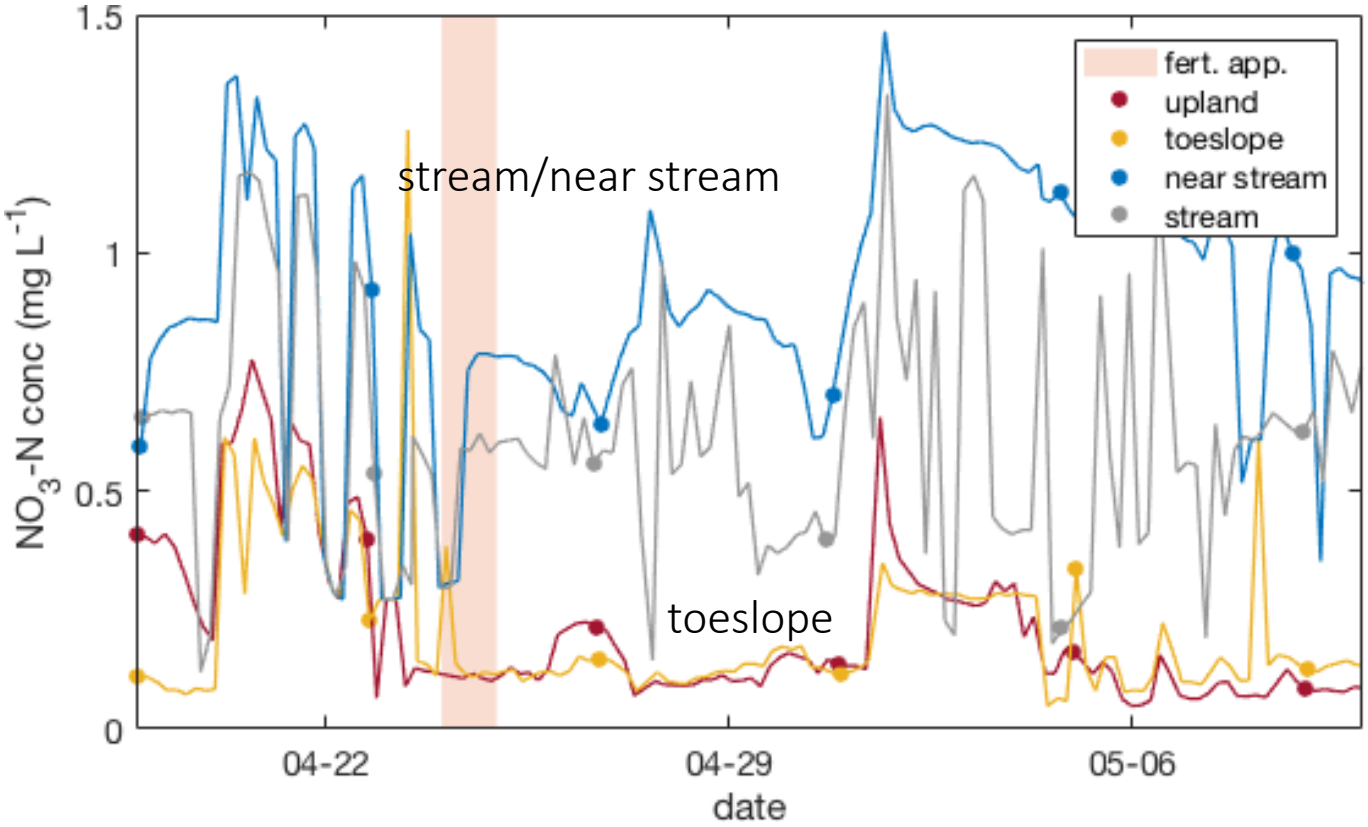
Spring 2018 melt timeline



Ag site: High frequency NO3 data







- Previously – grab samples every couple days
- Now – high frequency GW chemistry
- Better understanding of N/P retention in riparian wetlands during events

Conclusions (thus far…)

- 2018 was characterized by a number of intermittent thaw and rain on snow events
- Intensive sampling campaigns sampled a number of these events
- Detailed analysis of C, N, and P retention and export during these events
- **Goal: Understand consequences of changing thaw patterns on nutrient export from forested and agricultural catchments**

Ongoing work…

- Winter lake sampling campaigns
- Continued riparian, stream, and lake sampling during “green up” and into summer

Questions?