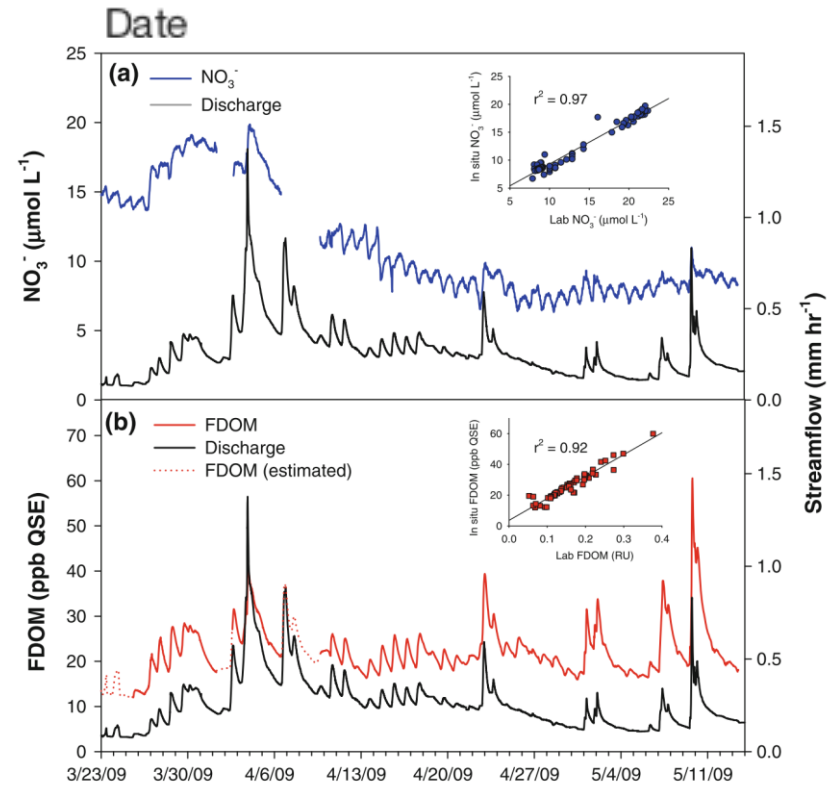
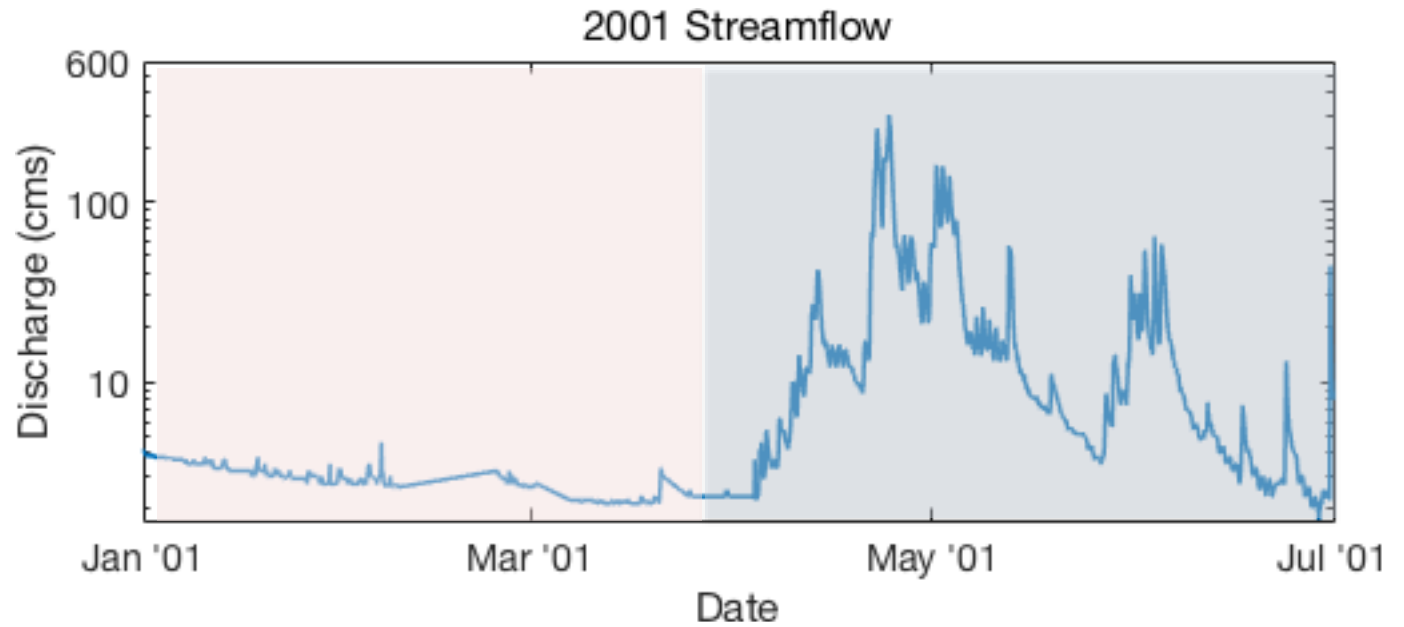


Effects of changing spring melt and land use on watershed nutrient export

Dr. Erin Seybold
BREE All-hands
Meeting
June 12, 2018



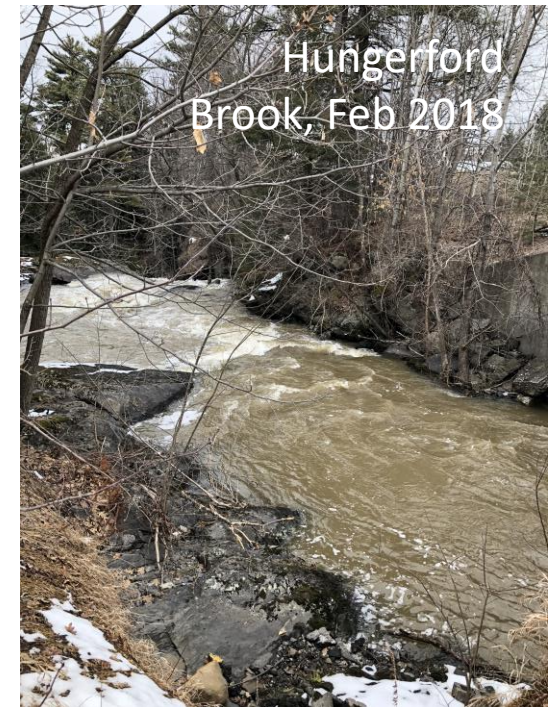
Ranch Brook, 2001



- How will snowmelt change in the future?
 - Early thaw
 - Intermittent thaw events
 - Rain on snow events

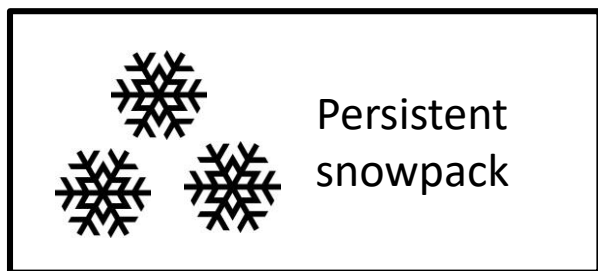


- Effects of changing hydrology on nutrient mobilization and export



Question:

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



↑ Greater solute accumulation in soils

↓ Infrequent mobilization to stream network

↑ More opportunity for biology to mediate release via assimilation



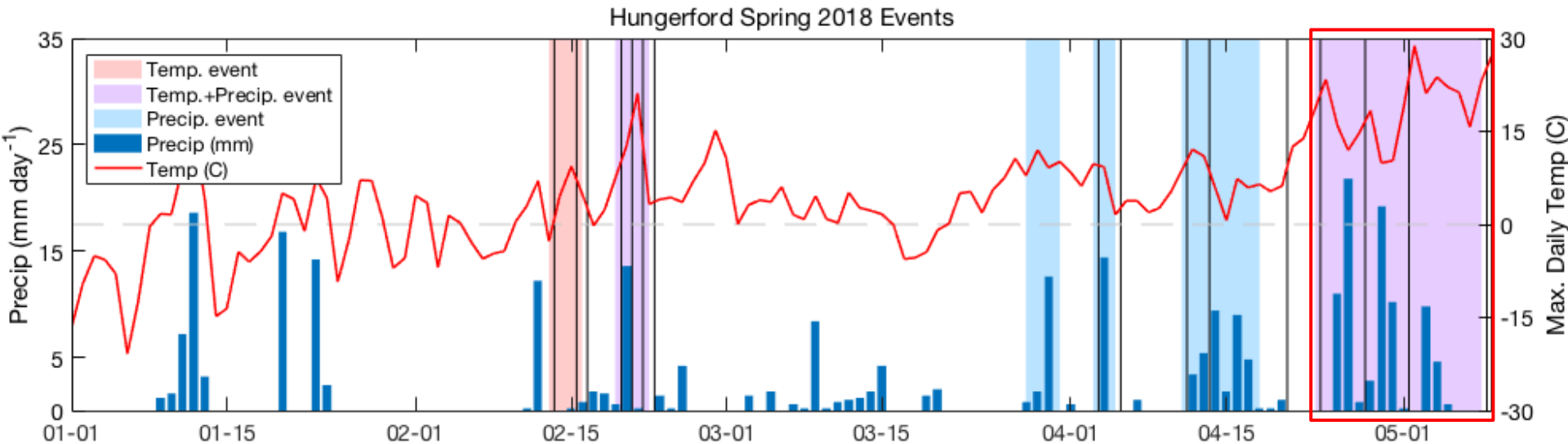
↓ Less solute accumulation in soils

↑ Frequent mobilization to stream network

↓ Less opportunity for biology to mediate release via assimilation

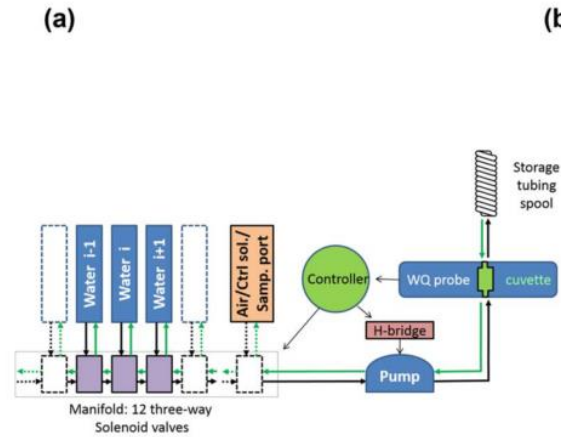
Dual approach: 1) Stream water 2) Groundwater and soil water

Spring 2018 sampling 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
- **High frequency streamwater and groundwater chemistry during thaw events**

High-frequency GW chemistry

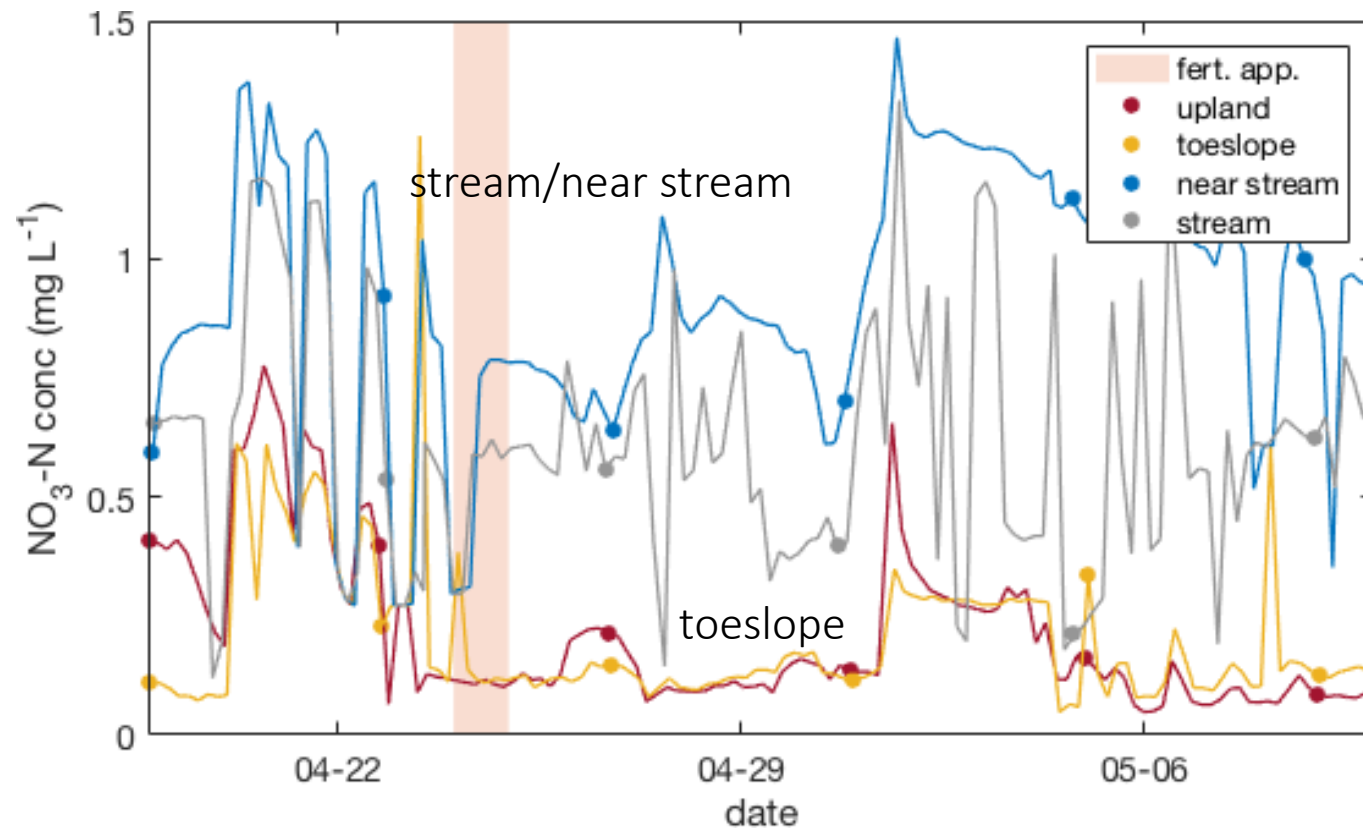
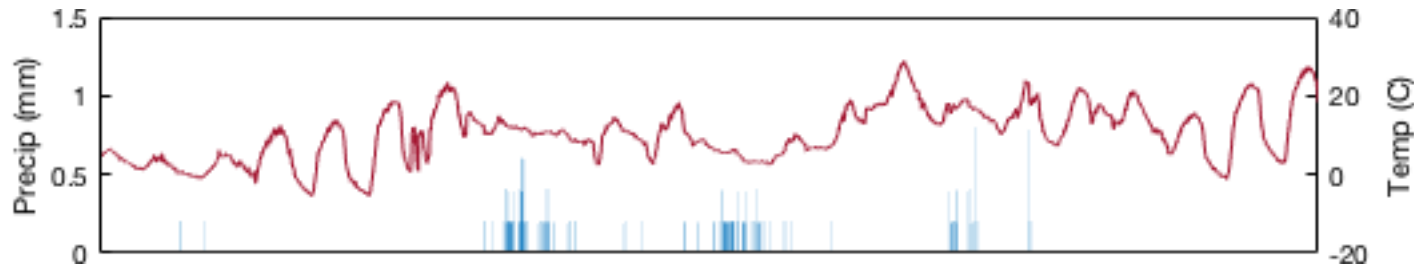
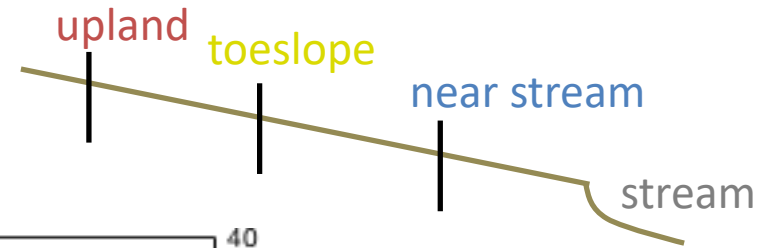


Use model to derive concentration of solutes (NO_3 , DOC, SRP) from absorbance spectra



High-frequency measurements of $[\text{NO}_3]$ and $[\text{SRP}]$ in groundwater along riparian transect

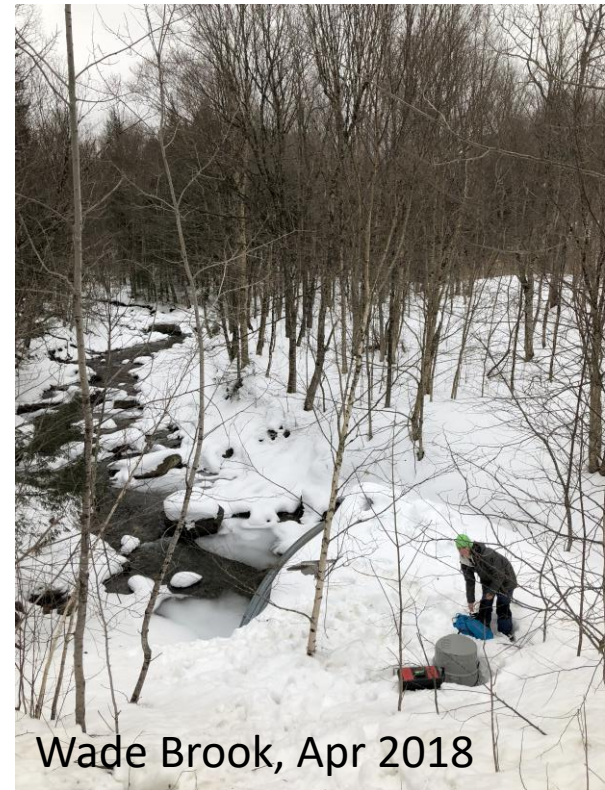
Ag site: High frequency NO₃ data



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

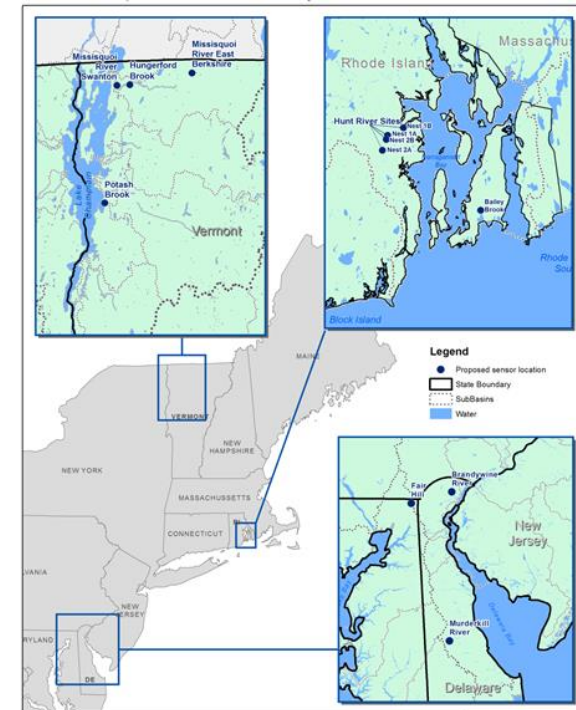
Conclusions (thus far...)

- 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 and land use on nutrient export



Effects of land use/climate on nutrient fluxes at regional scale

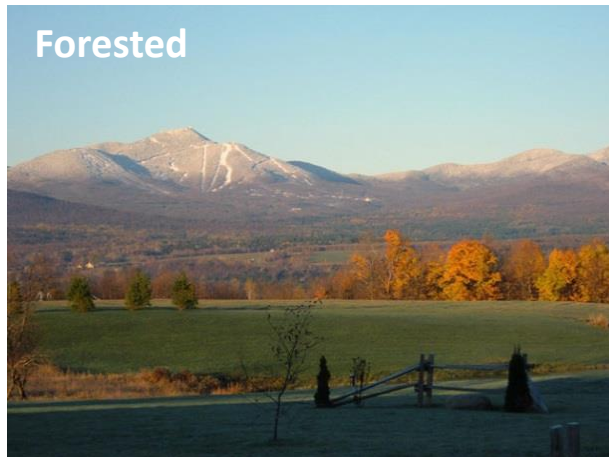
- Regional EPSCoR collaboration
- How do land use and climate affect the timing and magnitude of aquatic carbon and nitrogen fluxes at regional scale?



Minimal anthropogenic impact

Extensive anthropogenic impact

Forested



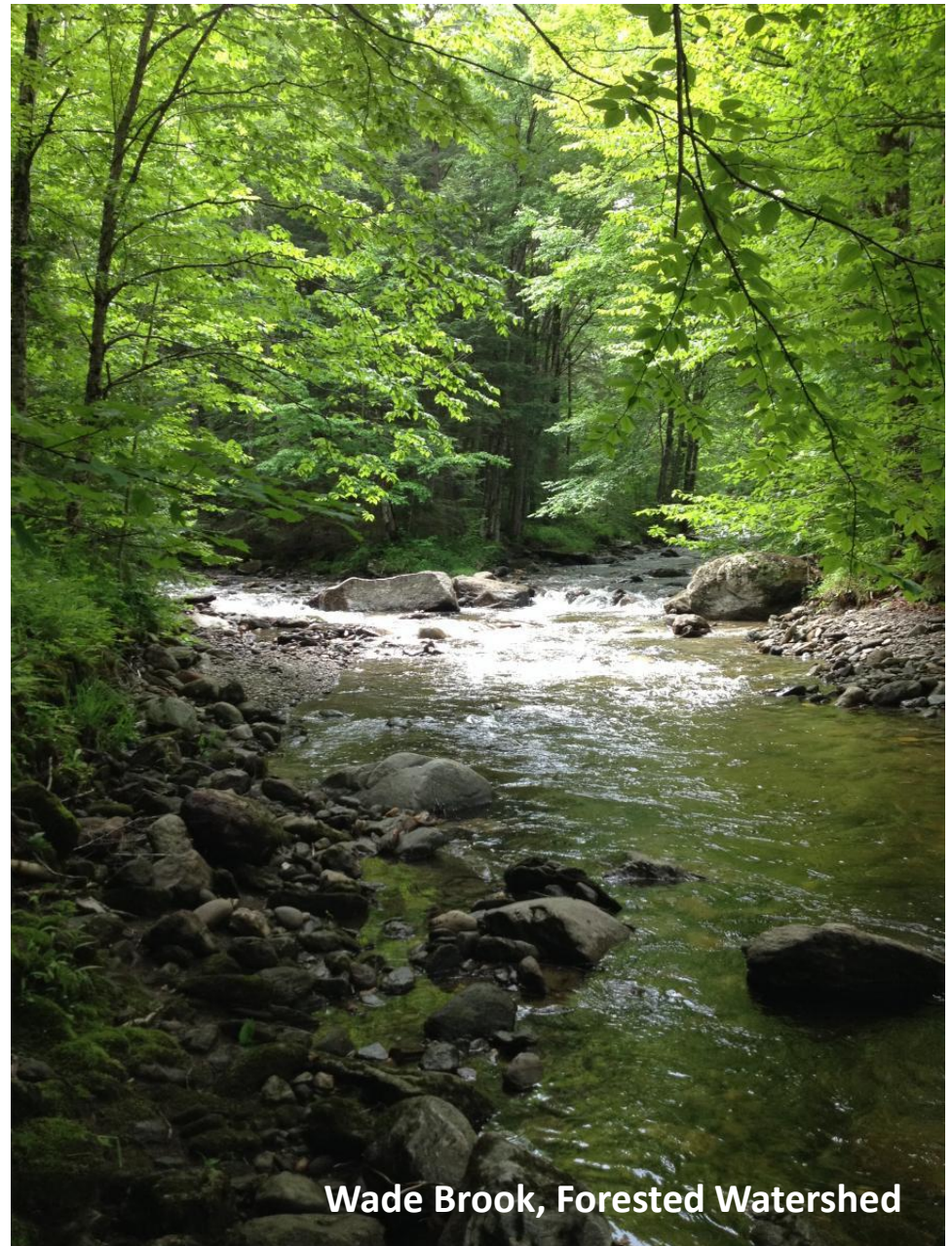
Agricultural



Urban



Questions?



Wade Brook, Forested Watershed

Photo source: VT EPSCoR