Water Quality and Tile Drainage in Addison County

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Acknowledgements

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- Project participants
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Research Context

- Inaccessibility of water quality data
- Need for formal survey of farmers’ perceptions
- Lack of information about tile drainage

Project Components

1) Farmer survey

2) Farmer interviews

3) Water sampling

4) Mapping and spatial analysis

Survey & Interviews

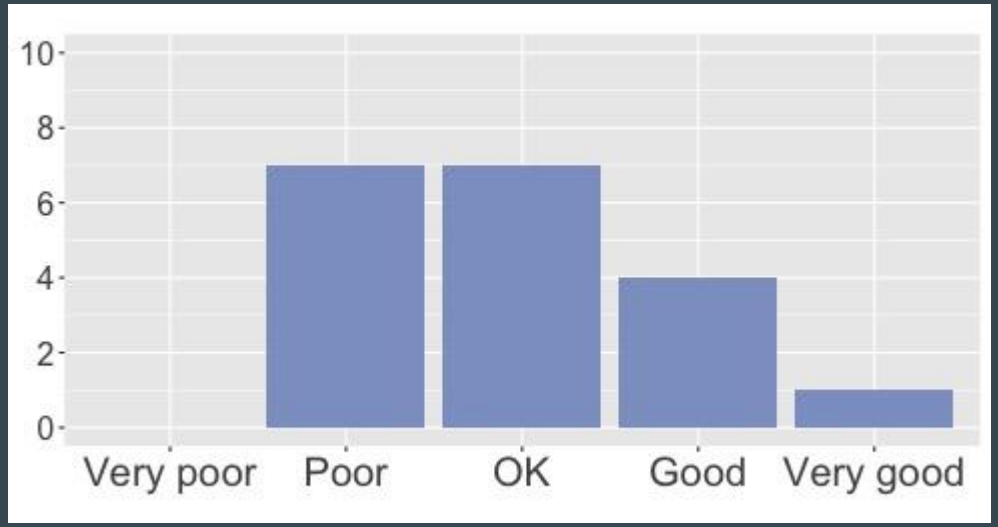
Survey & Interviews: *Methods*

- Goal: **understand farmer perspectives** on water quality, RAPs, and tile drains
- UVM No-Till Workshop and CVFC Meeting
- **19 surveys** and **7 farmer interviews** in total

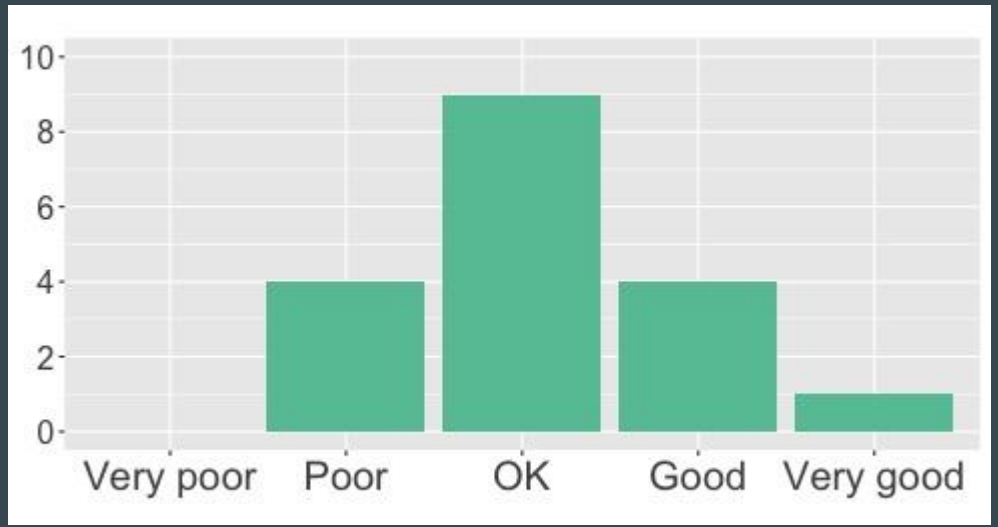
Survey & Interviews

Water Quality

Water Quality Perceptions



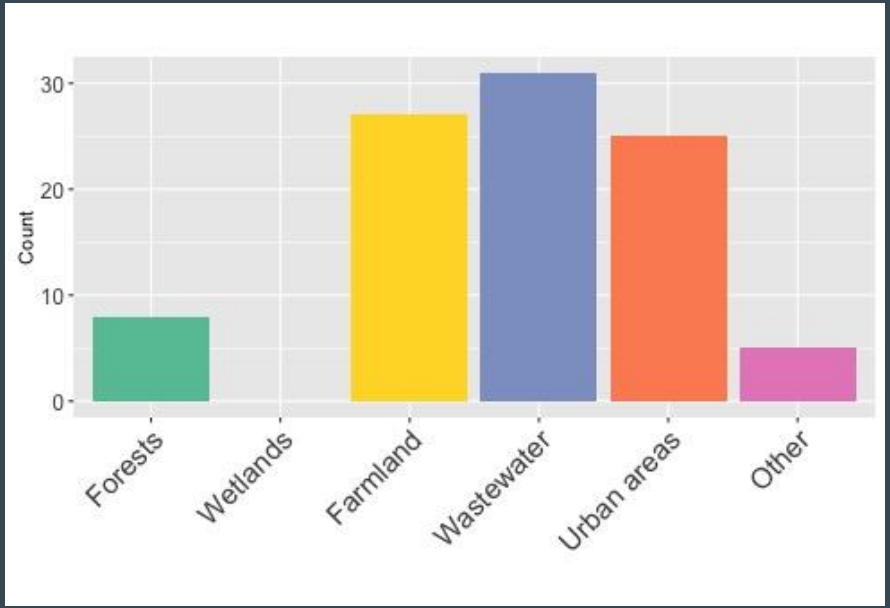
Lake Champlain



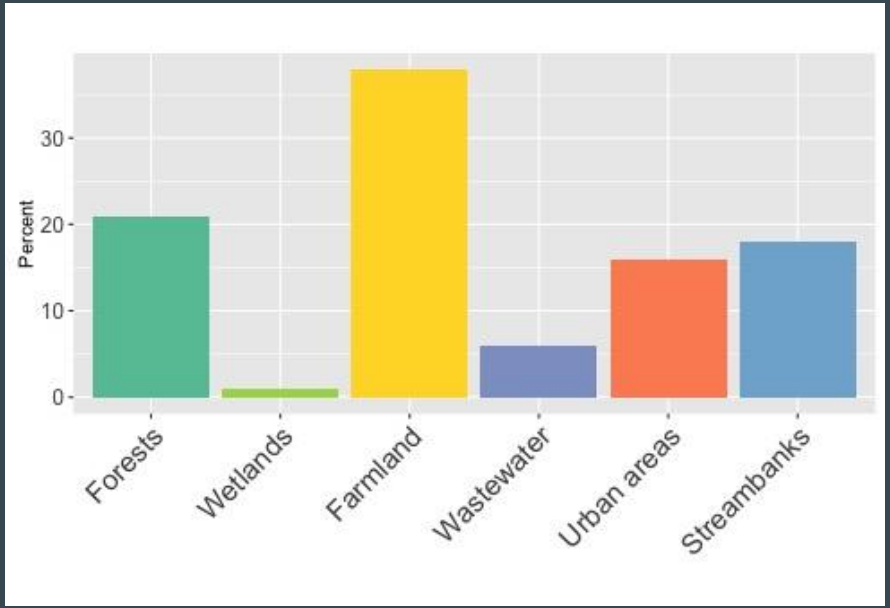
Addison County

Lake Champlain Nutrient Loading

Survey Responses



Actual Data
(2015 LCBP Report)



Interviews: *Key Findings*

Stewardship & Solidarity

*"It's true that it hurts, but **we're all in this together**...poor farming practices have gone on for too long."*

*"We're going to have to be conscious of every rule and regulation there is. We've always been conscious, but **we're going to have to be more vigilant.**"*

*"[I've] been doing things seat of the pants...now **I'll just have to be a little more scientific and attentive to things.**"*

Interviews: *Key Findings*

Monitoring & Enforcement

*"You can be doing an awesome job, but **if you don't comply, then you're smeared**."*

*"I guess **I hate the idea of someone looking over your shoulder** at every turn. It's just not a good feeling."*

*"I've got to be honest with you, **we're right in the spotlight**... whatever you do, you've got to be sure it looks right."*

Interviews: *Key Findings*

Subjectivity & Semantics

"Where do you want to draw the line between small, medium, and large? ***It's kind of subjective.****"*

"Even if it doesn't explicitly say that vegetables are exempted, they are...because ***they aren't part of the definition.****"*

*"I've always been a firm believer in science...****I'd like to see some real data.****"*

Interviews: *Key Findings*

Economic & Environmental Externalities

"If [fertilizer] runs away it doesn't do you any good. ***If it's not done correctly, you waste your time and money—and you're not doing our lake any good either."***

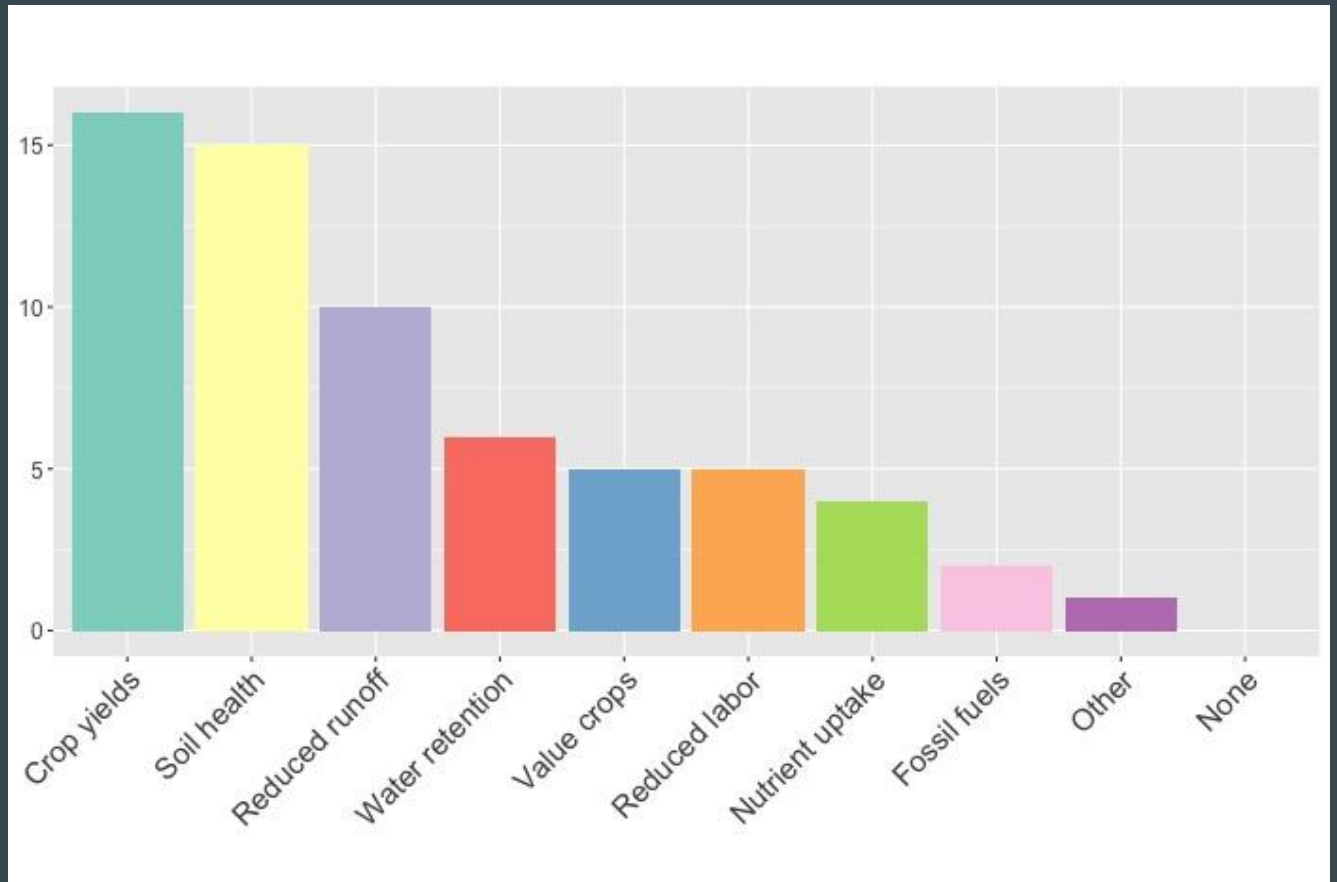
"What I'm seeing is that some of ***these regulations are going to create 'The Law of Unintended Consequences.'"***

"The phosphorus in the Lake is not the problem*—it's how it gets there."*

Survey & Interviews

Tile Drainage

Tile Drainage: Advantages



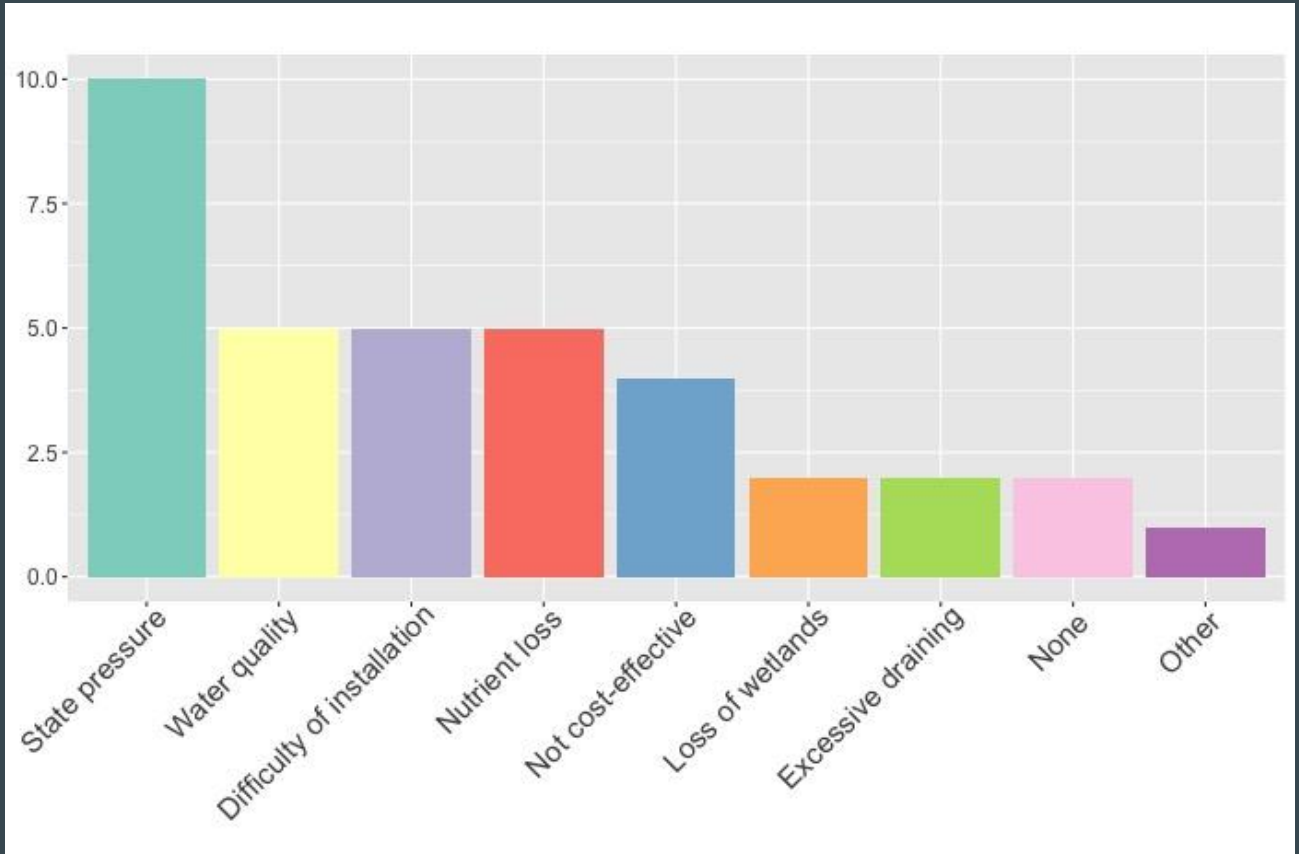
Tile Drain Advantages

“Pros certainly would be drier fields, getting on them quicker in the spring….Some of the wet spots would be gone, more production.”

“Because we don’t have this wonderful sandy-loam soil that drains really well, we wanted to be competitive, especially with early markets, and what that meant was getting water, snowmelt, whatever off of your fields as early and quickly as possible.”

“To have our field be dry. To be able to use it. Basically so we wouldn’t have a bunch of standing water and erosion.”

Tile Drainage: Disadvantages



Tile Drainage Disadvantages: *State Pressure*

"It's something that we have expressed interest in doing. Right now...the ***state's dead-set against it****....Some of the water's not as clean as they would like to see. But my point of view is,* ***you can treat it in one concentrated area a lot better than you can treat it in every runoff spot in the field.****"*

"If you spend...$3,000 an acre to [tile your fields], and then [the state] just comes out and blocks them, that doesn't make a lot of sense."

"The permitting issue would only be a problem if I got denied. That's the real issue there, is it ***just creates another unknown****...Like right now I'm thinking, 'Well, should I go ahead and get it drained this year...and t****hen I'm set, I've circumvented the requirements for now****?'"*

Tile Drainage Disadvantages: *Water Quality*

"When I put tile drains into my fields...my goal would be to get it to a ditch, to a grass waterway where it can settle and sit and ***go through a couple buffers rather than directly into the stream****....you're going to have* ***water-soluble nutrients*** *that are going to be directly put into the water system."*

"I used to think, ***'I can control erosion, and I'm not contributing to the problem****…' But lately, I guess there's been more data... apparently you can have phosphorus suspend[ed] in water."*

"I've talked to some Extension folks about taking samples at the outflow to establish a baseline and see, ***'are we losing phosphorus through the drainage tile?'*** *I don't know because I haven't tested."*

Water Sampling

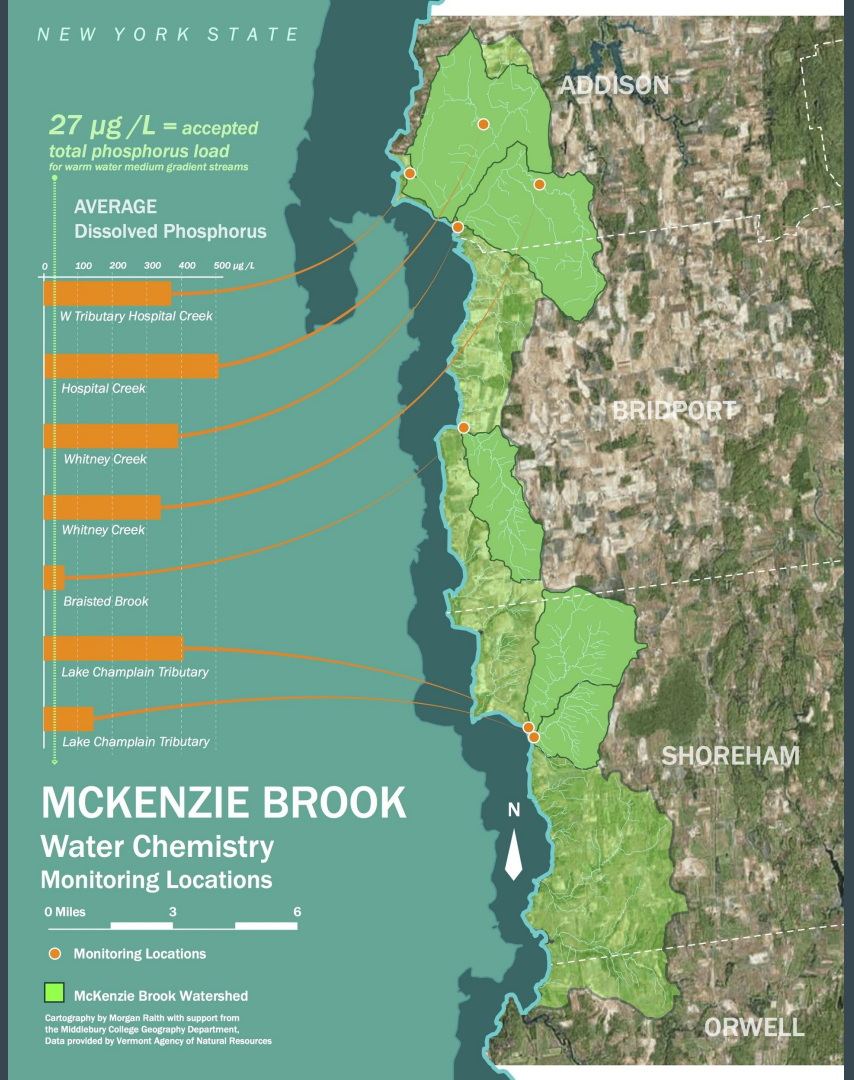
Water Sampling: *Methods & Discussion*

- Lack of information
- Methods
  - Tile drain outlets
  - Confidentiality
  - Phosphorus tests
- Challenges
- Future projects

Mapping & Spatial Analysis

Mapping

Current Nutrient Loads + Monitoring Locations



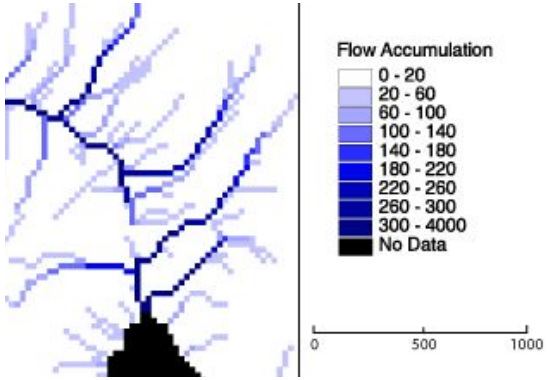
Mapping

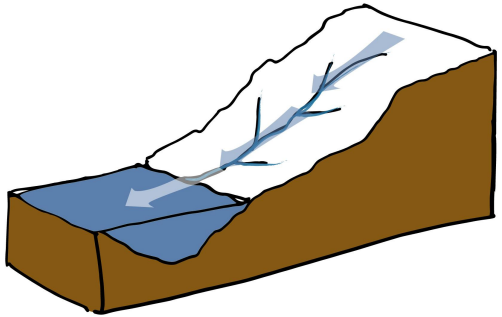
Future Data Collection and Experimental Design

Sub-watershed analysis as a tool for future sampling and experimental design

Flow direction and accumulation

Sampling above 95 ft (Lake Champlain surface elevation)



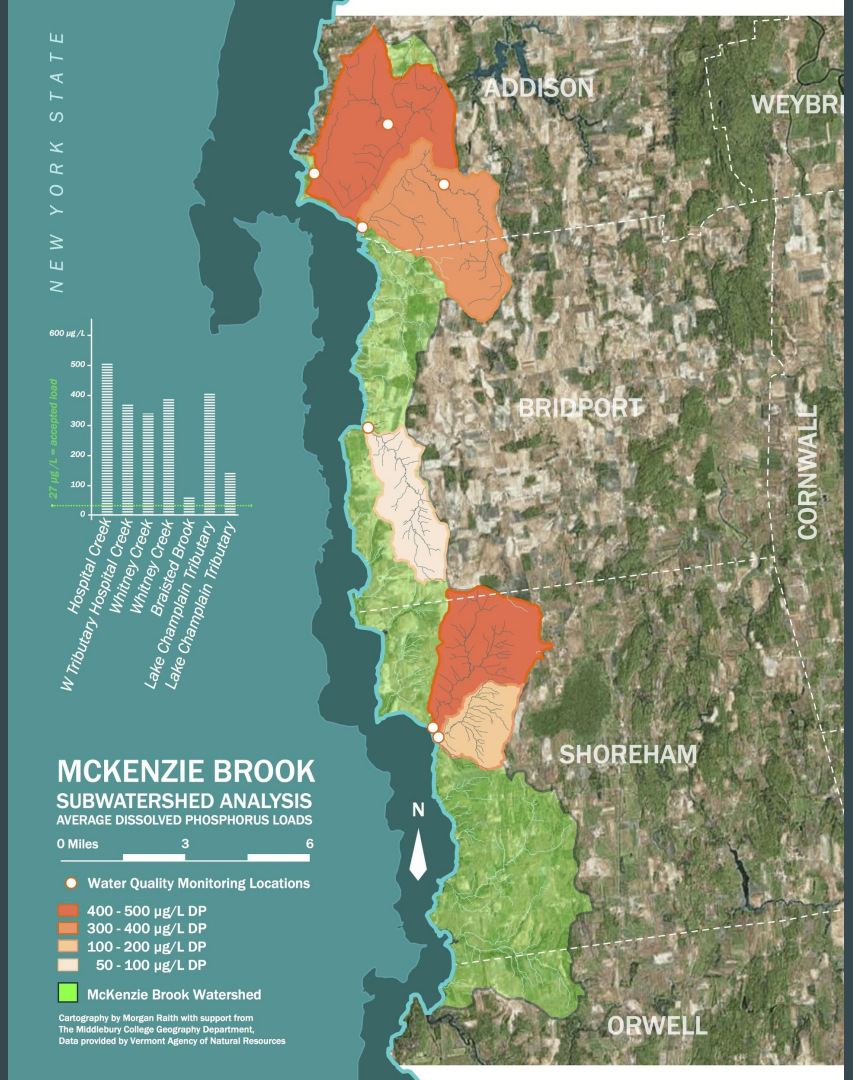


Mapping
Subwatershed Analysis

How does each subwatershed contribute ?

Potential for analysis with changing land use and BMPs in each subwatershed

Need for additional water sampling and monitoring



Conclusions

What We Gained

- Valuable personal interactions with farmers
- Better understanding of Act 64 and its implications for agricultural practices

What We Can Contribute

- Better insight into perceptions of water quality and tile drainage use in Addison County
- Suggestions for further experimental design and future monitoring of tributaries in the McKenzie Brook watershed