Modeling Farmer/Regulator Relations in the Missisquoi Bay Area

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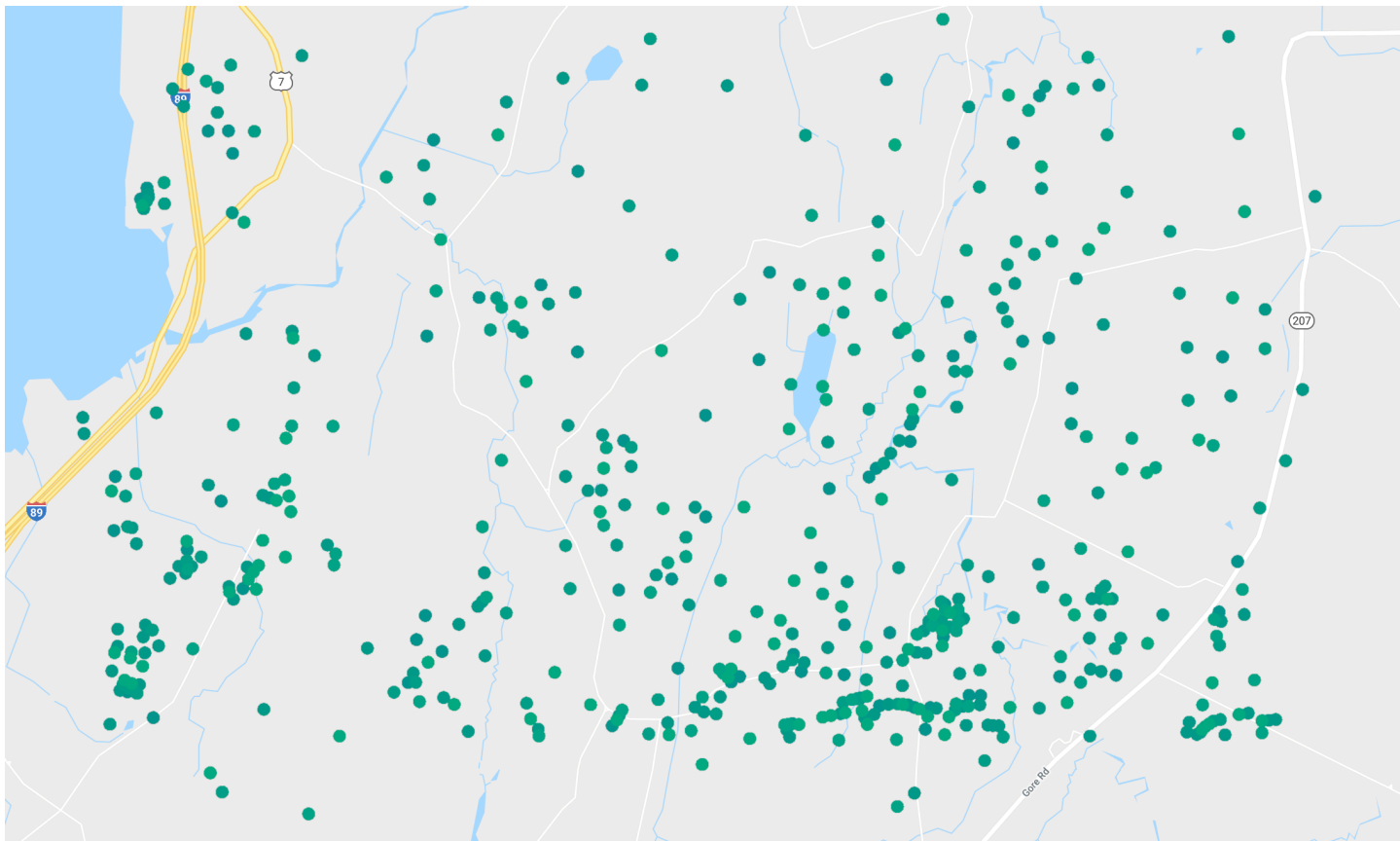
The Farmer/Regulator Model

We have farmers on a landscape.

BMPs



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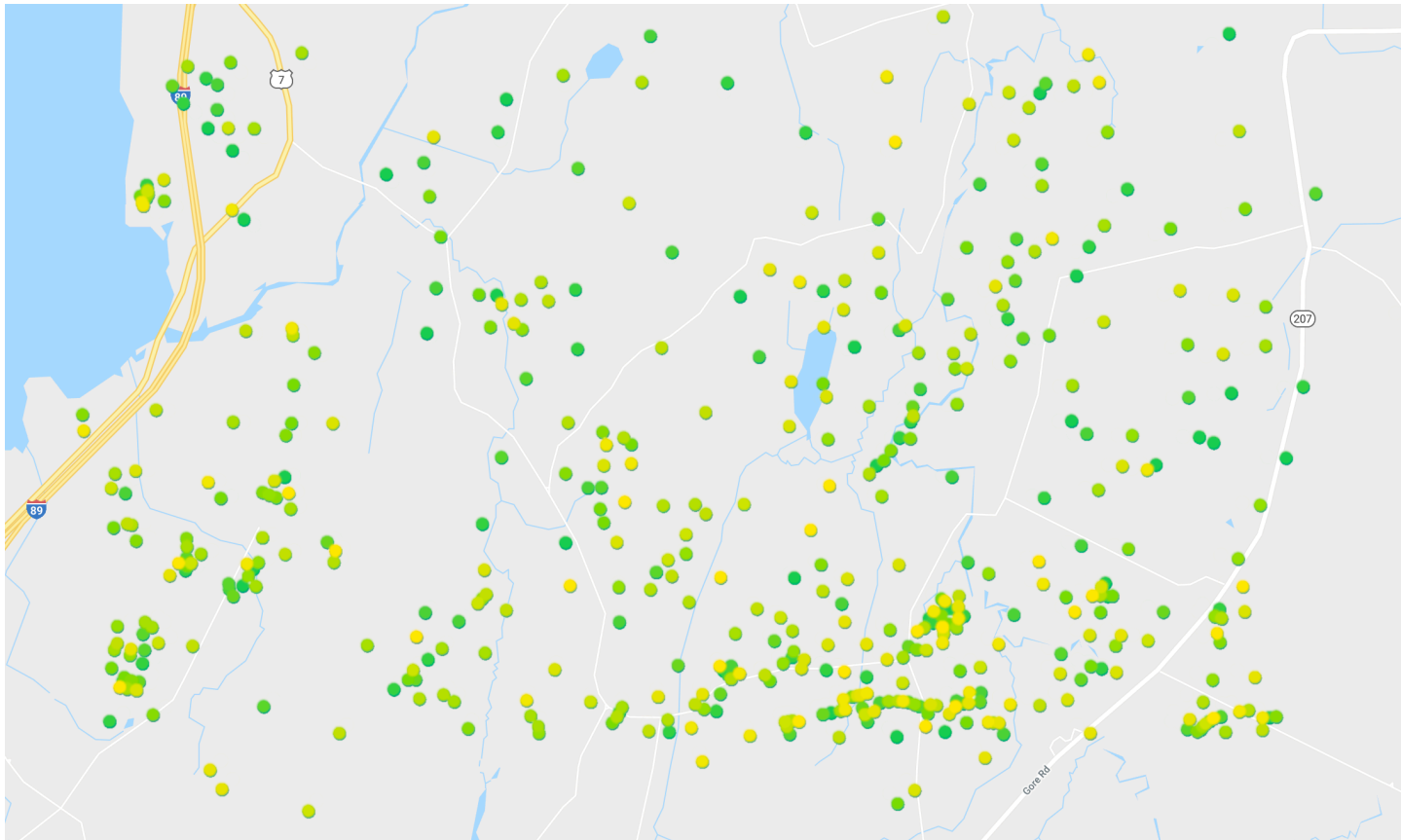
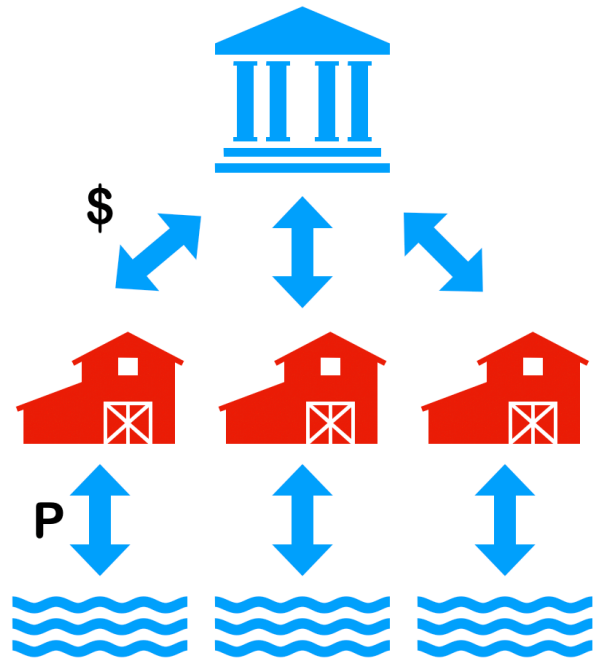


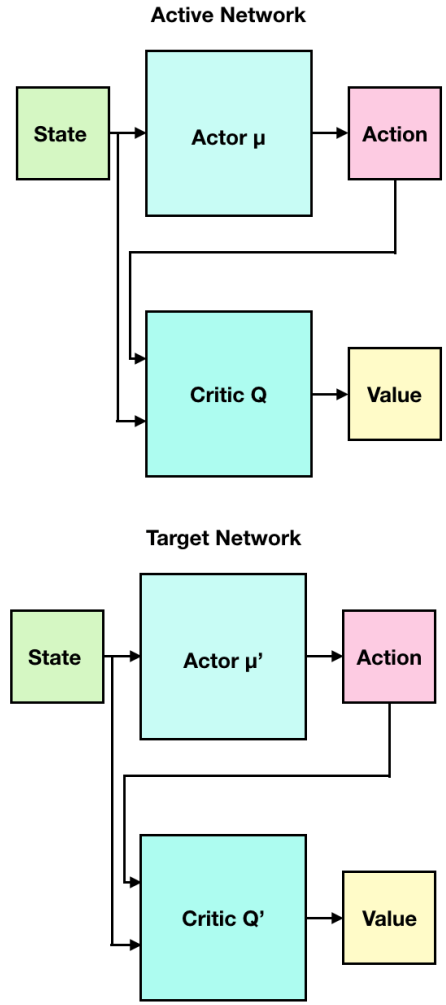
The Farmer/Regulator Model

- Looking at the relationship between individual farmer agents and a single municipal-level regulator agent over forty year model runs (2000–2040)
- Examining how decision-making changes under different potential scenarios
- Key Outputs
  - P Output
  - Losses from Extreme Events
  - Implementation of Agricultural Best Management Practices



Agent Learning

- Using a deep double Q network architecture with stochastic policy gradient and action replay to train agent decision-making in the model
- By training on past experience, agents can 'learn' to make decisions based on expectations of potential future conditions



Differentiation in Decision-Making

- For each scenario, 10 model runs were done and we looked at mean BMP adoption
- Under different scenarios we can see different mean rates of adoption and other behavioral trajectories