



Climate Change Scenarios and Adaptation Strategies

Nancy Luong



Regional Climate Change Scenario Development Workshop

- In mid-November of last year a climate change scenario development workshop for the Lake Champlain Basin was held with over a hundred experts in business, government, higher education and nonprofit organizations.



Question

- What is the pattern of interdependence between the impact chains that flow from climate change drivers?
- Does this pattern reveal any key strategies or critical developments around which the whole system changes?

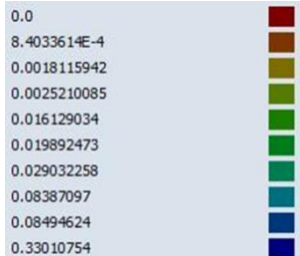
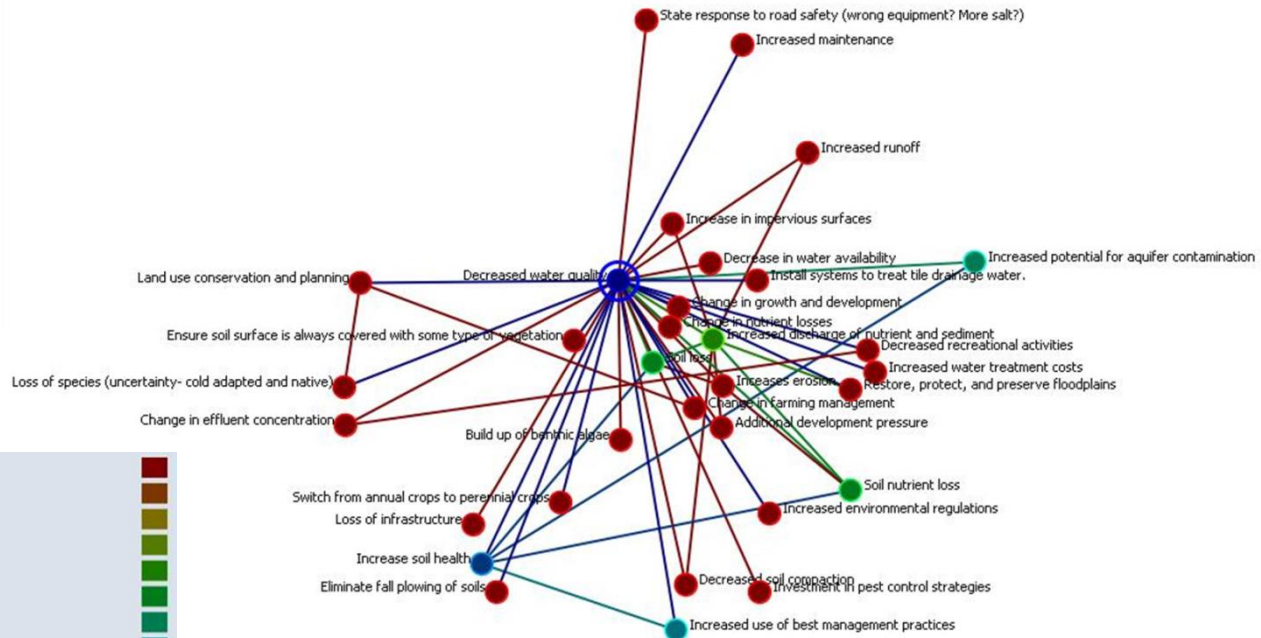
Methods

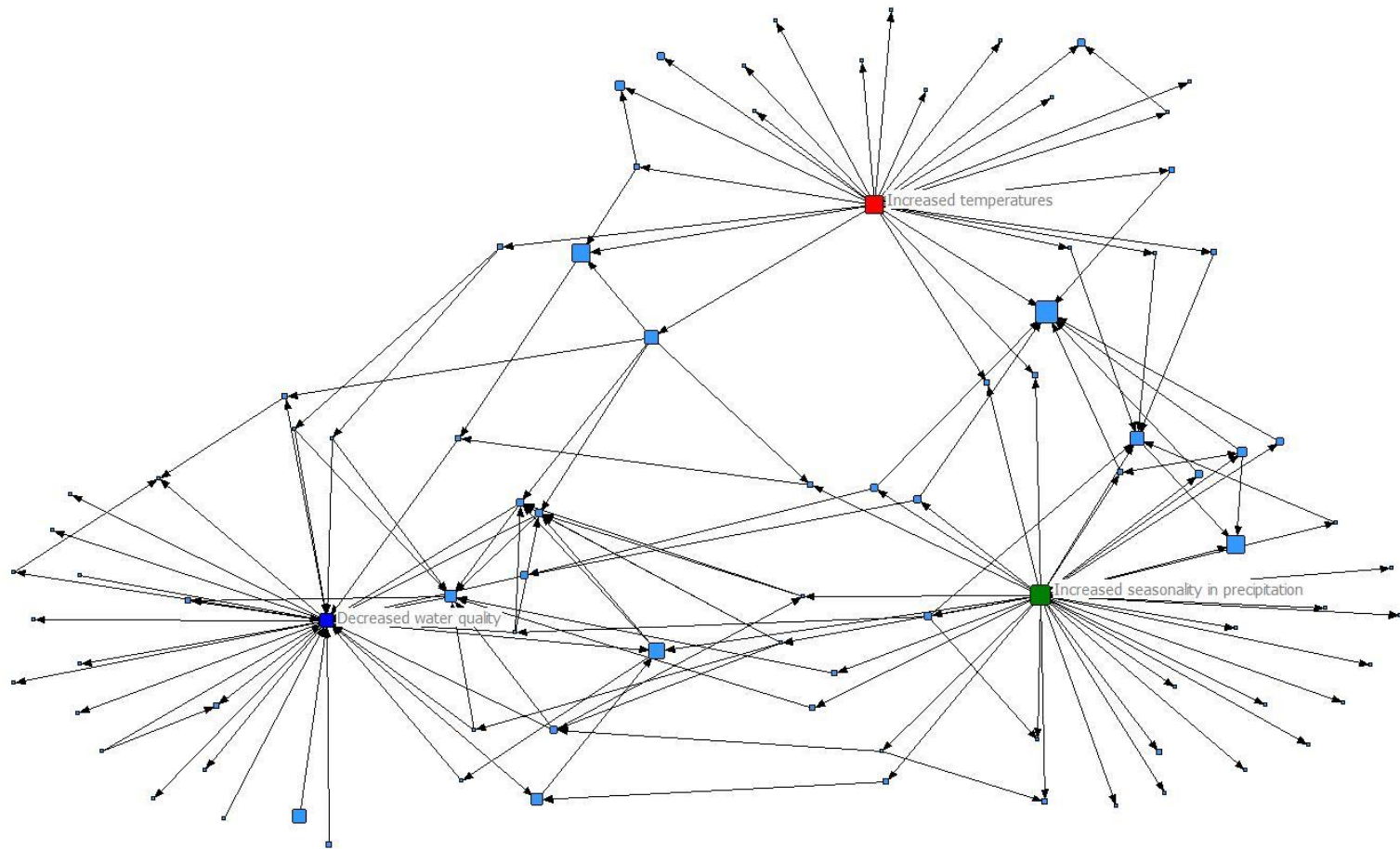
- Clean the data gathered from the workshop in Microsoft Excel
- Validated data was put into UCInet and *ORA
- Programs produced network graphics and ran network analytic measures

2D Visualization

Decreased Water Quality

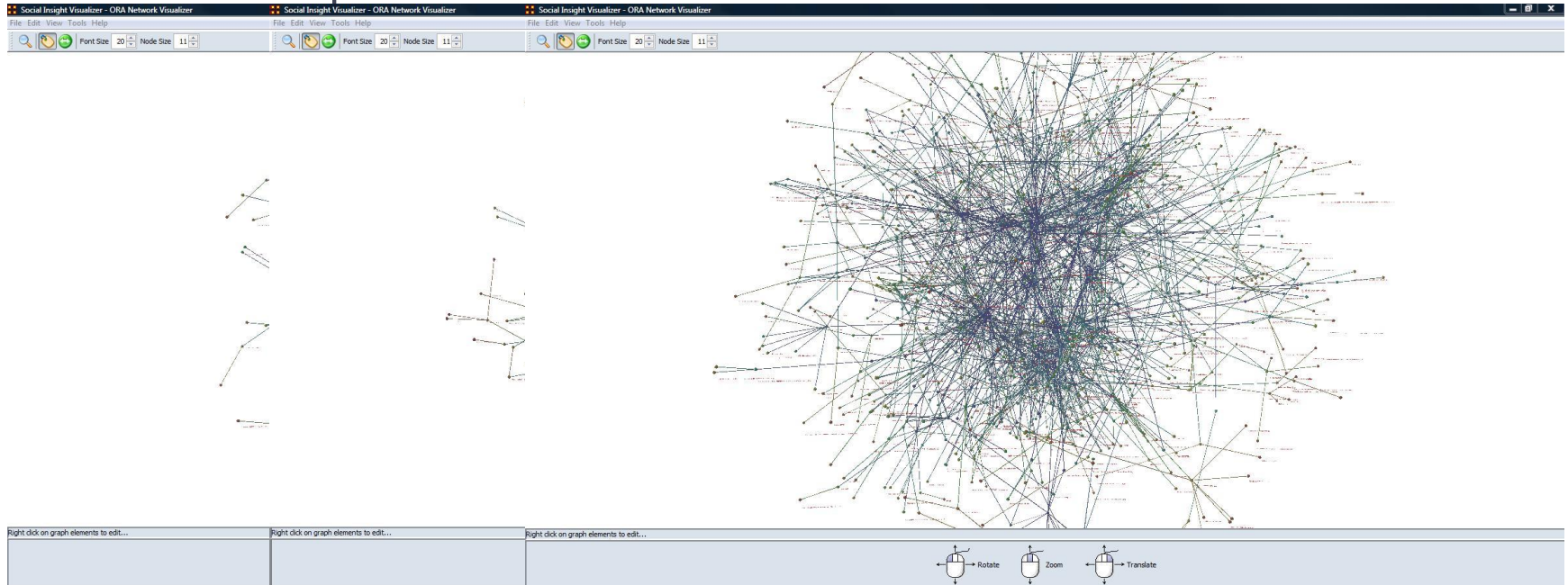
	Climate Drivers	First Order Impact	Second Order Impact	Third Order Impact	Fourth Order Impact	Fifth Order Impact
1						
323	Increased loss of snow and ice cover	Increased winter runoff from farms	Increased discharge of nutrient and sediment	Decreased water quality	Eliminate fall plowing of soils	NRCS state programs are already in place
324	Increased seasonality in precipitation	Increased winter runoff from farms	Increased discharge of nutrient and sediment	Decreased water quality	Install systems to treat tile drainage water.	NRCS state programs are already in place
325	Increased loss of snow and ice cover	Increased winter runoff from farms	Increased discharge of nutrient and sediment	Decreased water quality	Install systems to treat tile drainage water.	NRCS state programs are already in place
415	Increased temperatures AND Increased seasonality in precipitation	increased winter runoff	Increased discharge of nutrient and sediment	Decreased water quality		
440	Loss of snow and ice cover	Extended low flows from lack of snowpack and spring rains	Build up of benthic algae	Decreased water quality		
461	Loss of snow and ice cover	Increase soil health	Increased potential for aquifer contamination	Decreased water quality		
505	Increased population movement	Change in habitat	Investment in pest control strategies	Decreased water quality	Loss of species (uncertainty-cold adapted and native)	Preserve refugia
506	Increased population movement	Change in habitat	Investment in pest control strategies	Decreased water quality	Loss of species (uncertainty-cold adapted and native)	Preserve connectivity targeted land
507	Increased population movement	Change in habitat	Investment in pest control strategies	Decreased water quality	Loss of species (uncertainty-cold adapted and native)	Land use conservation and planning
804	Increased temperatures	Increased demand for public space	Additional development pressure	Decreased water quality		
807	Increased temperatures	Increased demand for public space	Increase in impervious surfaces	Decreased water quality		





Total 3D Visual

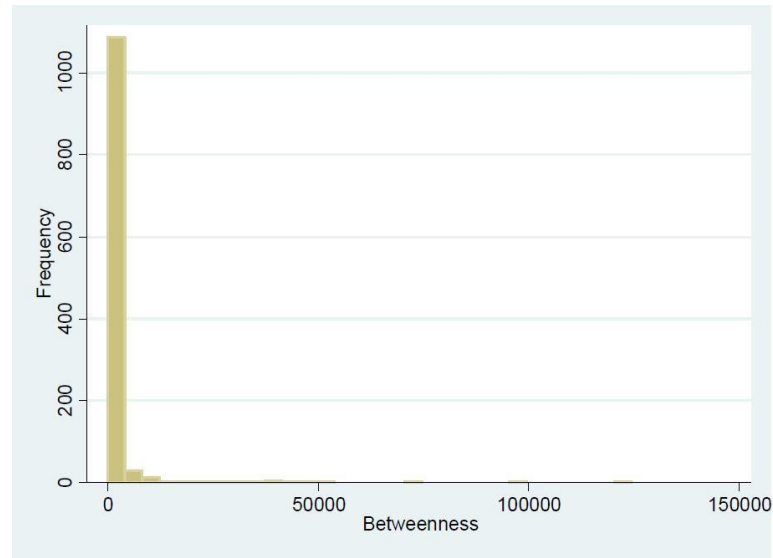
- Insert video from recording program
- Sample frames



In-Degree Centrality

Rank	Agent	Links
1	Extended growing season	130
2	Declining health	86
3	Crop diversification	80
4	Increase soil health	64
5	Decreased water quality	61
6	Transportation network ceases to function	56
7	Long-term displacement	52
8	Loss of jobs, income/wages	50
9	Increased pests	48
10	Loss of infrastructure	46

Betweenness Centrality



Out-Degree Centrality

Rank	Agent	Links
1	Increased seasonality in precipitation	365
2	Increased flooding	364
3	Increased temperatures	266
4	Increased population movement	195
5	Combination of internal climate drivers	179
6	Extended growing season	130
7	Loss of snow and ice cover	82
8	Declining health	75
9	Crop diversification	66
10	Transportation network ceases to function	56

Summary

- What does this mean for us?
 - Plan ahead

Future work

- ❑ Integrate impact assessments into adaptive management plans.
- ❑ Involve stakeholders for input
- ❑ Produce a risk assessment analysis of the critical scenarios