

# NETWORK ANALYSIS OF MISSISQUOI ACTION ARENAS

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# Background

- In order to further combat water pollution problems in Lake Champlain, the BREE team seeks to identify stakeholder networks and gauge their impact on the watershed.
- Networks consist of many different types of interactions, and stakeholders can have varying levels of involvement within the network.
- By deciphering these networks within specific contexts (Action Arenas) we can better understand the role of influential stakeholders and utilize raw data as a means of network analysis.

# Defining Terms

- Actors – Persons and/or organizations where theory originates and direction is established; have a tangible level of involvement with a given network.
- Action Situation – Space where interactions occur and outcomes are produced
- Action Arena – Social-organizational vectors where many processes converge to facilitate ambitious goals.

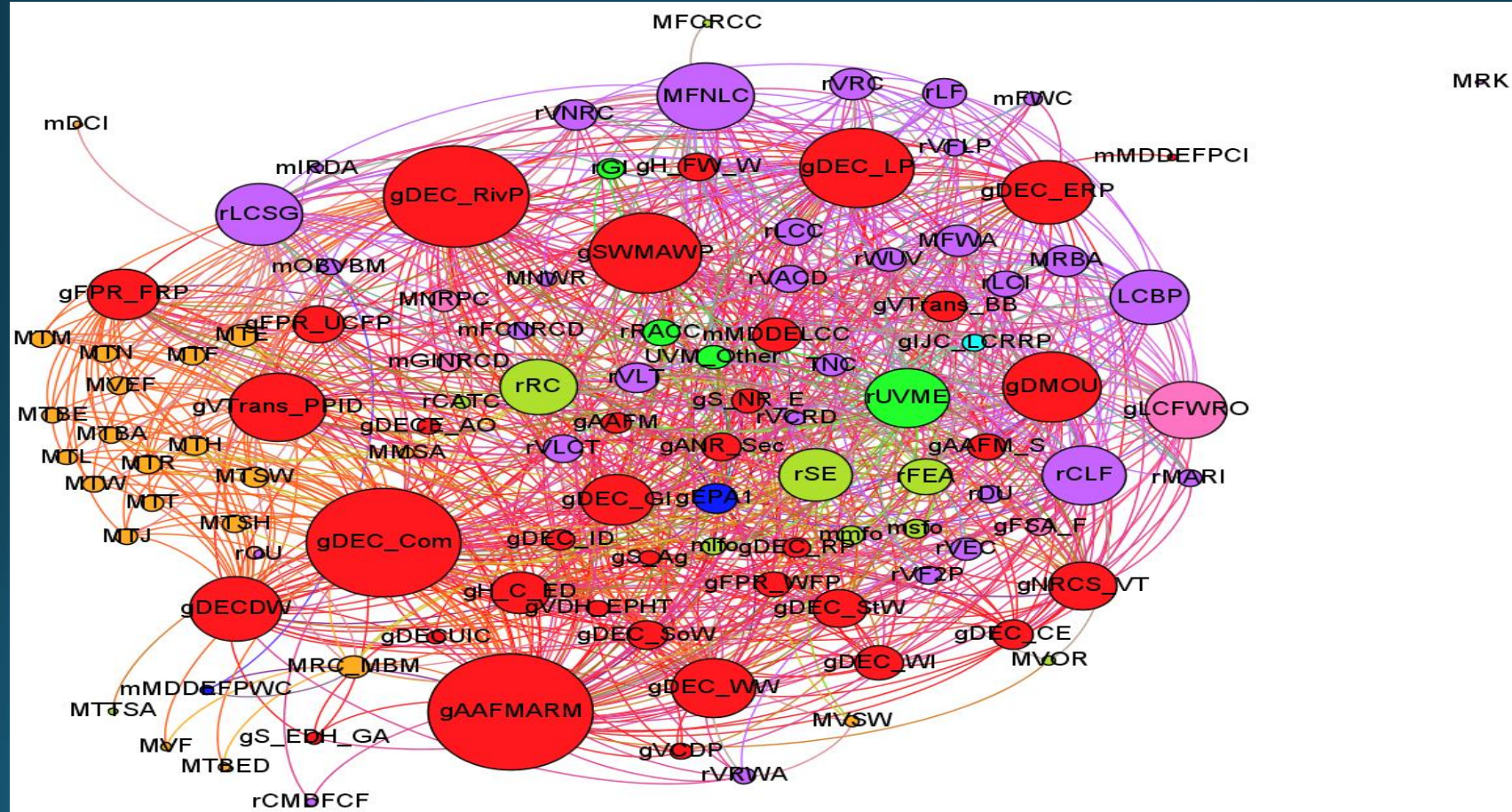
# Defining Terms

- Network Centrality- Measures that interpret nodal influence and network structures.
- Centrality Scores:
  1. Degree- “The number of ties incident upon a node ... no indirect links”\*
  2. Between- The number of paths that pass through given node; how a node acts as a bridge.\*\*
  3. Eigen- Measure of influence (i.e. central node connected to other nodes whom are connected to more nodes thereafter).\*\*\*

(Borgatti,2005: 60\*\*, 62\*, 61\*\*\*)

# What Does a Network Look Like?

Water Quality TA Network '14 (Koliba, Sheinert, Zia, Merrill)  
Missisquoi TBP AA PC&C '15



# Lake Champlain Action Arenas

Koliba, Scheinert, Zia, Merrill

ACTION ARENA	DESCRIPTION
Agricultural Technical Assistance Provision Coordination	Actors involved in agricultural technical assistance provision meet regularly to coordinate actions around achieving common water quality goals. Agricultural TA working groups are loosely coordinated and meet episodically.
Tactical Basin Planning	Actors participate in tactical basin planning meetings to develop water quality management plans for specific watershed and rivers. Priority is given to projects with higher return on investments relative to water quality. Each tactical basin planning meetings take place on a cyclical pattern, usually producing annual plans for the management of water quality across a geographic (watershed) region.
Lake Champlain Basin Program Planning and Research Coordination	Actors participate in the review and production of research on Lake Champlain and wider basin through the creation of “opportunities for Action” strategic plans every five years, State of the Lake Reports, and the use of grants and contracts to complete critical research on the LCB.
Total Maximum Daily Load (TMDL) Development	Actors involved in this action arena have informed the design of the state’s TMDL plan. During the time that this data was collected (2013-2015) the State of Vermont was developing a TMDL plan for the Lake Champlain Basin in order to mitigate phosphorus loading into the Lake. The Environmental Protection Agency (EPA) set targets for each watershed and the State Agency of Natural Resources, Governor and State Legislature are responsible for funding and executing the mitigation plan.
Regional Land Use Planning	The State of Vermont has very weak regional and county government structures, with zoning and land use planning decentralized to local municipalities. Regional planning processes are in place and undertaken on a cyclical basis (every five years). These plans are used to provide advice to local town planners who must revise and update local town land use plans every 5 years (staggered) as well.
Municipal Stormwater Technical Assistance Provision	Based largely as an intergovernmental collaboration and groups of technical assistance government officials and private consultants, the municipal stormwater technical assistance provision action arena provides technical assistance and supports the pursuit of loans, bonds and technical assistance grants for stormwater improvements at the municipal level.
Roadway Stormwater Technical Assistance Provision	Actors involved in this action arena provide technical assistance to town and state level transportation engineers and road crews with a goal of mitigating stormwater runoff, and water-related transportation infrastructure degradation.
Green Infrastructure Roundtable	This group of actors serve on the Green Infrastructure Roundtable and play the role of an advocacy coalition focused on the promulgation of green infrastructure design. Provision of technical assistance, seeking funding for green infrastructure projects, and advocating for green infrastructure projects at the state, municipal, residential and commercial levels.

# Methods

- Deciphering raw data from institutional network survey.
- Construction of Action Arenas within Winooski and Missisquoi watersheds.
- Using existing centrality score data to rank actors given three different centrality types: degree, between, and eigen; done for three Missisquoi AAs on each of the four types of network interaction (Information & Resource sharing, Reporting, and Project Coordination and Collaboration).
- Analysis of sector (actor type) and jurisdiction distribution for top actors of each centrality score; further extended to total distribution.

# Results

- Comprehensive relationship tables as they pertain to specific Action Arenas within the Missisquoi and Winooski watersheds.
  - Binary tables identifying ties between nodes (actors).
  - Based upon 2014/2015 network surveys.
- Centrality ranking datasets identifying “important” actors within Action Arenas.
  - e.g. actors with more ties in the network can be perceived as integral organizations to work with when it comes to the question of water quality.
- **Cumulative: Foundational data organization to be built upon by the continued work of BREE interns and staff members.**



# Further Research

- Is there a way to compute the relative influence of a node within a network as determined by its presence across individual subnetworks (coding for multiplex ties)?
- What would be the benefit of eliminating between centrality inside a nodal network? Is it feasible to do so?

# References

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