Roles and Positions for Comparison: Using Block Modeling to Compare Planned and Empirical Implementation Networks in the Lake Champlain Basin

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Assessing Plan Implementation and Performance

- There is a persistent gap between planned implementation and actual implementation (Allen, Curtis, Stankey, and Shindler, 2008)
- Plans can be reviewed as networks and the gaps between the network inherent in the plan and the empirical network is a measure of the system's performance (Kapucu and Demiroz, 2011)

Comparing Networks

- Difficult substantive task
  - Planned networks and empirical networks have different levels of specificity
  - Planners may not be able to account for the full scope of complex networks
- Difficult technical task
  - Standard comparisons methods are often imperfect
  - Standard comparison means require networks to be compared must:
    - Have the same number of nodes
    - Have the same exact set of nodes

Block Modeling

- Primary use is as a method of data reduction
- In reducing data, it simplifies the complexities that inhibit direct comparison between reified networks within plans and empirical networks
- In reducing data, it reveals a system's basic, underlying structure

Block Identification Processes

- Cliques
- Structural Equivalence (CONCOR)
- Fuzzy Overlapping Groups
- Network Structure (Newman Groups)

Block Model Points of Comparison

- Revealed underlying network structure
- Block memberships
- Inter-/Intra-block density matrix

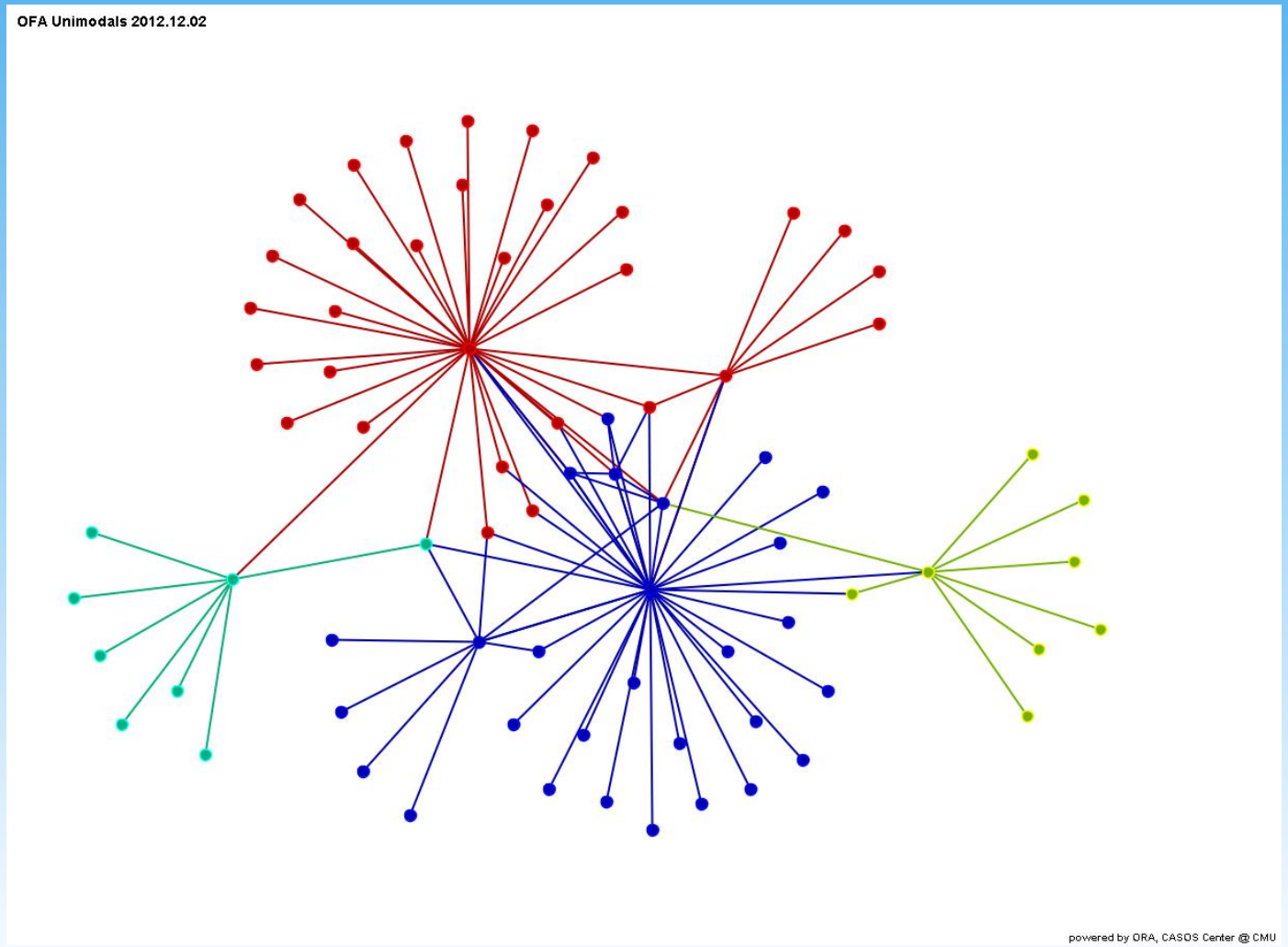
Case Study: Lake Champlain Basin Water Quality Management

- On-going need to control harmful algal blooms within Lake Champlain
- On-going failure to meet water standards under the Clean Water Act
- Two Basin-wide planning regimes
  - Lake Champlain Basin Program's Opportunities for Action (OFA)
  - Environmental Protection Agency-drive Total Maximum Daily Load (TMDL)

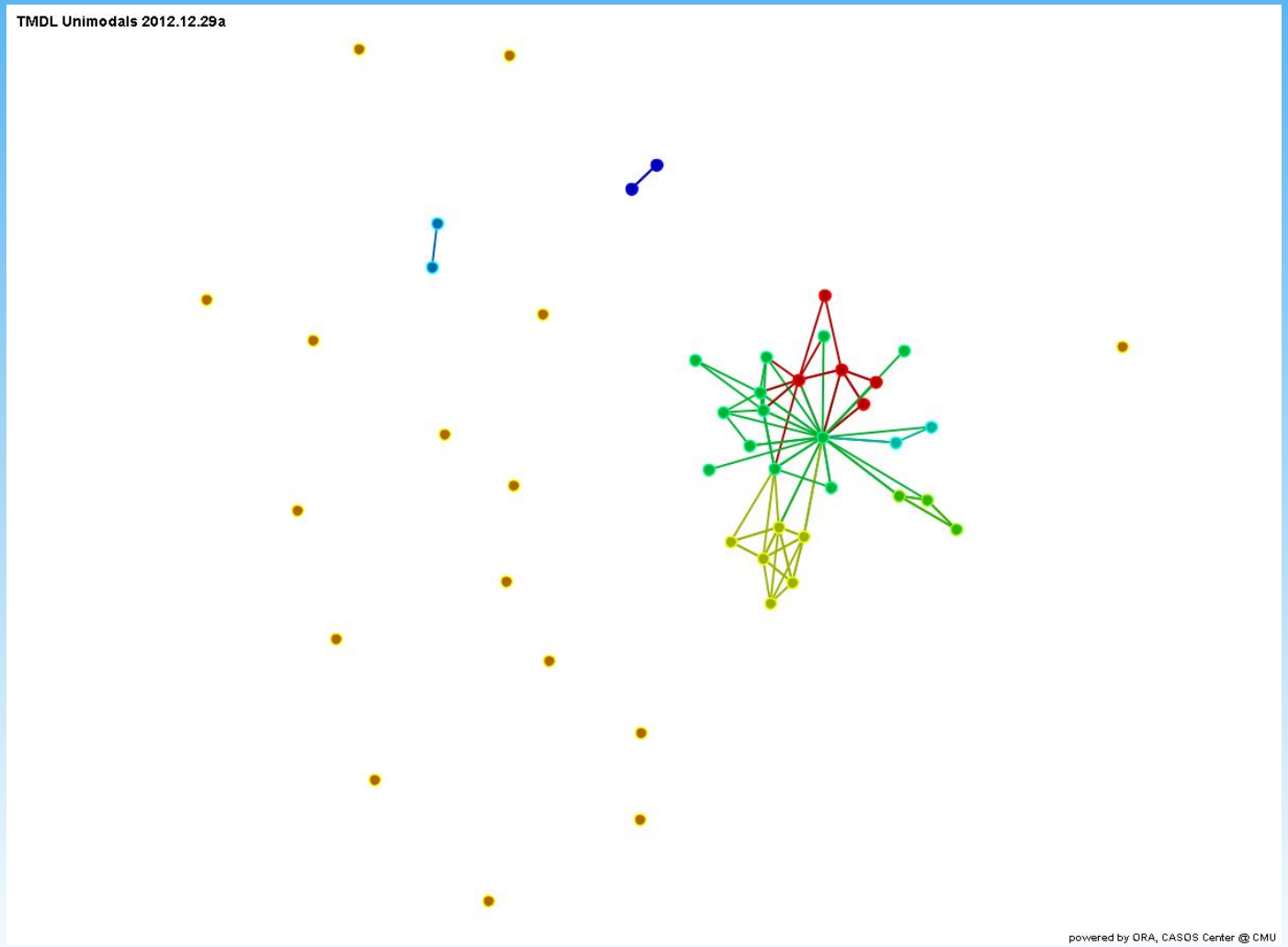
Data

- TMDL and OFA (Koliba, Reynolds, Zia, and Scheinert, 2015)
  - Written documents
  - Documents provide details of tasks assigned to organizations
  - Networks formed through common tasks
- Empirical Implementation Networks (Scheinert *et al*, submitted, under review, *CGN*)
  - Network survey, summer, 2014
  - OFA and TMDL networks match most closely to the survey's Project Collaboration and Coordination subnetwork

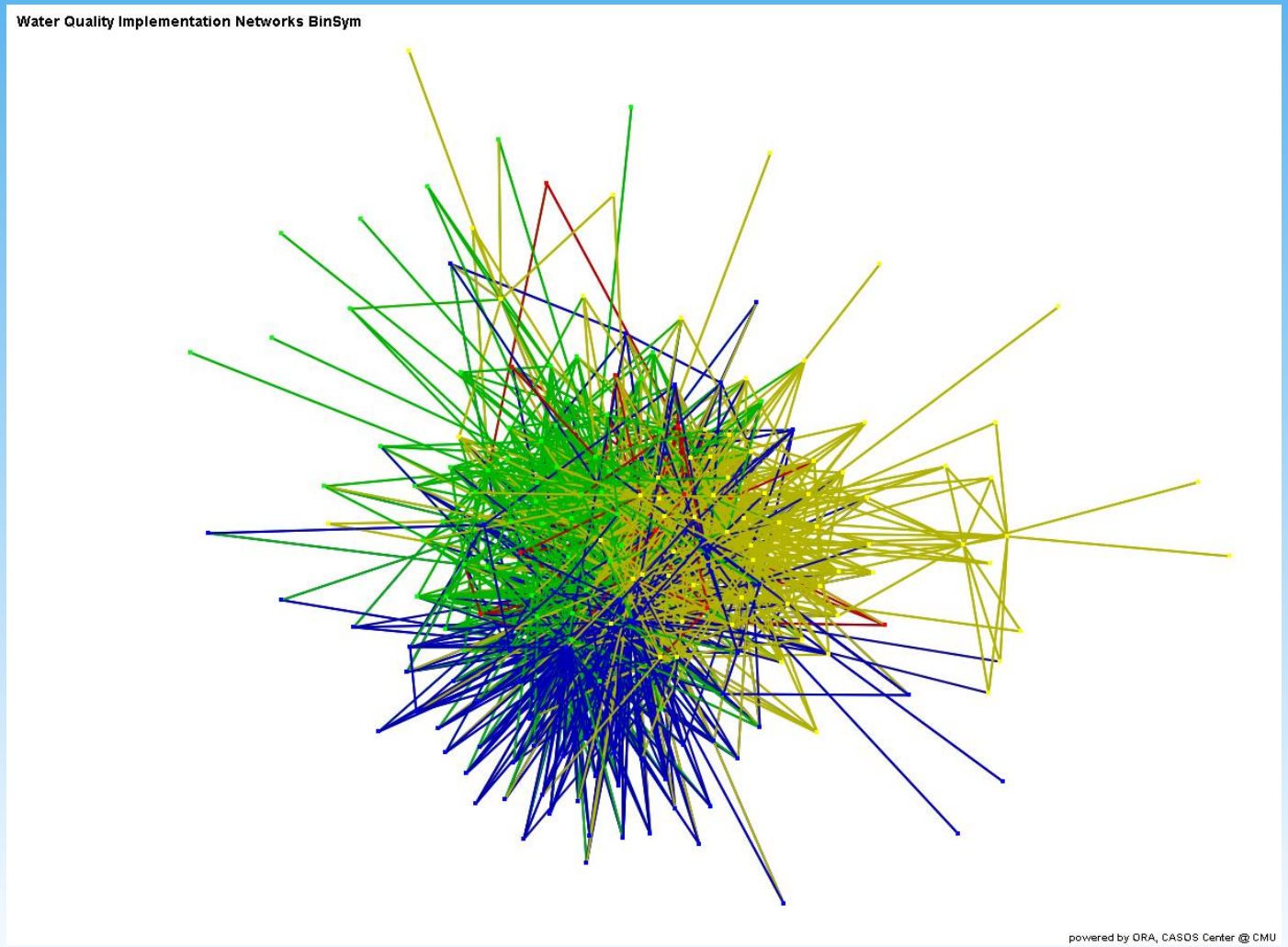
OFA: Full Map



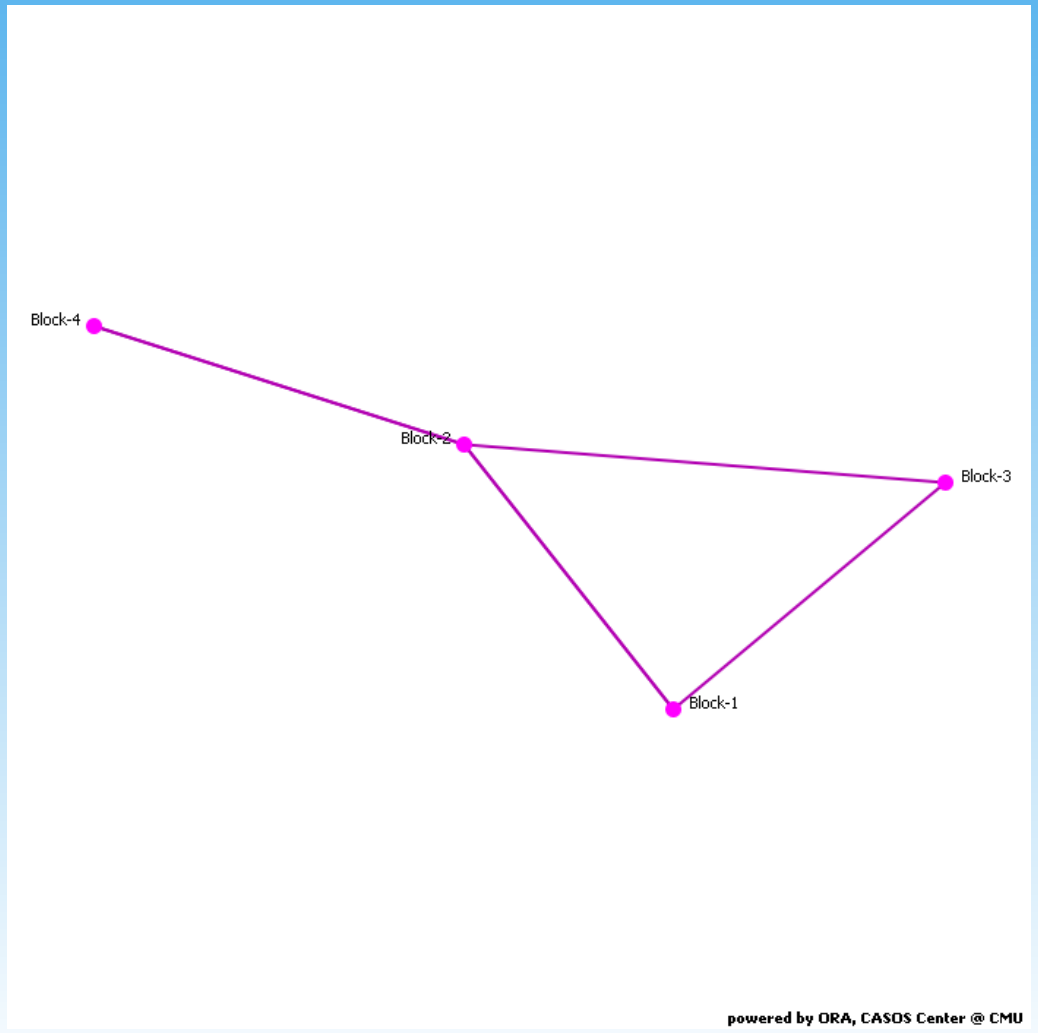
TMDL: Full Map



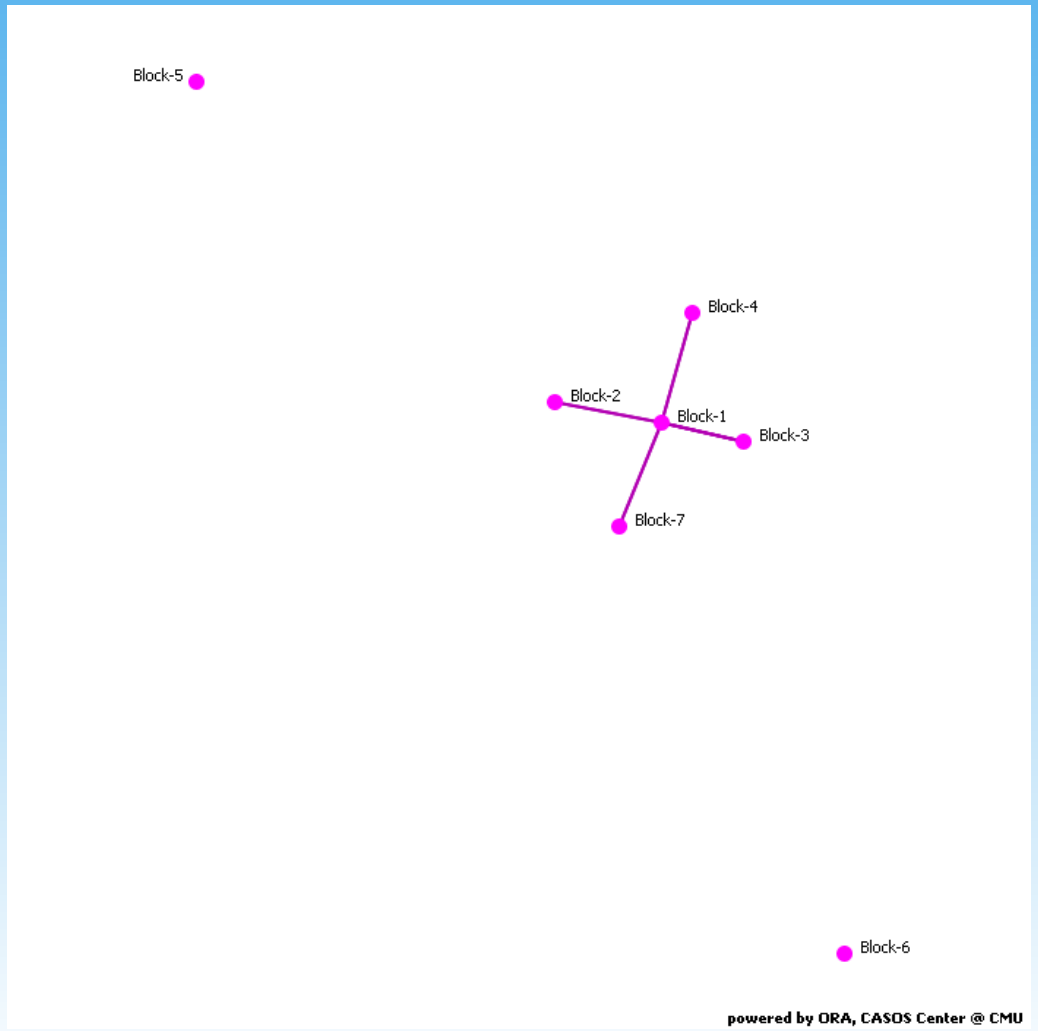
Empirical Implementation: Full Map



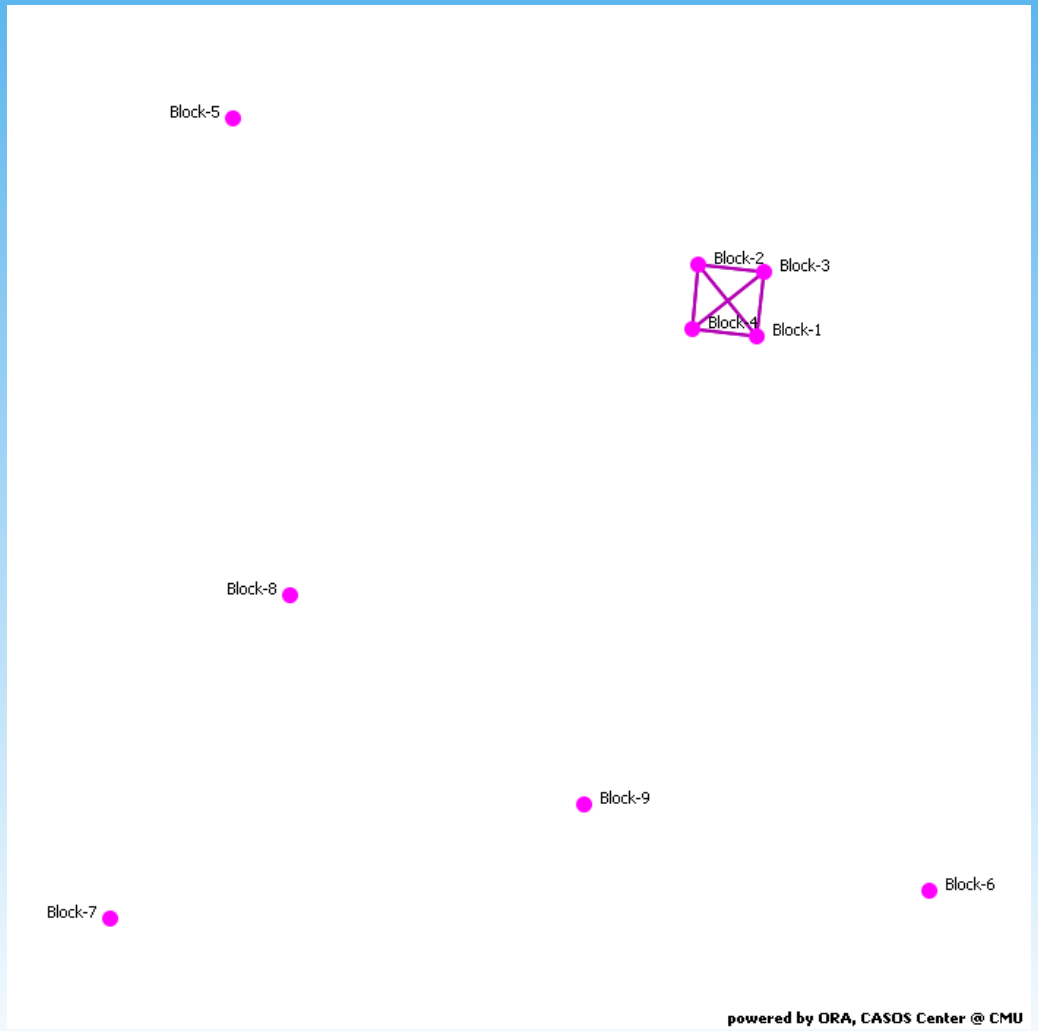
OFA: Block Map



TMDL: Block Map



Empirical Implementation: Block Map



Block Membership Characterizations

Block Number	OFA	TMDL	Empirical Implementation
1	New York agencies, EPA	Development and Planning	Agriculture
2	Vermont and Quebec agencies, USDA	Transportation-focused agencies	Municipalities
3	Municipal-level actors	Agriculture-focused organizations	Federal and state agencies, Vermont legislative committees
4	Major NGOs, individual-based entities, USACE	Governmental agencies generally	Forestry, Transportation, some technical assistance
5		University of Vermont	
6		Water treatment	
7		Rural interests	
Q-value	**0.35**	**0.41**	**0.18**

OFA: Density Matrix

Blocks	1	2	3	4
1	0.03	0.01	0.01	0
2	0.01	0.05	0.01	0.01
3	0	0	0.13	0
4	0	0.00	0	0.13

TMDL: Density Matrix

Blocks	1	2	3	4	5	6	7
1	0.21	0.03	0.10	0.06	0	0	0.08
2	0.07	0.67	0	0	0	0	0
3	0.15	0	0.40	0	0	0	0
4	0.03	0	0	1.00	0	0	0
5	0	0	0	0	1.00	0	0
6	0	0	0	0	0	0.50	0
7	0.04	0	0	0	0	0	0.50

Empirical: Density Matrix

Blocks	1	2	3	4
1	0.16	0.05	0.07	0.07
2	0.05	0.09	0.06	0.04
3	0.07	0.06	0.17	0.06
4	0.07	0.04	0.06	0.24

Conclusions

- Plans are more ‘silo’-ed than empirical networks
- Plans are built around either types of organizations (OFA) or policy domains (TMDL)
- Empirical networks have groups focused on both domains and organizational types
- Central roles for agriculture in both OFA and the empirical networks, while TMDL is focused on Development and Transportation
- Influence of both OFA and TMDL can be seen in the empirical network

Implications

- Simplified network structures allow for easier comparison
- Details preserved through characterization of group membership
- Gaps between reified networks embedded within planning documents and empirical implementation networks are more recognizable when networks are simplified and nodes are characterized at comparable levels

Questions?

Thank you!

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