



Great Northern  
LANDSCAPE CONSERVATION COOPERATIVE

# Rocky Mountain Partner Forum

## Using Social Network Analysis to Evaluate Change in a Large-Scale Collaborative Management Initiative

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University of Texas

For information about the Rocky Mountain Partner Forum, visit: <http://rmpf.weebly.com>

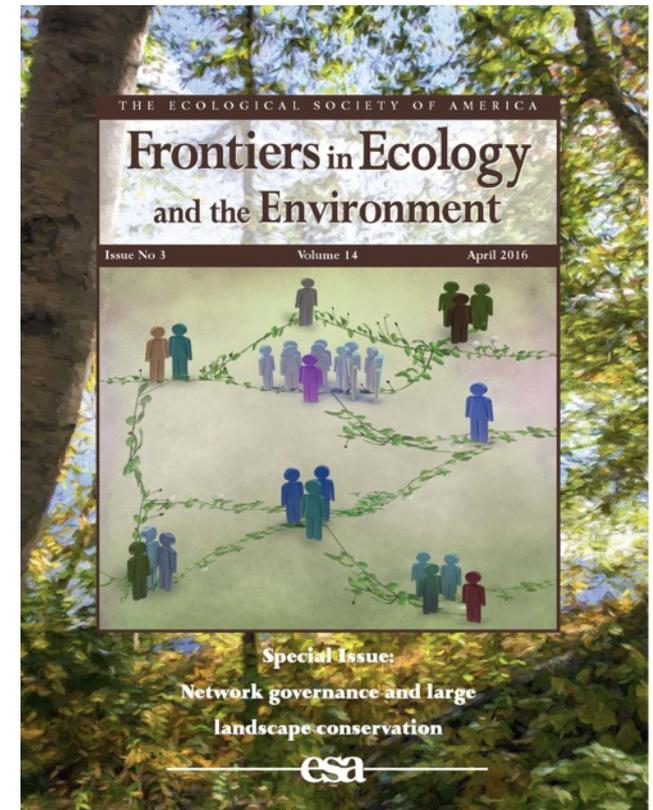
# Social Networks and Landscape Conservation

## -Presentation Outline-

- Background on performance measures and challenges of social/governance indicators
- Longitudinal analysis with the Crown of the Continent Adaptive Management Initiative
- Network-based metrics in the Northwest Boreal LCC

# Social Networks and Landscape Conservation

- We **theorize** that networks can affect an environmental outcome we care about
  - Empirical evidence suggests so
- Network analysis can provide a **methodological approach** that provides insights inside into the patterns and structure of collaborative efforts
  - But only one source of data



Bixler, McKinney, Scarlett 2016

# Why think networks?

## 1. Mismatch

## 2. Interdependent Interests

## 3. Gap in Governance

Existing governance structure is inadequate to address the problem

Community has the authority to address the problem

Community needs the authority to address the problem

Reasons “traditional” performance evaluation is challenging

# Measuring Collaborative Performance

Normative appeal vs. empirical scrutiny

Temporal nature, need longitudinal data

Little agreement on “effective” performance, plus equity and efficiency

Conceptual confusion impedes measurement

Many participants, multiple perspectives and priorities

# Measuring Collaborative Performance

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vs. empirical  
scrutiny

Conceptual  
confusion impedes  
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Temporal nature,  
need longitudinal  
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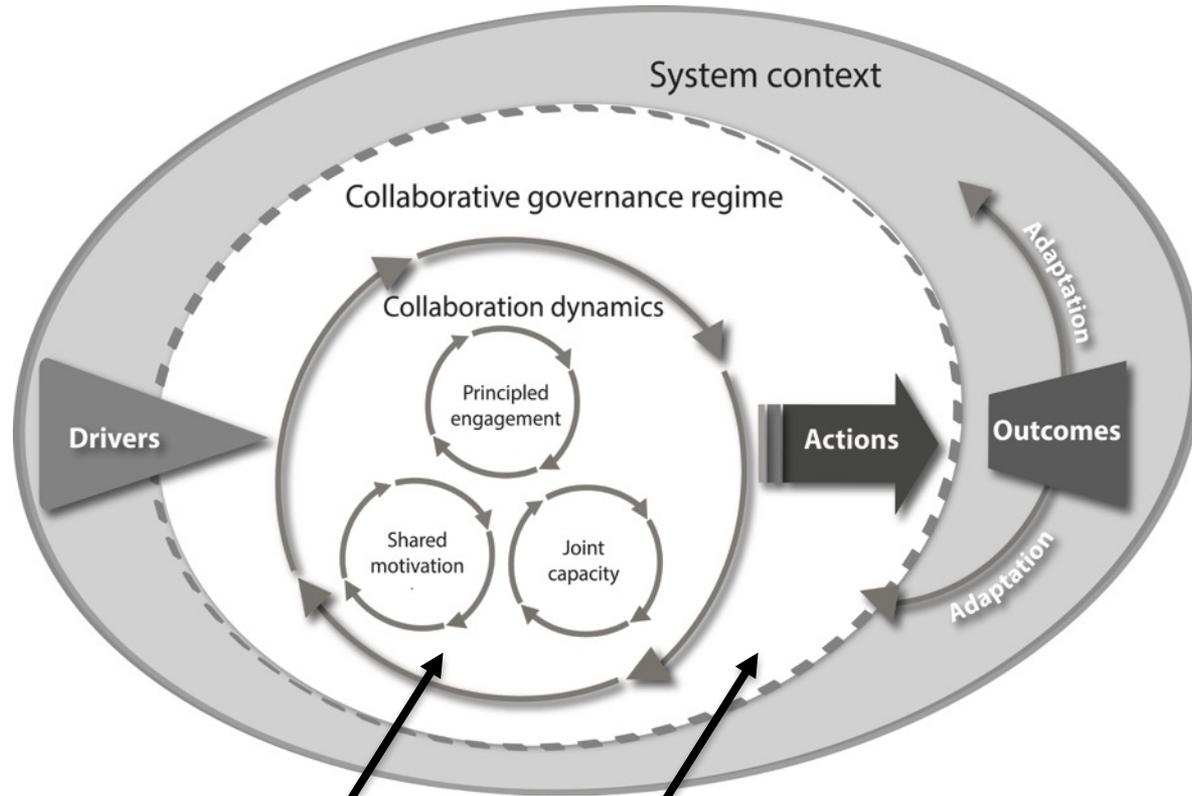
Many participants,  
multiple  
perspectives and  
priorities

Little agreement on  
“effective”  
performance, plus  
equity and efficiency

Process  
Performance

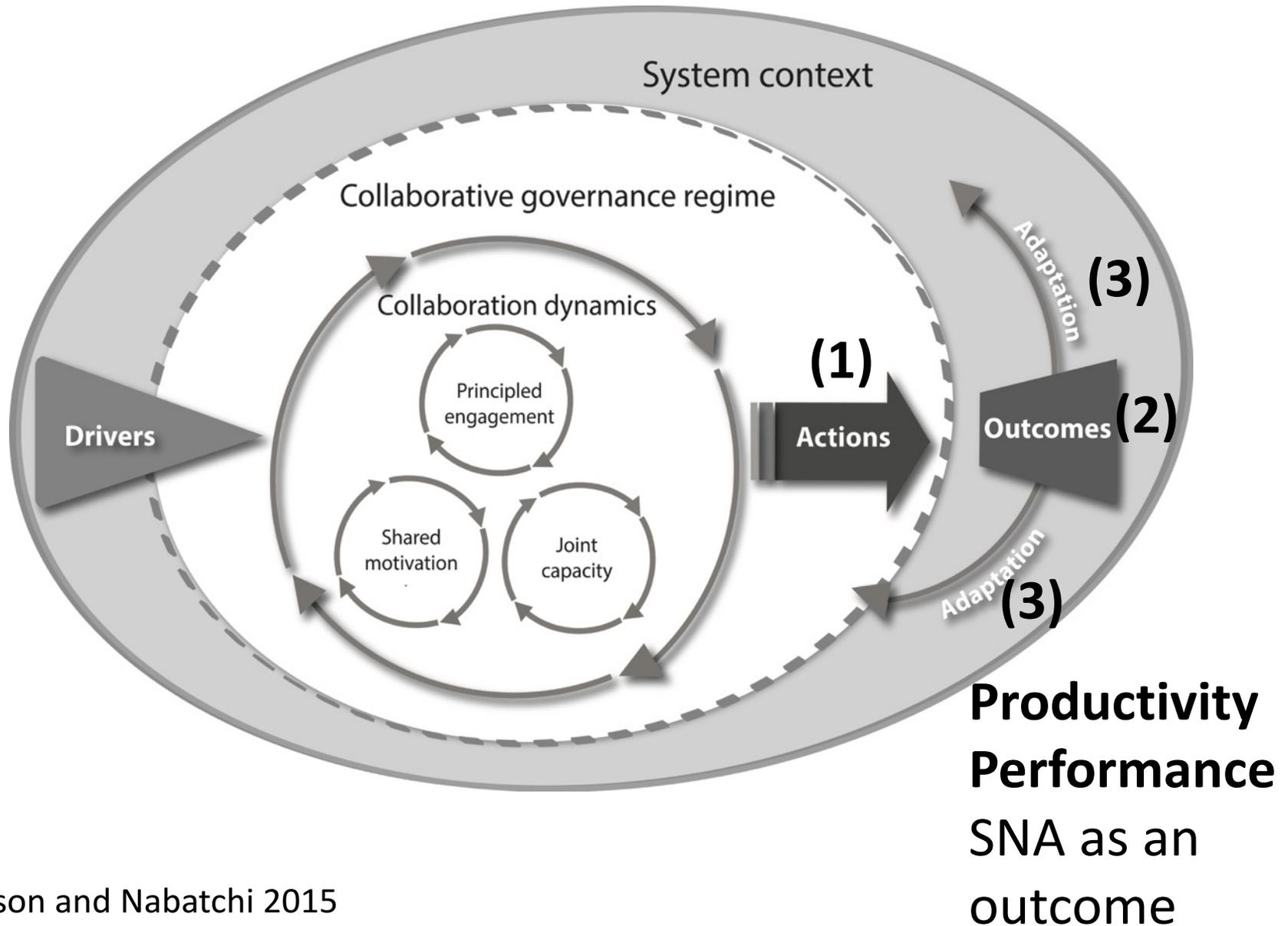
Productivity  
Performance

# Integrative Framework for Network Governance



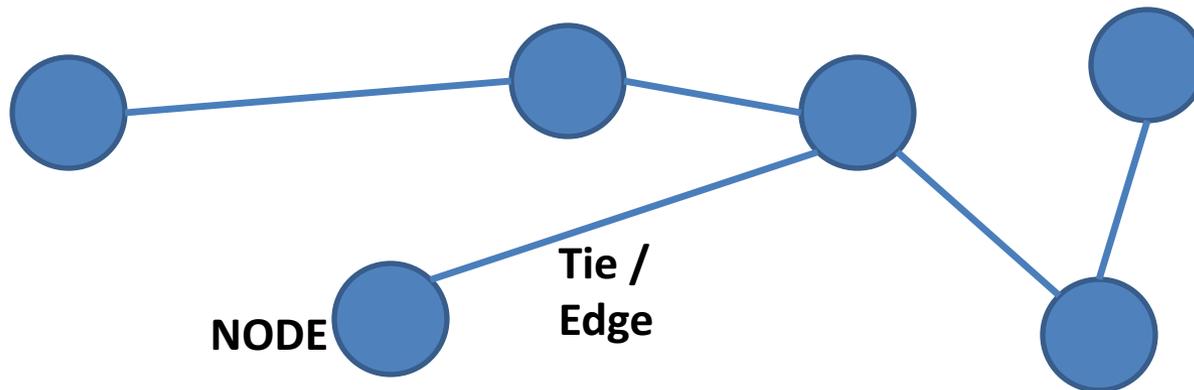
**Process Performance**  
(social network analysis)

# Integrative Framework for Network Governance



# Social Network Analysis as a Strategic Evaluation Tool

- Provides a snapshot of governance relationships
- Measures can be used as metrics for process goals
- Measures can be used as metrics for collaboration output or outcome goals



# Immediate Application: What can we visualize?

- Network composition
- Quantity of nodes (partners)
- Quantity of edges (links between partners)
- Strength of ties
- Substance of ties
  - Kinds of “quality”?

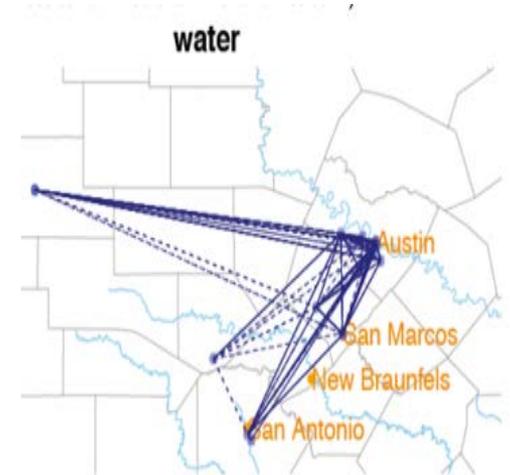
Community-based NGO	(29.55%)
Groundwater CDs_River Authority	(13.64%)
State NGO	(10.23%)
Business	(10.23%)
University	(6.82%)
National NGO	(6.82%)
Regional NGO	(6.82%)
Land Trust	(5.68%)
City_County	(5.68%)
State_Federal Agency	(4.55%)

	AMI 2013	AMI 2014	AMI 2015
# of Organizations	12	21	25
# of Connections	64	169	163
Avg. Ties per Org	5.33	8.4	6.52
Density	.530	.401	.272
# of Subgroups	3	3	3

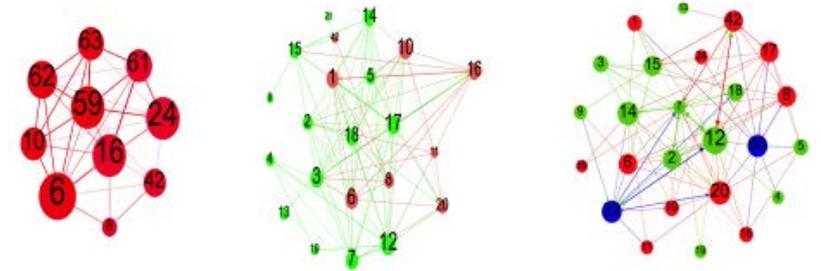
	Multiple	(50%)
	N/A	(24.07%)
	Data	(17.13%)
	Planning	(7.41%)
	BMP	(0.93%)
	Expertise	(0.46%)

# Immediate Application: What can we visualize?

- Networks across space

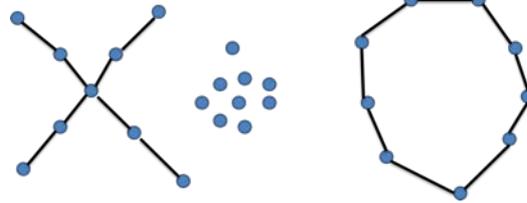


- Networks across time

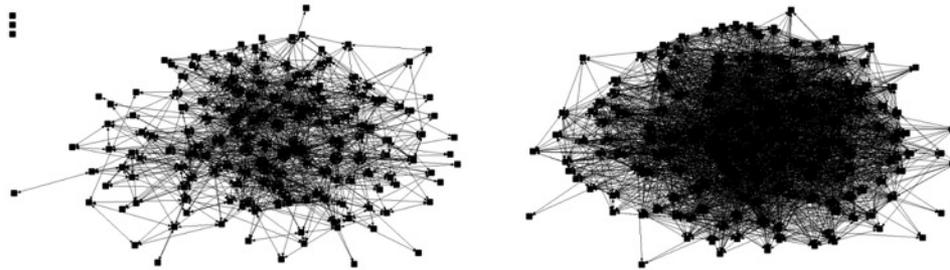


# What can we measure?

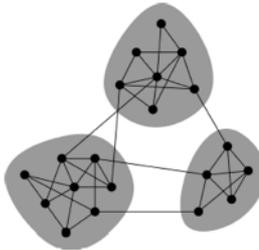
- Centralization



- Density



- Modularity (subgroups; core-periphery)



Network Cohesion

# The Crown of the Continent



How do we know if we're making a difference?

# Networks and landscapes: a framework for setting goals and evaluating performance at the large landscape scale

R Patrick Bixler<sup>1\*</sup>, Shawn Johnson<sup>2</sup>, Kirk Emerson<sup>3</sup>, Tina Nabatchi<sup>4</sup>, Melly Reuling<sup>5</sup>, Charles Curtin<sup>5</sup>, Michele Romolini<sup>6</sup>, and J Morgan Grove<sup>7</sup>

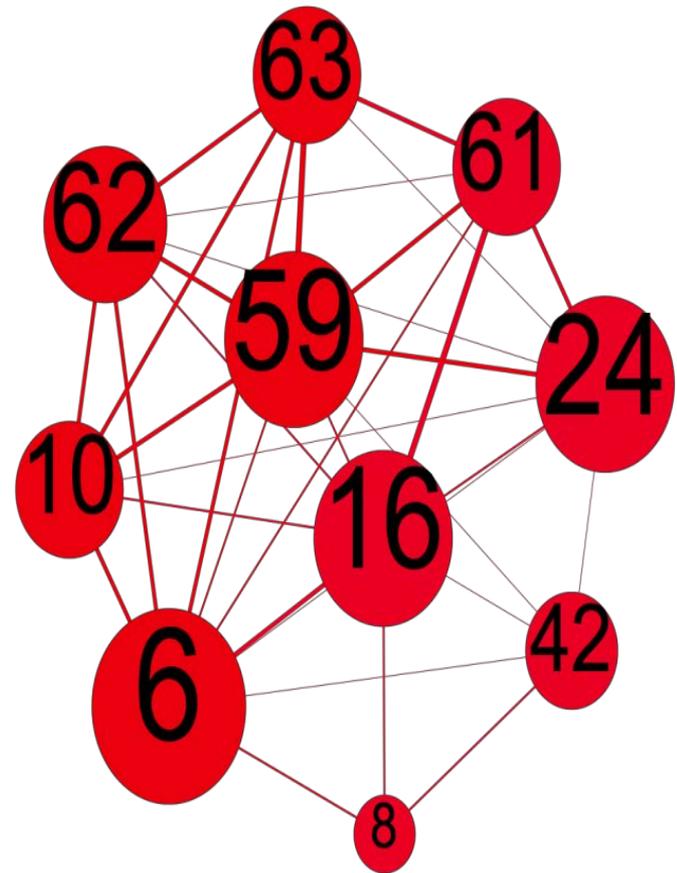
The objective of large landscape conservation is to mitigate complex ecological problems through interventions at multiple and overlapping scales. Implementation requires coordination among a diverse network of individuals and organizations to integrate local-scale conservation activities with broad-scale goals. This requires an understanding of the governance options and how governance regimes achieve objectives or provide performance evaluation across both space and time. However, empirical assessments measuring network-governance performance in large landscape conservation are limited. We describe a well-established large landscape conservation network in North America, the Roundtable on the Crown of the Continent, to explore the application of a social-ecological performance evaluation framework. Systematic approaches to setting goals, tracking progress, and collecting data for feedback can help guide adaptation. Applying the established framework to our case study provides a means of evaluating the effectiveness of network governance in large landscape conservation.

*Front Ecol Environ* 2016, 14(3): 145–153, doi:10.1002/fee.1250

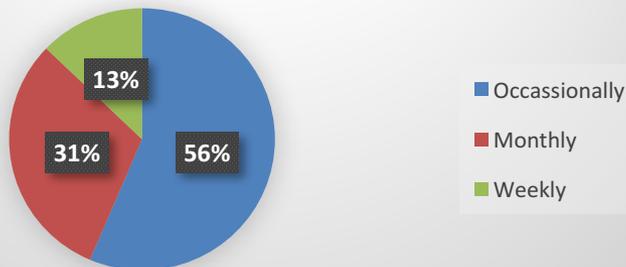
- An organized way to set goals, track progress towards those goals, and collect data for feedback to guide adaptation
- Apply a framework that facilitates an evaluation of ecological outcomes, the network itself, and the value-added benefits to network participants
- 2 components: social network analysis & performance dimensions matrix

# Adaptive Management Network 4 Year Comparison

	AMI 2013
# of Organizations	12
# of Connections	64
Avg. Ties per Org	5.33
Density	.530
# of Subgroups	3

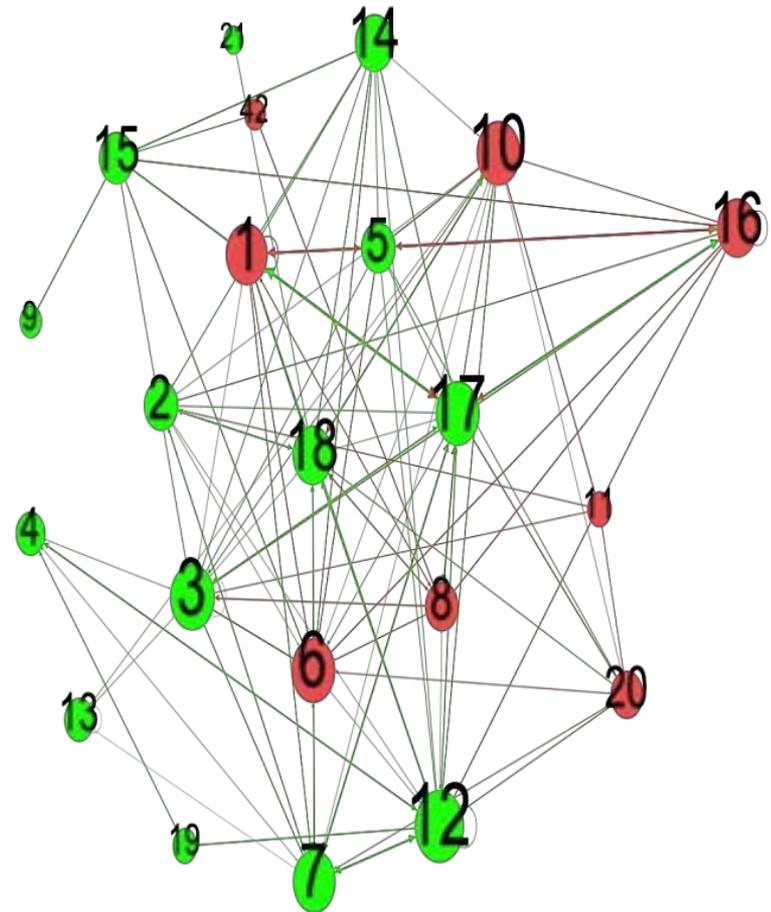


Frequency of Interaction - AMI  
2013

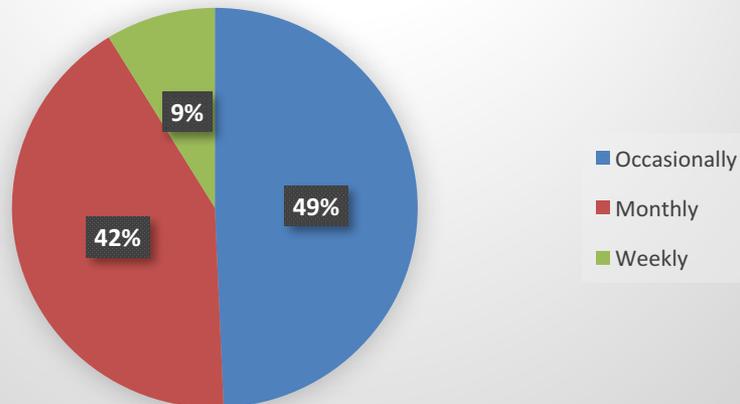


# Adaptive Management Network 4 Year Comparison

	AMI 2014
# of Organizations	21
# of Connections	169
Avg. Ties per Org	8.4
Density	.401
# of Subgroups	3

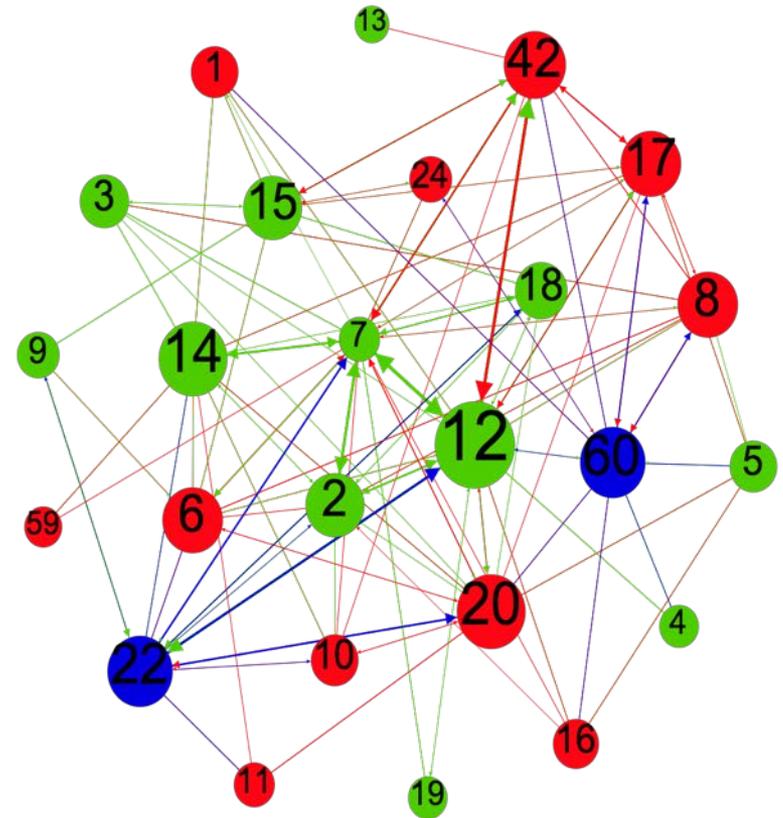


Frequency of Interaction – AMI 2014

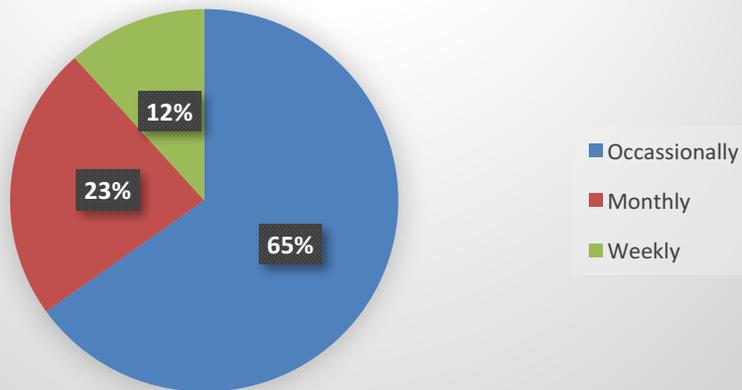


# Adaptive Management Network 4 Year Comparison

	AMI 2015
# of Organizations	25
# of Connections	163
Avg. Ties per Org	6.52
Density	.272
# of Subgroups	3

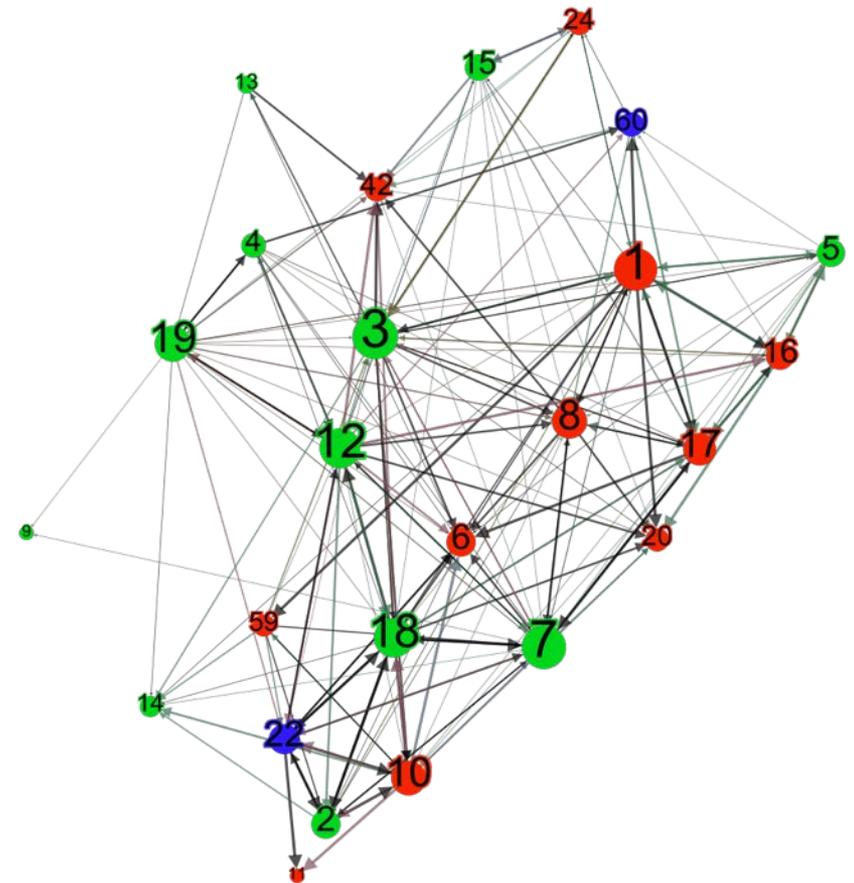


Frequency of Interaction - AMI 2015

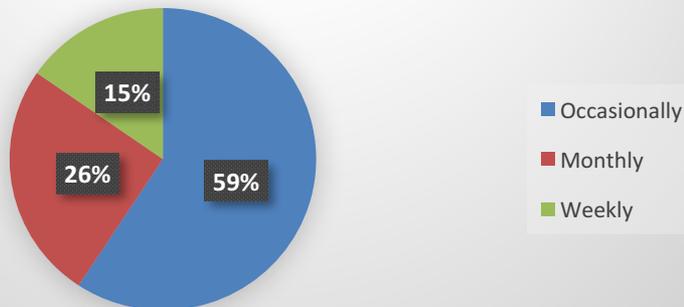


# Adaptive Management Network 4 Year Comparison

	AMI 2016
# of Organizations	25
# of Connections	189
Avg. Ties per Org	7.56
Density	.315
# of Subgroups	



Frequency of Interaction - AMI  
2016



# Adaptive Management Network 4 Year Comparison

	AMI 2013	AMI 2014	AMI 2015	AMI 2016
# of Organizations	12	21	25	25
# of Connections	64	169	163	189
Avg. Ties per Org	5.33	8.4	6.52	7.56
Density	.530	.401	.272	.315
# of Subgroups	3	3	3	

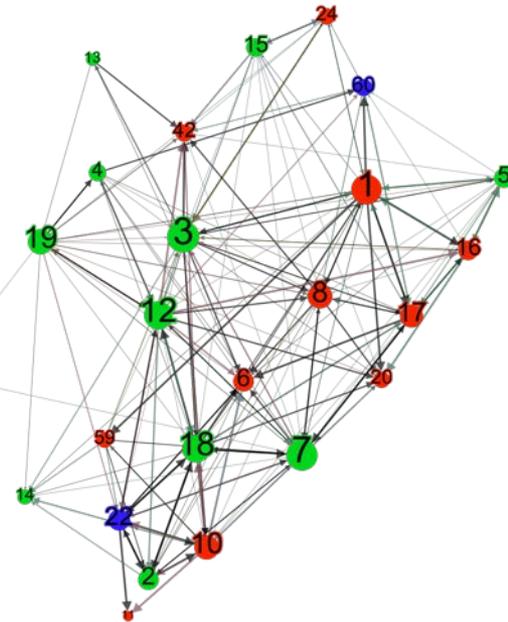
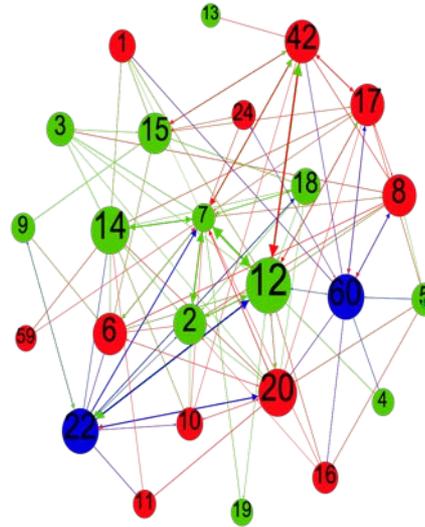
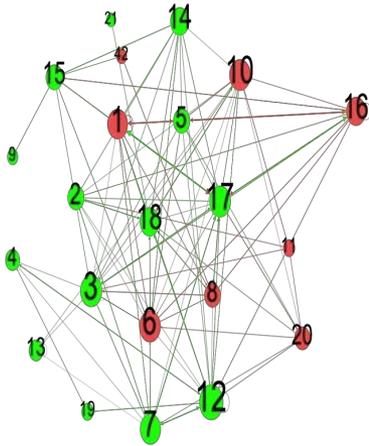
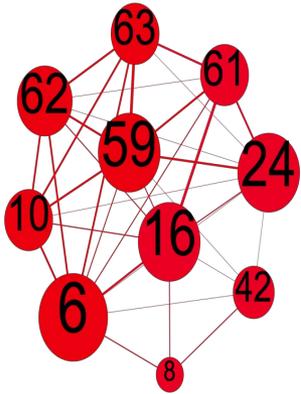
**Conduct Social  
Network  
Analysis**

**Actions  
Network  
grants  
funding to  
participant  
organizations**

**Outcomes  
Project  
implementation,  
network learning**

**Adaptation  
Granting  
criteria  
revised based  
on evaluation  
framework**

**Reassess  
network for  
growth and  
change**



**Adaptive Management Initiative Network  
at Time 1, 2, 3, & 4**

**Adaptive Management Initiative Network  
Year 1 organizations in red  
Year 2 organizations in green  
Year 3 in blue**

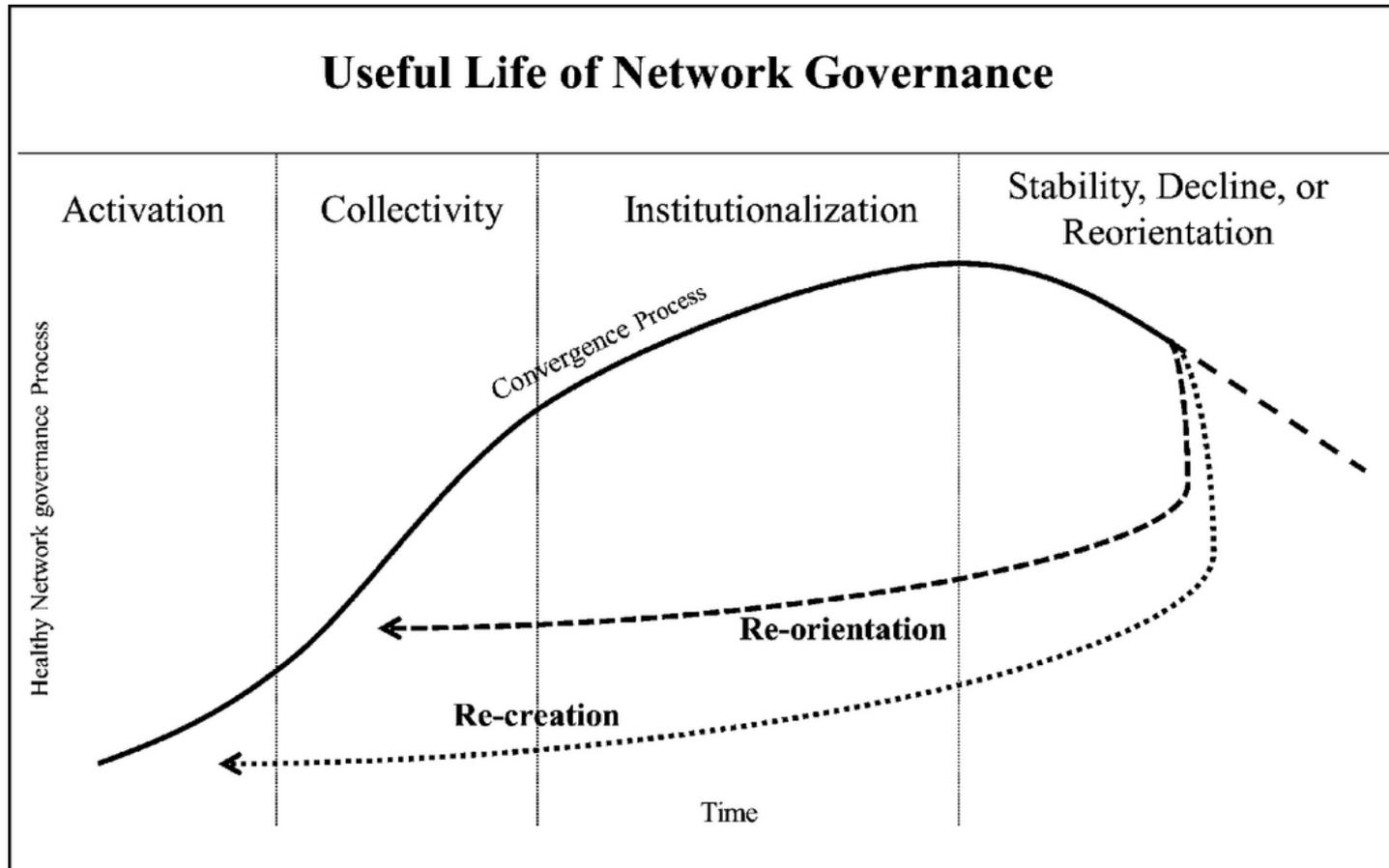
<b>Conduct Social Network Analysis</b>	<b><u>Actions</u> Network grants funding to participant organizations</b>	<b><u>Outcomes</u> Project implementation, network learning</b>	<b><u>Adaptation</u> Granting criteria revised based on evaluation framework</b>	<b>Reassess network for growth and change</b>
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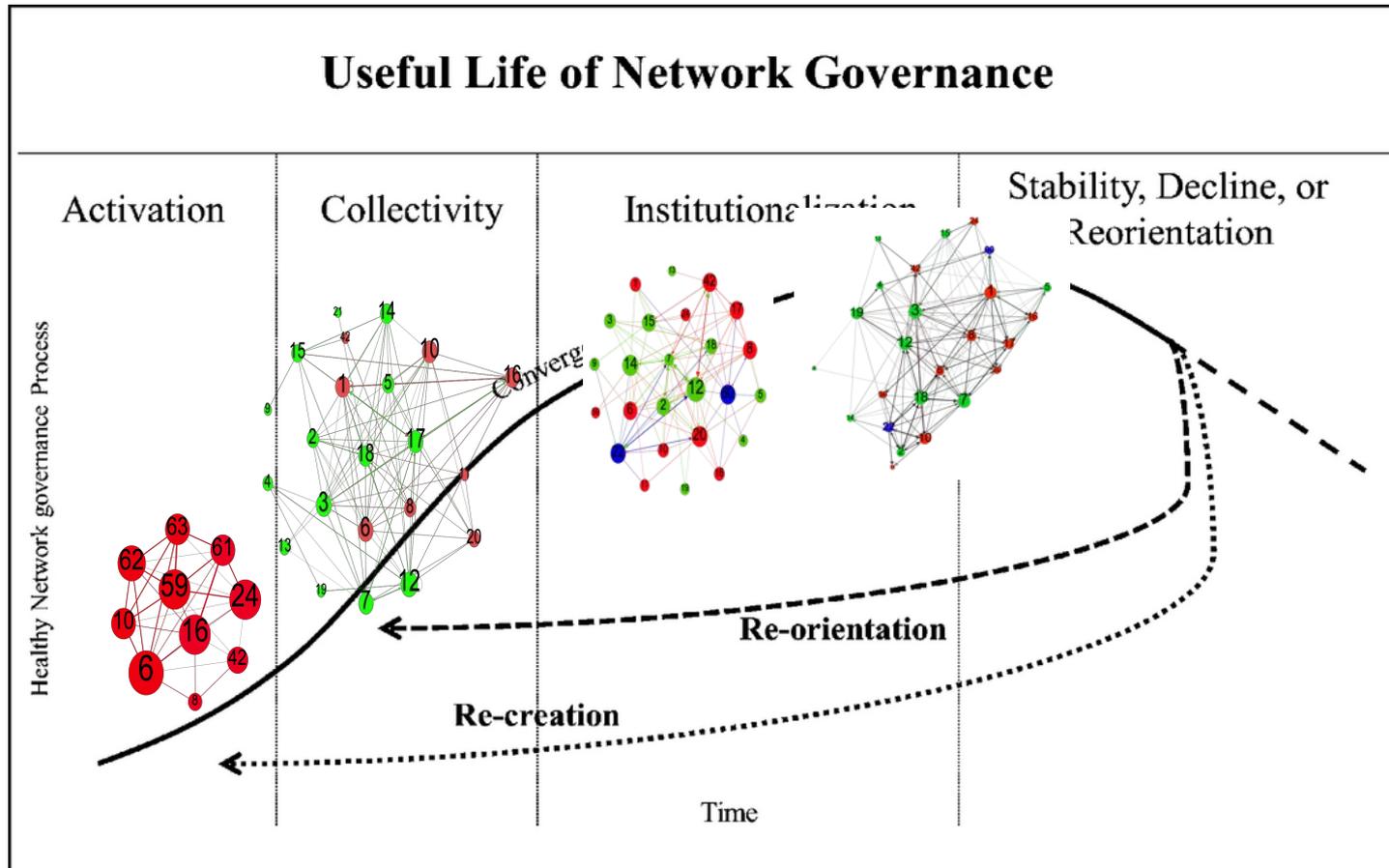
**Adaptive Management Initiative Network at Time 1, 2, 3, & 4**

**Adaptive Management Initiative Network Strength of Ties:  
Weakest Blue, Strongest Green**

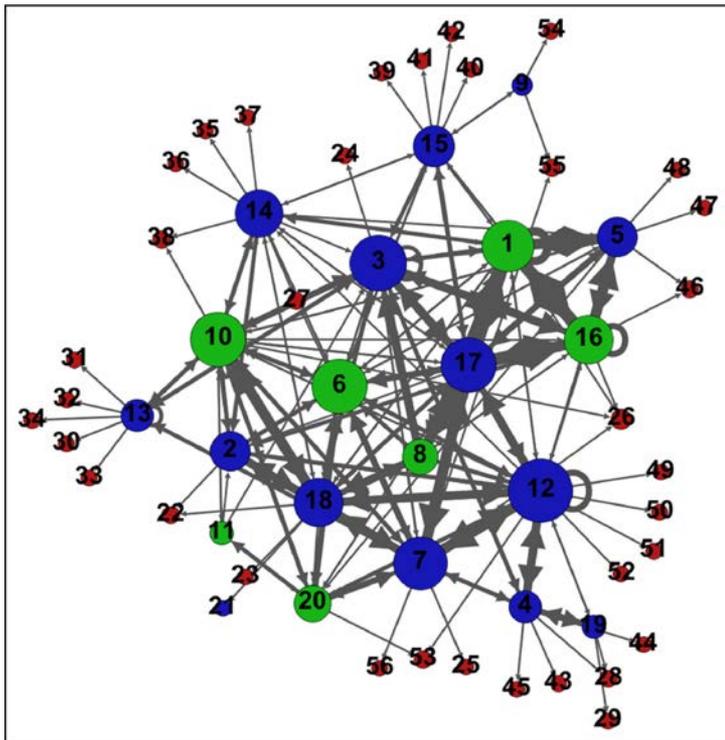
# Sustaining the useful life of network governance: life cycles and developmental challenges



# Sustaining the useful life of network governance: life cycles and developmental challenges



# How Much Social Capital Are We Building?

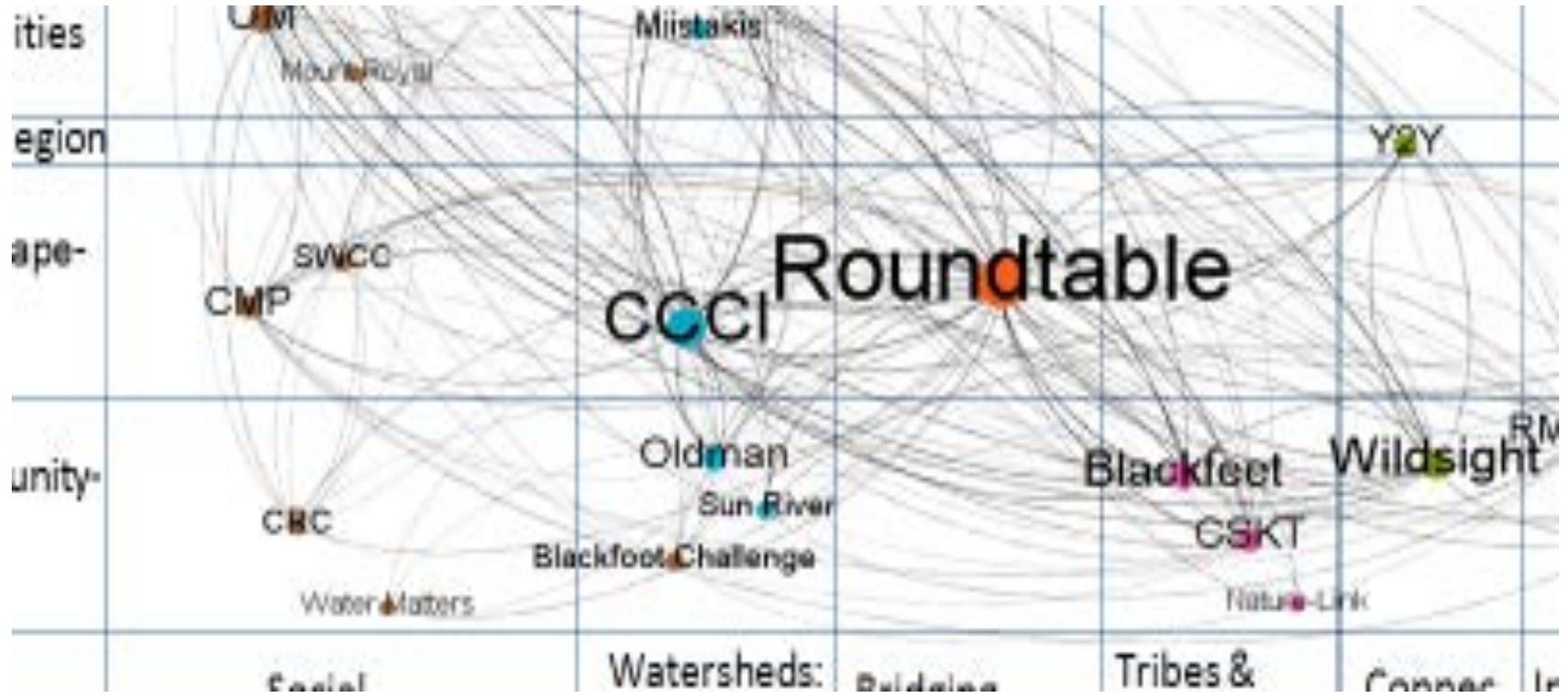


	AMI Year 2	AMI Year 2 + Project Partners
# of Organizations	21	<b>56</b>
# of Connections	169	<b>214</b>
Avg. Ties per Org	8.4	<b>3.8</b>
Density	.401	<b>.069</b>
# of Subgroups	3	<b>6</b>

AMI 2014 plus project partners

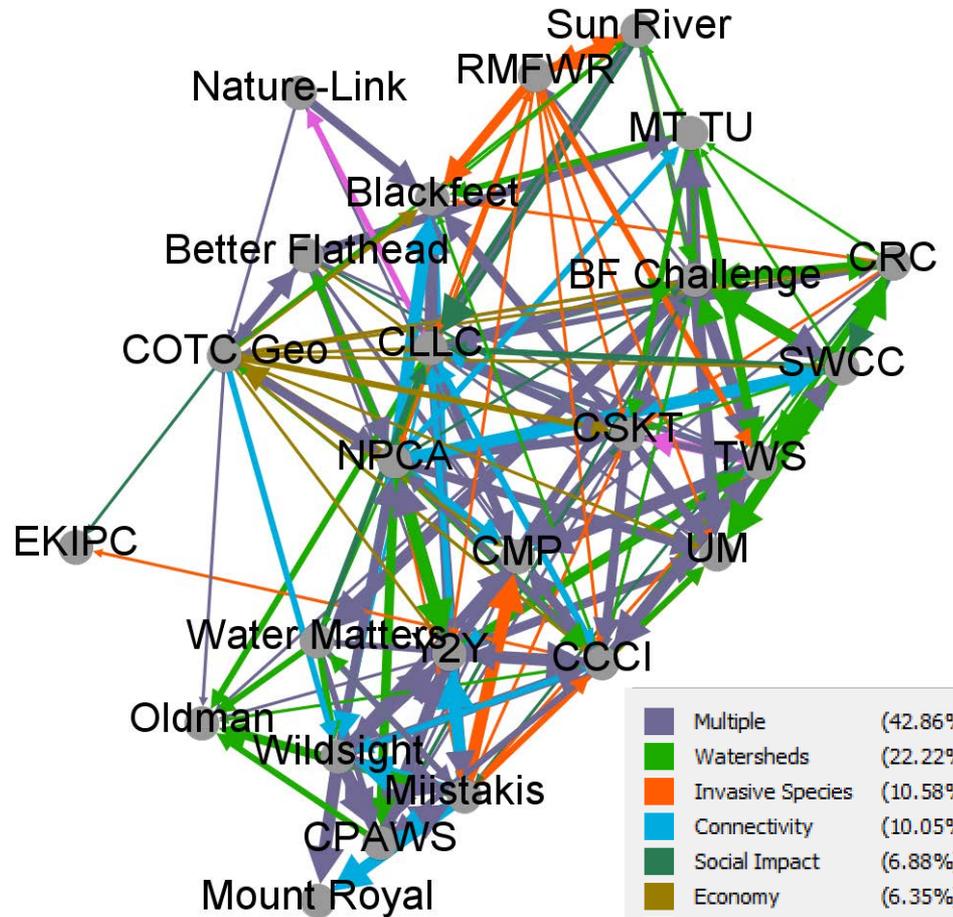
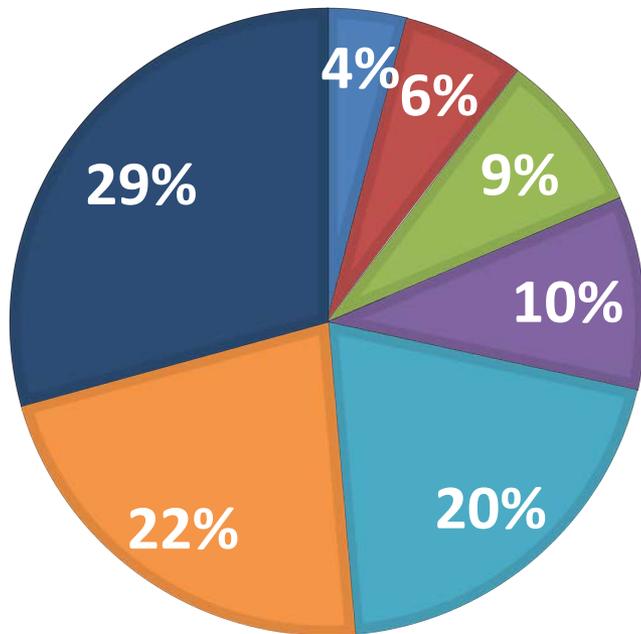
# How Are We Facilitating Adaptation?

AMI 2015 Organized by Category



# What are we working on?

- Other
- Invasives
- Tribes
- Economies
- Connectivity
- Social Impact
- Watersheds



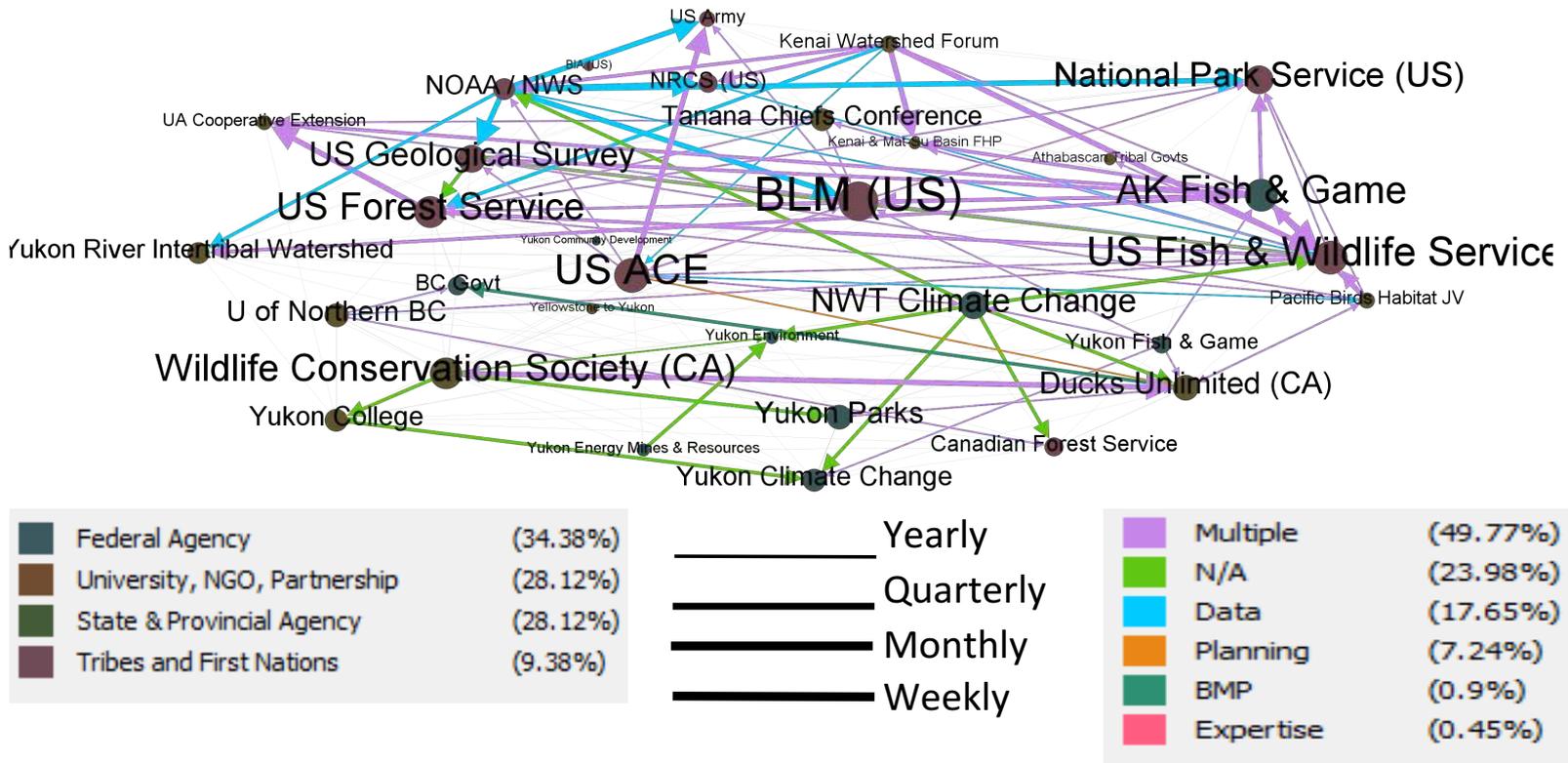
# The Northwest Boreal LCC



Establishing Baseline Collaborative  
Governance Metrics

# NWB LCC Steering Committee Network

Figure 1. The NWB LCC Network map with composition, centrality, strength and substance of tie attributes.

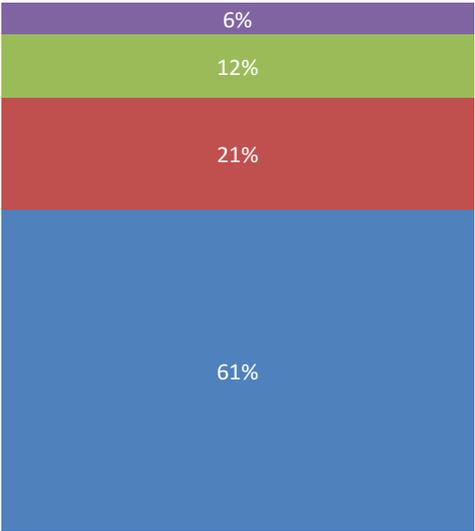


\*All graphs and figures from the forthcoming report: "Northwest Boreal Landscape Conservation Cooperative: An Assessment of a Large-Scale Conservation Social Network"

# NWB LCC: The “what” of the relationships

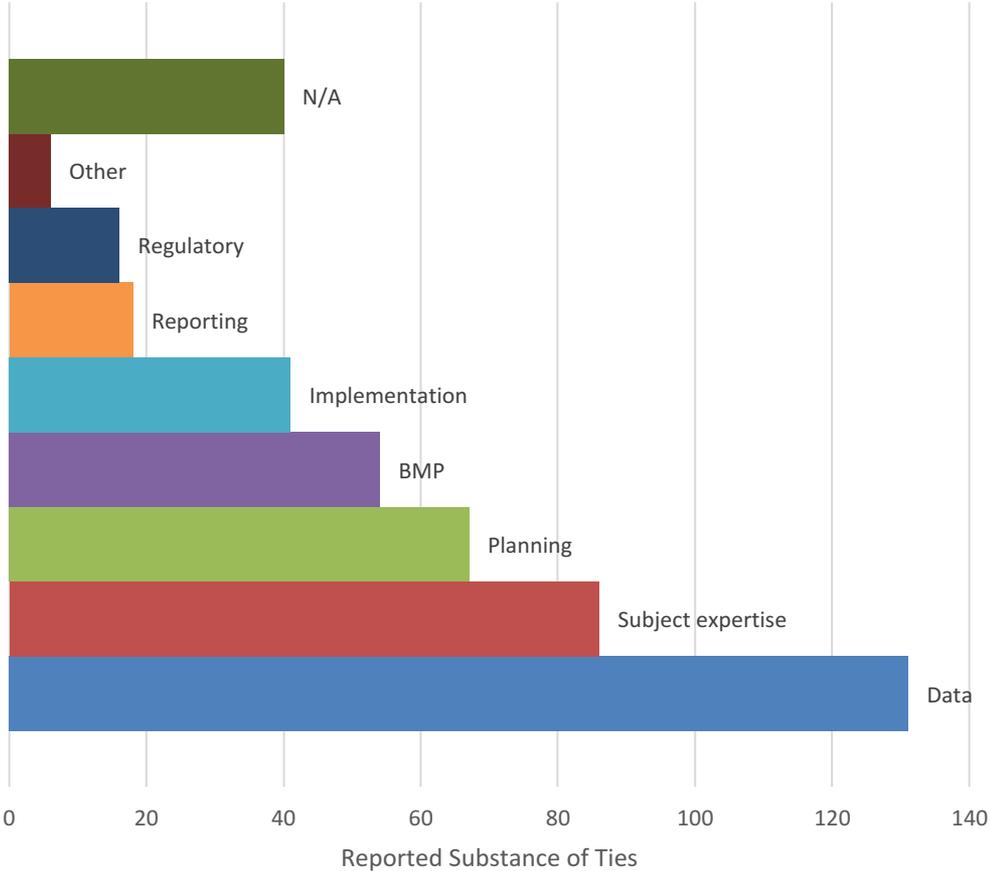
### FREQUENCY OF INTERACTION / COMMUNICATION

Yearly Quarterly Monthly Weekly

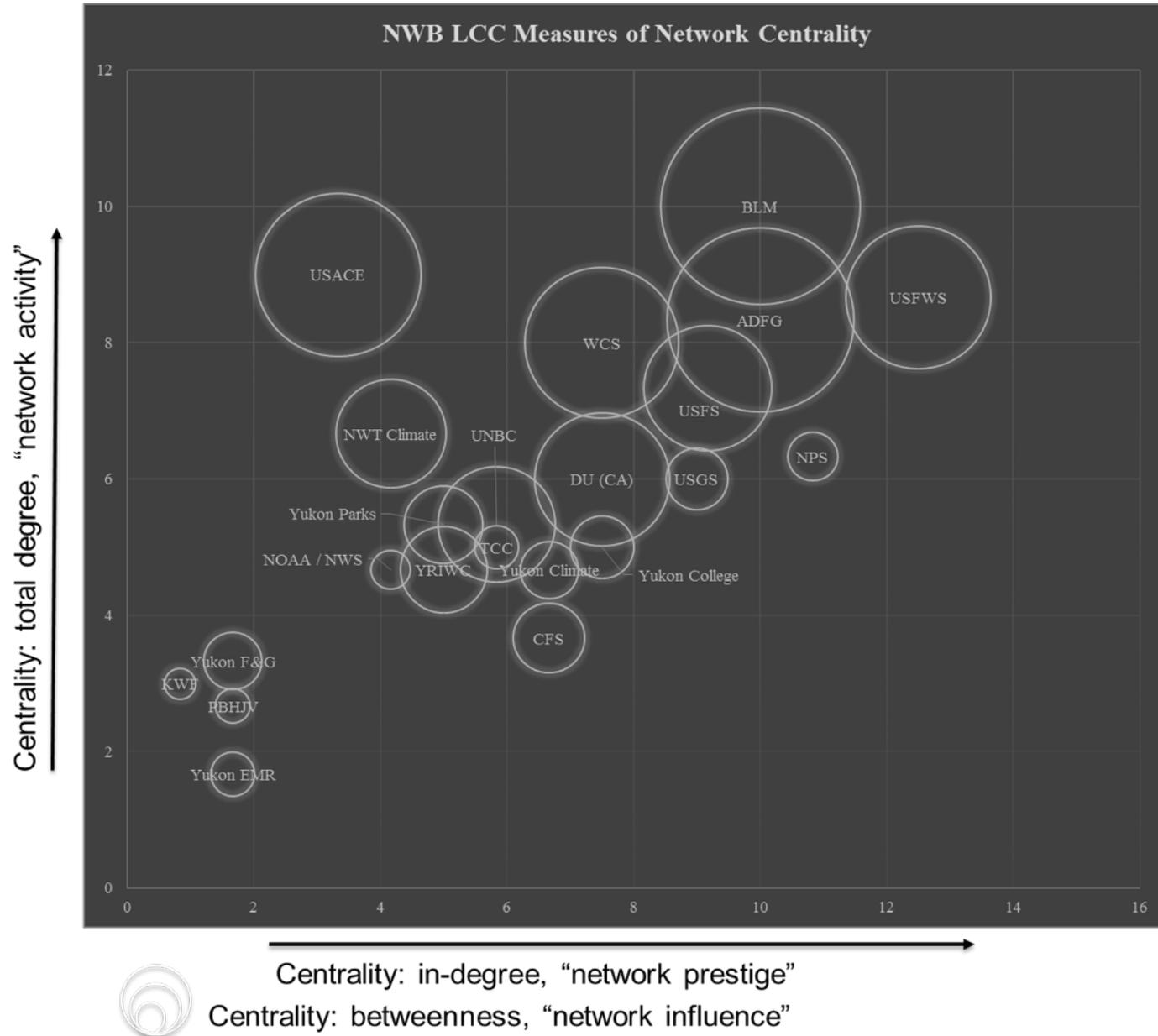


1

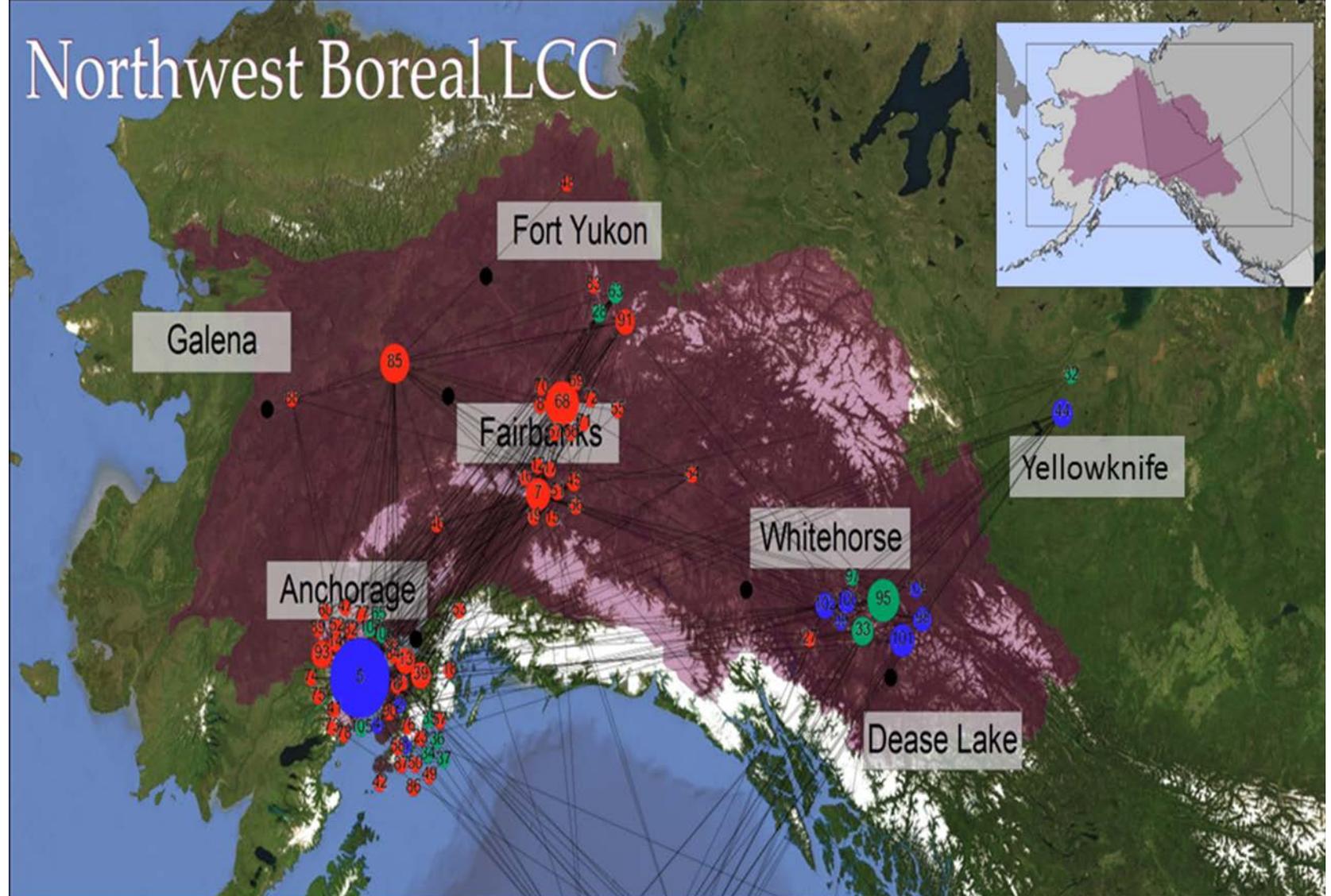
### NWB LCC Social Network Ties



# NWB LCC Node Centrality



# Northwest Boreal LCC



- Federal Gov't Agency (66%)
- Universities, Tribal, Nongovernmental Organizations, and Partnerships (19%)
- State / Provincial Territorial Gov't Agency (15%)

US Pacific Northwest  
British Columbia  
Alberta  
Manitoba  
Quebec

# How can we use this?



## Performance goals: promote and enhance collaborative conservation

- Increase or enhance organizational diversity
- Increase frequency of interaction between partners
- Increase connections on “implementation
- Identify gaps across geographical space or agency subunits
- Strategically identify new partners

# Limitations

- Tools to ask questions, reflect
- Data acquisition
  - Primary data collection, how to streamline?
- Network analysis measures along side other quantitative and qualitative or “scorecard” type measures
- Measures need to be “relative” to initiative place in life-cycle
- Doesn’t tell us much about “quality” of relationships
- What is “interesting” & what is “useful”

# A special thanks to...

- The Roundtable on the Crown of the Continent team
- ALL COTC AMI participants that have contributed to this research!
- The NWB LCC Steering committee participants to the research

Thanks to funders that have supported this research going:



Thank You &  
Questions?

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