

# *What is Social Network Analysis and How Do We Use It*

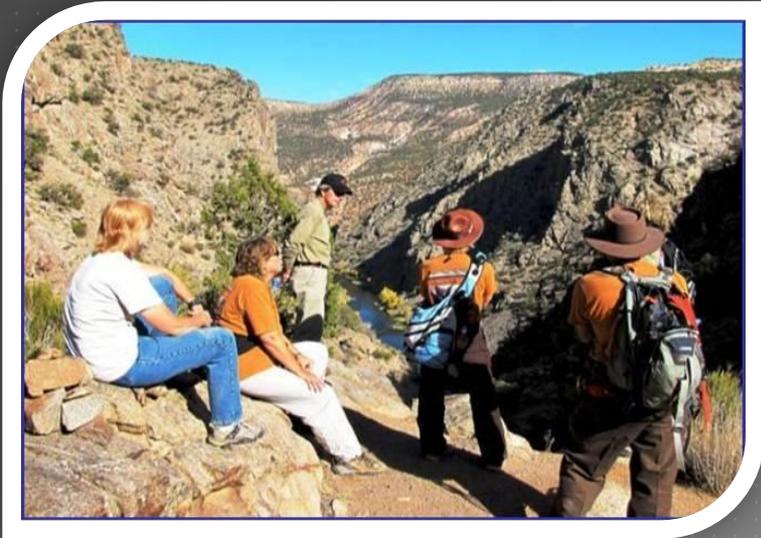


*Partnership &  
Community Collaboration  
Academy  
Managing by Network*

*July 24-26, 2012*

*Liz Madison, Instructor  
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# SOCIAL NETWORKS: THE FABRIC OF CIVILIZATION



Americans of all ages, all conditions, and all dispositions, constantly form associations...if they never acquired the habit of forming associations in ordinary life, civilization itself would be endangered.

*~Alexis De Tocqueville, 1835*

# OVERVIEW

## Introduction

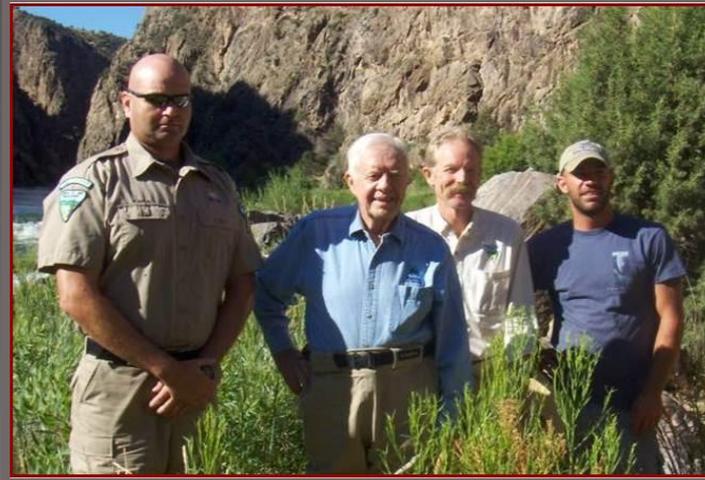
<b>Social Networks</b>	<b>4</b>
<b>Social Network Analysis</b>	<b>5</b>
<b>Social Network Mapping</b>	<b>8</b>
<b>Studies and Data Collection</b>	<b>12</b>
<b>Central Connectors and Brokers</b>	<b>21</b>
<b>Periphery</b>	<b>27</b>
<b>Communication Preferences</b>	<b>28</b>
<b>Study Applications</b>	<b>30</b>



# WHY ARE PROFESSIONAL SOCIAL NETWORKS IMPORTANT?

## Where Work Happens

- Knowledge
- Performance



## Where People Engage

- Satisfaction
- Retention

## Where Knowledge Lives

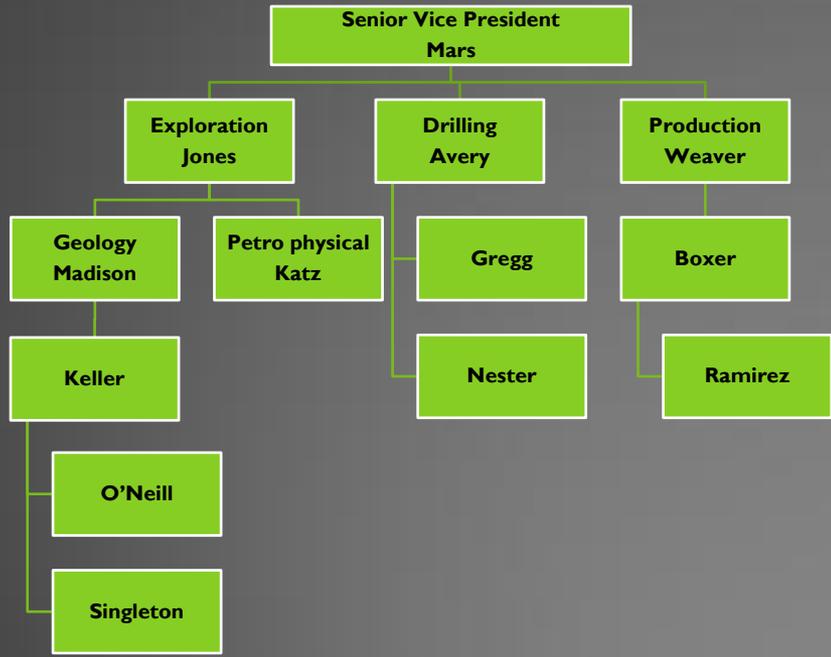
- Useful
- Fast

## But . . .

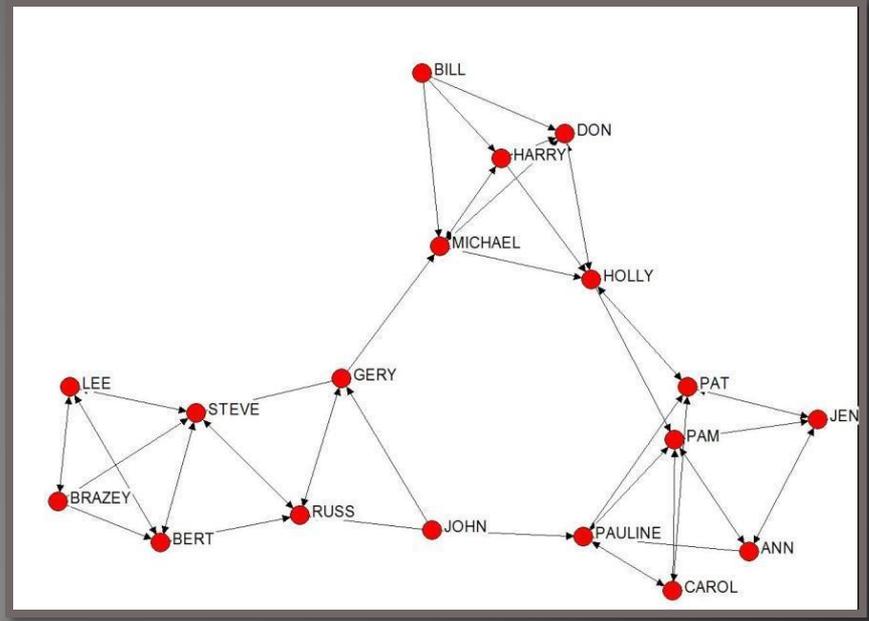
- Invisible
- Tough to Know

# COMPARE FORMAL & INFORMAL NETWORK STRUCTURES

## Formal Structure



## Informal Structure (SNA)



# RECOGNIZING WHAT EACH NETWORK STRUCTURE DOES BEST

## Characteristics of “The Formal”

- ▶ Rational
- ▶ Hierarchical
- ▶ Disciplined
- ▶ Clarity
- ▶ Aligning
- ▶ Predictable
- ▶ Scalable
- ▶ Efficient

## Characteristics of “The Informal”

- ▶ Emotional
- ▶ Collaborative
- ▶ Spontaneous
- ▶ Ambiguity
- ▶ Motivating
- ▶ Innovative
- ▶ Responsive
- ▶ Adaptive

# SOCIAL NETWORKS PLAY A KEY ROLE IN ORGANIZATIONAL EXCELLENCE

## Where Innovation Lives...

- > Rely on people FAR more than databases for information
- > Innovation lives in re-combining expertise and ties bridging organizational lines

## Where Work Happens...

- > After decades of restructurings, work and coordination of work occurs in networks
- > Appropriate connectivity drives performance

## Invisible Source of Inefficiency...

- > Costs of collaboration increasing but not systematically managed
- > Invisible decision-making delays consume time and resources

## But These Networks Are...

- > Invisible and highly misunderstood
- > At odds with formal structure, process views of work and standard culture inventories

# SOCIAL NETWORK MAPPING

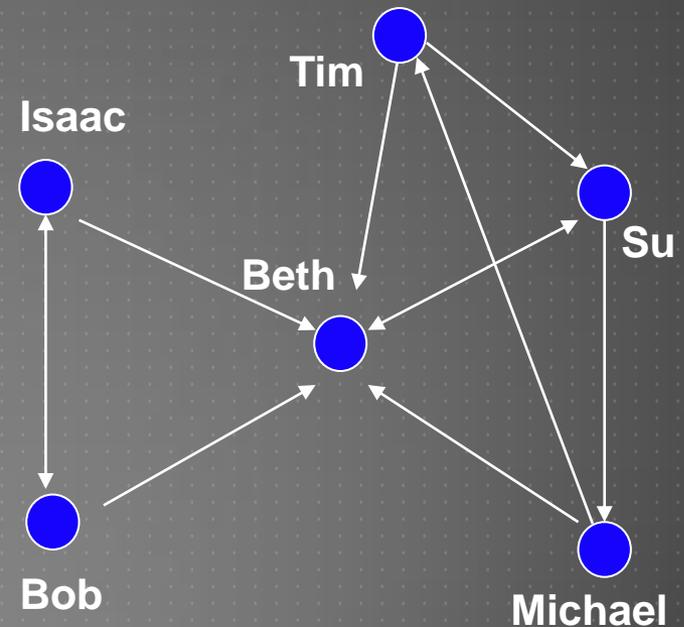
- A social network is essentially a map of all the relevant relationships between the network members being studied
- Key to social network theory is the relationship between individuals in terms of nodes and ties (nodes are individuals, ties are the relationships between them)

# SOCIAL NETWORK ANALYSIS FIVE KEY INDICATORS

Relationships are 'uncovered' through questions we ask

Network Structure Analysis is based on five key indicators:

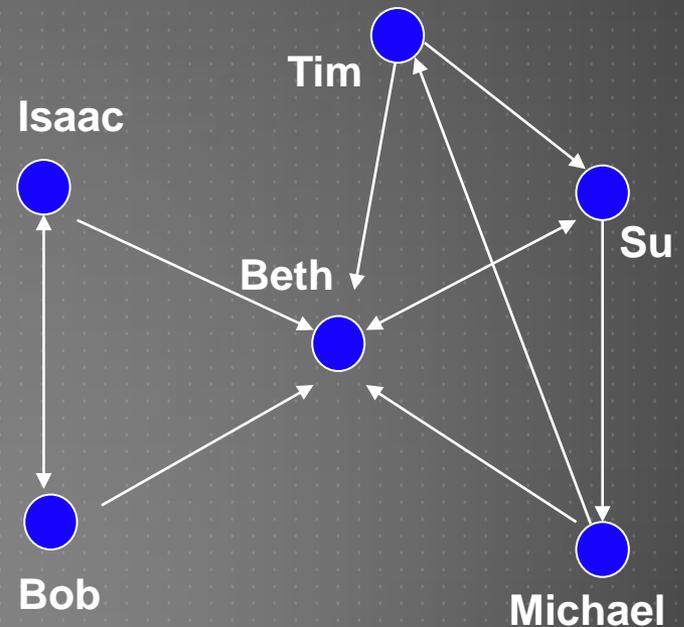
1. Direction of information flow
2. Individuals who are overly central
3. Individuals who are loosely connected and may be under-utilized
4. Off-track subgroups
5. Network level of overall connection



# SOCIAL NETWORK ANALYSIS THREE KEY CHARACTERISTICS

Network Structure focuses on three key characteristics:

1. Information / knowledge transfer
2. Task flow
3. Trust or energy



# EXPANDING NETWORKS

**From...**

**To...**

Implicit philosophy that more collaboration is “better”

Explicit analysis to determine exactly where collaboration is/is not needed

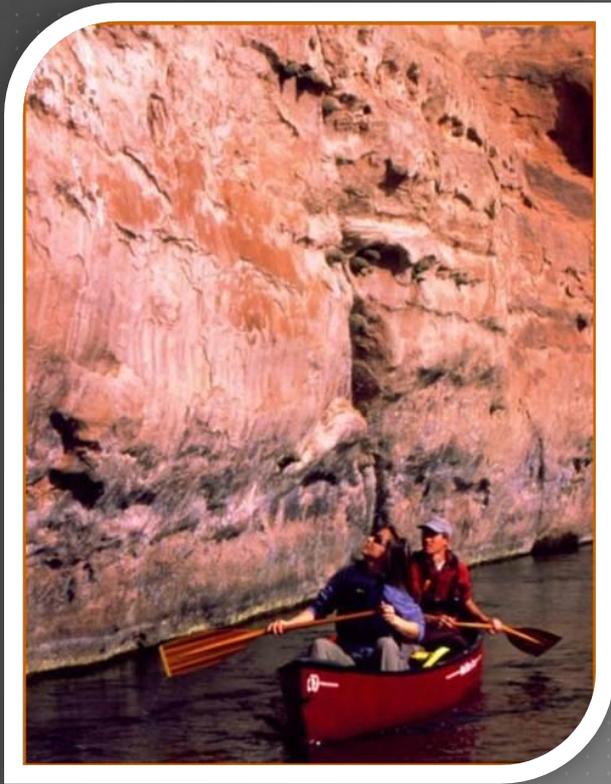
“Shotgun” approach promoting collaboration everywhere

Targeted approach to address specific barriers to collaboration

No focus on relationships that underlie effective collaboration

Ability to visualize and correct key relationships (e.g., awareness, trust and even fear)

# SOCIAL NETWORK ANALYSIS STUDIES



**SCIENCE, RESEARCH & MONITORING PROGRAM**, NATIONAL LANDSCAPE CONSERVATION SYSTEM, BUREAU OF LAND MANAGEMENT, 2012

**WILD AND SCENIC RIVERS PROGRAM**, NATIONAL LANDSCAPE CONSERVATION SYSTEM, BUREAU OF LAND MANAGEMENT, 2012

**CRATERS OF THE MOON NATIONAL MONUMENT AND PRESERVE**, BUREAU OF LAND MANAGEMENT AND NATIONAL PARK SERVICE, 2010

# SURVEY QUESTIONNAIRE - EXAMPLE

- This analysis is based on two questions. The first question: Provided survey participants with a list of 102 federal employees with position responsibilities related to the Program and 39 individuals outside of BLM that cooperate and/or partner with BLM staff. We asked each federal employee, “*Who do you contact for information, advice and or resources associated with your responsibilities in managing the Program?*”

0 = I never, or rarely, go to this person

1 = I sometimes go to this person

2 = I frequently go to this person

- 102 BLM employees were invited to participate, 61 BLM employees completed the survey for a 60 percent response rate
- 102 BLM Individuals + 39 individuals outside BLM = 141 Nodes
- One Relationship = One Tie
- Data collection began January 15 and concluded April 15, 2011.

# HOW CAN WE VISUALIZE THE RESULTS OF THE SURVEY?

The analytic software used for Social Network Analysis measures the connections between individuals in the study group.

The associated mapping software provides a visual display of this information using geometric shapes to denote individuals and lines to illustrate network connections.

The analytic software also calculates the number of ties individuals in the network have to each other. This measurement is referred to as geographic distance.

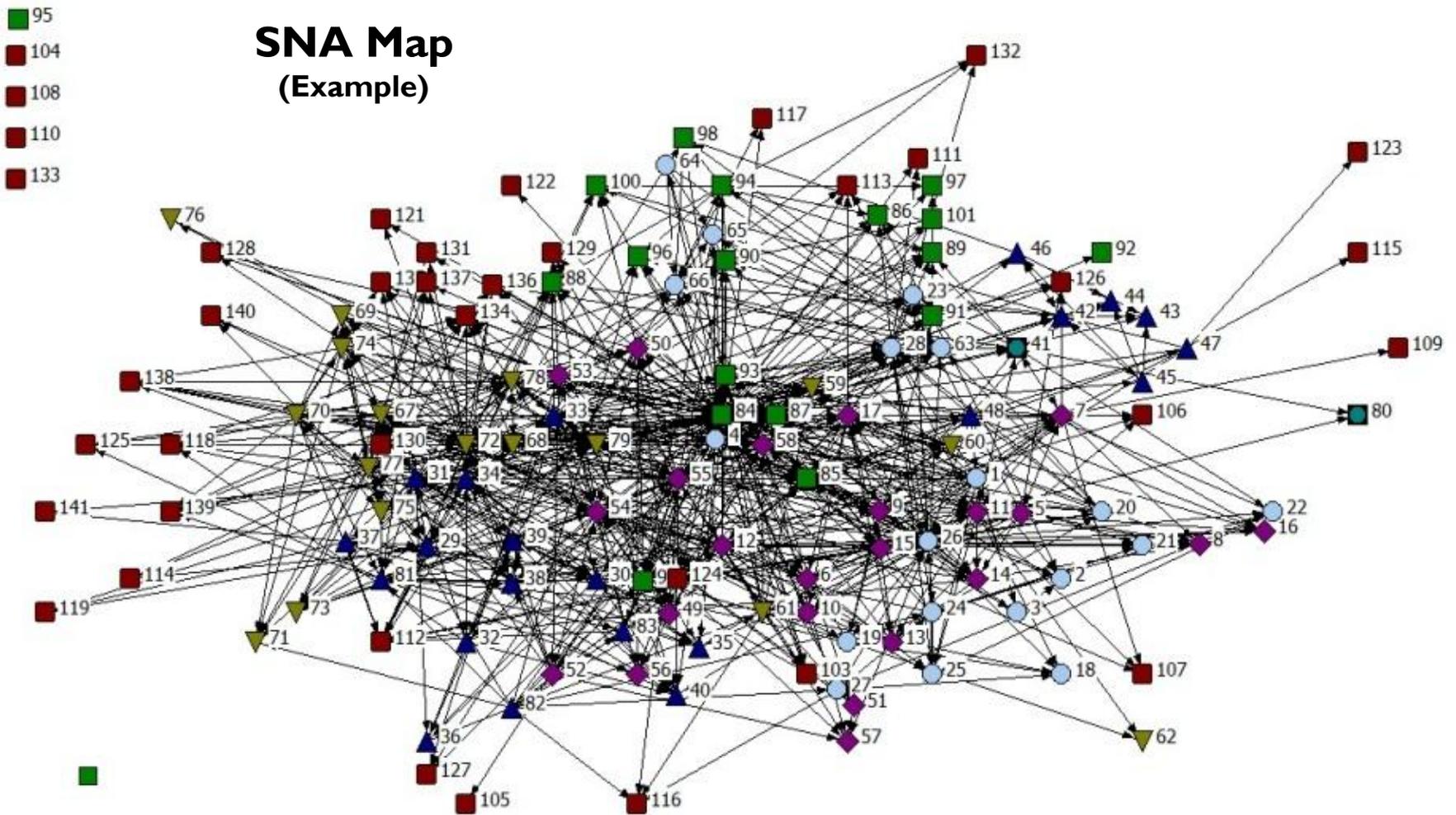
# SOCIAL NETWORK ANALYSIS MAPPING

The analytic software maps survey responses to illustrate the spatial connection among participants in the network. i.e. based on responses all network participants have a fixed place in the map.

The software also “fills in the blanks” if a network participant did not respond to the survey, placement on the map is determined by those who did respond.

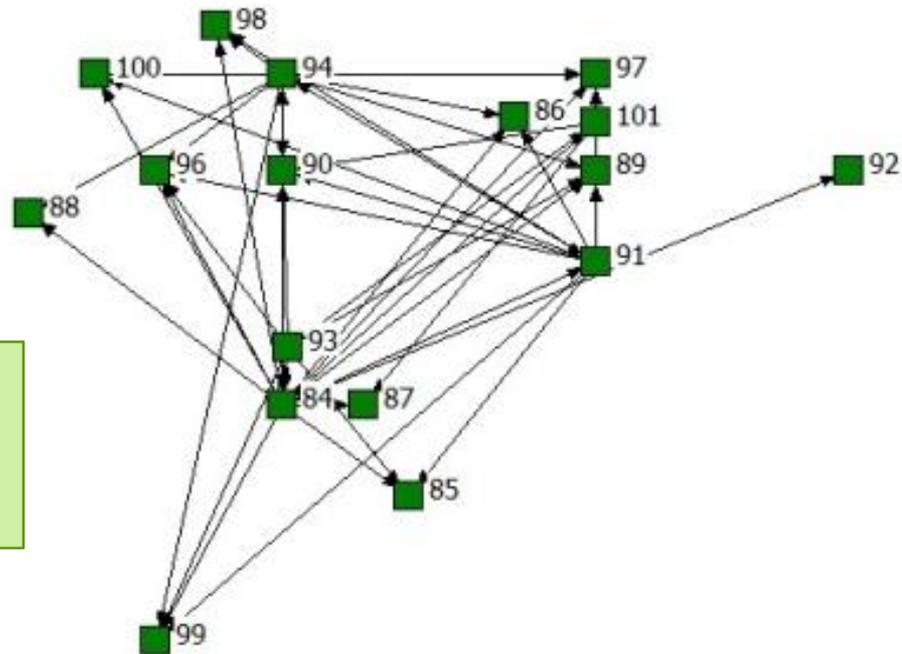


# SNA Map (Example)



# MAPPING OF WASHINGTON OFFICE - EXAMPLE

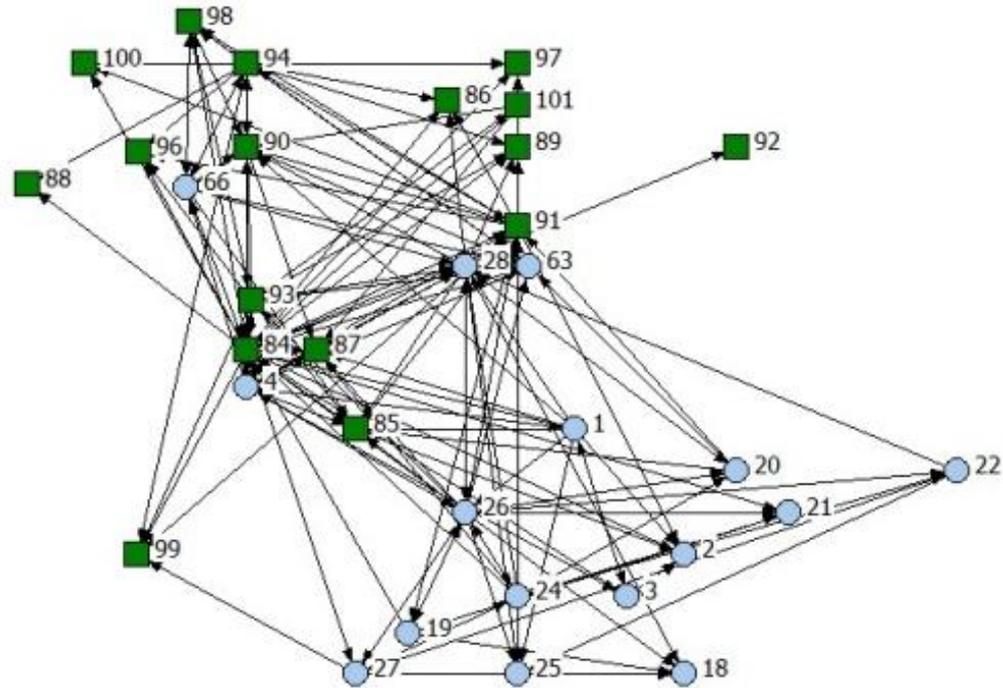
■ 95



Examine the connections among the WO participants

# MAPPING OF WASHINGTON OFFICE & PACIFIC RIM: ALASKA, OREGON & CALIFORNIA

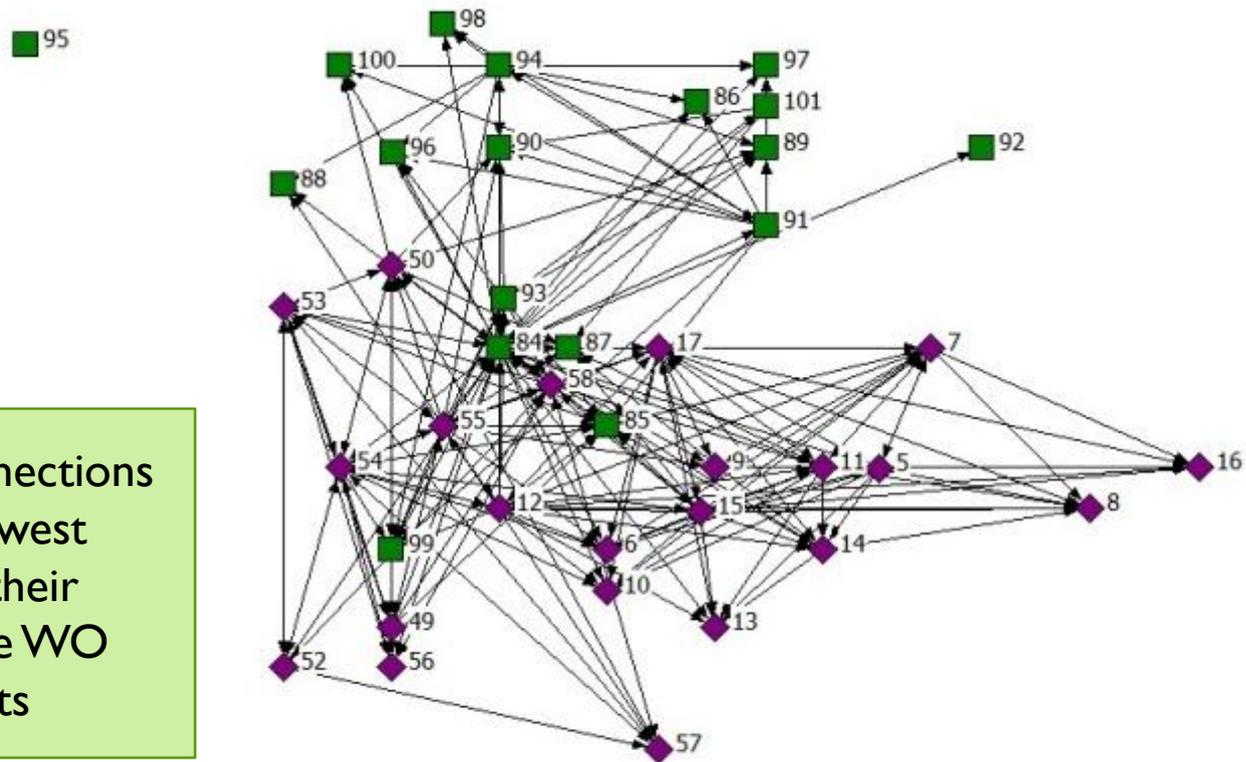
■ 95



Examine the connections among the Pacific Rim participants and their connection to the WO survey participants

# MAPPING OF WASHINGTON OFFICE & PACIFIC RIM: ARIZONA & NEW MEXICO

Examine the connections among the Southwest participants and their connection to the WO survey participants



# SOCIAL NETWORK ANALYSIS ~ DISTANCE

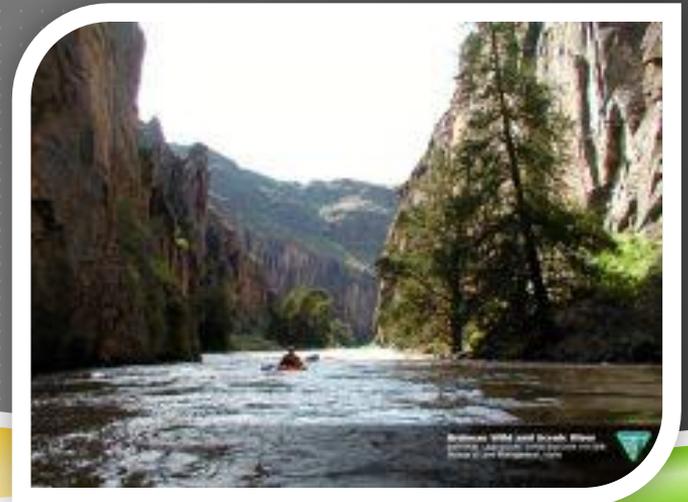
What is the average distance among reachable pairs?

- > The average number of steps it takes to reach all network participants
- > The average distance between any two pairs for this network is 2.200
- > *Scores of 2-3 are generally good, scores of 5-6 indicate a very unconnected network*
- > *Lower scores reflect a group better able to leverage knowledge: shorter distances mean faster, more certain, more accurate sharing*
- > Access to information, resources and advice for members of this network is within three contacts

# WHO CONTROLS THE FLOW OF INFORMATION?

Central Connectors in the network are identified by the highest number of ties. Brokers in the network are identified by their connection to bridge information among groups in the network.

This analysis uses Freeman's Degree of Centrality calculations to identify Central Connectors and measurements of structural holes to identify Brokers.



# BROKERS AND CENTRAL CONNECTORS

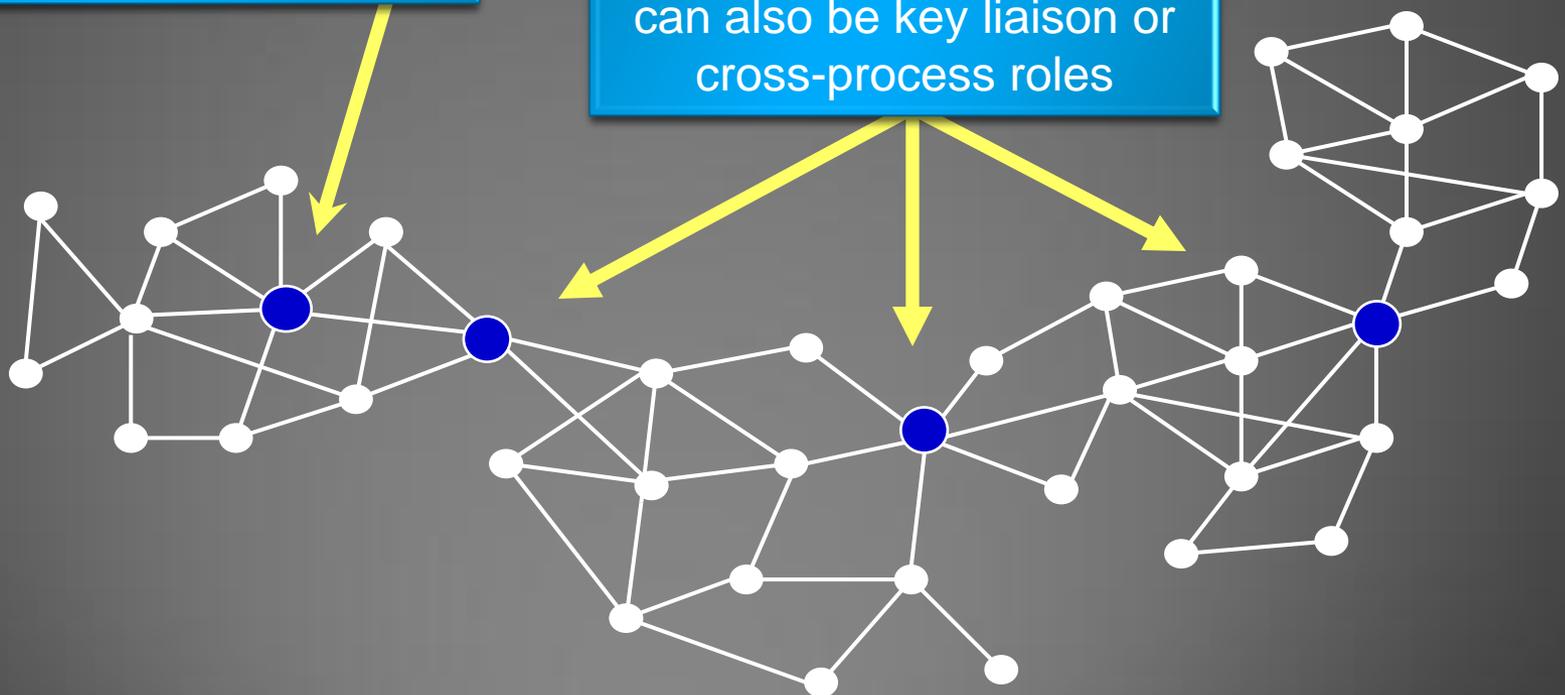
High-leverage employees who connect people across boundaries; such as functions, skills, geography, hierarchy, ethnicity, and gender

## Central Connectors:

leaders, experts, old timers, gateway roles or political players

## Brokers:

Leverage ability to drive change, diffusion or innovate. These people can also be key liaison or cross-process roles



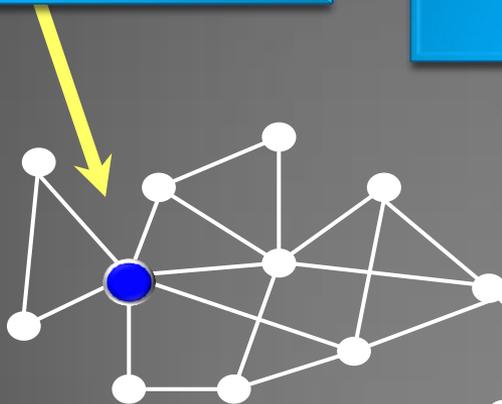
# CENTRAL CONNECTORS

Those individuals with the highest number of direct connections

## Overloaded Leaders, Experts or Gateway Roles

I am working to my limits but still can't respond to everyone.

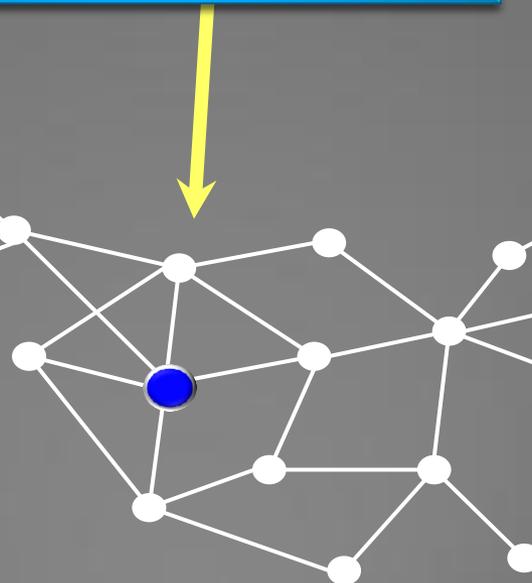
**Solution:** Re-allocate information, decision rights and portions of role



## Rising Stars/Flight Risks

I am rising through the organization rapidly and am being considered for new opportunities.

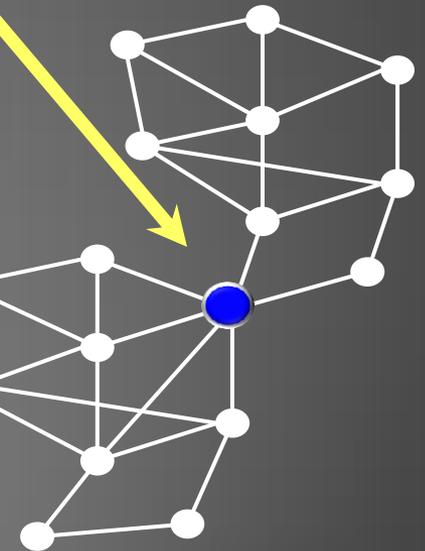
**Solution:** Recognize expertise, succession planning



## Knowledge Keepers

I control the information tightly; my position is secure.

**Solution:** Build connectivity to break stranglehold



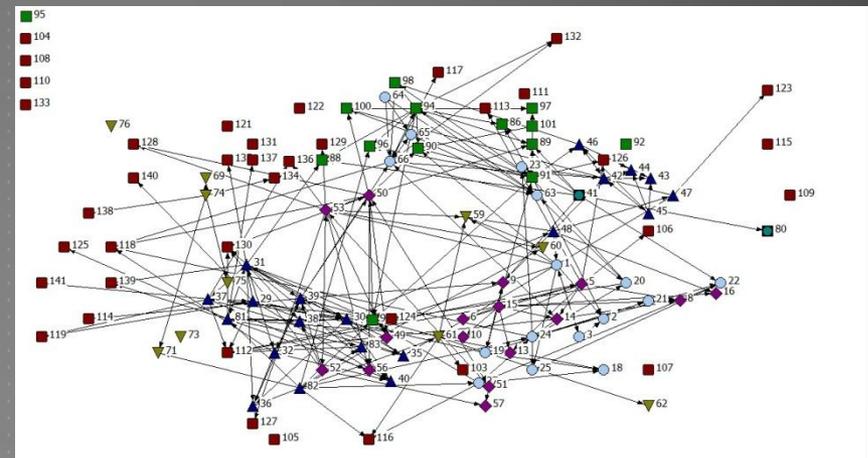
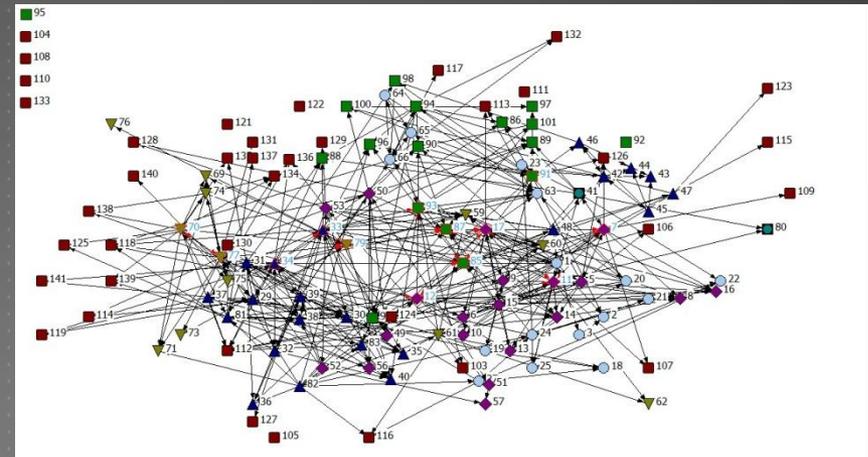
# CENTRAL CONNECTORS

- ▶ What happens to the network communication if one-half of the connectors are removed?



Removing the Central Connectors and their links in the network illustrates the role of connectors to foster communication throughout the program.

- ▶ What happens to the network if all central connectors are removed?



# SOCIAL NETWORK ANALYSIS-DEGREE CENTRALITY SCIENCE, RESEARCH & MONITORING PROGRAM

## **Degree Centrality:**

- ▶ Displays how well each individual is connected
- ▶ Technical definition: The number of ties a persons has
- ▶ Study participants have a range of 0-100 links per individual. Results illustrate that 85 or 86 percent of federal employee network participants are well connected to the network. The remaining 15 or 14 percent of 15 federal employees reflect a more limit interaction with the network with 5 federal employees or 3 percent of the network working on the periphery.
- ▶ This Program Network Analysis mean degree of centrality score of 11. Reflecting a dispersed communication network driven by inclusion of External individuals/organizations.



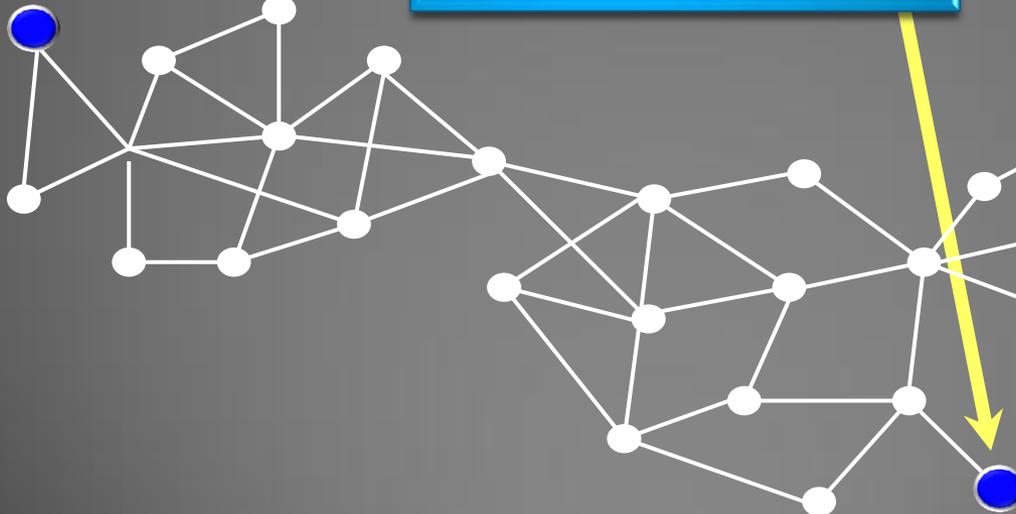
# INDIVIDUALS ON THE PERIPHERAL

Those who work on the edge of the network

## Niche Experts/Balance

I research very specific technologies and feed my findings to a research group.

**Solution:** Room to maintain a productive peripheral position; a dual career path



## Disconnected Contributor

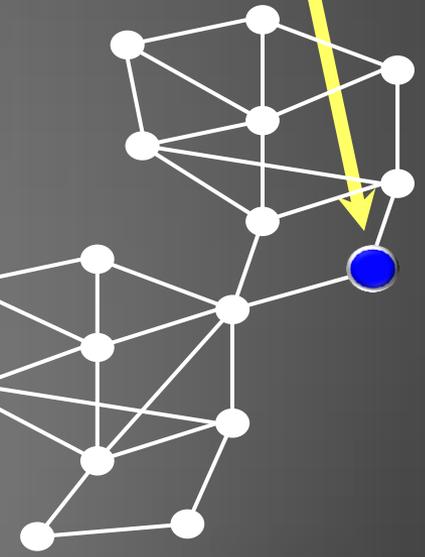
I'm new to this organization. Few people know me or my capabilities, but I don't know where to turn for help.

**Solution:** Orientation, staffing, mentoring, training

## Loners

I prefer to work alone. I often feel out-of-step with my co-workers.

**Solution:** Support improve communication and collaboration



# SECOND SURVEY QUESTION EXAMPLE



“On a scale of 1-5,  
please rate your preferred way of communicating  
(5 = favorite, 0 = least favorite)

- > Face to face
- > Telephone
- > Email
- > Text Messaging
- > Formal Meeting
- > Chance Meeting
- > Conference Participation

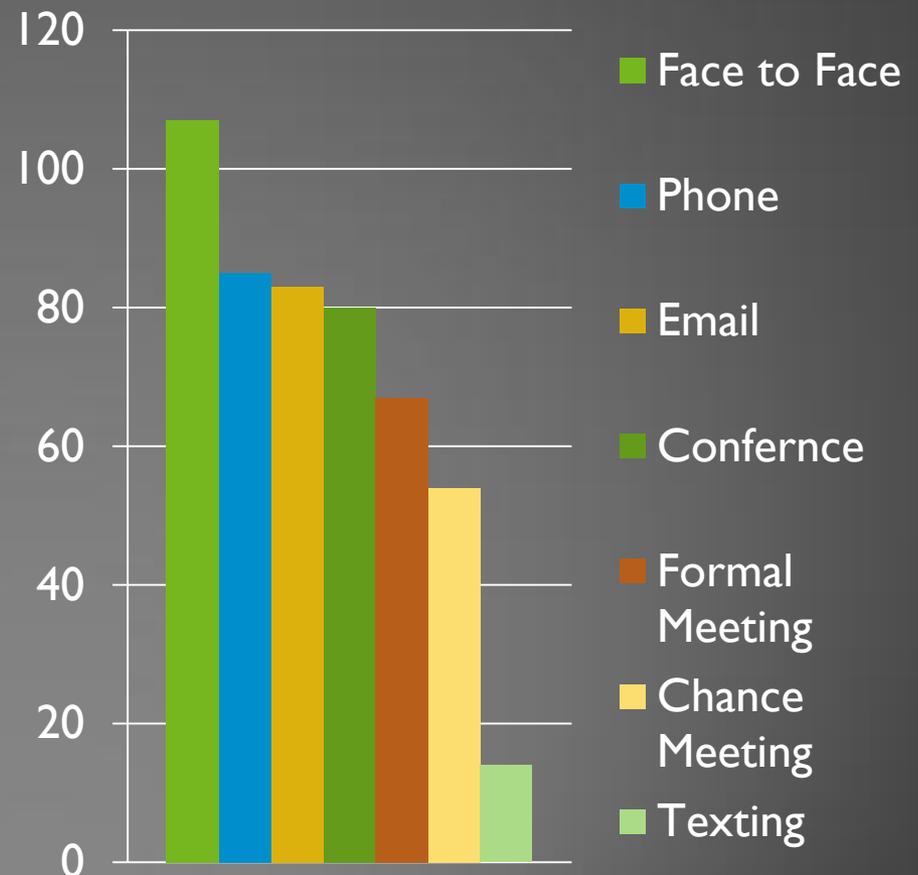
# Communication Preferences

Federal survey participants place the highest values on direct communication of face to face meetings.

Phone calls, email and conference participation are of equal preference to participants.

Formal meetings are preferred to chance meetings.

Text messaging is limited means of communication.



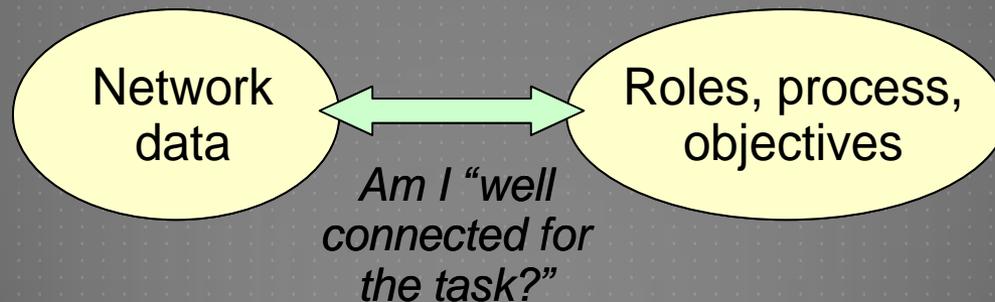
# SUMMING IT UP...



- ▶ Network analysis is a valuable tool for helping units to understand what their informal network looks like and how it has evolved.
- ▶ Once leaders and network participants decide to evaluate their networks, the conclusions drawn must then be translated into actionable results.

# CREATING ACTIONABLE RESULTS

- ▶ Cultivate social networks: because networks impact individual and group success
- ▶ Network visioning: how does this network link to external networks
- ▶ Develop tangible goals related to network activities
- ▶ Action planning
- ▶ Factor network-building into objectives and employee development plans



# FOCUS ON TWO LEVELS: INDIVIDUAL AND GROUP

“Our network” is as important as “My network”

## Individual

Assert behaviors and take individual action

Volunteer for cross-functional teams

Leverage people in existing network to establish new contacts

Use more face-to-face communication

Attend conferences

Treat network-building as integral part of my work

When interacting, ask questions to find commonalities

## Group

Provide collective action, mindset and resources

Network “mentoring”

Create a unique and conducive physical environment

Ensure “Acting Responsibilities” support network communication

Use preferred methods of communication

Rewards that promote trust & collaboration

Joint training with colleagues

# DISCUSSION



1. How will you use your knowledge of the social network to address the absence of federal staff related to details, fire duty, training, succession planning?
2. How will you use your knowledge of the social network to support collaboration between external organizations and federal employees with similar Program responsibilities?