



The Hope for Integrated Regional Management:

Network governance linking watershed and fishery management

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Call for Integration

Oceans, Estuaries, Watersheds, Uplands:

- U.S. Ocean Commission
- National Research Council
- Scholarship

What does it look like?

- Collaborative planning and management
- Ecosystem-based management, adaptive management
- Regional governance

Okay, but what does this look like?

- Inter-governmental, multi-sectors
- Communication, coordination, synchronization
- Mapping and multi-use planning

Governing by networks

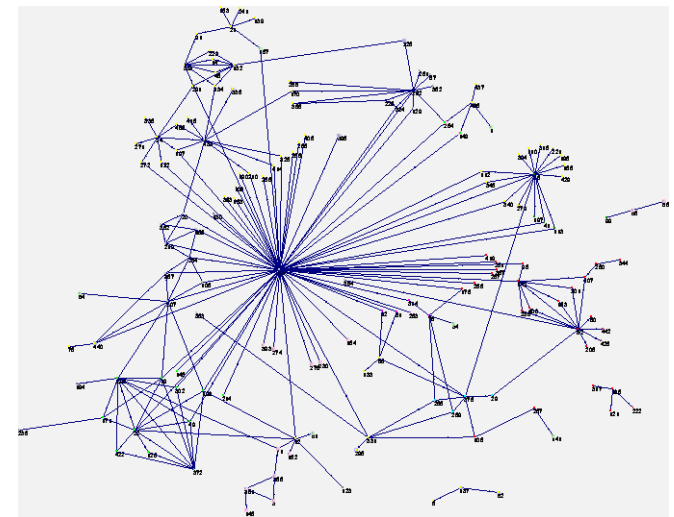
Governing by Networks

Network analysis

- ❑ Mathematics – graph theory
- ❑ Relational measures – centrality, connectivity
- ❑ Graphics software development
- ❑ Applications: organization theory, social capital

Communication network analysis:

- ❑ Communication links – frequency
- ❑ Individual nodes
- ❑ Informal + formal
- ❑ Snap shots
- ❑ Under estimate



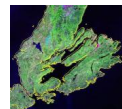
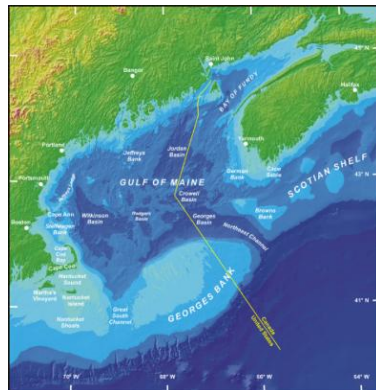
Communication Network Analysis



Research questions:

- Extent of coordination
- Role of network leaders or managers
- Vulnerability and enhancement potential in network structure and function

- Three cases:
 - Claimed to be doing integrated, collaborative planning
 - Met specific criteria for being governance networks



Bra d'Or Collaborative Environmental Planning Initiative (CEPI)

NH Coastal Watershed Land Conservation Plan

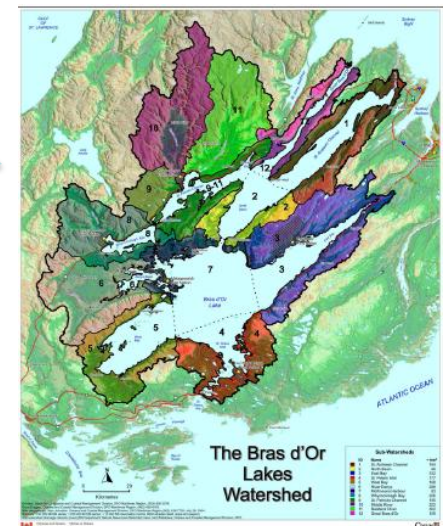
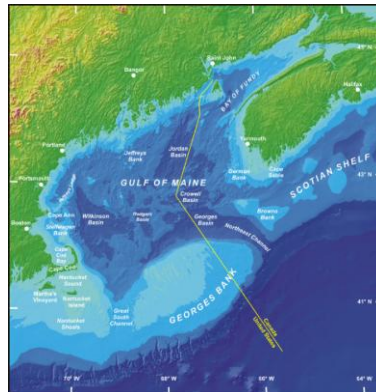
Atlantic Herring Fishery Management Plan

Present: Network analysis plus integration testing...

Bra d'Or Lake, Nova Scotia

Collaborative Environmental Planning Initiative (CEPI):

- Canada's Ocean Act – DFO
- Eastern Scotian Shelf Integrated Mgt (ESSIM)
- CEPI steering committee
 - Local, provincial, federal, Tribal government
 - Non-profit and private sectors
 - University
- Ecosystem degradation – water, fishery, cultural resources
- Developing a cross-sector, multi-governmental plan





NH Coastal Watershed Land Conservation

Land conservation:

- ❑ State Coastal Zone Mgt program-funded, collaborative planning approach
- ❑ Project team:
 - ❑ Local and state governments
 - ❑ Non-profit sector
 - ❑ University
 - ❑ Private sector consultant
- ❑ Development pressures, water quality degradation
- ❑ Prioritized land for Coastal and Estuarine Land Conservation Program (CELCP) funding

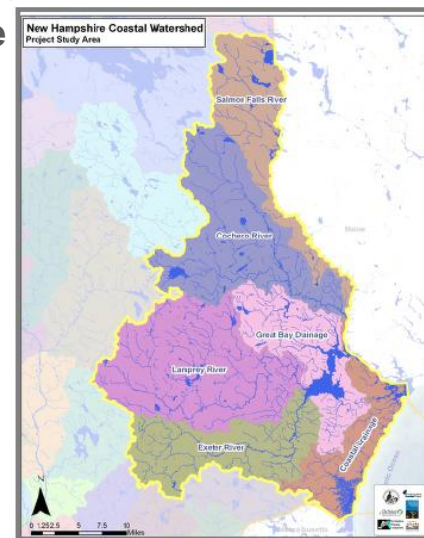
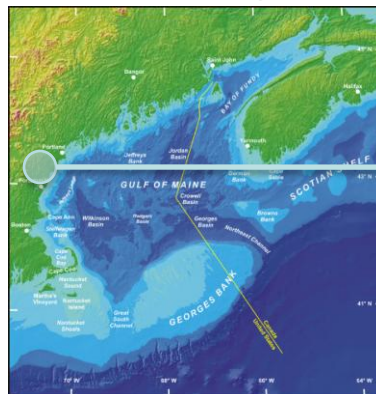


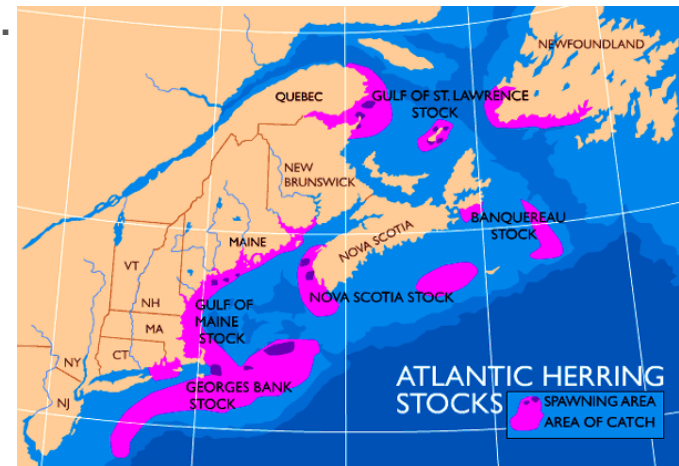
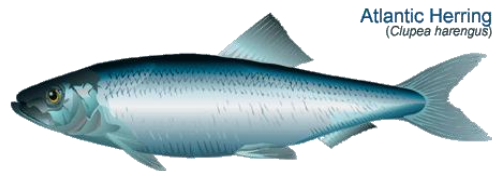
Figure I-1. New Hampshire's coastal watersheds.



Atlantic Herring Fishery Management Plan

Joint State-Federal fishery management planning:

- State waters, federal waters, US-Canada
- Economic – bait, forage fish, consumer
- Biology – inshore-offshore interactions
- FMP participants:
 - State and federal governments, incl. elected officials
 - Non-profit sector
 - Universities
 - Private sector
- Healthy stock might increase effort, localized depletion.





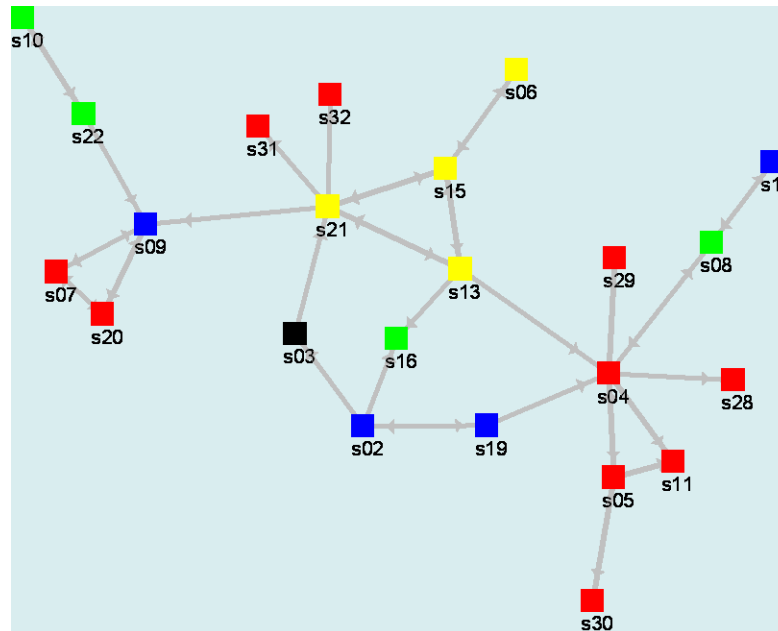
NH Coastal Watershed Land Conservation

Communication network map:

Network size: 23 (2 local, 2 state, 2 ngo's, 3 univ, 1 private)

Density: 8%

Weighted average path length: 2.5



Spin of influence

Betweenness ($1/3 - 1/2x$)

s04: 0.20

s21: 0.15

s13: 0.11



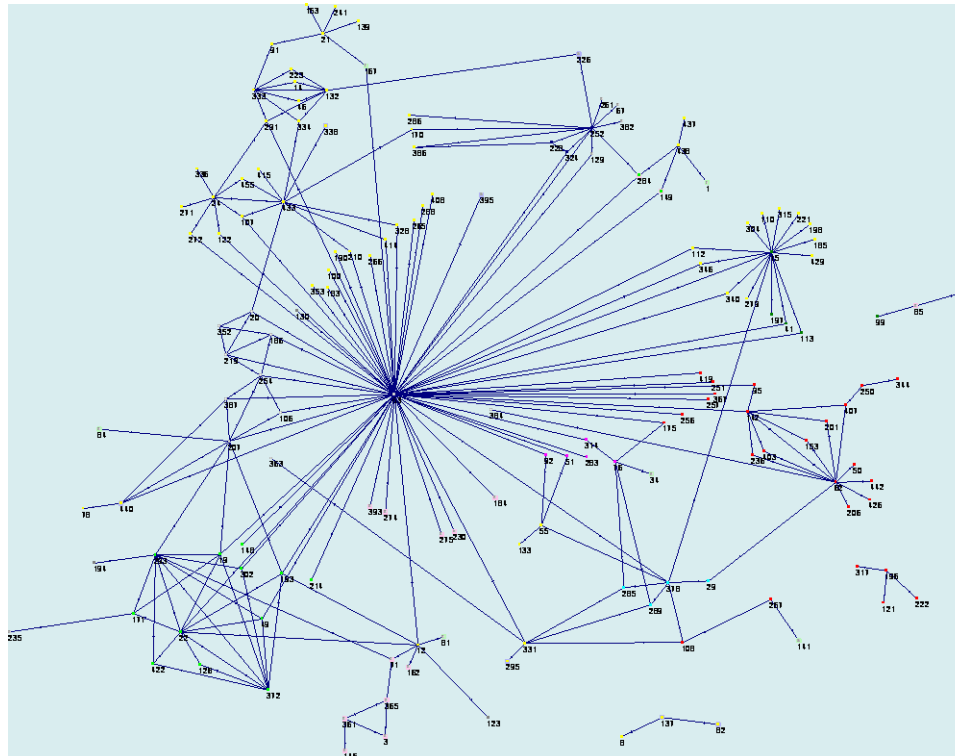
Atlantic Herring Fishery Management Plan

Communication network map:

Network size: 146 (multi-state, US & Can, staff, multiple private sector, 4 ngo's)

Density 1%

Weighted average path length: 2.5



Noisey story

Betweenness:PDT 3x (0.2)

NEFMC staff (2x) (0.06)

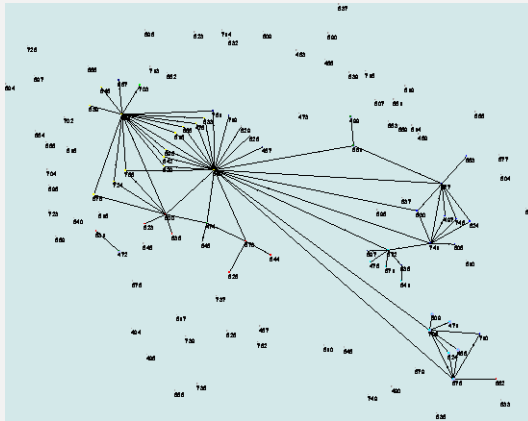
State Commissioner (0.03)

State agency staff (0.03)

NMFS staff (0.03)

Weekly Networks

CEPI



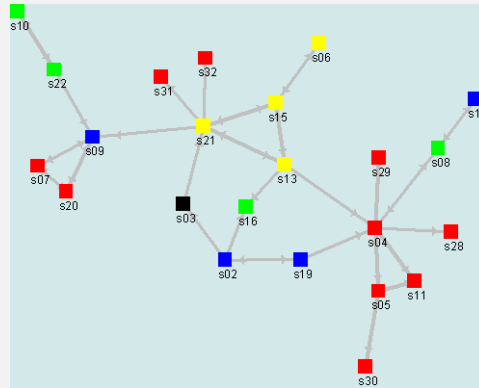
Size: 53

Density: 3%

Wght Avg Path Length: 2.5

Betweenness: 6x (0.75)

NH Coastal Lands



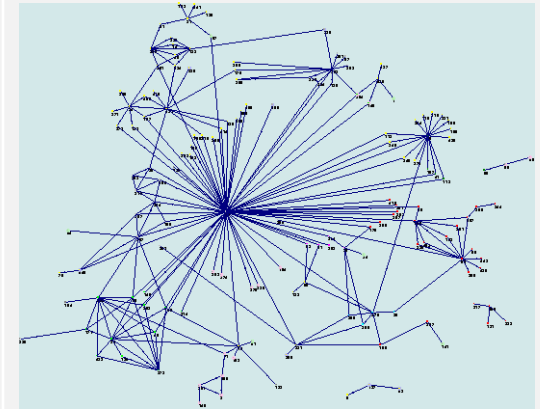
Size: 23

Density: 8%

Wghtd Avg Path Length: 2.5

Betweenness: 1/3x (0.2)

Atlantic Herring



Size: 146

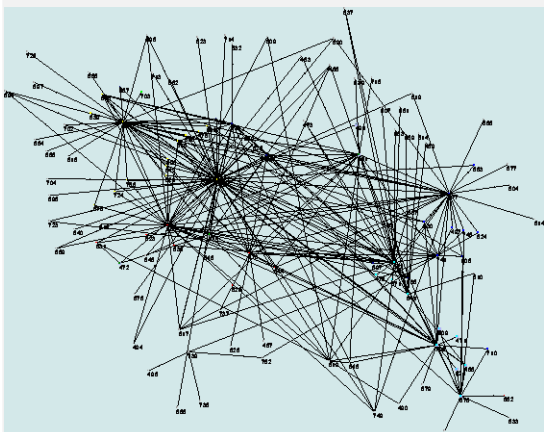
Density: 1%

Wghtd Avg Path Length: 2.5

Betweenness: 3x (0.2)

Monthly Networks

CEPI



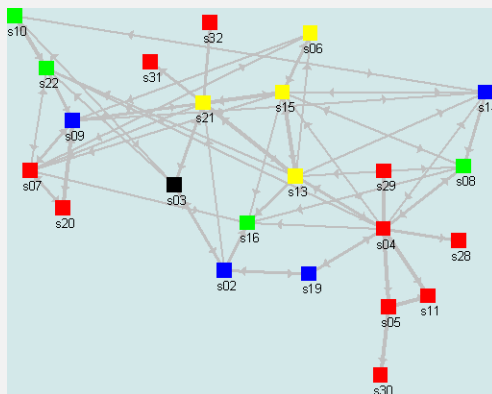
Size: 116 (+63)

Density: 2% (+)

Wght Avg Path Length: 2.3 (+)

Betweenness: 0.75(6x) to 0.38(3x)

NH Coastal Lands



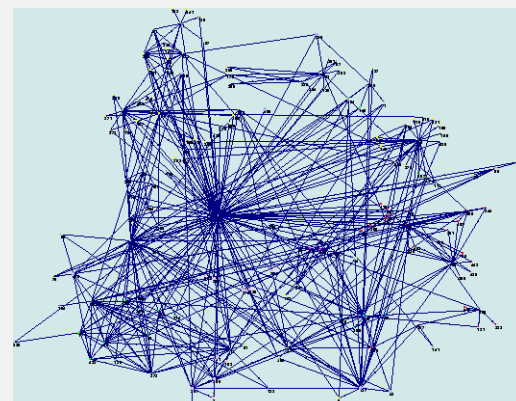
Size: 23 (no change)

Density: 16% (doubles)

Wghtd Avg Path Length: 2.5

Betweenness: 0.2(1/3x) to 0.4(2x)

Atlantic Herring



Size: 156 (+10)

Density: 2% (+)

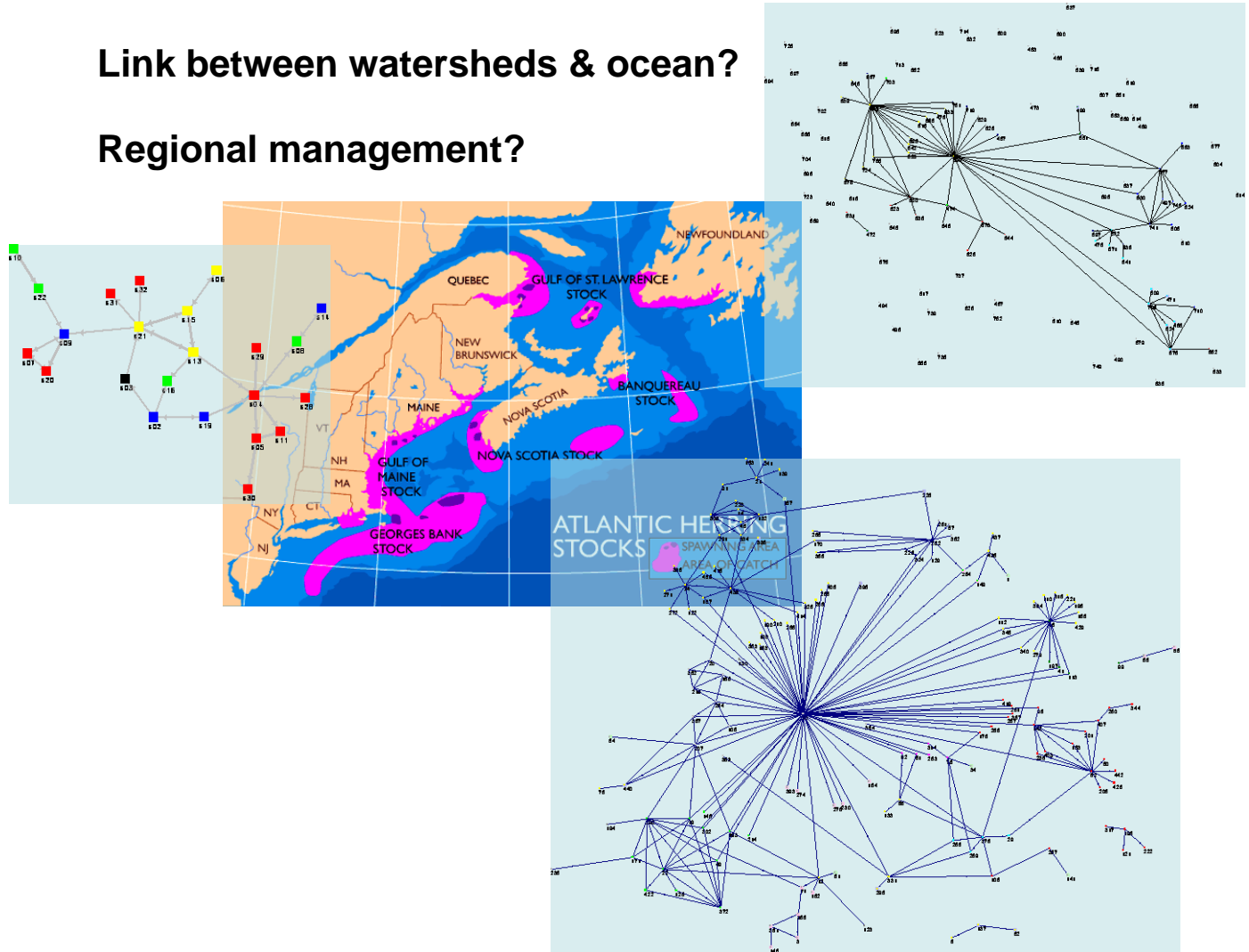
Wghtd Avg Path Length: 3.5 (+)

Betweenness: 0.2(3x) to 0.4(1.5x)

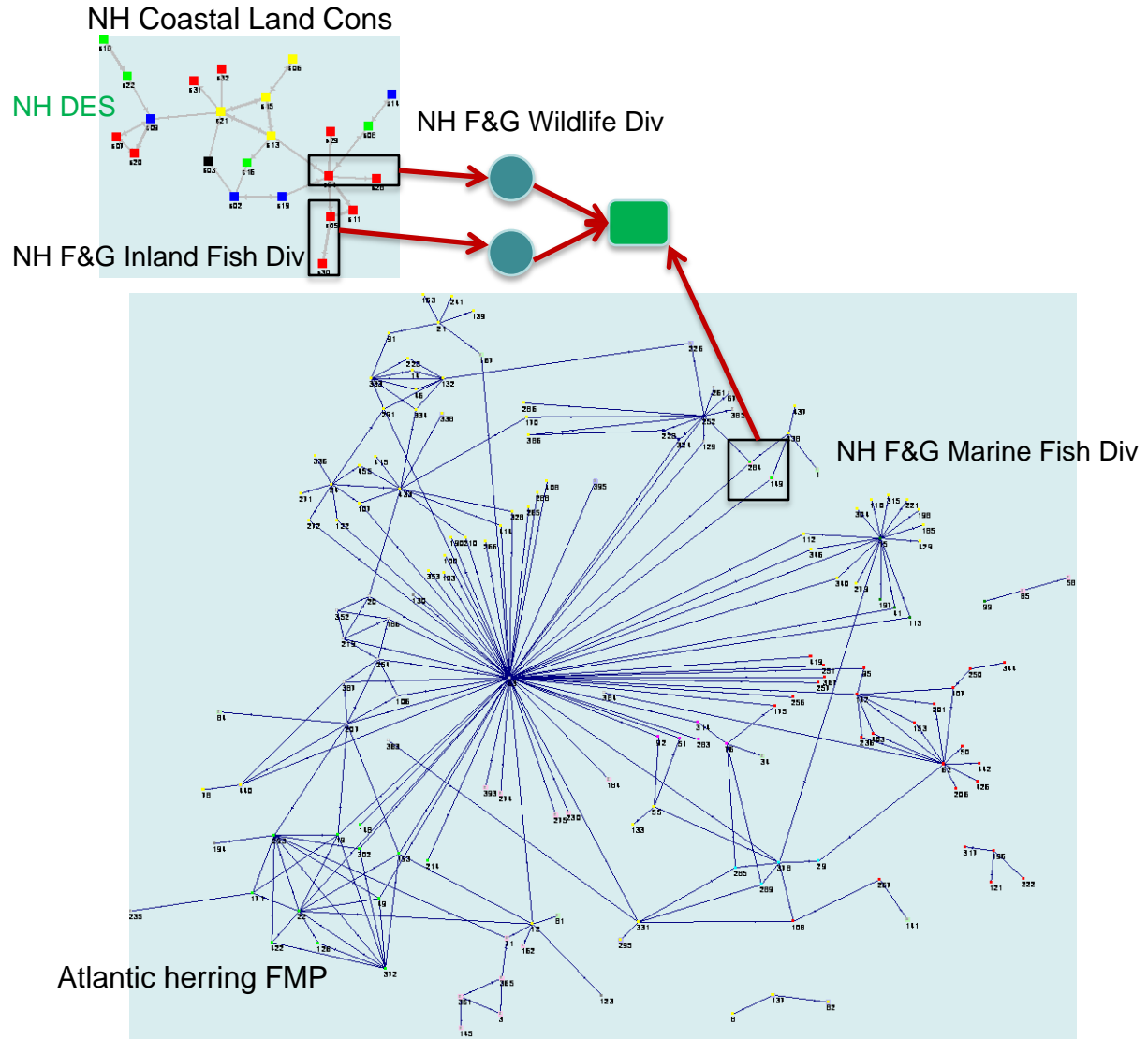
Can you hear me now?

Link between watersheds & ocean?

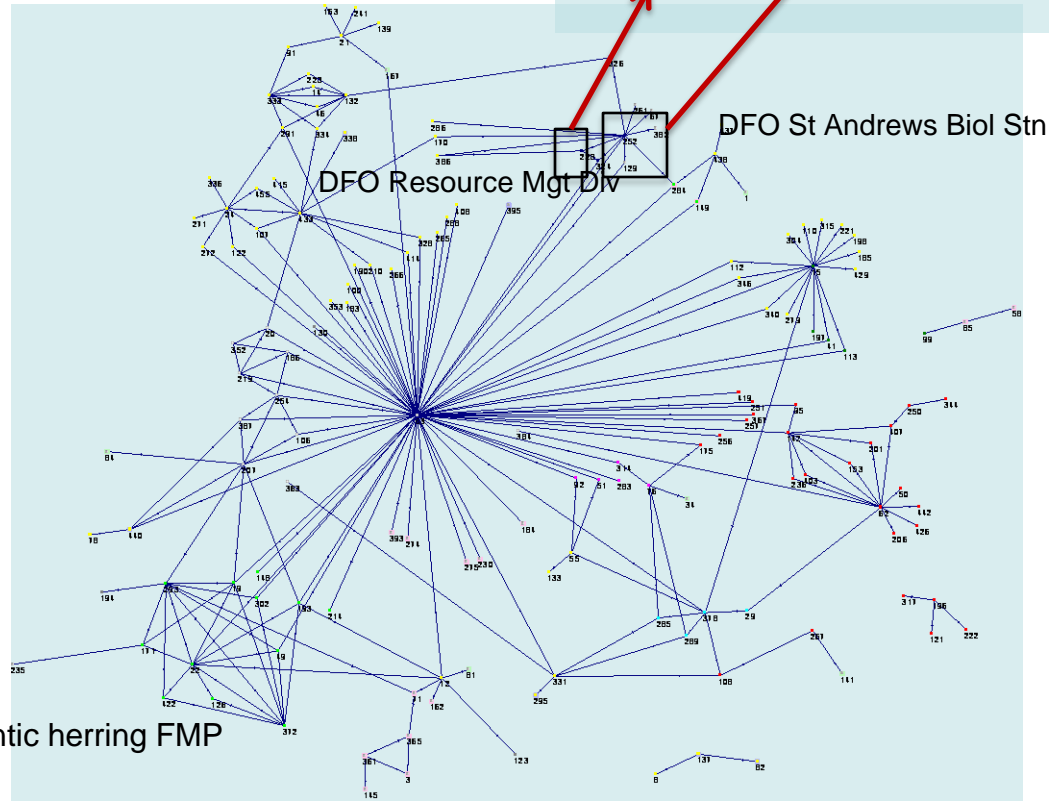
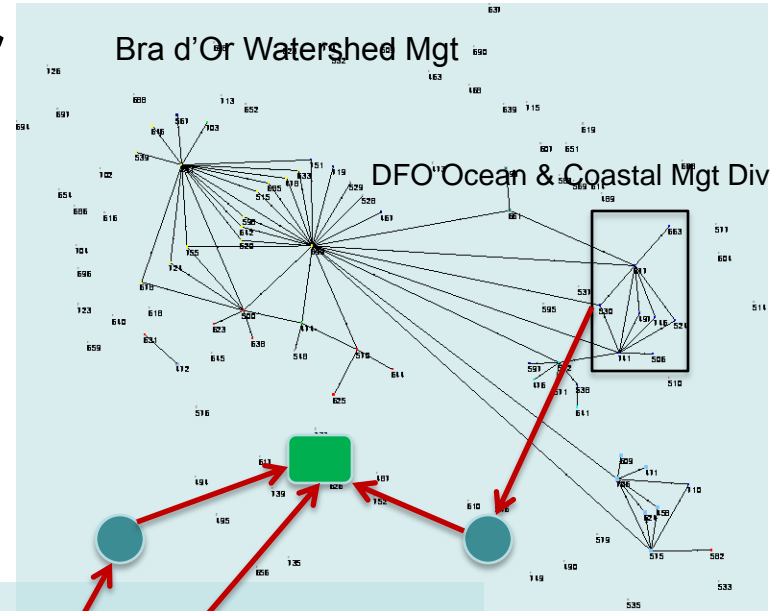
Regional management?



Can you hear me now?



Can you hear me now?

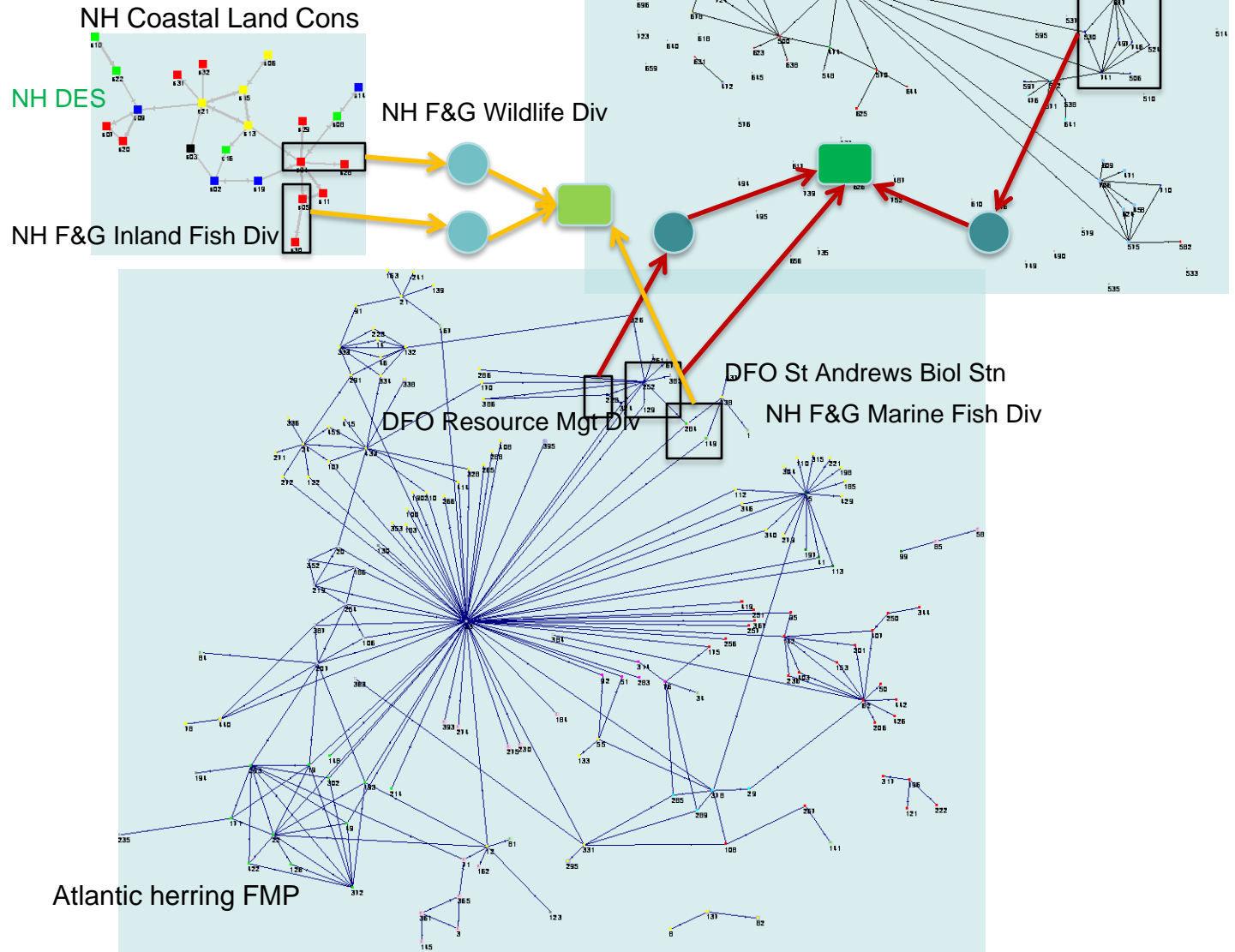


Atlantic herring FMP



Can you hear me now?

Probably Not



Can you hear me now?



Probably Not.

Importance of bridgers: how can we enhance bridging function

- Can bridging be a team rather than individuals?
- Value-added networking services:
 - Information synthesis
 - Monitoring capacity
 - Information Technologies
- Faced with a network dilemma. What's the right balance?
 - Innovative and adaptive v. social control and conformity



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Thanks!

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