

Linking ACLs to Habitats (and Ecosystems)

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Habitats and Ecosystems

- Habitats – species-specific
- Ecosystems – the whole enchilada

Topics

- Dealing with imperfect knowledge – getting beyond faith-based EbM
- What the MAFMC SSC is doing to support addressing habitat and ecosystem issues
- Flip-flop between habitats and ecosystems

Organization of Habitat Information (from EFH Guidelines)

- Level 1 – Presence/Absence
- Level 2 – Habitat-related densities
- Level 3 – Vital rates within habitat type
- Level 4 – Production rates by habitat type

Unfortunately, we have been finding that habitat association information for most managed species is still at the level 1 stage

Why?

- Some species are only incidentally caught
- Knowledge gaps in the life cycle
- Habitat preference or lower predation rate?
- Range extension in relation to abundance

But we probably know more than we think we do...

- Species/habitat relationships
- Food preferences and requirements
- Spawning behavior, timing, and location
- Early life stage development
- Migratory pathways
- Species associations

Need to learn how to function with imperfect knowledge

- Cannot afford the cost or the time to learn everything
- Need a body of theory for fish/habitat relationships
- Develop some rules of thumb to filter noise to detect signals
- Take advantage of new sampling and data handling technologies

Development of a body of habitat theory

- List the life history traits
- Relate each trait to habitat usage (habitat association)
- Begin looking for generalizations
 - By trait
 - By habitat usage

Development of a body of habitat theory

- Use generalizations to apply knowledge gained from data on species with similar habitat usage traits
- Rely on theories already explored, for example:
 - Niche occupation (Darwin's finches)
 - Species radiation (Island biogeography)

Examples of Life History Traits

- Spawning
 - Location
 - Timing
 - Length of spawning season
 - Single or multiple events
- Egg Characteristics
 - Free-floating, adhesive, or interstitial
 - Specific gravity
 - Incubation period

Life History Trait	Habitat Type Required			
	A	B	C	D
1	X _Y	X _Y	X Y Z	Y Z
2	X Y _Z		X Y Z	Z
3	x Y	X Y Z	X Y	x Y Z
4	X Y _Z	X Y Z		x Z

What can we do now?

- Focus on what is immediately useful to stock assessments, e.g., translate habitat effects into age-specific mortality rates (e.g., use of conditional mortality rates*)
- Solidify partnerships between scientists and fishermen, which are useful and necessary to understand habitat function and use (whatever happened to “natural history”)?

* Defined here as the fractional reduction in year class strength

Role of Councils

- Habitat science is conducted by a multitude of agencies and organizations
- Being on the receiving end of habitat science information, the fishery management councils (and interstate commissions) can serve to focus efforts and provide meaningful coordination
- Continually improve science products
- Need end-to-end information management architecture

What the MAFMC SSC Is Doing

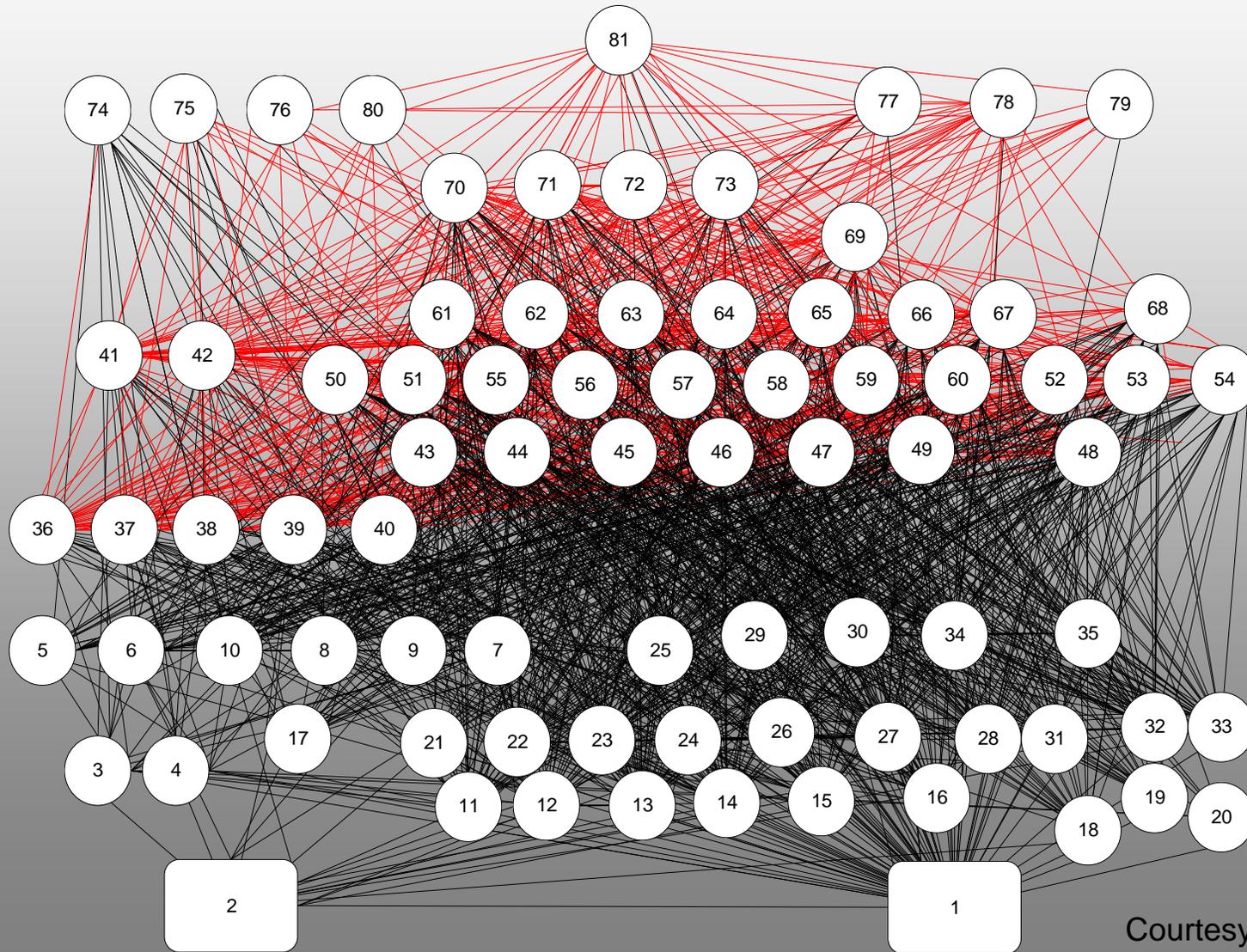
- SSC Ecosystems Subcommittee, with charge from MAFMC:
 - Provide the Council with scientific advice to support and inform the **development of the Council's ecosystem level goals, objectives, and policies.**
 - Provide advice to address and incorporate **ecosystem structure and function** in its fishery management plans (FMPs) and quota specification process

- Describe scientific information that the Council could consider to **anticipate or respond to shifts in ecological conditions** (e.g., climate change and other externalities) or processes in its management programs.
- Summarize what other countries and regions are doing to incorporate ecosystem-based fishery management principles in their management plans and programs.
- Describe how ecosystems principles could be used by the Council in the long term to **evolve its single-species and multi-species FMPs into a regional ecosystem-based fishery management plan.**

Ecosystem Issues Currently Confronting MAFMC

- Accounting for “forage species”
 - What is a forage species?
 - Request to increase B above B_{msy}
 - Handle species-by-species or develop omnibus approach?
 - Double accounting?

Feeding Relationships on the NE Shelf



Courtesy of Jason Link

Ecosystem Issues Currently Confronting MAFMC

- Handling bycatch caps (e.g., squid and butterfish)
- Topic for next Nat'l SSC Workshop

Summary

- The Magnuson-Stevens Act requires input of habitat and ecosystem advice to the management process
- Habitat assessment advice should be expressed in a common currency that can be input directly into stock assessments
- For species that have no habitat use information, we should be developing a body of theory based on habitat associations by other species with similar life history traits

Some Advice

- Keep habitat-related studies focused on supporting fisheries management
- Keep agency and council leadership engaged and informed
- Start simple
- Develops means of working with imperfect knowledge