

Habitats

- Shellfish aggregations:
 - Oyster reef.
 - Hard clam beds.
 - Scallop beds.
 - Dead shell accumulations.
- Other sessile fauna:
 - Primary coral reef architecture.
 - Patch reef, soft coral, anemones amidst soft sediment.
 - Live rock.
- Macroalgae: *Fucus*, *Ulva*, *Laminaria*, *Sargassum*.
- Submerged aquatic vegetation (SAV):
 - Tidal fresh and oligohaline spp.
 - Mesohaline and polyhaline spp.
- Tidal vegetation:
 - Saltwater marsh.
 - Brackish marsh.
 - Tidal freshwater marsh.
 - Mangroves.
- Coastal inert substrate:
 - Loose fine bottom (sand, silt, mud).
 - Loose coarse bottom (gravel, cobble).
 - Firm hard bottom.
 - Structured sand.
- Riverine:
 - Higher gradient headwater tributaries.
 - Lower gradient tributaries.
 - Higher gradient large mainstem rivers.
 - Lower gradient large mainstem rivers.
 - Low order coastal streams.
 - Non-tidal freshwater mussel beds.
 - Coastal headwater ponds.
 - Non-tidal freshwater marshes.

Species

- All ASMFC-managed species.
- All Council-managed species (NEFMC, MAFMC, SAFMC) with life stages occurring within 3-mile state limit.
- All other *native* diadromous species.
- Select state-managed species (e.g., blue crab) and unmanaged species (e.g., oyster toadfish, Atlantic silverside).
- Not included:
 - Bivalves (counted as habitat).
 - Species with no marine or estuarine life stage.
- Totals by region:
 - New England = 36
 - Mid-Atlantic = 55
 - South Atlantic = 62
 - South Florida = 62

Methods I: Rankings.

- Separate matrices completed for each of four sub-regions to accommodate:
 - Different species assemblages
 - Geographic variation in habitat use (and availability)
- Regional leads assembled teams of experts, each assigned set of species.
- Used published articles, grey literature, personal observations and personal communication, all documented in accompanying bibliography and notes pages for each species.
- Assigned one of six ranks to each node (species life stage-habitat type combination):
 - U = unknown (not very useful designation)
 - Blank = not present
 - L = Low = Infrequent or occasional use
 - M = Medium = Regular but non-essential use
 - H = High = Important use; loss results in significant impact on popn.
 - VH = Very High = Essential; species cannot persist without.
- Converted ranks to numerical scores for analysis.

Methods II: Review.

- Overall goal: Minimize subjectivity in a process where subjectivity is inevitable.
- Initial check for the “red face” test:
 - Nonsensical rankings (habitats or species where they don’t belong).
 - Poor referencing or documentation.
 - Overzealousness/hypercautiousness (i.e., too many scores or too many high scores).
- Comparison of matrices from different regions for a given species by scorers where “red face” test is met.
- Review panel convened to:
 - Revise and calibrate where possible
 - Identify questions for original scorers
 - Identify outside experts where needed
- Outside experts review where expertise are lacking.
- Review panel reconvened (by phone) to revise and calibrate outside expert changes (done!).

Methods III: Scoring & Analysis.

- L/M/H/VH ranks converted to:
 - 1/2/3.5/4 values.
 - 1 for any rank, 0 otherwise to evaluate simple presence/absence.(other systems considered and still possible)
- Ranked habitats in terms of:
 - Highest aggregate score.
 - Highest # of H/VH.
 - Highest # of L/M.
 - Highest # any rank.
 - Ratio of H/VH to L/M.

Results I: New England

New England	Highest Score	2nd Highest Score	3rd Highest Score	4th Highest Score	5th Highest Score
Highest Habitat Category Score	Coastal Inert Substrate	Riverine	SAV	Marine & Est. Shellfishbeds	Tidal Vegetation
Highest Habitat Type Score	Loose Fine Bottom	Loose Coarse Bottom	Structured Sand	Firm Hard Bottom AND Mesohaline-Polyhaline spp.	
Which falls under the following Habitat Category:	Coastal Inert Substrate	Coastal Inert Substrate	Coastal Inert Substrate	Coastal Inert Substrate AND SAV	

Results II: Mid-Atlantic

Mid Atlantic	Highest Score	2nd Highest Score	3rd Highest Score	4th Highest Score	5th Highest Score
Highest Habitat Category Score	Coastal Inert substrate	Riverine	SAV	Marine & Est. Shellfish beds	Tidal Vegetation
Highest Habitat Type Score	Loose Fine Bottom	Mesohaline -Polyhaline spp.	Lower Gradient Large Mainstem River	Loose Coarse Bottom	Structured Sand Habitat
Which falls under the following Habitat Category:	Coastal Inert Substrate	SAV	Riverine	Coastal Inert Substrate	Tidal Vegetation

Results III: South Atlantic

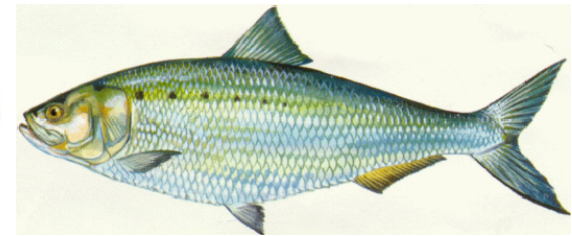
South Atlantic	Highest Score	2nd Highest Score	3rd Highest Score	4th Highest Score	5th Highest Score
Highest Habitat Category Score	Coastal Inert Substrate	Tidal Vegetation	Riverine	SAV	Marine and Estuarine Shellfish Beds
Highest Habitat Type Score	Saltwater/ Brackish Marsh	Loose Fine Bottom	Mesohaline-Polyhaline spp.	Lower Gradient Large Mainstem River	Tidal FW marshes
Which falls under the following Habitat Category:	Tidal Vegetation	Coastal Intert Substrate	SAV	Riverine	Tidal Vegetation

Results IV: South Florida

South Florida	Highest Score	2nd Highest Score	3rd Highest Score	4th Highest Score	5th Highest Score
Highest Habitat Category Score	Other Sessile fauna	Coastal Inert substrate	Tidal vegetation	Riverine	SAV
Highest Habitat Type Score	Patch reef, soft coral or anemones amidst soft sediment	Primary Coral Reef Architecture	Live rock	Firm hard bottom	Loose fine bottom
Which falls under the following Habitat Category:	Other Sessile fauna	Other Sessile fauna	Other Sessile fauna	Coastal Inert Substrate	Coastal Inert Substrate

Future Directions for Analysis

- Totals by management category (e.g., ASMFC-managed species only).
- Totals by life stage (e.g., only Juv/YOY for most important nursery habitats).
- Weighting by trophic linkages.
- Economic analyses?



Overview

- What is the Matrix? → Assessment of the importance of coastal & inland habitats for *selected* fish species in terms of:
 - Shelter.
 - Direct trophic links.
 - Spawning.
 - Nurseries.
- What is the Matrix NOT? → Assessment of either the *status* or the full ecological importance of these habitats in terms of:
 - Nutrient processing.
 - Securing sediments.
 - Maintaining water quality (filtration, etc.).
 - Broader trophic linkages.

Lessons Learned

- Takes a LONG time! (3 months became 2 years...)
- Always understanding purpose.
- Documentation proved to be key.
- Strong regional leaders.
- Requires careful consideration and definition of habitat categories (species list can be more fluid).
- Regional differences in habitat categories.
- Trade-offs between lumping and splitting.
- Keeping perspective on the importance of any single cell or even single species, but...
- ..beware of death by a thousand cuts.
- Non-reef-forming bivalves are “fish” more than habitat?
- Be clear about treatment of pelagics.

Species

