Atlantic States Marine Fisheries Commission

Habitat Committee

October 28, 2014
Hilton Mystic
20 Coogan Boulevard, Mystic, Connecticut

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1. Welcome and Introductions (*K. Smith*)	8:30 a.m.
2. Committee Consent	8:35 a.m.
• Approval of Agenda	
• Approval of Proceedings from May 2014	
3. ACFHP Update (*L. Havel*)	8:40 a.m.
4. Collaborating with Local Municipalities (*J. Kritzer*)	9:00 a.m.
5. Fisheries and Land Use Discourse (*T. Hartley, VIMS, Virginia Sea Grant*)	9:30 a.m.
6. Break (10 minutes)	10:00 a.m.
7. Blue Carbon Activities in the Coastal Zone (*P. Colarusso, EPA*)	10:10 a.m.
8. Habitats, Populations, and Ecosystem-Based Fisheries Management (*P. Auster, University of Connecticut*)	10:40 a.m.
9. Opportunities with Restore America's Estuaries (*K. Smith*)	11:10 a.m.
10. Fish Passage Working Group Update (*J. Kipp*)	11:40 a.m.
11. Lunch	12:00 p.m.
12. Ocean Acidification Task Force (*M. Topolski*)	1:00 p.m.
13. Review 2014 Work Plan (*M. Yuen*)	1:30 p.m.
• Habitat Management Series Products (*M. Yuen*)	
• 2014 Habitat Hotline: Climate Change Impacts on Fish Habitats (*M. Rousseau*)	
14. Break (10 minutes)	2:30 p.m.
15. Set 2015 Work Plan (*M. Yuen*)	2:40 p.m.
• Habitat Bottlenecks	
16. Other Business	4:00 p.m.
17. Adjourn	4:30 p.m.

Field Trip (Fish Passage Sites): Wednesday, October 29
Meet at hotel front lobby at 8:30 a.m. Vans will depart at 8:40 a.m.
Full itinerary will end at 12:30 p.m., but an earlier van will return to hotel by 11:30 a.m.

ASMFC HABITAT FIELD TRIP- OCTOBER 29- 8:30 AM – 12:30 PM

FISH PASSAGE PROJECT SITES, SOUTHEASTERN CONNECTICUT

The restoration of diadromous fish runs is accomplished through the removal of dams, construction of fishways, and installation of eel passes. To promote restoration in many watersheds, small projects need to be pursued outside the regulatory community—proactive, cooperative, voluntary projects funded by grants. This tour will visit six sites in southeastern Connecticut where such projects have been completed or planned. The sites are varied with a different story to tell.

Vargas Pond Fishway- the smallest fishway in the state. Fabricated off-site, hand-carried on-site and installed. Beneficiaries- alewife.

Wequetequock Pond Dam- a stone fishway on private property designed by CTDEEP and hand-built by staff and TNC. Historic resources were an issue. Beneficiaries- alewife, sea-run trout, American eel.

Rutan Dam- An 11-foot high dam just upstream of the Wequetequock Pond Dam that was removed. Stones from its spillway were used to build the Wequetequock Pond Dam Fishway. We will tour the site to see what the stream looks like two years later. Beneficiaries- alewife, sea-run trout, American eel.

Lantern Hill Pond Culvert- A previous road crossing was replaced with one that can pass fish. Beneficiaries- alewife, trout, American eel.

Hallville Dam Fishway- An 15-ft high dam with a steeppass fishway that has a underground viewing window and camera with digital videography capabilities. This fishway also has an eel pass. Beneficiaries- alewife, sea-run trout, American eel.

Hyde Pond Dam Removal- The small dam has a functional fishway but the future is threatened by certain dam failure. A plan has been developed to remove the dam and recycle the fishway for another project. Beneficiaries- alewife, blueback herring, sea-run trout, American eel and an occasional American shad.

The tour will commence from the hotel and return to the hotel in time for lunch. Transportation will be provided by a van and other vehicles. Attendees should wear field attire, including rain gear depending upon the forecast. There are no shelter or facilities at any location. The tour will be led by Steve Gephard, CTDEEP, Diadromous Program. Space is limited.

Atlantic States Marine Fisheries Commission

Habitat Committee

Spring Meeting
May 1, 2014
Annapolis, Maryland

Meeting Summary

On May 1, 2014, the Habitat Committee (HC) met in Annapolis, Maryland to discuss fish habitat issues and review its 2014 work plan. The HC welcomed new members from the New England, Mid-Atlantic, and South Atlantic fisheries management councils.

The Habitat Committee discussed climate change and management of fisheries resources and habitats. ASMFC staff (Science Coordinator) provided an overview of the Management & Science Committee's task to analyze reallocation schemes for species that are experiencing a shift in their range due to changes in the marine climate. MAFMC staff provided an overview of its recent climate change workshops, then ASMFC staff explained the Commission's participation and highlighted resulting themes and discussion relevant to fish habitats. There is general consensus that climate change is a topic that needs to be addressed. The next *Habitat Hotline* will focus on adaptations to climate change and impacts to fish habitats, and will feature articles on sea level rise, ocean acidification impacts on corals and oysters, and species distribution shifts.

The HC visited three living shoreline projects by Maryland Department of Natural Resources (MD DNR). Following discussions on the definition and goals of living shorelines, project implementation, and monitoring, a working group was formed to review and update the *Living Shorelines* document (Habitat Management Series, 2010).

A biologist from MD DNR gave a presentation on habitat considerations in fisheries management (stock assessments) using a case study of impervious surface and fish distribution in the Chesapeake Bay.

ASMFC staff provided an update on the Fish Passage Working Group (FPWG). The FPWG continues to develop the resource document on the Federal Energy Regulatory Commission's (FERC) hydropower dam relicensing process, which is intended to serve as a guide for state personnel. The FPWG is working with The Nature Conservancy to develop a database tool for managers to use in prioritizing fish passage projects. Currently, the project leader is refining the spreadsheets to facilitate data collection.

The current *Habitat Management Series* issue focuses on the impacts of nearshore and estuarine aquaculture on fish habitats. It presents the beneficial, negative, and neutral perspectives on state-water aquaculture activities, and includes summaries of policies from state to federal levels; the range of species, topics, and purposes; and a resource section for further information. The Habitat Committee reviewed the draft and provided additional comments.

The Sciaenid Habitat Source Document is a compilation of the habitat utilization for each Commission-managed sciaenid species, as well as three kingfish species (Northern, Southern, and gulf). There will be a general sciaenid habitats section that summarizes the typical habitat requirements for this family of fishes. The project is underway, with the template populated by existing habitat information from the FMP documents. Information may be missing or outdated, depending on the species' FMP. At this point, species experts have been identified, including external authors. The target completion date is end of 2015.

The HC discussed the NEFMC's proposed Winter Flounder EFH (draft Omnibus Habitat Amendment 2) and the submission of a Habitat Areas of Particular Concern (HAPC) proposal during the comment period in late summer. The NOAA Fisheries Northeast Regional Office, Habitat Conservation Division is interested in submitting an HAPC proposal.

The next HC meeting will take place during the ASMFC Annual Meeting Week in Mystic, Connecticut during the week of October 27, 2014.

2014 Habitat Program Work Plan

The following work plan outlines the tasks assigned to the ASMFC's Habitat Program from the **2014 Action Plan**. Each task has the Action Plan description; the work plan delegates the responsibility for completing these tasks to an individual or subcommittee; the expected work that needs to be completed is described; and a timeline for completing each task is identified. The Work Plan will be used to monitor the Habitat Program's efforts to complete the tasks identified in the Action Plan, as well as to ensure that the original intent of the task is preserved throughout the year.

Task 4.1.3 – Artificial Reefs Committee

Coordinate artificial reef activities among the Atlantic coast states, and between the Atlantic and Gulf States Marine Fisheries Commissions.

Coordinator: Melissa Yuen to coordinate with James Ballard (GSMFC)
Assignment: Coordinate with GSMFC to hold a joint meeting of the Artificial Reef Subcommittees. Provide necessary support for a successful annual meeting. Report outcome to Habitat Committee.
Timeline: Date and Location TBD
Recently Completed:

- ASMFC & GSMFC Artificial Reef Committees (ARC) met in February 24-26, 2014.
- The ARC will update the *Guidelines for Marine Artificial Reef Materials*.
- Next ARC meeting will be held on January 12-13, 2015 jointly with the Florida Fish and Wildlife Commission's Artificial Reef Summit.

Task 4.2.1 – Habitat FMP Sections

Take the lead in updating FMP habitat sections for Commission-managed species by working closely with technical committees, other species experts, and staff. For each species, include descriptions of habitat types or areas most critical to restoring or maintaining sustainable stocks. Each habitat section will also discuss the habitat limitations creating a bottleneck to the recovery of a species of concern.

- **American Lobster**

Contractor: Jason Goldstein
Assignment: Draft American lobster habitat section using the habitat outline, and including a discussion on bottlenecks; Revise section based on comments from subcommittee.
Work Group: Carl Wilson, Cheri Patterson, Mark Rousseau, Eric Schneider, Penny Howell
Assignment: Select contractor; provide guidance to the contractor during development; review and comment on draft habitat section.
Timeline: HC Review at May Meeting; TC Review by end of May; Board considers habitat paper (direction to staff to turn into addendum, public comment, Board reviews again with public comment for final approval)
Progress: Completed. The Board approved the habitat addendum in August 2014.

- ~~**Black Drum Habitat Addendum**~~ **Sciaenid Habitat Source Document**

Assignment: The HC is developing a habitat source document for all Commission-managed sciaenids and three kingfishes in lieu of the black drum habitat addendum. Since

black drum and other sciaenid FMPs have limited habitat information, the HC will address all sciaenids with one resource document.

Progress: See Habitat Management Series

Task 4.2.4 – Habitat Limitations

Develop an approach for describing habitat limitations creating a bottleneck to the recovery of Commission managed species with a poor stock status. Recommendations to address the habitat limitations would also be explored.

- **Habitat Limitations on a larger scale (i.e. not species-by-species)**

*Assignment***:** Entire HC will continue to have discussions about how this effort should be carried out. The first habitat bottleneck

*Timeline***:** Spring and Annual Meetings

Assignment: Develop a working paper that will discuss bottlenecks for all Commission-managed species with poor stock status. Jake Kritzer drafted the introduction and explanation of the habitat bottleneck concept. The HC categorized types of habitat bottlenecks (ex. environmental and physical) and identified bottlenecks that can be addressed by management.

Timeline: Living Document. Draft introduction completed, with definition and case studies. Next step is for HC to decide how to designate bottlenecks in FMPs (by individual species habitat addendum, or an omnibus document analyzing habitat bottlenecks for all Commission-managed species).

Task 4.3.1 – Project Comment

Provide information or comment on Atlantic coast projects and permits in accordance with ASMFC project review protocol.

- *Assigned as needed*

Progress: No action as of May 2013

Task 4.3.5 – Habitat Managers Database

Update habitat managers database to disseminate information about important habitat areas identified in Habitat Committee products

Note: In October 2012, HC decided to discontinue the use of the Habitat Managers Database, but will help to maintain the Commission's distribution lists as a means for disseminating information.

Assignment: Conduct an audit of the Habitat Hotline distribution list; HC to review all bounce back addresses and recommend changes to the distribution list; Coordinator compiling from the HC the names of listservs or email distribution lists that might be interested in receiving HC products. These lists will be used to disseminate information.

Timeline: Review of bounce-back addresses and listserv/email distribution lists at Spring HC meeting

Progress: Habitat Hotline bounce-back addresses and listserv/email distribution lists collated for HC review. HC will make recommendations to improve distribution of HC products.

Update: The listserv has been corrected and updated in the Commission's new database. The HC will continue to monitor the Commission's development of social networking. When feasible, Habitat Program products should be disseminated via the collected list of listservs. Ongoing.

Task 4.4.1 – Disseminate Information on Ecosystem-based Management & MPA

Facilitate coordination and distribution of information for ecosystem-based management and marine protected area activities, and the potential consequences of significant anthropogenic activities on habitats of concern.

- ***Conducted on an as needed basis***. When information is available the Coordinator or HC members distribute information to the HC and other interested parties.

Progress: Ongoing

Task 4.4.2 – Other Habitat Related Meetings

Participate in regional and national habitat meetings and scientific conferences to facilitate increased communication with agencies and programs that have jurisdiction over habitat.

Assignment: Committee members attend habitat-related meetings as part of their normal course of business and relay pertinent information back to the Habitat Committee.

Timeline: Throughout the year, as needed.

Progress: Ongoing

Task 4.4.3 – Habitat Hotline

Review and improve format of *Habitat Hotline Atlantic* newsletter to enhance the utility and effectiveness of meeting the target audience's needs. Produce and distribute an annual issue of Habitat Hotline Atlantic newsletter.

- **Review and Improve Format**

Note: In October 2012, HC decided to continue with an annual issue of *Habitat Hotline Atlantic*. Each issue will have a theme, which may be linked to a current issue from the Habitat Management Series with a box on state related projects. An issue may include articles on habitat related initiatives, projects, and/or papers. Each issue will also have an Atlantic Coast round of habitat related issues/projects for the past year.

- **Produce Annual Issue**

Coordinator: Collect state habitat bullets highlighting 2-3 significant habitat projects for the year; format articles, collect pictures, and work with Commission staff to format newsletter

Work Group: Mark Rousseau (project leader), Kent Smith, Jay Odell, Cheri Patterson, Russ Babb, Bob Van Dolah, January Murray, Eric Schneider, Shanna Madsen

Assignment: Propose a list of potential articles and authors for consideration at October HC meeting, contact authors, review and revise early drafts of articles and newsletter
Timeline: Draft for review at October 2014 meeting
Progress: October 2014: Drafts of most articles and state updates are written.

Task 4.4.4 – Habitat Management Series
Develop next installment of the Habitat Management Series: Habitat Impacts of Harbor Deepening Projects for ISFMP Policy Board acceptance. Identify a subsequent topic for the Habitat Management Series (e.g. Sand mining, Power plant impingement, climate change impact on fish habitat, estuarine and nearshore aquaculture).

- **Habitat Considerations for Estuarine & Nearshore Aquaculture**

Work Group: Marek Topolski (Lead), Russ Babb, Jeff Tinsman, Eric Schneider, and Dawn McReynolds.
Assignment: Develop a Habitat Management Series with a focus on the habitat considerations for estuarine and nearshore aquaculture of both finfish and shellfish. The document should refer to the 2002 ASMFC document "SR#76 Guidance Relative to Development of Responsible Aquaculture Activities in Atlantic Coastal States" (November 2002), as well as newly developed policies from NOAA Fisheries and Fishery Management Councils.
Progress: Outline completed in October 2013. HC to review during the October 2014 meeting.

- **Sciaenid Source Document**

Work Group: Jay Odell, Jimmy Johnson, January Murray, Wilson Laney
Assignment: Develop a comprehensive habitat source document for sciaenids, similar to *Atlantic Coast Diadromous Fish Habitat*.
Timeline: Draft review by HC during October HC Meeting 2014. Target completion end of 2015.
Progress: The HC reviewed and approved the template for the Sciaenid Habitat Source Document in October 2013. Working group members reviewed species sections or suggested external authors to review. ASMFC hired a contractor, Steve Midway, to conduct literature research on the four of the sciaenids species requiring expertise beyond the HC. After literature search, HC members to draft designations for HAPC and habitat management recommendations and research priorities.

- **Living Shorelines Update**

Work Group: Lou Chiarella (Lead), John Gill, Dawn McReynolds, Marek Topolski, January Murray, Russ Babb, Pace Wilber
Assignment: Update the Living Shorelines reference document
Progress: Conference call to discuss outline of next edition.

Task 4.4.5 – Energy Related Issues
Serve as a point of contact and information conduit at the Commission for energy-related issues affecting fish habitat.

- ***Conducted as needed***. When information is available the Coordinator or HC members distribute information to the HC and other interested parties.

Progress: Ongoing

Task 4.5.1 – Program Review
Review program goals and evaluate accomplishments annually.

- **Progress Review**

Assignment: *Coordinator* - Review and present to HC progress on completing Annual Action Plan tasks.
Habitat Committee - Determine steps to complete outstanding tasks in 2nd half of the year.
Timeline: Yearly
Progress: Ongoing

- **Annual Review**

Assignment: Coordinator - Review and present to HC progress toward completing Annual Action Plan tasks.
Timeline: October/Annual Meeting 2014

Task 4.5.2 – ~~Operational Procedures Manual~~ Habitat Committee Guidance
Revise the Habitat Operational Procedures Manual and submit for ISFMP Policy approval.

Work Group: Wilson Laney, Bob Van Dolah, Kent Smith, Jake Kritzer, and Megan Caldwell
Assignment: Revise Operational Procedures Manual to incorporate recommendations from the Habitat Program Review.
Timeline: Present draft revised manual to HC at Spring meeting; Provide revised Operational Procedures Manual to Policy Board for approval at August Meeting Week.
Progress: Completed. The Habitat Committee Guidance document has been approved by the ISFMP Policy Board during its August 2013 meeting.

Task 4.5.3 – Develop Action Plan for 2015
Coordinator: Draft Action Plan for 2015 that complements the Commission's strategic plan.
HC: Review draft Action Plan and modify as needed.
Timeline: HC discussion to set work plan October 2014

- **ASMFC Strategic Plan**

Assignment: Participate in ASMFC Strategic Plan process; advise the Commission on goals and strategies for Habitat Program.
Timeline: May 9 -10, 2013 HC discussion on vision for next 5 years
May 21, 2013 Strategic Plan Workshop (HC Chair; Coordinator)

Fall 2013 HC review and comment on draft strategic plan

Progress: Completed.

Task 4.6.1 – Stakeholder Outreach

Provide stakeholders with the tools to effectively communicate, promote and accomplish habitat protection, restoration, and enhancement programs at the local level.

- ***See Task 4.3.5***

Progress: Ongoing. Distribute via email and website – Habitat Hotline Atlantic 2014, Habitat Managers Series

Task 4.6.2 – Work with ACFHP

Work with ACFHP to foster partnerships with like-minded organizations at local levels to further common habitat goals.

Coordinator: Coordinate with Lisa Havel (ACFHP)

Progress: Ongoing

Task 4.6.3 – Update Species Habitat Fact Sheets

Species habitat fact sheets are used for outreach at trade shows and conferences to promote the conservation and management of fish habitats.

Coordinator: Habitat Coordinator, ASMFC Director of Communications

Timeline: Every two years

Habitat Hotline Atlantic 2014
Theme: Adaptations to Climate Change

	Draft Completed	Photos	Articles First drafts due on September 15, 2014	Contributor
	Fish Movement (distribution shifts and changes in migratory pathways)			
1	started		Species shifting north and effects to habitats	Cheri Patterson, Shanna Madsen
2			Invasive species (ex. green mussel, green crab)	Wilson Laney
	Ocean Acidification			
3	√	√	Corals	Kent Smith
4	√		Oysters and clams	Russ Babb
5	√		Planktonic Resources	Eric Schneider (Jason Link)
	Sea Level Rise			
4	√	√	Marshes	Bob Van Dolah
5	√	√	Oyster Reef	January Murray
6	√		Transport of acidic water out of salt marshes	Kent Smith Melissa Yuen
7			Stories About Impacts	Melissa Yuen
8			Habitat Management: considerations and tools for adaptation to climate change	MSC (Cheri Patterson)
	Partners' climate change activities related to fish habitats			
9			DOI Climate Science Centers	Wilson Laney
10	√		ACFHP (resiliency project)	Lisa Havel
11			~~NERACOOS, MARACOOS, SECOORA~~ TNC	Jay Odell

			Updates of Habitat Activities 2-3 paragraphs summarizing activities in 2014 First drafts due on October 1, 2014	
12			Maine	(Gail Wippelhauser)
13			New Hampshire	Cheri Patterson
14	√	√	Massachusetts	Mark Rousseau
15			Rhode Island	Eric Schneider
16			Connecticut	Penny Howell
17			New York	Dawn McReynolds
18	√		New Jersey	Russ Babb
19	√		Pennsylvania	Ben Lorson
20	√		Delaware	Jeff Tinsman
21			Maryland	Marek Topolski
22	√	√	Virginia	Tony Watkinson Jay Odell
23			North Carolina	Jimmy Johnson
24	√	√	South Carolina	Bob Van Dolah

25	√	√	Georgia	January Murray
26			Florida	Kent Smith
27	√		ACFHP	Lisa Havel
28			NEFMC	Michelle Bachman
29			MAFMC	Jessica Coakley
30			SAFMC	Roger Pugliese
31	√		NOAA Fisheries	Lou Chiarella Pace Wilber
32			USWFS	Wilson Laney John Gill
33			USGS	Rachel Muir
34			EPA	Suzanne Ayvazian

Theme

Climate change impacts to coastal fish species and habitats, and management adaptations to address those impacts.

Articles

- Ideal length is one page (2 pages max), including photos.
- Photos are highly encouraged, so please submit high-resolution images with your draft and include credit/source and captions.

2014 Updates

- Ideal length is 2-3 paragraphs long.
- Photos optional, but encouraged

Audience

- Please write for a general audience. Feedback from ASMFC Communications staff: the general public (not just managers) is interested in reading about coastal marine habitat activities. *Habitat Hotline* is also used as an outreach tool to promote fish habitat conservation and management activities.

Submission

Please send drafts to Mark Rousseau at mark.rousseau@state.ma.us and Melissa Yuen at myuen@asmfc.org.

- Articles due on September 15, 2014
- Updates due on October 1, 2014

Timeline	
September 15	Article drafts due
October 1	State updates due
October 28	HC Review of drafts
November 20	Final drafts due
December 2014	Design layout Publish

Atlantic States Marine Fisheries Commission
Habitat Committee

Sciaenid Habitat Source Document

Purpose: The document will serve as a comprehensive reference on the habitat utilization and needs of Atlantic sciaenid species managed by the Commission, and include considerations and recommendations on habitat management to enhance fish habitats necessary to sustain the sciaenid fisheries resources. Fisheries and marine habitat managers interested in enhancing sciaenid populations can use the source document as a tool to make decisions and prioritize habitat conservation and restoration activities.

Background: ASMFC currently manages six sciaenid species, and some states have considered managing new sciaenid fisheries in the future (i.e. kingfishes). The Habitat Committee (HC) is responsible for developing the habitat section required in each fishery management plan, which includes:

- A description of the species' range and habitat needs during each life stage,
- Threats to the habitat and potential impacts to the resource,
- Identification of critical habitats (Habitat Areas of Particular Concern) and habitat bottlenecks (if any),
- Research priorities to gain information on habitat utilization and impacts, and
- Habitat management recommendations to maintain or enhance the stock's population level.

While the Red Drum FMP implemented Addendum I in 2012 to specify habitat needs and concerns, most of the Commission-managed sciaenids are lacking or have outdated habitat information in their respective FMP documents. When the HC was tasked with developing the habitat section for the new Black Drum FMP, it decided to review and update habitat needs for all Commission-managed sciaenid species through one comprehensive document, similar to the Atlantic Coast Diadromous Fish Habitat source document (2009).

Development of Sciaenid Habitat Resource Document

The Sciaenid Habitat Resource Document is a publication under the Habitat Management Series, with the general format following that of the Atlantic Coast Diadromous Fish Habitat source document. To the extent available, information will be presented for individual species and the general sciaenid family. In the interest of making the document user-friendly and to compensate for the limited habitat information for some of the sciaenid species, the document will feature a general sciaenids habitat description to summarize the typical habitat requirements commonly utilized by Atlantic sciaenids.

Audience: The primary audience for the habitat resource document are fisheries managers and marine/coastal habitat managers. Other audiences may include stakeholders with interest in the conservation of sciaenid populations (ex. NGOs and fishermen). The publication will be available digitally and posted on the ASMFC website.

The following table outlines the contents of the sciaenid habitat source document.

Parts	Chapters	Sections
1. General Sciaenids	• General Sciaenid Habitat Needs • Threats and Uncertainties • Recommendations for Habitat Management • Research Needs	
2. Species	• Atlantic Croaker • Black Drum • Red Drum • Spot • Spotted Seatrout • Weakfish • Northern Kingfish • Southern Kingfish • Gulf Kingfish	• Geographic and Migration Patterns • Salinity • Substrate • Temperature • Dissolved oxygen • Feeding Behavior • Competition and Predation • EFH and HAPCs • Threats and Uncertainties • Management Recommendations • Research Recommendations
3. Literature Cited		

Timeline

October 2013	Develop template for the document (outline of sections), assign HC members to species chapters, and identify external authors/experts
May 2014	First draft of the document was populated with existing habitat information from each FMP. Review, update, and populate sections
October 2014	Second draft of document for HC review.
May 2015	Review of draft document by TCs of each species FMP.
August 2015	HC to respond to TC recommendations and edits.
October 2015	Target completion

Working Group Members

Kent Smith, FL FWC	kent.smith@myfwc.com
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External Authors

Steve Midway	srm30@psu.edu	black drum, spot, spotted seatrout, weakfish
Brian Boutin	bboutin@tnc.org	general sciaenids
Chip Collier	chip.collier@ncdenr.gov	Kingfishes (northern, southern, gulf)

Habitat Bottlenecks and Fisheries Management

ASMFC Habitat Committee Working Paper

May 2014

Habitat Coordinator's Notes:
2013 August: Drafted by J. Kritzer, presented to committee, edited by P. Howell
2013 October: HC provided comments during October mtg.
2014 May: Whitepaper revised according to HC comments.

Introduction

There is little dispute among fishermen, scientists and fishery managers that the amount, quality and availability of habitats utilized by marine species is a critical determinant of a fish stock's productivity and resilience. However, despite the widespread recognition, conservation of fish habitat remains one of the biggest challenges in fisheries management. There are at least three important reasons for this.

First, patterns of habitat use by a given species typically vary considerably both within and among life stages. Many species exhibit strong dependence on one or a small number of habitats, but many also show an ability to utilize different habitats at a given life stage in response to prey availability, density, or other factors. Habitat sections of most FMPs illustrate the diversity and complexity of habitat use.

Second, quantifying the relationship between habitat metrics (i.e., % cover, patchiness, density of structural features, etc.) and stock productivity is difficult for most species[1]. This means that decision-making often cannot be informed by estimates of an *X*% reduction in potential yield of a given species if *Y* acres of habitat are lost due to a proposed action (e.g., marina development, offshore energy facility, dredging, destructive fishing practice, etc.), or, conversely, that yield will increase due to habitat recovery through protection or restoration. The synergy of multiple impacts which degrade or improve habitat quality very often result in nonlinear or indirect responses in species' productivity.

Third, the range of impacts that affect habitat is broad, and fall under the purview of multiple agencies, not solely those responsible for harvest management. This creates a complex, and generally disconnected, governance structure that would likely have limited effectiveness even with a stronger and clearer scientific foundation.

In response to these challenges, the ASMFC Habitat Committee has been working with the concept of *habitat bottlenecks* as a means of focusing both research and management on those areas likely to yield the greatest returns.

[1] An important exception is the generally strong relationship between abundance of anadromous species and accessible river miles.

Definition

A Habitat Committee work group developed a proposed definition, which was modified slightly by the full Committee at its April 2013 meeting. The current working definition is as follows:

> *A habitat bottleneck is defined as a constraint on a species' ability to survive, reproduce, or recruit to the next life stage that results from reductions in available habitat extent and/or capacity and reduces the effectiveness of traditional fisheries management options to control mortality and spawning stock biomass.*

In other words, the concept of a habitat bottleneck is not meant to capture situations wherein the stock's response to changes in habitat conditions is gradual, incremental or linear. Rather, a habitat bottleneck is a situation in which the response is sharp and pronounced, to a degree that it overwhelms the effectiveness of harvest control measures and creates excessive deviation from the constant or bounded conditions assumed by stock assessment models. Figure 1 illustrates potential relationships between habitat metrics and ecological responses in which a threshold exists at which the response is sharper and more sudden. Such thresholds are points at which habitat bottlenecks are likely to be created.

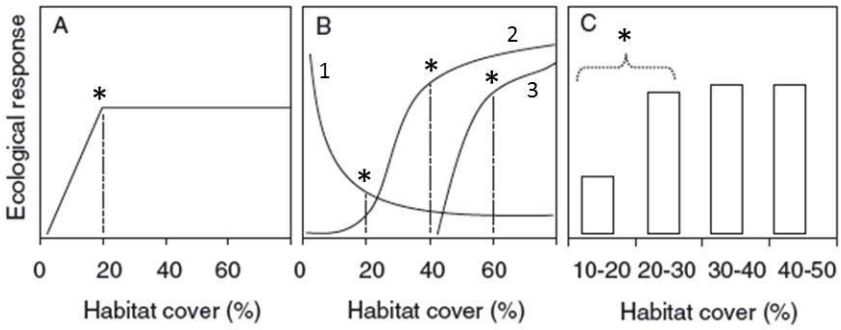

Fig. 1. Possible functional relationships between habitat metrics and ecological response variables, such as key demographic rates (growth, mortality, recruitment). Asterisks marks thresholds at which a habitat bottleneck might be created. A and C represent situations in which the response variable is constant, or at least variable within bounds, over a wide range of habitat conditions, but then changes marked past the threshold. B represents situations where there is an ecological response to habitat across all values, but the rate of change increases or decreases markedly at the threshold. Curve 1 in B represents a response variable that is inversely related to habitat, such as mortality rate. Curve 3 represents a response variable that is strongly tied to habitat, and for which the bottleneck is created when the habitat metric is still seemingly high. An example might be demographic rates during the juvenile stage when individuals are strongly dependent upon nursery habitat for shelter and feeding. (modified from Swift and Hannon 2010)

This is not to say that more gradual or linear changes are not important. If, for example, a 5% reduction in some key habitat metric causes a 5% reduction in growth rate[2] for a given species, but the stock assessment model does not account for that change, then the actual dynamics will

[2] Although the definition proposed by the Habitat Committee does not explicitly include growth, among other important attributes (e.g., condition, behavior, etc.), those attributes affect survival, reproduction and recruitment, and therefore are implicit within the definition.

deviate from those predicted by the model and management will seem to underperform. However, such a deviation is modest and within the range of expected error and uncertainty, and a response to harvest controls would still likely be observed (assuming other errors and uncertainties are not excessive). A habitat bottleneck is the point at which the deviations from model assumptions are no longer minor, and prevent expected responses to management.

It is important to note that incremental or linear responses to changes in habitat metrics can lead to a habitat bottleneck if the changes are continuous, directional and not detected scientifically or incorporated into management. For example, a 5% reduction in growth rate due a modest change in habitat might have tolerable effects, but if the reduction grew to 30% through sustained declines in habitat, then the deviation would be excessive even if the change did not look like crossing a threshold (per Fig. 1). At that stage, it would also represent a habitat bottleneck. One response might be to take no action on the habitat conditions in the water, and instead adjust the assessment model to better account for the new reality (i.e., lower productivity and recoverability regime). Or, action could be taken to remove the bottleneck and restore the previous productivity regime.

Importantly, habitat bottlenecks can come and go for a given stock in response to changes in habitat condition, as well as stock size. Habitat is a key determinant of carrying capacity, and adverse impacts on habitat can lower carrying capacity. However, if the stock size is below even the reduced carrying capacity, then a bottleneck will not be evident and the stock should respond to harvest controls. Once the stock approaches the new lower carrying capacity created by changes in habitat conditions, then the bottleneck will become evident as the stock no longer responds as expected under the (incorrectly) assumed conditions.

Categories of Habitat Bottlenecks

Habitat bottlenecks can be categorized as environmental and physical. The distinction differentiates the bottlenecks that can be addressed by habitat management measures, such as barriers and human activities, from those that cannot be controlled, such as temperature changes.

Environmental Habitat Bottlenecks

Physical Habitat Bottlenecks

Case studies

As the Habitat Committee continues to refine the habitat bottleneck concept, we are exploring the utility of new data presented in updates to the habitat sections of different FMPs. The following example illustrate how the concept is being considered and applied for in the management of different stocks.

American Lobster

The draft updated habitat section of the American lobster FMP identifies two potential habitat bottlenecks being observed in the species. Neither relate to structural habitat attributes (i.e., benthic features such as vegetation, sessile fauna or sediment type). Instead, both relate to water quality attributes and the stock's physiological and behavioral responses.

The first bottleneck is a temperature threshold effect that was most evident in Long Island Sound at the time of the massive 1999 lobster die-off. Fall water temperatures increased rapidly that year causing thermal stress and mortality, and also caused lobster to aggregate in deeper thermal refuges. These stressed animals were less resistant to several chronic diseases. The result was mortality on the order of 90% or more that year. In subsequent years, continued high temperatures during the fall season caused further physiological stress, and overwhelming any expected effects of fisheries management. research has demonstrated that lobsters show a distinct and abrupt response to water temperatures above 20^0C (Crossin et al. 1998) which field studies have shown can double observed mortality rates (see figure 1), making temperature a true bottleneck for this species.

The second bottleneck is also linked to temperature, and involved the reduction and contraction of suitable thermal habitats in several locations off southern New England. This has caused lobster to be absent from traditional nearshore fishing ground, reducing availability to the fleet and subsequent yield. There is some evidence that displacement of egg-bearing females into deeper water has resulted in newly hatched planktonic larvae being carried on currents out to open ocean waters where their survival rate is diminished. It is not clear whether and to what extent the stock has experienced a decrease in productivity as a result of these increases in temperature, or whether the change has primarily been one of distribution. Regardless, the effect is similar in that the fishery does not perform as expected.

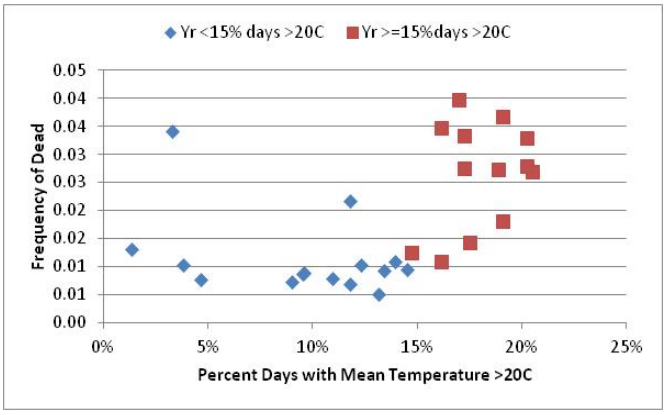

Fig 1: Relationship between the observed annual frequency of dead lobsters in research traps versus the percent of days that year with a mean bottom water temperature above 20^0C. (Data provided by Millstone Environmental Laboratory, Dominion Nuclear Resources)

Summer and Winter Flounder

These two specialized flatfish rely on shallow estuaries as nursery grounds which contribute substantially to successful recruitment of juveniles to the adult population (Beck et al. 2001). A bottleneck, as defined above, can often develop when these nursery areas experience chronic seasonal hypoxia due to excessive nutrient loading and eutrophication. Laboratory studies of juveniles of these two species (Stierhoff et al. 2006) show that growth of winter flounder at 20°C was reduced by ~50% at both 3.5 and 5.0 mg O2 l–1(compared to growth at normoxia [7.0 mg O2 l–1]), and growth was completely haulted at 2.0 mg O2 l–1. Similarly, summer flounder

growth was reduced by ~25% at 3.5 mg O2 l–1 and by 50 to 60% at 2.0 mg O2 l–1. Importantly, there was no evidence of growth acclimation for either species after 7 to 14 d exposure to hypoxia, and these levels of hypoxia commonly persist in many coastal estuaries. The distinct drop in growth at DO levels below 3.5 mg O2 l–1 was attributed to reduced feeding rates under hypoxic conditions. These significant reductions in juvenile growth rates, at sizes and ages below those usually modeled for fishery management, can translate into significant reductions in the ultimate production of the entire population (Eby et al. 2005), resulting in overly optimistic model predictions under reduced fishing mortality on the adult stock.

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