

DRAFT

**Spatial Management Alternatives to Address
River Herring Bycatch in the Directed Atlantic Herring Fishery**

Prepared for the Atlantic Herring PDT

by

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Purpose

The current Atlantic Herring Fishery Management Plan (FMP) Amendment 5 (A5) draft discussion document contains several management alternatives to address river herring (alewife, *Alosa pseudoharengus*, and blueback herring, *Alosa aestivalis*) bycatch in the directed Atlantic herring, *Clupea harengus*, fishery (NEFMC 2010). The management alternatives under consideration include 100% monitoring, Closed Area I provisions, a move-along rule, implementing the Sustainable Fisheries Coalition (SFC) project through a Framework Adjustment (FW), and closed areas. Several of these alternatives have sub-options based on 100% or less than 100% observer coverage. These alternatives would apply in bimonthly river herring hotspots using a two-stage approach, based on three hotspot configuration options from fishery (stage 1) and research survey hotspots (stage 2). Recently, the Plan Development Team (PDT) has been encouraged to streamline the river herring hotspot analysis (Cournane and Correia 2010a-c).

Spatial Management Alternatives to Address River Herring Bycatch

In general, the management alternatives fall under three broad management goals: monitoring, avoidance, and protection. These three management goals can be linked to the design of spatial management alternatives (Table 1). Here in the proposed framework, the existing A5 management “alternatives” become management “options” under the spatial management alternatives.

Management Goal	Spatial Management Alternative	Management Option
Monitoring	1. River Herring Monitoring Areas	A. 100% monitoring B. Closed Area I provisions
Avoidance	2. River Herring Avoidance Areas	A. Move-along rule B. SFC project/FW adjustment
Protection	3. River Herring Protected Areas	A. Closed areas

Table 1: Reframing A5 management “alternatives” as management “options” under spatial management alternatives linked to specific management goals.

Goal

Here, the goal is to design spatial management alternatives to address river herring bycatch in the directed Atlantic herring fishery that are ecologically based, simple to understand, and enforceable. The alternatives should also link directly to the management measures under consideration in A5.

Design Considerations

Depending on the management goal, configurations for spatial management alternatives might include using existing Atlantic Herring FMP management areas, Fisheries Statistical Areas, extending the timing of the inshore Atlantic Herring spawning closure, or creating new spatial

management areas. However, spatial management alternatives should be based on the river herring hotspot analysis, maintaining the bimonthly stratification. Selection of areas for inclusion should focus on the fishery hotspots, but also consider the survey hotspots based on management goals. Therefore, creating new spatial management areas based on fisheries encounters with river herring and the expected distribution of river herring should be the focus.

The size and the shape of the spatial management alternatives should reflect the management goals. In general, the size of a river herring monitoring or avoidance area might be greater than a river herring protected area. In addition, contiguous areas might be preferred to several disconnected discrete areas to achieve monitoring or avoidance goals.

Example Configurations

The following bimonthly maps display possible spatial management alternatives linked to specific management goals to address river herring bycatch in the Atlantic Herring Fishery (Figures 1-12). Table 2 summarizes the design elements of the possible spatial management alternatives. In addition, possible river herring monitoring areas were scaled up to the level of statistical areas for reference (Figures 1-6).

Spatial Management Alternative	Stage 1 Hotspots	Stage 2 Hotspots	Figures
River Herring Monitoring Areas	> 40 lbs	YES	1- 6
River Herring Avoidance Areas	> 40 lbs	NO	7- 12
River Herring Protected Areas	> 1233 lbs	NO	13- 16

Table 1: Example design of possible spatial management alternatives using the river herring hotspot analysis. Stage 1 (fishery) hotspots are identified as quarter-degree squares within a bimonthly block with at least one river herring encounter in the directed Atlantic herring fishery greater than the specified threshold level (here 40 lbs or 1233 lbs), based on observer data. Stage 2 (survey) hotspots are identified as quarter-degree squares within a seasonal survey with relative high percent occurrence and high catch of river herring, based on NMFS bottom-trawl surveys.

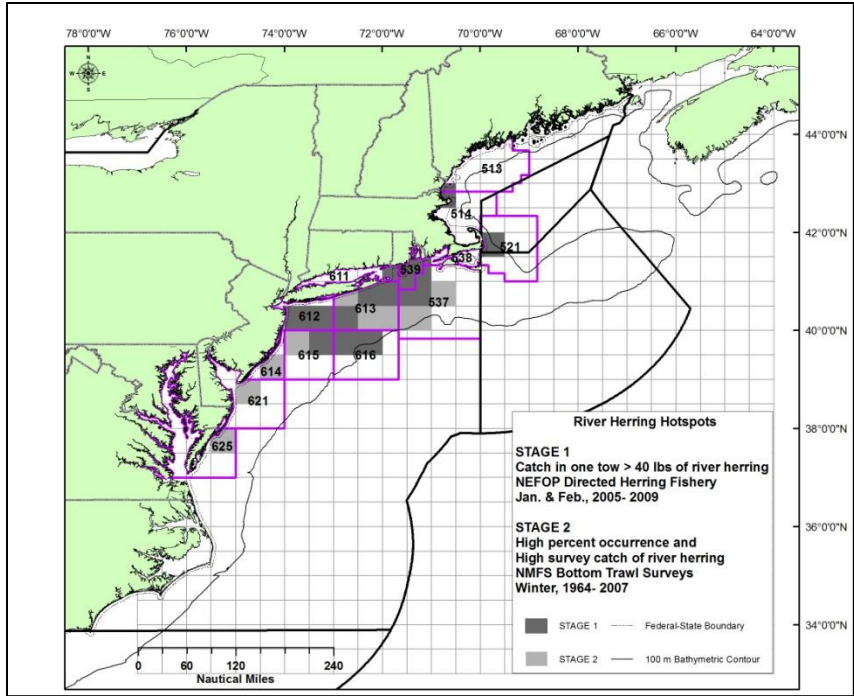


Figure 1: River herring monitoring areas alternative, January- February.

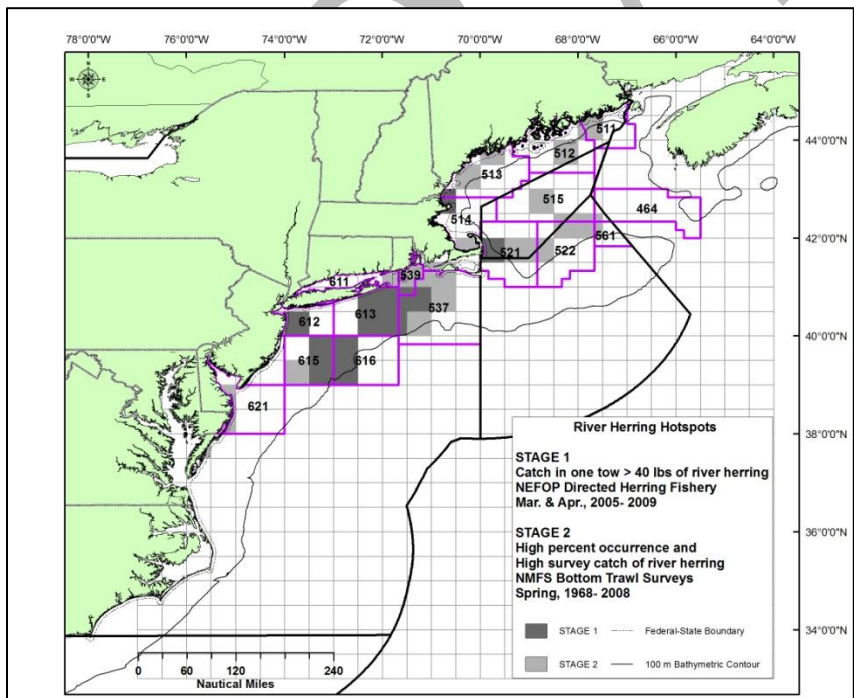


Figure 2: River herring monitoring areas alternative, March- April.

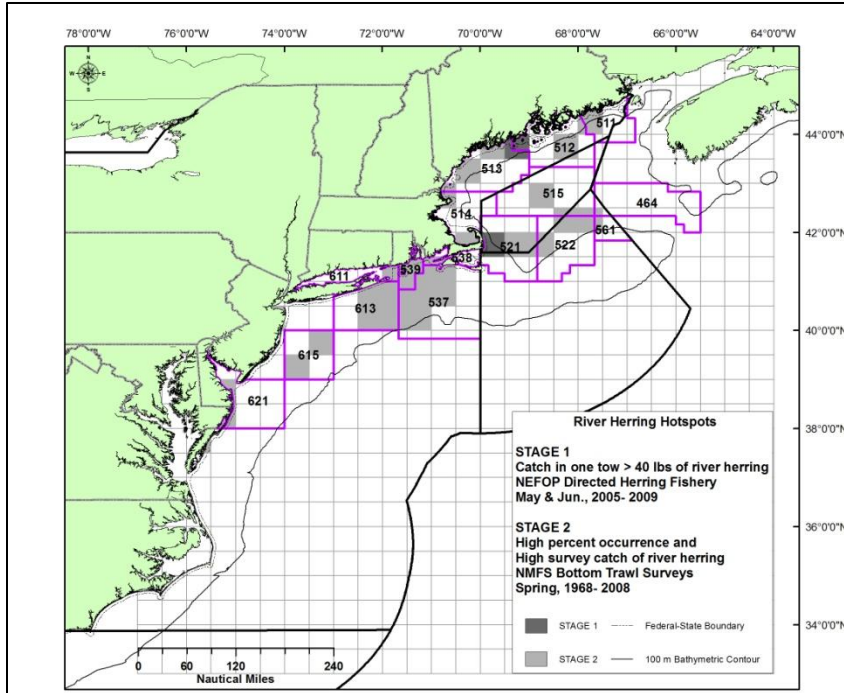


Figure 3: River herring monitoring areas alternative, May- June.

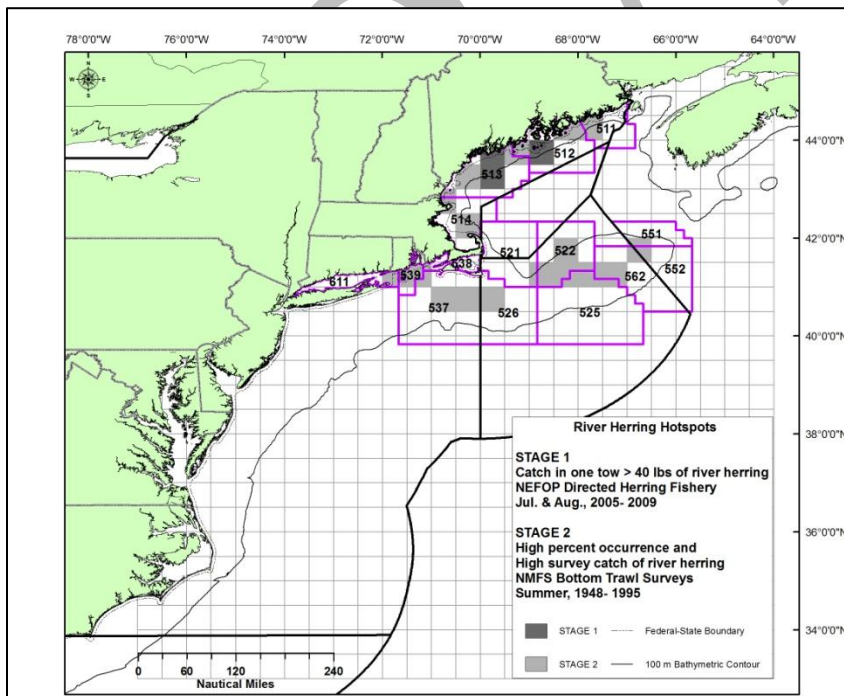


Figure 4: River herring monitoring areas alternative, July- August.

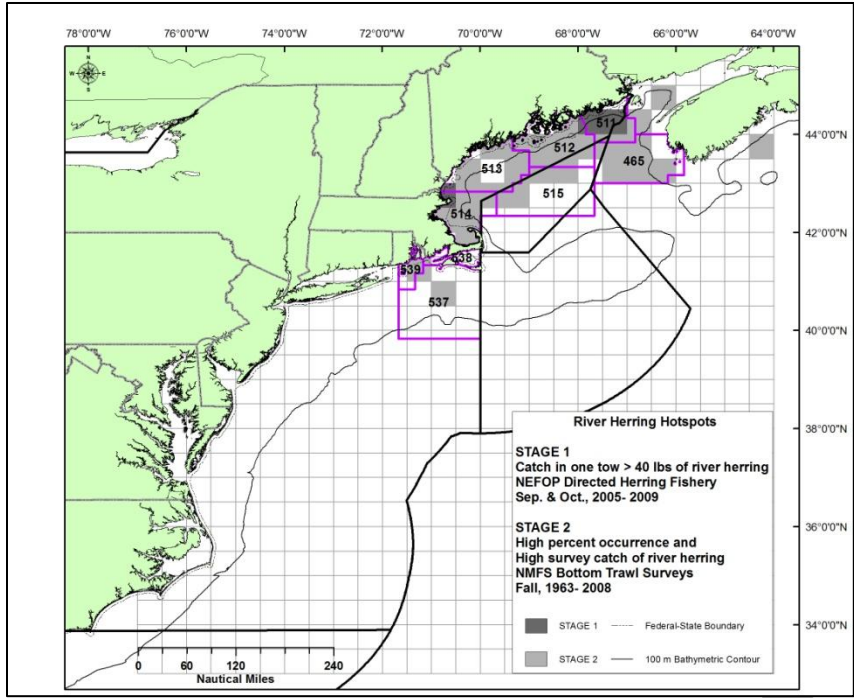


Figure 5: River herring monitoring areas alternative, September- October.

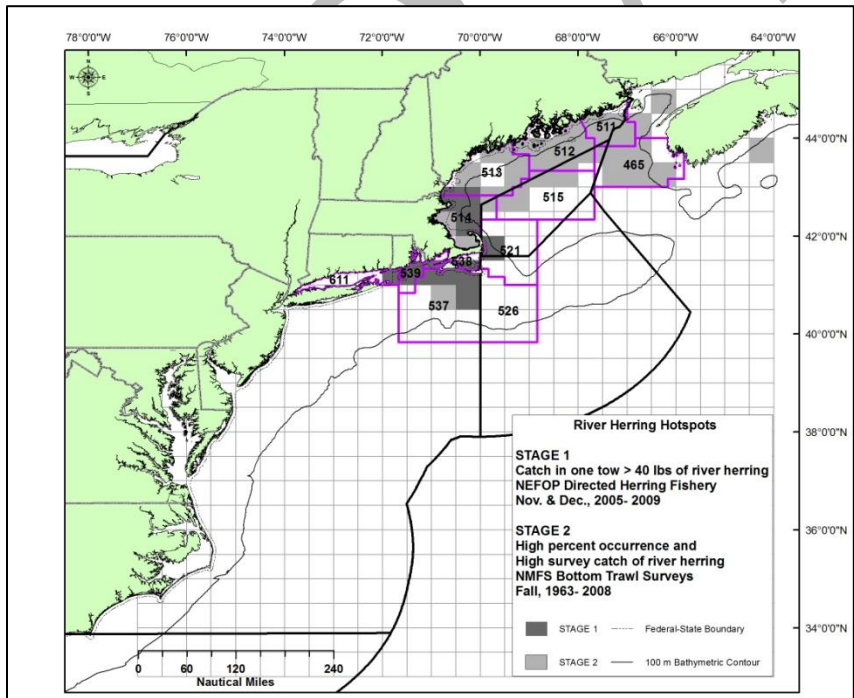


Figure 6: River herring monitoring areas alternative, November- December.

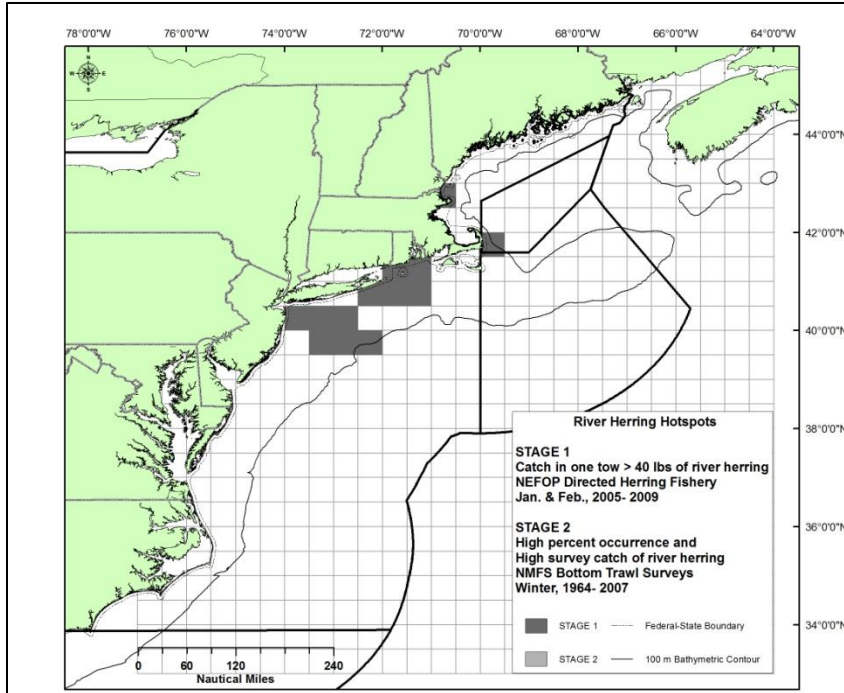


Figure 7: River herring avoidance areas alternative, January- February.

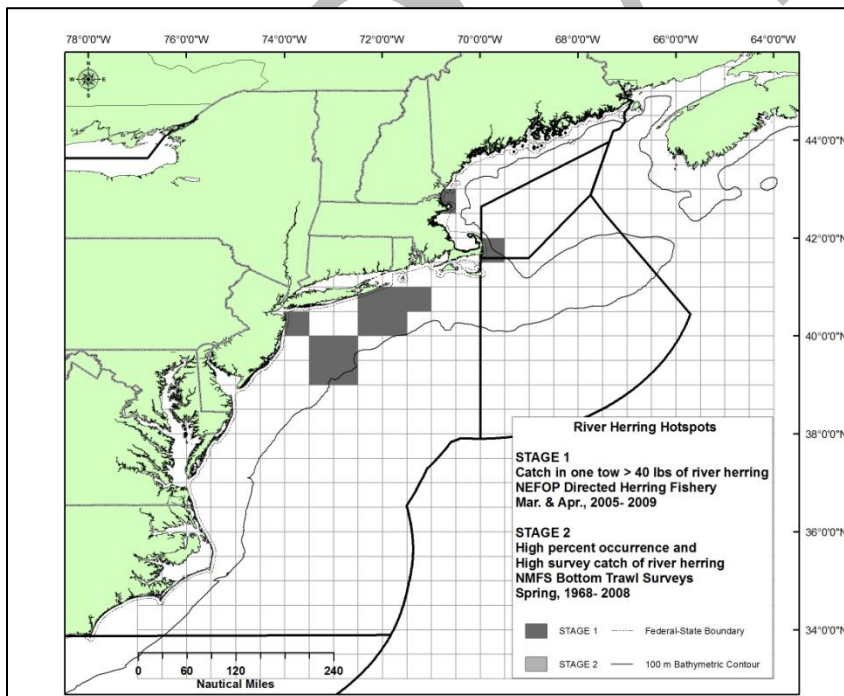


Figure 8: River herring avoidance areas alternative, March- April.

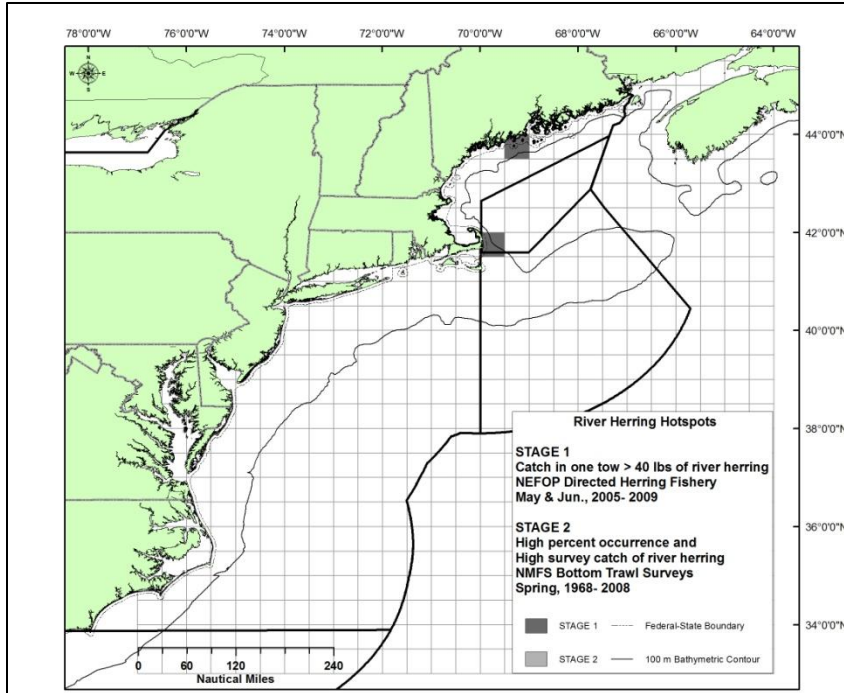


Figure 9: River herring avoidance areas alternative, May- June.

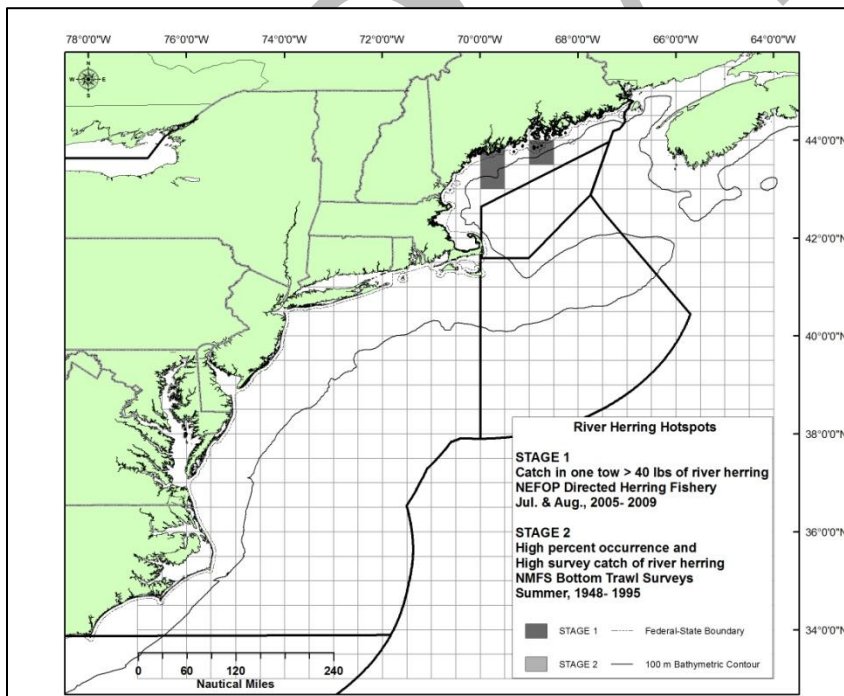


Figure 10: River herring avoidance areas alternative, July- August.

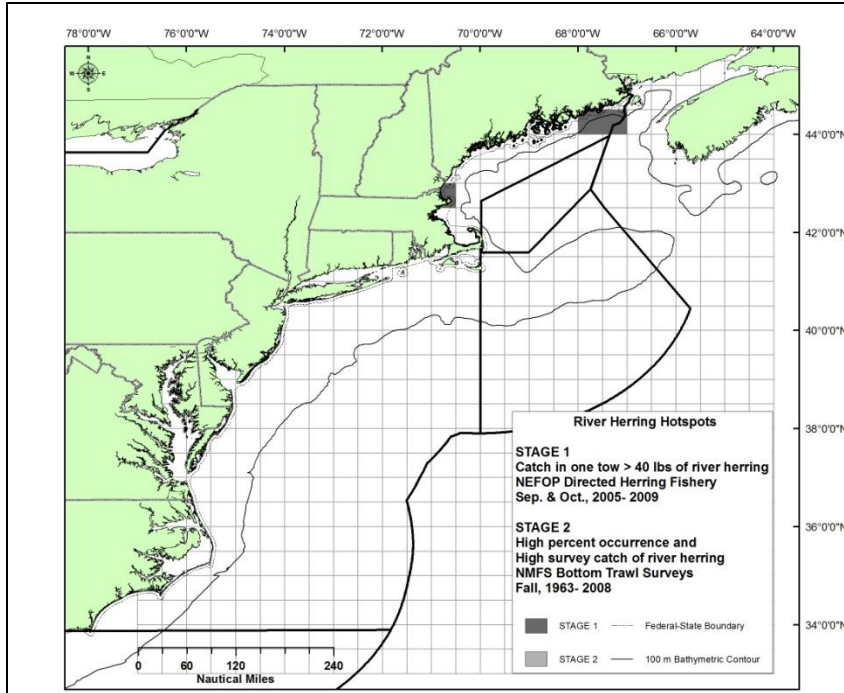


Figure 11: River herring avoidance areas alternative, September- October.

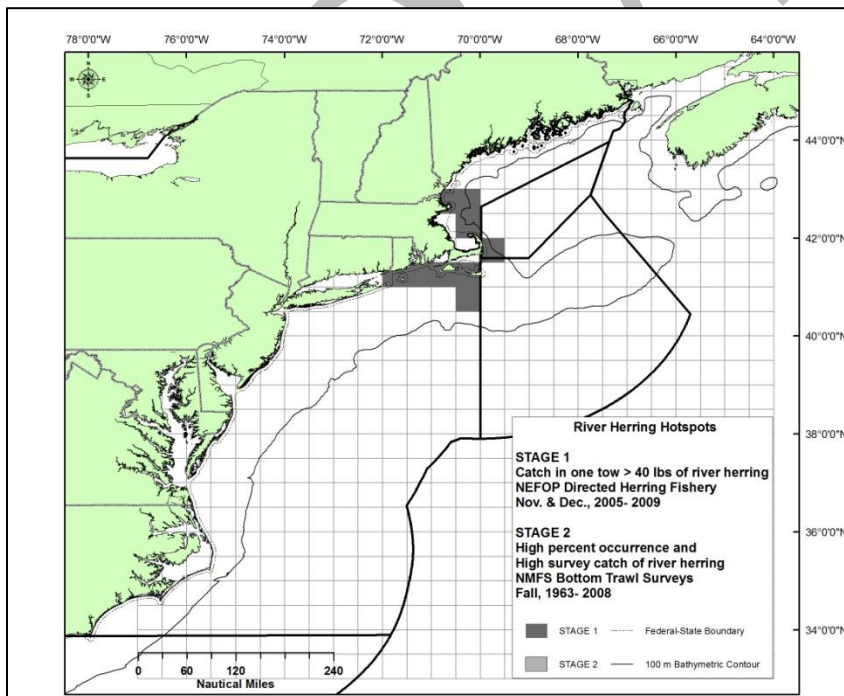


Figure 12: River herring avoidance areas alternative, November- December.

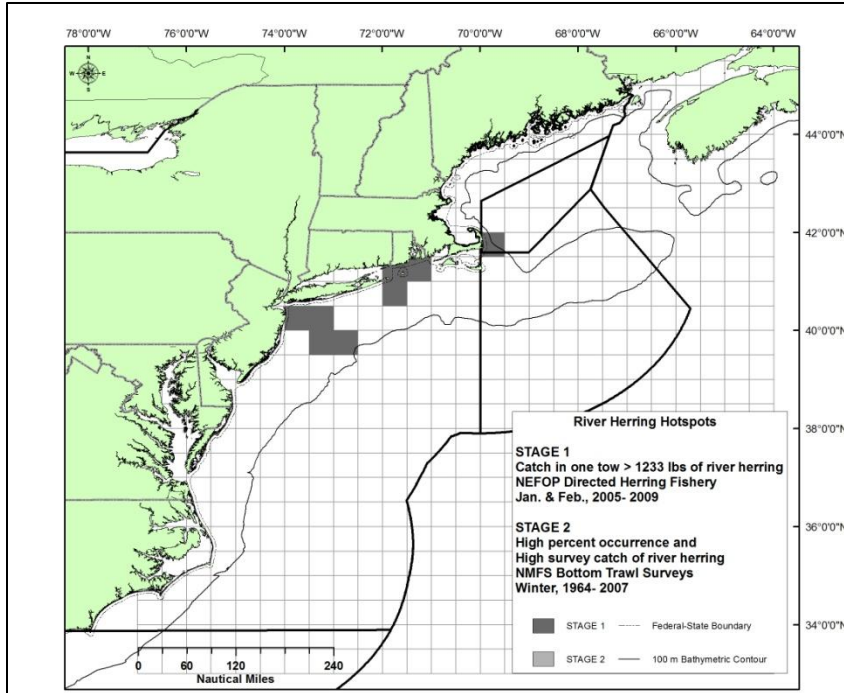


Figure 13: River herring protected areas alternative, January- February.

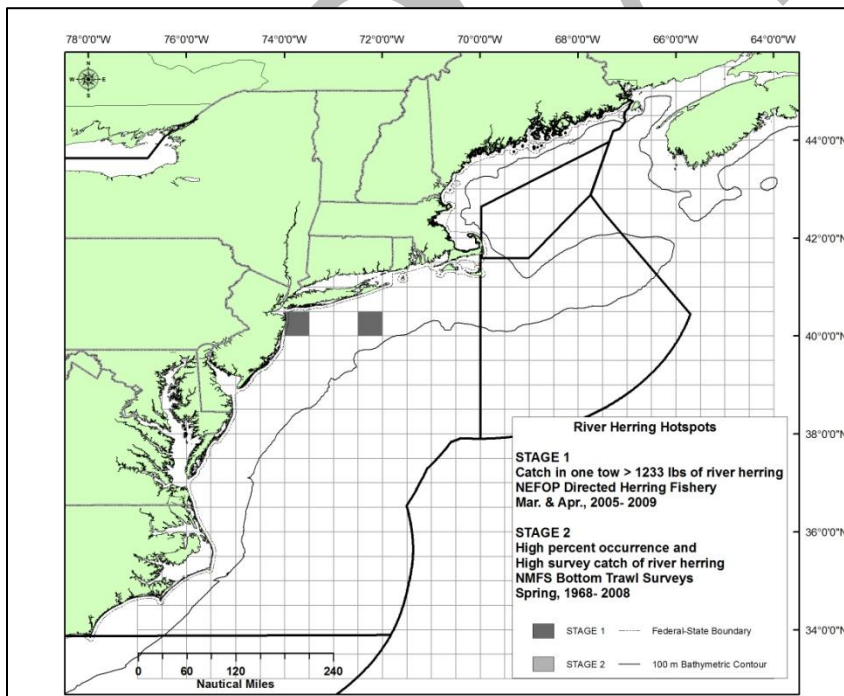


Figure 14: River herring protected areas alternative, March- April.

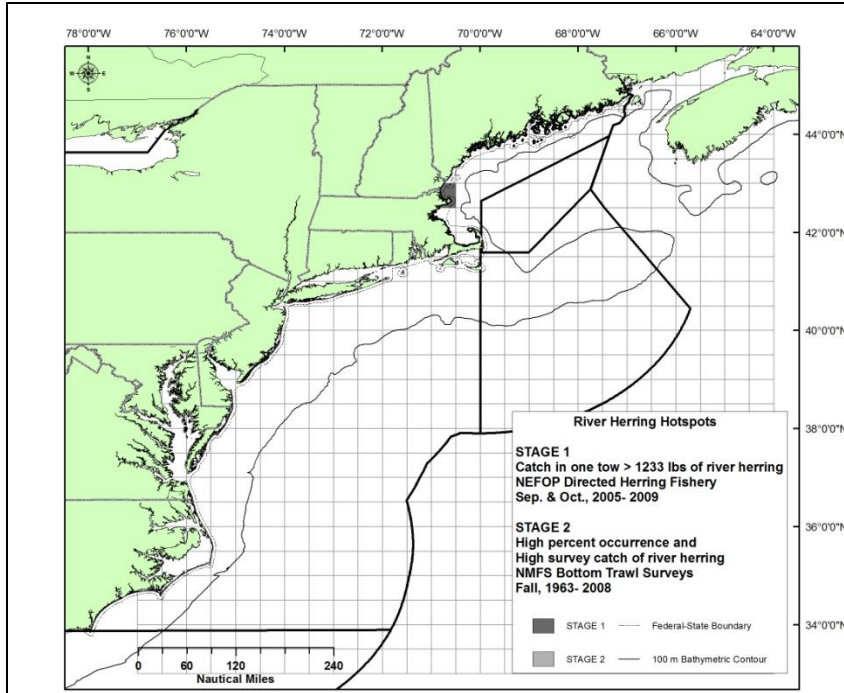


Figure 15: River herring protected areas alternative, September- October.

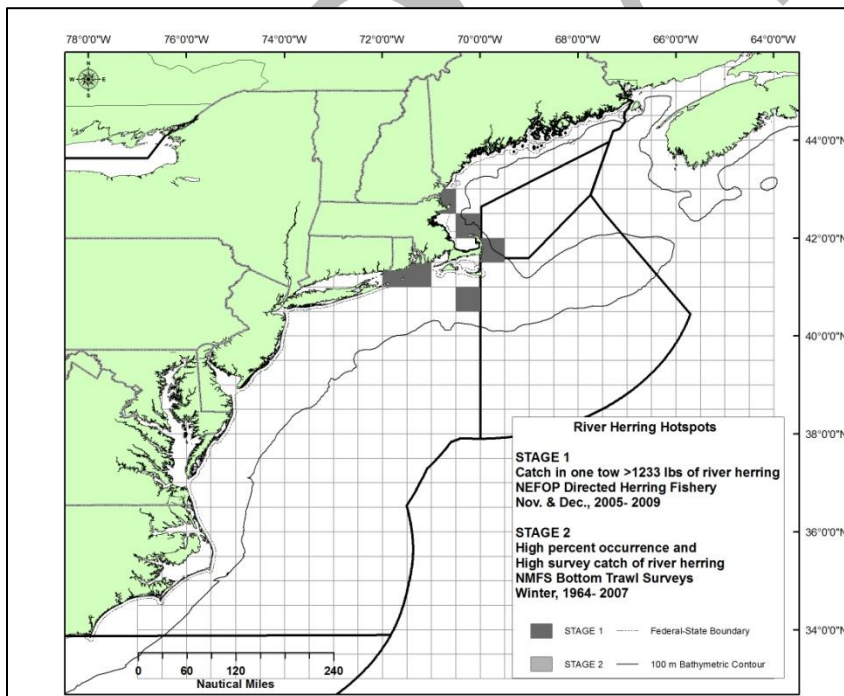


Figure 16: River herring protected areas alternative, November- December.

Literature Cited

Cournane, J. and S. Correia. 2010a. *Identification of river herring hotspots at sea using multiple fishery dependent and independent datasets*. Report prepared for the Atlantic Herring PDT, NEFMC. July, 2010.

Cournane, J. and S. Correia. 2010b. *UPDATE: Identification of river herring hotspots at sea using fishery dependent and independent datasets*. Report prepared for the Atlantic Herring PDT, NEFMC. August, 2010.

Cournane, J. and S. Correia. 2010c. *SUPPLEMENTAL MATERIAL- UPDATE: Identification of river herring hotspots at sea using fishery dependent and independent datasets*. Report prepared for the Atlantic Herring PDT, NEFMC. August, 2010.

NEFMC. 2010. *Amendment 5 to the Atlantic Herring Fishery Management Plan (FMP): Draft Discussion Document*. November 30, 2010.

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