New England Fishery Management Council
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MEMORANDUM

DATE: March 14, 2013
TO: Habitat Committee
FROM: Habitat PDT
SUBJECT: Northern Edge habitat management areas for adverse effects minimization

Under the direction of the Habitat Committee Chairman, the PDT discussed habitat management options and available data related to the northern edge of Georges Bank at two recent meetings (1/17/13 and 3/6/13) and makes the following comments to the Committee. The outline of this memorandum was developed by PDT members attending the 3/6 meeting, and the content was reviewed via correspondence.

Background

Previous analyses

Various data products have been developed by the PDT to support the Omnibus EFH Amendment, including the Swept Area Seabed Impact model vulnerability maps (Figure 1), Local Indicators of Spatial Association analysis (Figure 2), and equal area permutation analysis (Figure 3, Table 1). All three are described in the SASI model document (NEFMC 2011). Using the SASI LISA cluster areas as a starting point, the PDT developed a list of vulnerable habitat areas with corresponding boundaries for the entire region (Figure 4). Other sources of data were investigated as appropriate to identify each of these vulnerable areas. For the northern edge of Georges Bank, these sources included the substrate maps underlying the SASI model (Figure 5), the SASI data support maps (Figure 6) and substrate maps published by Harris and Stokesbury (2010, dominant substrate reproduced in Figure 7).

Overall, the model and associated analyses indicate the vulnerable habitat types are present across the entire northern edge of the bank. We note the relationship between the results of the cluster analysis and the data support figure. Specifically, within the Western Georges Shoal area, sampling frequency is lower leading to larger grid cells size. When these grids contain cobble substrates, the cobble is inferred to a greater proportion of the area. This greater proportion of cobble by area appears to be driving the results of the cluster analysis, such that higher $Z\infty$ values and higher probability values occur in these cells. While the data clearly indicate the presence of vulnerable habitat types throughout the region, including in the Western Georges Shoal polygon, the variation in $Z\infty$ scores and strength of the clustering in terms of the probability value appears to be at least somewhat an artifact of the sampling resolution, rather

than an indication of higher vulnerability habitats as you move east to west along the northern edge.

Additional newly available data

Beyond the data sources listed above, additional substrate, epifauna, scallop, and fish distribution data have been collected for this region, and other regions, by the School for Marine Science and Technology video survey, the HabCam project, the US Geological Survey, and the Virginia Institute of Marine Science. In January, the Habitat PDT met jointly with Closed Area Technical Team members and representatives from these institutions to discuss available data products. Many of these data, particularly the fine-scale scallop distributions, were collected after the 2011 Habitat PDT and Committee discussions of these areas during 2012 scallop Research Set Aside projects.

Current range of management options

Three areas are currently under consideration as habitat management areas in this region (Figure 8). The existing/no action habitat management area has been closed to fishing as part of a year round groundfish closed area since 1994. A portion of the groundfish closure was designated as an HAPC in 1999 via Omnibus Amendment 1, and the same area was designated as a habitat closed area in 2004 via Multispecies Amendment 13. The area was also designated a habitat closure under the scallop FMP via Amendment 10, with equivalent boundaries to the groundfish habitat closure implemented via Scallop Amendment 15.

Two new areas are also being considered, the Georges Shoal East and West habitat management areas. These areas were developed by the Committee in July 2011 based on the boundaries of four areas of vulnerable habitat highlighted by the PDT (Figure 4). In August 2011, the PDT recommended that the Committee consider an alternative to modify the boundaries of this area to include just the northern portion (referred to as the Northern Edge HMA, outlined in blue on Figure 9), but the Committee chose not to move forward with this option.

Issues to consider

Issue 1: Inflexible packaging of options into alternatives

The current Habitat Committee strategy for packaging habitat management area options alternatives groups all new options and all existing (status quo) options. The decision was based on a philosophy that because the Council and PDT had invested so much in the SASI process, the "SASI-based" options should not be packaged with the non-SASI-based options of the existing habitat closed areas. Applying this approach, no single status quo area (e.g., the existing habitat closed area in CAII) could be retained and combined with any of the new areas.

The PDT has not yet completed a comprehensive analysis of new vs. existing areas for inclusion in the Omnibus EIS, but the results of the SASI LISA and EAP analyses combined with the distribution of habitat types as shown on the substrate maps would suggest that the existing and newly proposed areas in this region are comparable in many respects.

Recommendation 1: The PDT encourages the Committee to adopt a more flexible approach to packaging options into alternatives, one that would allow any individual status quo area to be combined with one or more new habitat management areas.

Issue 2: Balancing multiple objectives may be difficult with the existing range of options

Any management area implemented in this region will balance habitat and groundfish protection with fishery access considerations. For example, groundfish industry members have expressed concerns regarding mobile gear closures in the proposed Georges Shoal areas in relation to their importance as winter flounder grounds. Scallop industry members have noted that there are significant aggregations of sea scallops in the existing habitat management area. Habitat attributes throughout the northern edge region, including within the existing habitat closure, are not uniform. This creates an opportunity for the design of an area more narrowly focused on the most vulnerable habitats. Previously, the Committee has requested more narrowly defined Habitat Management Areas for Fippennies Ledge, Platts Bank, Jeffreys Ledge, and Cox Ledge, and a similar approach could be taken for the northern edge region.

Recommendation 2: An alternative habitat management area for the northern edge region could be designed that more narrowly targets the most vulnerable habitats. The Habitat Committee may wish to request that the PDT develop such an option for the northern edge region that will feed into the reconciliation process with the Groundfish CATT and Committee. The Committee should articulate specific management objectives associated with any such area.

Issue 3: Habitat-related objectives should be clear as the Habitat Committee moves into the reconciliation process with the Groundfish Committee

The Council is currently awaiting recommendations for groundfish management areas from the Closed Area Technical Team, which could include management areas within this region. A reconciliation process between the groundfish and habitat options is planned for the period between the April and June Council meetings. This reconciliation provides an opportunity to modify management area boundaries and fishing restrictions to design management areas for the northern edge and elsewhere that meet multiple objectives, i.e. groundfish productivity, adverse effects minimization, and fishery access.

This process will involve expertise from other PDTs as appropriate, and such involvement will continue as the EIS is drafted. For example, The Habitat and Scallop PDTs have been in close communication about scallops in proposed and existing habitat management areas, and the scallop PDT plans to produce biomass estimates for any proposed or existing management areas that are considered in the Omnibus Amendment. Their work to date confirms that both the existing habitat management area in CAII and the Georges Shoal East area contain large number of scallops (see discussion and draft data in NEFMC Scallop PDT report dated 2/12/13).

Presumably, area boundaries may change as a result of this reconciliation, and it will be important for the Habitat Committee to be able to articulate which portions of any of the options

for this region, and other regions, are the most important in terms of continued protection from adverse effects.

Recommendation 3: The reconciliation process will proceed more smoothly if the Committee is able to articulate specific objectives for this region, for example, maintain/increase access for the sea scallop fishery, maintain/increase access for the groundfish fishery, protect regional cobble/boulder habitats from adverse effects, maintain some portion of the existing habitat management area, etc.

References

Harris, B. P. and K. D. E. Stokesbury (2010). "The spatial structure of local surficial sediment characteristics on Georges Bank, USA." Continental Shelf Research 30: 1840-1853.

NEFMC (2011). Essential Fish Habitat Omnibus Amendment. The Swept Area Seabed Impact (SASI) model: a tool for analyzing the effects of fishing on Essential Fish Habitat. 303 pp. Available online at http://www.nefmc.org/habitat/sasi_info/110121_SASI_Document.pdf.

NEFMC (2013). Final Scallop PDT Meeting Summary, Tuesday, February 12, 2013, Mariners House - Boston, MA.

Figure 1 – Estimated seabed vulnerability to bottom otter trawl gears, assuming uniform distribution of area swept fishing effort per cell. Redder colors/higher values indicated that the cell is estimated to be more vulnerable to accumulating adverse effects from this gear, combining initial susceptibility of seabed features and recovery rates over time.

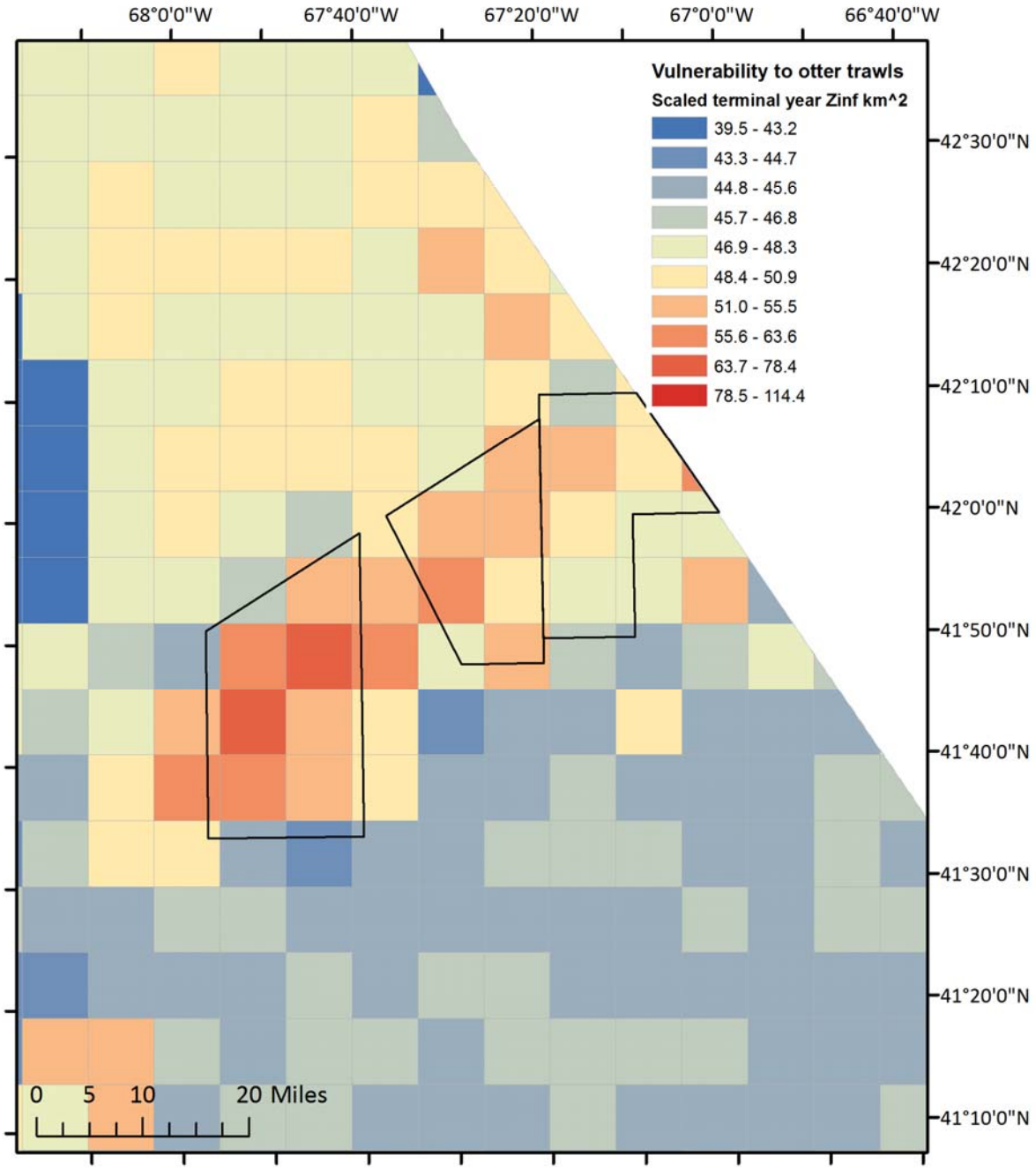

Figure 2 – LISA clusters of highly vulnerable cells overlaid on the otter trawl vulnerability map. The Local Indicators of Spatial Association analysis identifies cells that have both significantly higher Z values than the mean and are adjacent to (queen contiguity) other high vulnerability cells. The results are grouped according to probability value as shown with the darker/lighter red outlines.

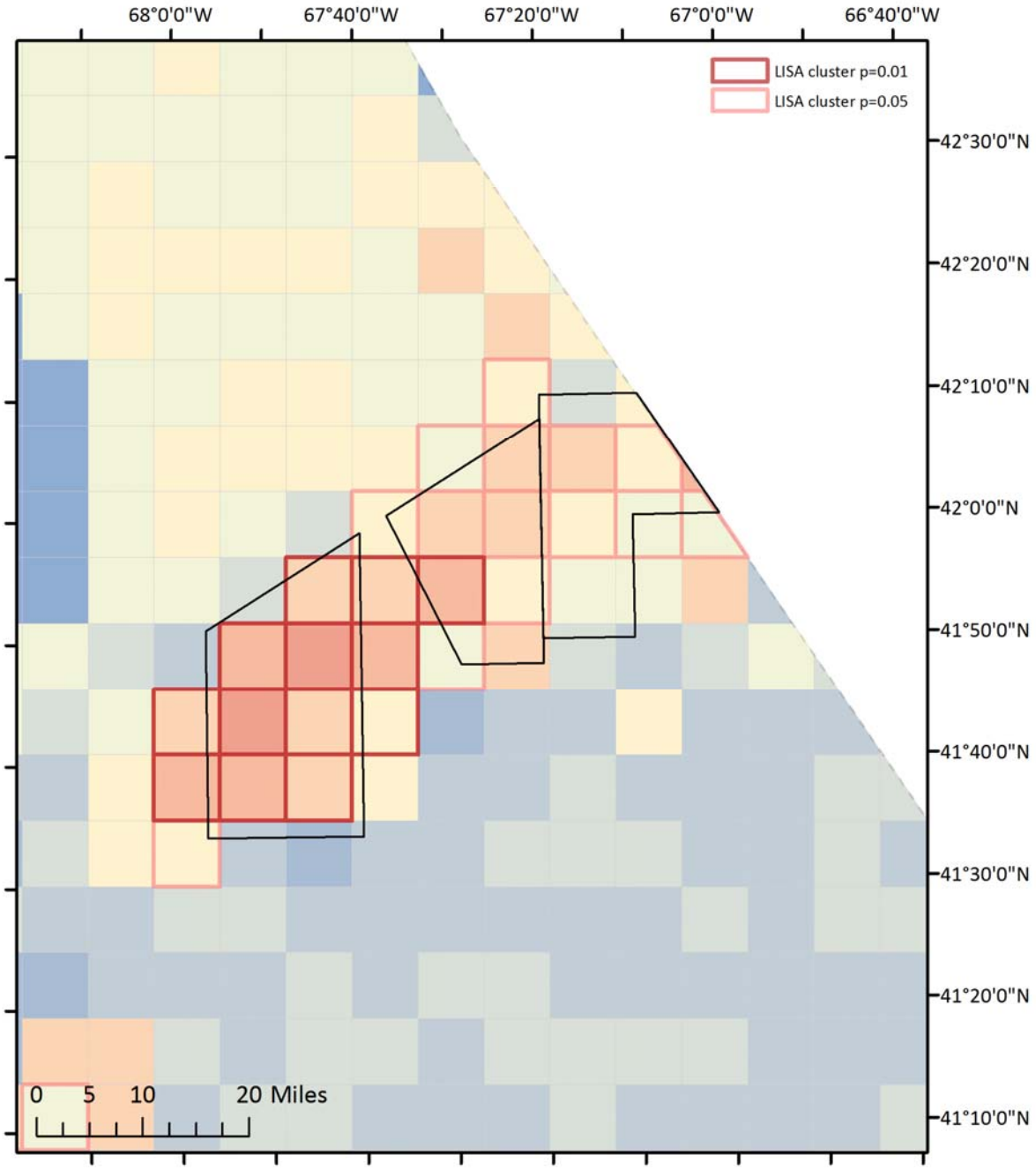

Figure 3 – Equal area permutation analysis results for the existing habitat closed area on the northern edge. The black circles, which are the same size as the existing area, indicate locations where mean Zinf is equal to or greater than the mean Zinf of the existing management area. The shaded yellow-brown circles highlight the top 1 percent of such locations.

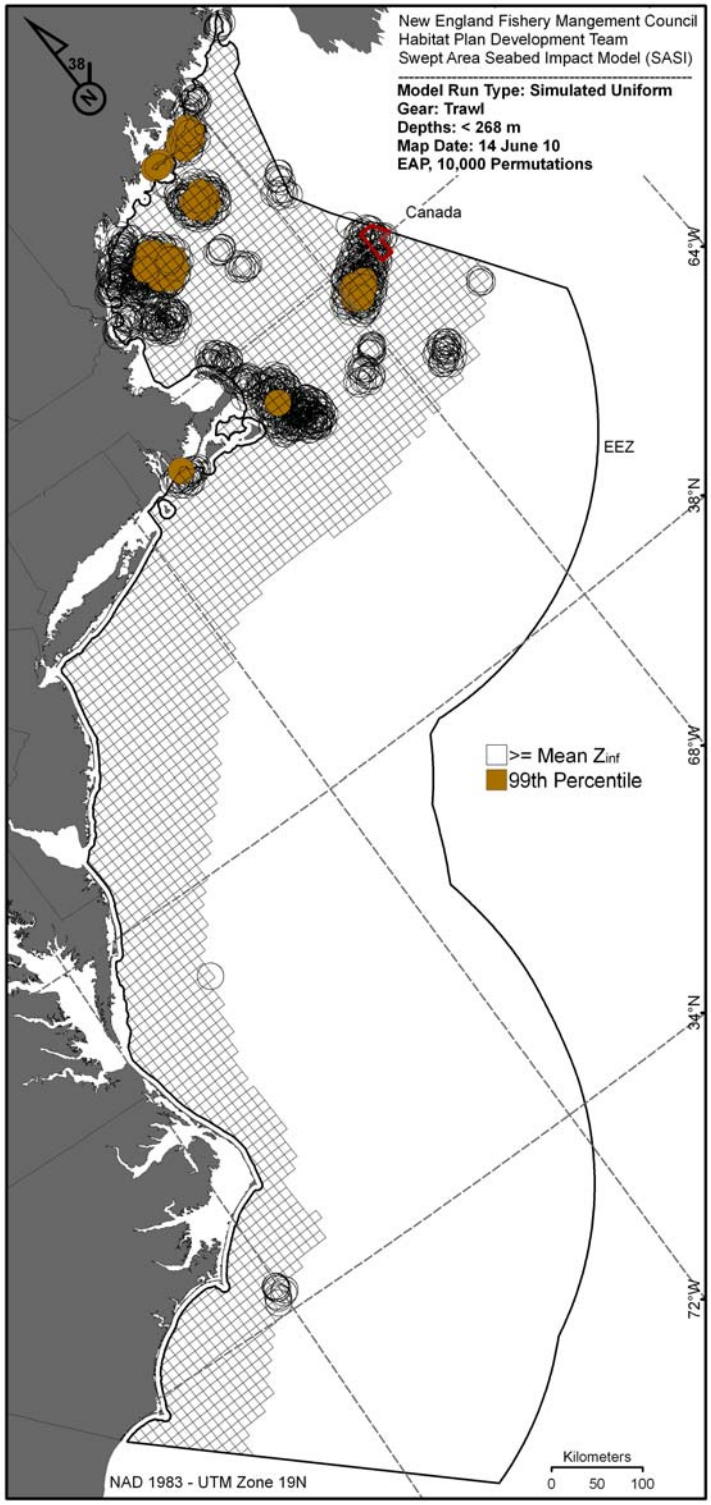

Table 1 – Trawl Equal Area Permutation results with tested areas, their size, $\overline{z_w^\infty}$ permutation percentile (P%) and number of permutation areas (out of 10,000) with $\overline{z_w^\infty}$ ≥ than the tested area. For the CAII habitat closure, these results indicate that the existing area has a higher $\overline{z_w^\infty}$ value than 92.2% of possible same-sized areas. This puts the 'performance' of the existing CAII habitat closure somewhat below the three GOM areas, but significantly above the other three areas on GB. When comparing these results across areas, it is important to note that data quality is not uniform across the model domain (see Figure 7 for an example).

		Tested area result			Permutation results		
	Closed Area	**km^2**	**AWM z∞**	**Sum z∞**	**P%**	**Areas with ≥ Mean z∞**	**99th %**
Groundfish (Amendment 13) EFH Closed Areas	Cashes Ledge	443	51.437	588.06	96.00%	400	57.661
	Jeffreys Bank	499	57.667	510.13	99.10%	90	57.101
	WGOM	2272	50.114	1777.55	95.10%	490	52.63
	CAII	**641**	**49.425**	**844.79**	**92.20%**	**780**	**56.567**
	CAI N.	1937	45.186	1287.93	12.80%	8721	53.15
	CAI S.	584	46.085	609.67	50.30%	4970	57.101
	NLCA	3387	46.787	2205.24	56.80%	4320	51.884

Figure 4 – Vulnerable habitat areas identified by the PDT in July 2011. The polygons (shown in purple outline) were drawn based on the dominant substrate map used in the SASI model (Figure 5) and based on the dominant substrate maps of gravel hot spots in Harris and Stokesbury 2010 (Figure 7).

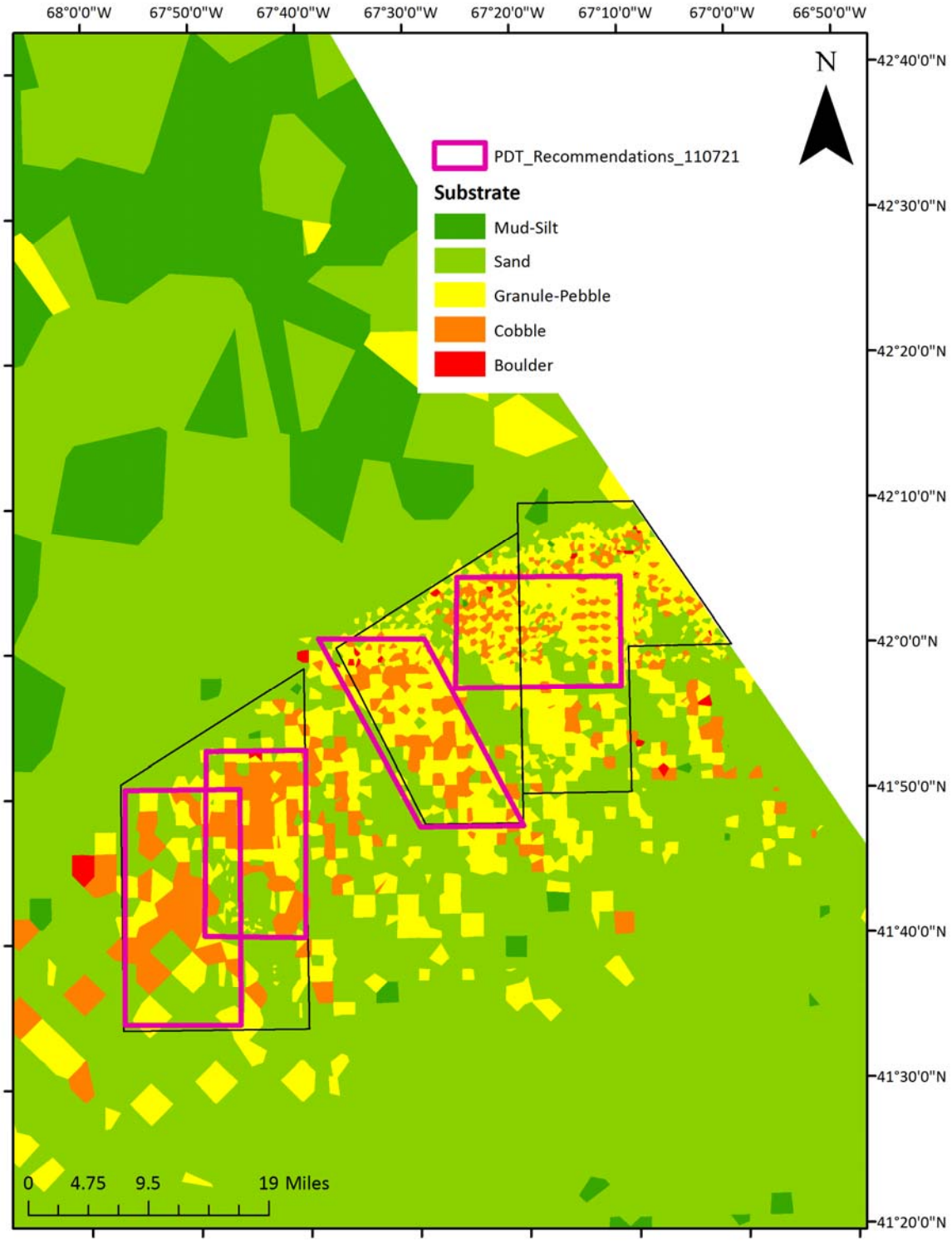

Figure 5 – Dominant substrate base grid from the SASI model analysis. The size of each cell is based on the density of samples. Data sources include SMAST video survey and usSEABED parsed and extracted data points.

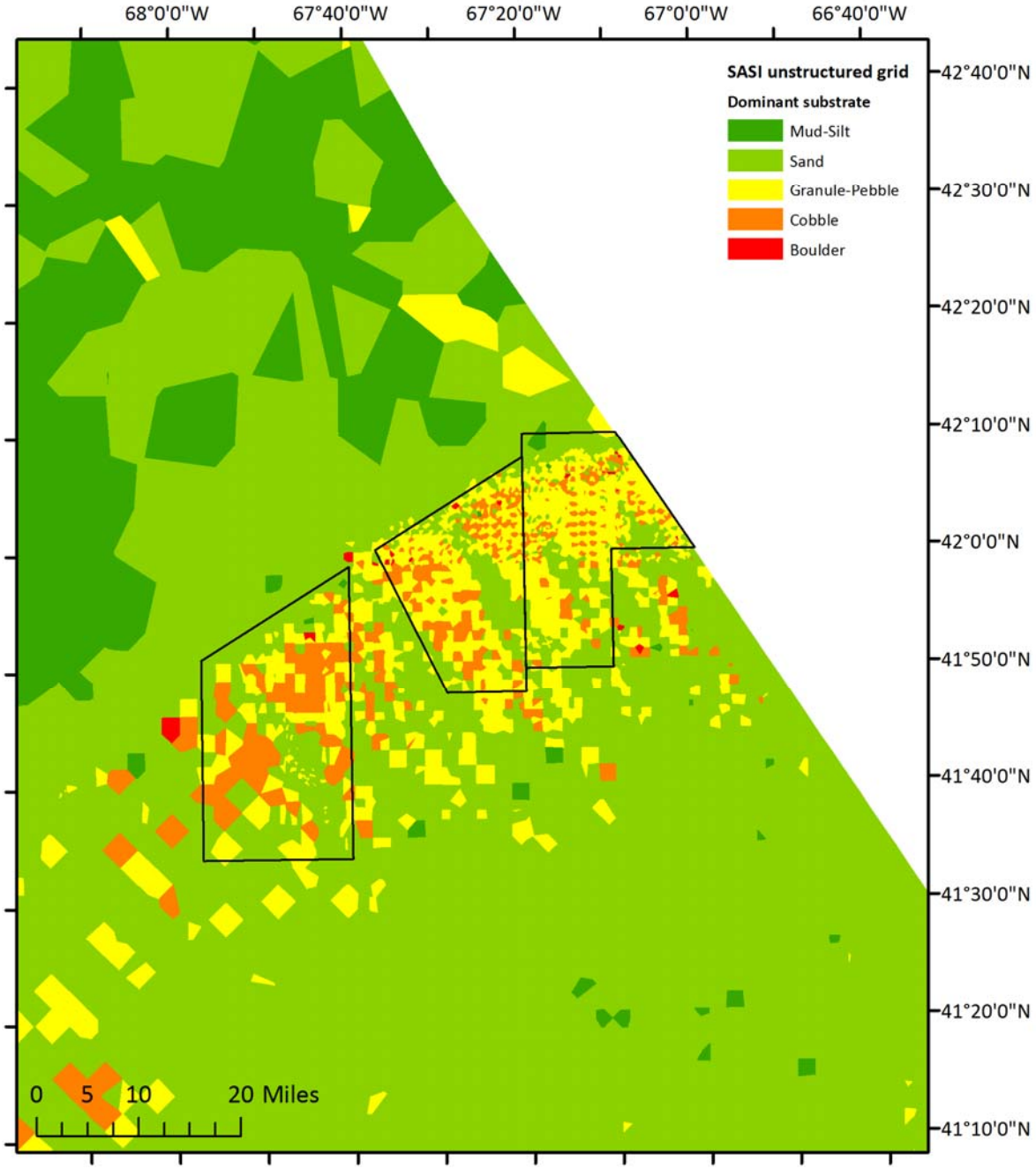

Figure 6 – SASI model data support. From yellow to blue, the rankings are a composite of cell size and sampling potential. Low (yellow) = only mud- granule pebble detectable and low sampling frequency, Moderate, high moderate, and very high moderate (orange/red) = only mud- granule pebble detectable, with increasing sampling frequency, High, very high, ultra high (purple/blue) = full range of substrates detectable, increasing sampling frequency.

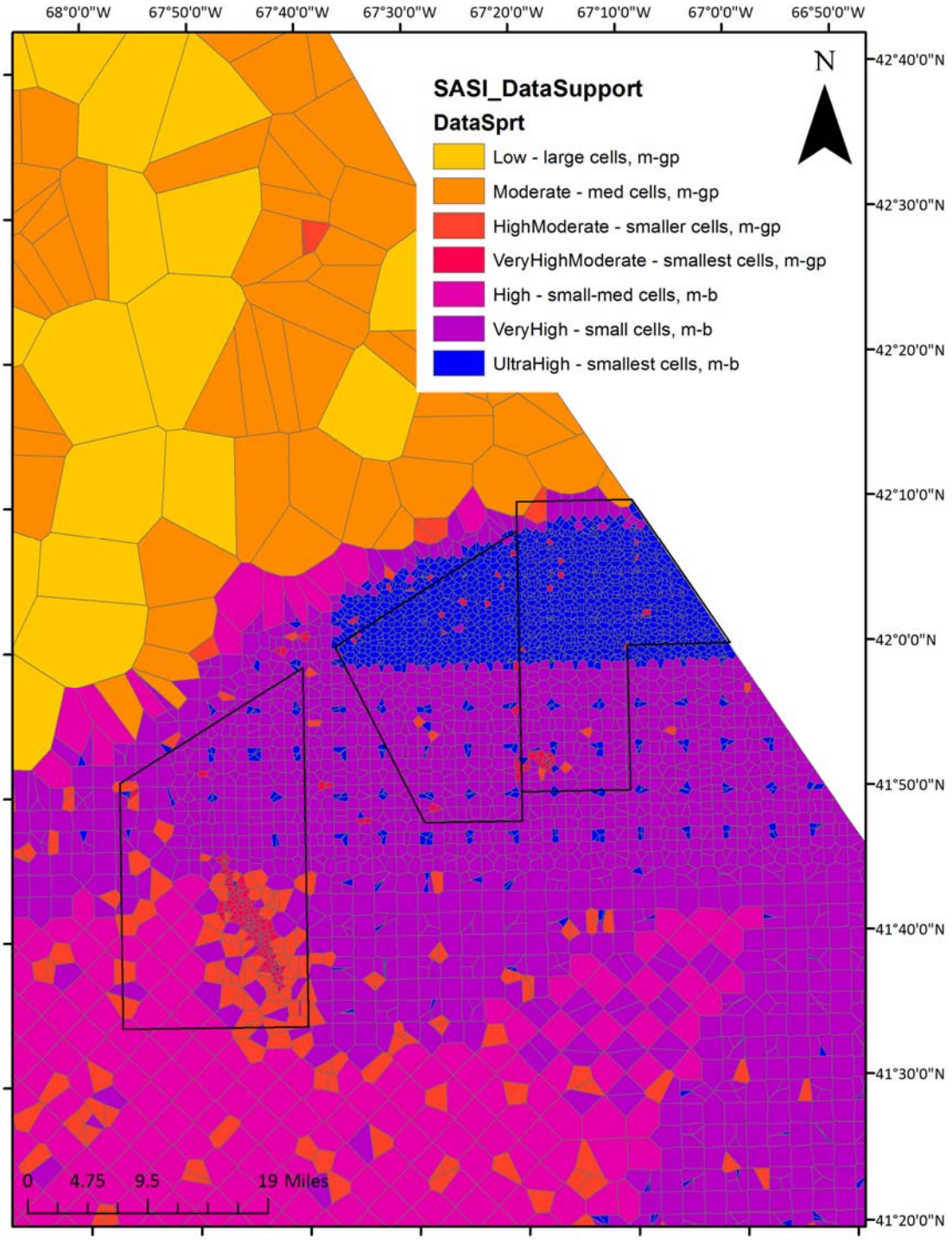

Figure 7 – Dominant sediment data for the Northern Edge of Georges Bank from Harris and Stokesbury 2010, overlaid with vulnerable areas (Figure 4), the existing habitat management area (Figure 8), and possible new habitat management areas (Figure 8).

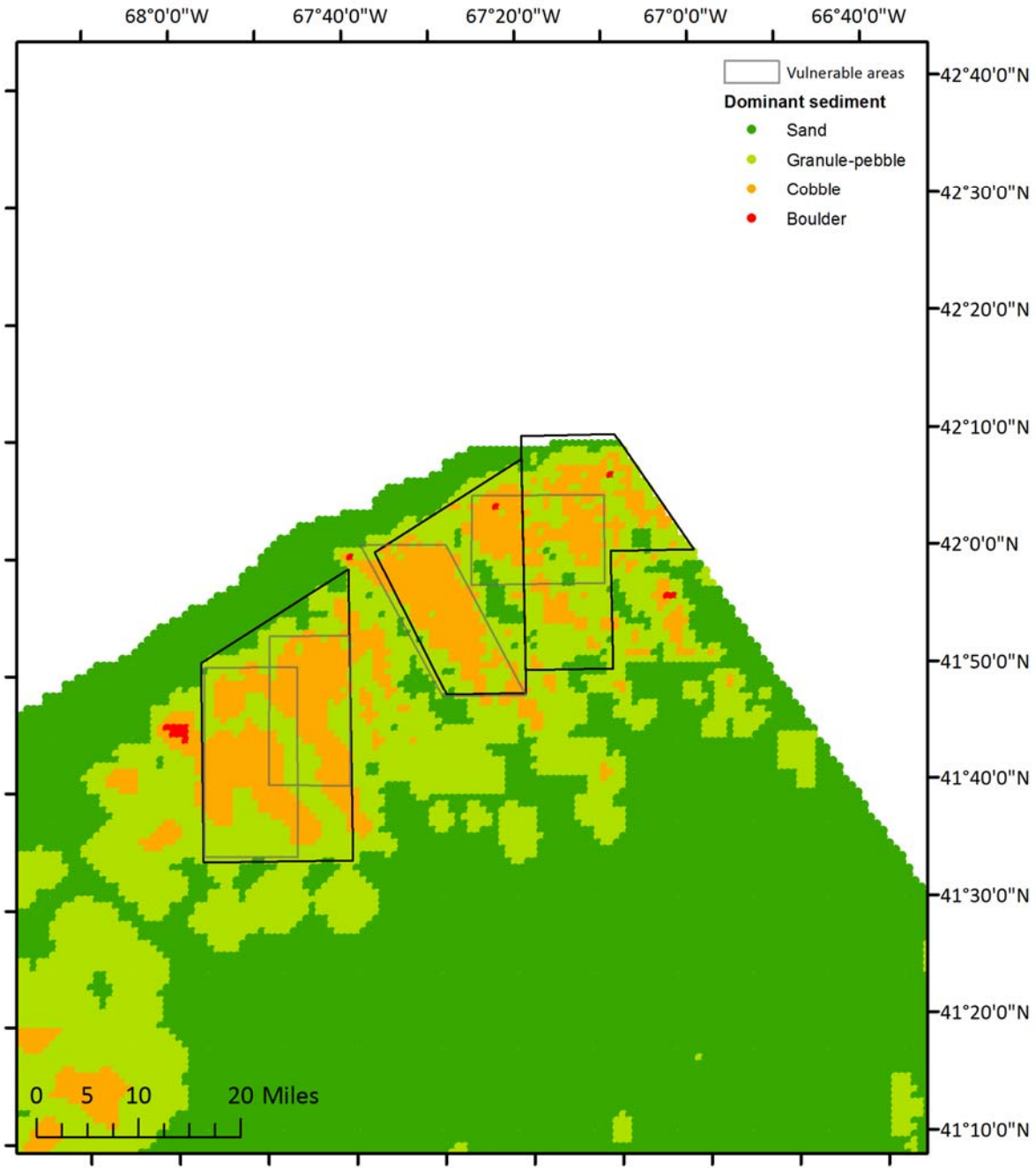

Figure 8 – Existing and proposed management areas, with bathymetry.

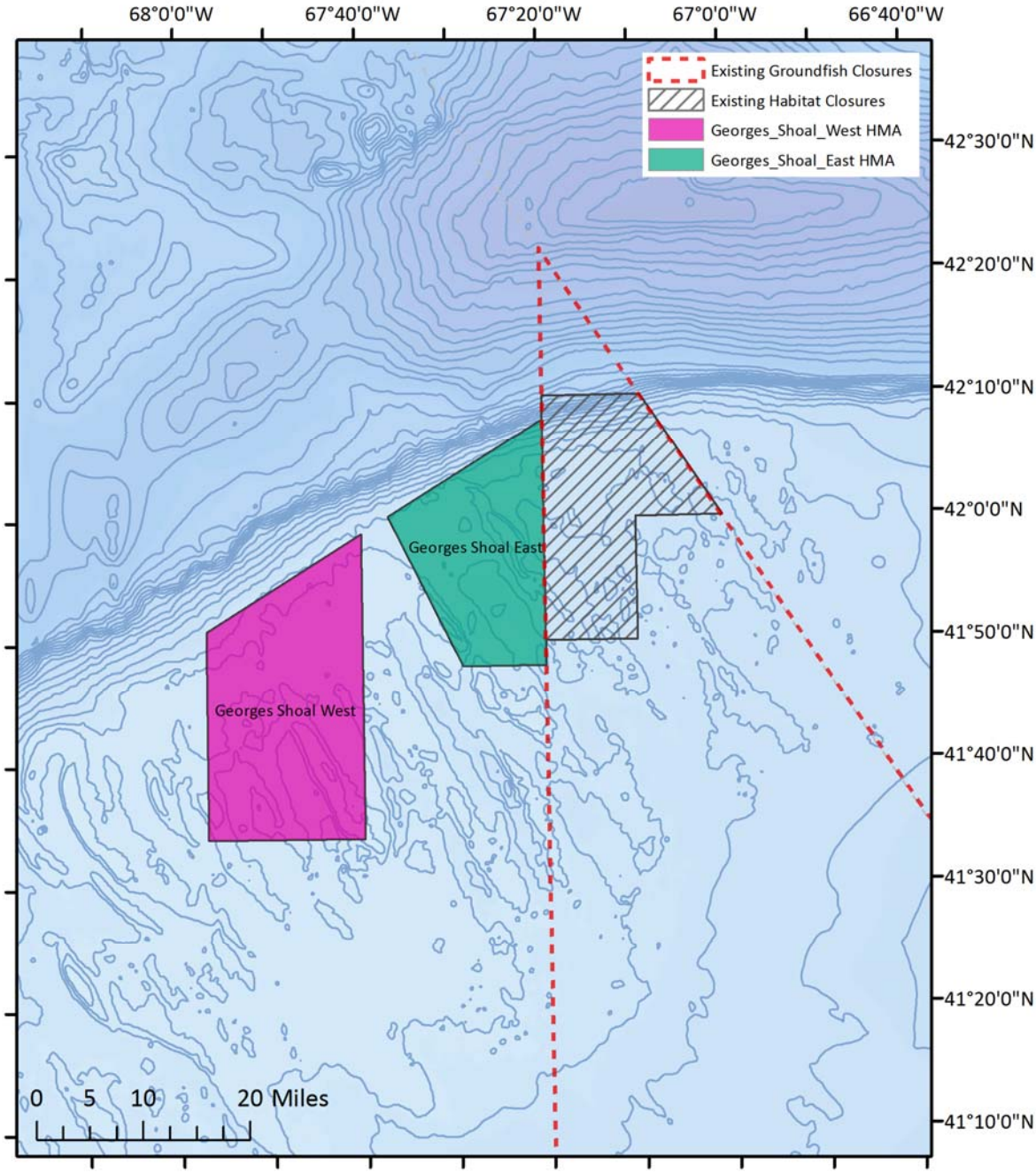

Figure 9 - Proposed and existing habitat management areas (black outline), July 2011 vulnerable habitat areas (purple outline), and Northern Edge area (blue outline), overlaid on SASI model dominant substrate grid.