Northern Edge Habitat-Scallop Framework Concept Area Analysis Including Advisory Panel and Committee Input

Michelle Bachman, Connor Buckley, Jennifer Couture, and Jonathon Peros NEFMC staff
Agenda

- Summarize tasking, scallop, and habitat analyses
- Summarize advisory Panel and Committee recommendations
- Council questions, discussion
  - Refine, remove concept areas – consider Habitat/Scallop CTE motion
  - Provide guidance on the direction of action overall
  - Provide other recommendations for alternatives

April 16, 2024
Goal

Develop a scallop rotational harvest program within and/or around the Closed Area II Habitat Closure Area (i.e., “habitat management area” or “HMA”) that avoids habitats important to juvenile cod, minimizes adverse effects to essential fish habitats, minimizes adverse biological and economic impacts to other managed fisheries, and contributes to optimum yield for the scallop fishery.

Objectives

In brief

1. Develop access area(s)
2. Review HMA boundaries
3. Develop harvest program including frequency and intensity of access
4. Manage scallop yield and harvest over short and long term
5. Ensure enforceability
6. Minimize bycatch
7. Consider egg-bearing lobster and lobster fishery interactions

As a reminder...

April 16, 2024
Council Tasking (September 2023):

Council tasked the Scallop and Habitat PDTs to:

- Analyze the following four areas in the development of access areas for the Northern Edge Framework.
  - Include estimates of biomass in each area by the scallop PDT,
  - Estimates of percent disturbance from the Fishing Effects model by the Habitat PDT,
  - Consider possible impacts to other fisheries resources, in accordance with the objectives for the action.
Scallop PDT Analyses:

- Where have surveys detected scallops in these areas?
  - Historically
  - Recently – Length frequencies and optical data

- How big are the concept areas?
  - Including size of areas at different depths

- How much biomass is in each concept area?
  - What does this mean for possible access?
Designing Concept Areas

- Council considered scallop density, dominant sediment, and avoiding High Complexity Area.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Concept 1 Full area</th>
<th>Concept 2 North</th>
<th>Concept 3 South</th>
<th>Concept 4 High-density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>14%</td>
<td>46%</td>
<td>6%</td>
<td>26%</td>
</tr>
<tr>
<td>Pebble</td>
<td>46%</td>
<td>44%</td>
<td>46%</td>
<td>58%</td>
</tr>
<tr>
<td>Cobble</td>
<td>36%</td>
<td>0%</td>
<td>46%</td>
<td>11%</td>
</tr>
<tr>
<td>Boulder</td>
<td>1%</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
</tr>
</tbody>
</table>

- South of High Complexity Area has much higher proportion of cobble substrate
- High complexity area has depths between 30-40 fathoms (55-73 m)

April 16, 2024
SMAST Drop Camera Images:

Sand, Pebbles, Scallops

Dense Scallops, More Complexity

High Complexity Area

Values are scallops per m²
Concept Areas

1. Full area: all major areas of scallop biomass
2. North of high complexity
3. South of high complexity
4. High density scallop beds wrapping around high complexity area

Concept areas overlap northern part of CAII Habitat Management Area (HMA) and extend north beyond HMA boundary

April 16, 2024
Distribution of Scallops in HMA

- Scallops present throughout the HMA in dredge and optical surveys
- Higher densities to the north and east between 2014 and 2023
Year Classes and Length/Frequencies

Dominant YC fully recruited.

5 – 6 inch scallops

Dominant YC fully recruited.

5 – 5.5 inch scallops

Two cohorts 2 & 5 inches

Dominant YC mostly recruited.

4 – 5.5 inch scallops
Relative SAMS area sizes

- Concept areas are small relative to rotational areas on GB and Mid-Atlantic
- Comparable to areas with concentrated fishing in GOM (i.e., Stellwagen)

Area estimates based on SAMS boundaries (blue outlines)

April 16, 2024
Key distances

- 1.5 nautical miles from concept area boundary to 55 fathom line (Concept areas 1, 2 & 4)
- 2 nautical mile wide corridor between northern and southern areas (Concept areas 1 & 4)
- ~8 nautical miles to Hague Line
- Substrate very different despite proximity
- Bottom type, depth change sharply along edge
## Concept area size

<table>
<thead>
<tr>
<th>Area</th>
<th>Size of concept area</th>
<th>Size of area &lt;= 55 fathoms</th>
<th>Size of area &lt;= 80 fathoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>169 mi²</td>
<td>117 mi²</td>
<td>128 mi²</td>
</tr>
<tr>
<td>2</td>
<td>68 mi²</td>
<td>16 mi²</td>
<td>27 mi²</td>
</tr>
<tr>
<td>3</td>
<td>99 mi²</td>
<td>99 mi²</td>
<td>99 mi²</td>
</tr>
<tr>
<td>4</td>
<td>87 mi²</td>
<td>35 mi²</td>
<td>46 mi²</td>
</tr>
</tbody>
</table>
## 2022-2023 Total Biomass

<table>
<thead>
<tr>
<th>Area</th>
<th>Size of concept area</th>
<th>2022 Biomass (SE)</th>
<th>2023 Biomass (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NEFSC HabCam</td>
<td>SMAST Drop Camera</td>
</tr>
<tr>
<td>1</td>
<td>169 mi²</td>
<td>12,028,000 lb (304,000 lb)</td>
<td>29,291,000 lb (10,164,000 lb)</td>
</tr>
<tr>
<td>2</td>
<td>68 mi²</td>
<td>3,228,000 lb (82,000 lb)</td>
<td>15,871,000 lb (9,683,000 lb)</td>
</tr>
<tr>
<td>3</td>
<td>99 mi²</td>
<td>8,490,000 lb (111,000 lb)</td>
<td>14,762,000 lb (5,961,000 lb)</td>
</tr>
<tr>
<td>4</td>
<td>87 mi²</td>
<td>7,090,000 lb (179,000 lb)</td>
<td>22,959,000 lb (10,624,000 lb)</td>
</tr>
</tbody>
</table>
Interpreting Biomass Estimates

- Uncertainty associated with all biomass estimates for the concept areas. Reflected in large standard error.
- Total biomass > Exploitable Biomass. Allocations based on exploitable biomass.
  - Dredge survey samples from 2023 suggest dominant YC in concept areas 2 & 4 are or will be fully exploitable.
- Examples → Allocating the NYB Access Area for FY 2024
  - Biomass projection → 17.8 million pounds
  - Exploitable biomass → 13.2 million pounds
  - Fishing at F=0.45 → ~4.6 million pounds
    - Slightly more than that the 12,000 lb trip that was allocated for FY2024 in FW 38.
## Access Area Openings, Time Averaged F

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimated F</th>
<th>Exploitable Biomass (lbs)</th>
<th>Access Area Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>0.49</td>
<td>13.9 mil. lbs</td>
<td>~6 mil. Lbs (18k lbs trips)</td>
</tr>
<tr>
<td>2016</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CA2-SE EBMS (lb)
- 2021: 3,917,610
- 2020: 0
- 2019: 0
- 2018: 0

### CA2-SW EBMS (lb)
- 2021: 32,253,591
- 2020: 29,092,166
- 2019: 13,717,146
- 2018: 7,372,249

### CA2-Ext EBMS (lb)
- 2021: 23,582,820
- 2020: 12,786,796
- 2019: 10,723,272
- 2018: 9,334,361

Access Area Allocation:
- **2021**: ~9 mil. Lbs (18k lb trips)
- **2020**: ~29 mil. Lbs (18k lb trips)
- **2019**: ~13 mil. Lbs (18k lb trips)
- **2018**: ~7 mil. Lbs (18k lb trips)
Key considerations scallop analysis (1)

- Recent Closed Area II North biomass estimates have been ~20 mil. lb
  - Concept areas are a sub-part of the total SAMS area → biomass for these areas is therefore lower than the survey estimates for CAII-N.

- 2023 SMAST drop camera survey → range of densities in each concept area. Scallops are not evenly distributed throughout each concept area.
  - High-density station on the northern boundary of the high complexity area, outside of the concept areas, and discussed trade-offs of impacts associated with fishing high density areas.

- Given the high standard errors, short-term allocations to harvest the current dominant year class in this area at around F=0.4 (used as an example) could be less than allocations to other access areas, which have been around 4 mil. – 6 mil. lb. in recent Frameworks depending on the concept area.
Key considerations scallop analysis (2)

- Assessing the impact of fishing high concentrations of scallops in a small areas deserves additional consideration based on recent experience fishing the Nantucket Lightship and Stellwagen Bank.
  - High density areas where higher than anticipated M occurred (NLS-W), and increased safety risks can come with vessels fishing in very close proximity.
- The Council should consider the size of the concept area, biomass estimates and standard error, and distribution of scallops within the area, in addition to key habitat considerations when considering the further development of concept areas and/or alternatives.
Motion 1: Option 1 preferred
Motion 2: Option 4 secondary preferred
Motion 3: Options 2 and 3 should remain under consideration
Southern boundary of Option 2 should be extended closer to High Complexity Area to encompass high density patch of scallops

- Motion 1 - Recommend as large an area as possible for operational flexibility
  - Spread out effort for vessel safety and to avoid concentrating habitat impacts into a small area. Biomass estimates are highly uncertain, given uncertainties a larger areas is preferable.
- AP felt all concepts worth considering (vs. no access).
Questions on scallop analyses?
Council Tasking (September 2023):

Council tasked the Scallop and Habitat PDTs to:

- Analyze the following four areas in the development of access areas for the Northern Edge Framework.
  - Include estimates of biomass in each area by the scallop PDT,
  - **Estimates of percent disturbance from the Fishing Effects model by the Habitat PDT,**
  - Consider possible impacts to other fisheries resources, in accordance with the objectives for the action.
Fishing Effects Model Basics

- Combines fishing effort with habitat data and feature susceptibility and recovery parameters to generate spatially- and temporally-specific estimates of percent habitat disturbance
  - Fishing effort is represented as swept area, km²
  - Habitat types mud, sand, pebble, cobble, boulder (5); high or low energy (2); 10 total types
  - Geological and biological structures inferred to each grid, depending on habitat type \( \rightarrow \) see Tables 2 and 3 in memo
  - Susceptibility (scaling) and recovery (decay) parameters based on vulnerability assessment \( \rightarrow \) see Table 5 in memo
  - Northeast regional scale model; 25 km² grid cells, monthly timestep

https://www.nefmc.org/library/fishing-effects-model
https://www.northeastoceandata.org/HS8WVbup
Size of concept areas relative to Habitat Management Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Size</th>
<th>Proportion of HMA</th>
<th># overlapping model grids</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>169 mi²</td>
<td>53%</td>
<td>33 (max number)</td>
</tr>
<tr>
<td>2</td>
<td>68 mi²</td>
<td>12%</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>99 mi²</td>
<td>40%</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>87 mi²</td>
<td>20%</td>
<td>21</td>
</tr>
</tbody>
</table>

High Complexity Area = area with a higher density of structure-forming fauna that are long-lived, likely to have substantial, more than temporary impacts from fishing
Fishing Effects Scenario Analysis

- Eight effort scenarios compare potential impacts of fishing within four concept areas using 3-year and 5-year rotational intervals.
- **Fishing events:** during years 1, 5, 9 (3-year recovery) or 1, 7, 13 (5-year recovery).
- Same effort (74 km² area swept) in all months, distributed across grids in each concept area according to recent scallop density data.
- Effort for each fishing event based on a past fishery with a 0.5 trip/vessel - 9,000 lb possession limit (2011 CAII-S access area).
- Generally, inferred biological features are present on the Northern Edge, with limited exceptions → see Tables 4 and 6, Figures 5-8 in memo.
- Results - % disturbance per grid; index of disturbance (km²) across all grids.
  - 3-year results here; 3- and 5-year results in memo.
Concept Area 1

3-year interval

Start at 0% → April 2026 15% → March 2027 50% → March 2030 15% → ... → 1%

Fishing occurs:
April 2026-March 2027
April 2030-March 2031
April 2034-March 2035

* Approximate concept area boundary
Concept Area 1 (Full Area)

- Highest total disturbance value (km²) because this is the largest area across which fishing effort is distributed and more area is fished/impacted.

Habitat Council staff guidance

- **After 1 year of fishing (March 2027):**
  - 6 out of 22 cells with effort allocated have > 90% of grid disturbed
  - Total disturbance = 355 km² across all cells that had fishing effort
    - Impact more than minimal for these 6 grid cells
  - Mean % disturbance exceeds 20%

- **After 3 years without fishing (March 2030):**
  - Some of these grid cells remain >55% disturbed
    - Impact more than temporary for these cells
  - Mean % disturbance falls to ~15%
    - The 10 grid cells without fishing effort/impact downweights average

April 16, 2024
Fishing occurs:
April 2026-March 2027
April 2030-March 2031
April 2034-March 2035

* Approximate concept area boundary
Concept Area 2 (North)

- Lowest total disturbance value (km²), with fishing occurring over the smallest portion of the Habitat Management Area.

Habitat Council staff guidance

- **After 1 year of fishing:**
  - 6 out of 8 cells with effort allocated have > 90% of grid disturbed
  - Total disturbance = 145 km² across all cells that had fishing effort = substantially less than Concept Area 1 → habitat disturbance could be considered minimal
  - Mean % disturbance < 20%

- **After 3 years without fishing:**
  - Some of these grid cells remain >45% disturbed → impact more than temporary for these cells
  - Mean % disturbance falls to ~7% → includes 25 grid cells without fishing effort, downweights average

- **Overall:** While impacts are locally high, providing access via this concept could have a sufficiently low habitat disturbance overall.
Concept Area 3
3-year interval
Start at 0% → April 2026 13% → March 2027 40%
→ March 2030 12% → ... → 1%

Fishing occurs:
April 2026-March 2027
April 2030-March 2031
April 2034-March 2035

* Approximate concept area boundary
Concept Area 3 (South)

- Concept Area 3 (South) shows intermediate total disturbance level (km²) relative to Areas 1 and 2 with Area 3 having a greater impact than 4 because of greater fishable area.

_Habitat Council staff guidance_

- **After 1 year of fishing:**
  - 4 out of 17 cells with effort allocated have > 90% of grid disturbed.
  - Total disturbance = 288 km² across all cells that had fishing effort = less than Concept Area 1 but greater than Concept Area 2.
  - Mean % disturbance = 40%.

- **After 3 years without fishing:**
  - Some of these grid cells remain >60% disturbed → impact more than minimal and temporary for these cells.
  - Mean % disturbance falls to ~12% → includes 15 grid cells without fishing effort, thus, downweights average.
Concept Area 4
3-year interval

Start at 0% → April 2026 12% → March 2027 32% → March 2030 9% → ... → 1%

Fishing occurs:
- April 2026-March 2027
- April 2030-March 2031
- April 2034-March 2035

* Approximate concept area boundary
Concept Area 4 (High Density)

- Concept Area 4 (High Density) show intermediate disturbance level relative to Areas 1 and 2 with Area 4 having less impact than 3 because of smaller fishable area

**Habitat Council staff guidance**

**After 1 year of fishing:**
- 5 out of 12 cells with effort allocated have > 90% of grid disturbed
- Total disturbance = 235 km² across all cells that had fishing effort = = less than Concept Area 1 but greater than Concept Area 2
- Mean % disturbance < 20%

**After 3 years without fishing:**
- Some of these grid cells remain 60% disturbed → impact more than minimal and temporary for these cells
- Mean % disturbance falls to ~9% → includes 19 grid cells without fishing effort, thus, downweights average
## 3-year Recovery: Sum of Habitat Disturbance (km²)

<table>
<thead>
<tr>
<th>Concept Area</th>
<th>Area of all grid cells within each concept area</th>
<th>April 2026</th>
<th>March 2027</th>
<th>March 2030</th>
<th>March 2044</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Full</td>
<td>464</td>
<td>98</td>
<td>335</td>
<td>95</td>
<td>8</td>
</tr>
<tr>
<td>2 – North</td>
<td>161</td>
<td>78</td>
<td>145</td>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>3 – South</td>
<td>372</td>
<td>94</td>
<td>288</td>
<td>84</td>
<td>8</td>
</tr>
<tr>
<td>4 – High Density</td>
<td>286</td>
<td>93</td>
<td>235</td>
<td>66</td>
<td>6</td>
</tr>
</tbody>
</table>

**Sum of disturbance across all grid cells, km²**

- **Max km² habitat disturbed:**
  - 33
- **Max amount of recovery (km²):**
  - 33
Results – percent disturbance by grid

- After one month of fishing across concept areas:
  - Mean % disturbance: 12-15%
  - Minimum non-zero % disturbance: 6-13%
  - Maximum % disturbance: 40-68%

- After one year of fishing: *max amount of impact*
  - Mean % disturbance: 27-50%
  - Minimum non-zero % disturbance: 46-72%
  - Maximum % disturbance: 92-95%

- After three years without fishing:
  - Mean % disturbance: 7-15%
  - Minimum non-zero % disturbance: 11-17%
  - Maximum % disturbance: 27-28%

- After ten years without fishing: *max amount of recovery*
  - Mean, min, and max % disturbance: ~0-1%

Additional recovery estimated to occur with 5-yr recovery scenario
Caveats about Results

- Habitat regulations do not specify a % level of disturbance or time estimates that correspond to minimal and temporary
  - Possible to use information on natural disturbance for longer-lived, structure-forming species to compare against impact levels → TBD
- Habitat Council staff used best judgement in initial guidance on what could be considered minimal and temporary impacts
- Each grid cell assigned an effort value or zero fishing effort
  → Mean % habitat disturbance could underestimate habitat impacts for concept areas with several unfished grid cells
- Do not over-interpret model results re: recovery of in space and time
  → Fine scale patterns of disturbance and recovery cannot be accurately det.
Additional considerations

- Features that are abundant and occur at high density in the high complexity area occur in other parts of the HMA → should not assume areas outside the high complexity area are low vulnerability.
- Timing of habitat disturbance is important
  - Affects habitat value of managed species especially for species that spawn infrequently or in very localized area.
  - Ex: if habitat disturbance occurs during juvenile settlement → higher mortality rates and reduced recruitment for that year class.
  - Multiple year classes could be impacted depending on # months/years disturbance persists.
  - Could have longer term adverse effects for species with poor stock status or with high reliance on the area.
- Model doesn’t evaluate changes in catch efficiency (more info next slide)
Fishing Efficiency Question

- Are there fewer or reduced impacts to habitat if scallop beds are denser? If so, does the Fishing Effects model over-estimate habitat impacts?
  - Do not know tow duration & catch efficiency for whole fleet
  - Hard to estimate typical catch rates for a potential new access area
  - Catch efficiency likely to change over time as initial scallop biomass is harvested → exploratory fishing
  - Area swept inputs could reflect these nuances but challenging to estimate
  - Here, we generally estimate greater impacts in areas of higher scallop density because we expect more fishing in those grids
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemones</td>
<td>2-5</td>
<td>Yes</td>
<td>Fully recovered after 6 yrs; no significant impact at any site</td>
</tr>
<tr>
<td>Ascidians</td>
<td>1-2</td>
<td>Yes</td>
<td>Stalked tunicate: sig. decreased following impact, full recovery 6 yrs in sites 1-3 (none in sites 4-6); strong mixed effect (Control x Impact x Habitat) after 2 yrs suggesting habitat &amp; impact influence population recovery</td>
</tr>
<tr>
<td>Bryozoans</td>
<td>1-2</td>
<td>Yes</td>
<td>Mixed; Changes in bryozoan/mussel habitat remained strong after 2 yrs (except site 2, fully recovered); full recovery after 6 yrs</td>
</tr>
<tr>
<td>Mollusks</td>
<td>5+</td>
<td>Yes</td>
<td>Mixed; Changes in bryozoan/mussel habitat remained strong after 2 yrs (except site 2, fully recovered); full recovery after 6 yrs</td>
</tr>
<tr>
<td>Filograna implexa</td>
<td>2-5</td>
<td>Yes</td>
<td>Sig. decreased in sites 1-3, has not recovered in 2 yrs; indicator species</td>
</tr>
<tr>
<td>Sponges</td>
<td>2-5</td>
<td>Yes</td>
<td>Iphon sensitive to mechanical disturbance, little recovery by 2 yrs, fully recovered 6 yrs</td>
</tr>
</tbody>
</table>

Longer-lived, structure-forming taxa
Juvenile Cod Habitat

- **Generally**: structurally complex habitat (gravel/cobble) with epifauna, seagrass, eelgrass important for recently settled cod
- **Age 0+ cod**: structured & unstructured habitat (sand) for schooling to avoid predation; common in shallow habitats
- **Age 1 cod**: found in deeper waters in less complex habitat; also found in granule-pebble habitat
- **Juvenile cod**: coarser substrates with cobble, gravel, boulder, rocks for food/refuge
- **Larger size classes**: mixed use of structurally-complex habitat; as cod grow in size → move to deeper water → predation threat decreases → complex habitat less important
Lobster evaluation

- ASMFC developing a report on:
  - Presence and abundance of lobsters and lobster fishing effort in/around Northern Edge by month/season

- Report forthcoming
  - Technical Committee still evaluating available data
  - Will be reviewed by Lobster Board then given to Council
Failed Motion 1: Support Scallop AP motions and analyze 1) limiting TAC, 2) limiting fishing time in area, 3) expanding observer coverage to collect habitat data, 4) seasonal closures for lobster and fish bycatch, and 5) trading Northern Edge access trip to open area DAS.

Rationale: do not have enough data on dredge impacts, need to understand economic impacts for leaving area closed & benefits to cod,

Failed 2/2/2

Passed Motion 2: Continue analyzing the four concept areas.

Rationale: still at analysis stage, waiting on additional information on lobster & groundfish fisheries, etc. to make informed decision later

Passed 4/2/0
Questions on habitat analyses
Considering tradeoffs

- **Concept Area 1** – greatest total habitat disturbance, encompasses the greatest amount of complex habitat.
  - *Staff recommendation: Might be appropriate for removal from further consideration given habitat impact considerations.*
- **Concept Area 3** – second highest total habitat disturbance, overlaps substantial areas of complex habitat. Biomass estimates are variable depending on the survey (~14.7 – 18.4 million lb, high uncertainty).
  - *This concept may be appropriate for removal from further consideration.*
- **Economic feasibility and enforceability of Concept Areas 2 and 4 should be further discussed.**
  - **Concept Area 2** – only 16 mi² based on a 55-fathom depth limit; though the total habitat disturbance, very large range of biomass estimates depending on the survey (< 0.5 – 16 million lb)
  - **Concept Area 4** – intermediate total habitat disturbance, very large range of biomass estimates depending on the survey (7 – 23 million lb)
Considering tradeoffs, continued

Should account for:

- Potential for scallop fishing in deeper waters (>70 fathoms north of High Complexity Area) and impact to habitat & scallop resources
- Contribution of deep-water scallops to recruitment more regionally
- Relationship between gear efficiency and area swept (impacts to habitats)
- Biomass estimates, given high survey uncertainty levels

Also:

- Reminder: Habitat regs do not specify a % level of disturbance and impact that would be adverse (more than minimal/temporary); Council has not established levels
  - Consider impacts in a regional context and as a continuance of impact reduction achieved through Omnibus EFH Amendment 2
- Adverse impacts may indicate a need for mitigation in terms of impact reduction outside of HMA
**Motion:** Remove Concept Areas 1 (Full Area) and 3 (South of High Complexity Area) from further consideration in the framework document.

**Rationale:** Concept Areas 1 and 3 are inconsistent with the goal and objectives of the framework

- Goal is to develop access program that avoids habitats important to juvenile cod; minimizes adverse effects to EFH
- Concept Area 1 has greatest percent habitat disturbance; encompasses greatest amount complex habitat
- Concept Area 3 has second highest percent habitat disturbance, overlaps substantial area complex habitat
- Area south of High Complexity Areas has high % gravel, cobble, boulder → important habitat for juv. cod and other species
- Removing areas 1 and 3 allows greater focus on options that are more consistent with goal/objectives

**Passed by unanimous consent**
Reminder: Enforcement Committee Input (4/2)

**Consensus Statement:** Does not support further development of Concept Areas 1 (Full Area) and 4 (High Density) in framework due to enforceability concerns.

**Rationale:** expressed concern with the shape of the polygons and noted the difficulty of enforcing the shape of the areas.

- HAPC is < 1.5 nm across its narrowest width and a VMS ping rate of 5 mins, incursions of a 0.25 nm into the closed area still possible;
- Enforcement with VMS alone likely insufficient to prevent incursions into closed area

*Note: Committee discussed the likelihood of scallop fishing right on the northern boundary of concept areas for high scallop densities and enforcement implications; discussed idea of a buffer along this boundary*
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>DEC Council prioritizes action</td>
</tr>
<tr>
<td>2023</td>
<td>FEB/MAR Kickoff meeting with PDTs, staff, as appropriate to define scope/goal and objectives</td>
</tr>
<tr>
<td></td>
<td>MAR CTEs, APs review draft goal and objectives</td>
</tr>
<tr>
<td></td>
<td>APR Council approves goal and objectives, initiates action</td>
</tr>
<tr>
<td></td>
<td>MAY-JUN (ongoing) Assemble spatial and other data and information</td>
</tr>
<tr>
<td></td>
<td>JUN-AUG PDTs draft list of actions; begin to brainstorm alternatives</td>
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<tr>
<td></td>
<td>AUG-SEP CTEs, APs review draft actions and provides initial feedback on concepts</td>
</tr>
<tr>
<td></td>
<td>SEP Council update; approval of spatial analysis concepts</td>
</tr>
<tr>
<td></td>
<td>OCT-DEC Initial PDT evaluation of spatial concepts</td>
</tr>
<tr>
<td></td>
<td>NOV Habitat AP, CTE input</td>
</tr>
<tr>
<td></td>
<td>DEC Council update</td>
</tr>
<tr>
<td>2024</td>
<td>JAN-MAR PDTs continue to analyze spatial concepts, CTE and AP meetings</td>
</tr>
<tr>
<td></td>
<td>APR Council reviews analysis of spatial concepts</td>
</tr>
<tr>
<td></td>
<td>MAY-SEP or MAY-NOV PDTs, CTEs, APs develop the range of alternatives and impacts analysis; APs and CTEs recommend preferred alternatives; staff completes impact analyses</td>
</tr>
<tr>
<td></td>
<td>SEP or DEC Council final action</td>
</tr>
<tr>
<td></td>
<td>OCT-DEC or JAN-FEB Staff completes and submits action to NOAA Fisheries</td>
</tr>
<tr>
<td>2025</td>
<td>TBD NOAA Fisheries Review</td>
</tr>
<tr>
<td></td>
<td>TBD Implementation</td>
</tr>
<tr>
<td></td>
<td>TBD NOAA Fisheries Review</td>
</tr>
<tr>
<td></td>
<td>TBD Implementation</td>
</tr>
</tbody>
</table>
Timeline considerations

- Changes to spatial concepts will set timeline back
- Mitigation alternatives will set timeline back
- If alternatives are identified, possible final action by September or December 2024
  - Want to avoid specifications action where there are two scenarios that need to be analyzed (with and without fishing on Northern Edge)
  - Submission to NMFS early 2025, for review, approval, and implementation for April 1, 2026 (Scallop FY)
- Target implementation for FY 2026
Recommendations / consensus on which Concept Areas:

1. To remove from consideration?
2. To further discuss, refine, analyze?
Backup slides
## Interpreting Biomass estimates

<table>
<thead>
<tr>
<th>Year</th>
<th>CA2-SE F</th>
<th>CA2-SW F</th>
<th>CA2-EXT F</th>
<th>CA2-SE EBMS (lb)</th>
<th>CA2-SW EBMS (lb)</th>
<th>CA2-Ext EBMS (lb)</th>
<th>Total CA2 EBMS (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2024</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
<td>10,546,902</td>
<td>2,268,554</td>
<td>9,142,559</td>
<td>26,818,365</td>
</tr>
<tr>
<td>2023</td>
<td>0.36</td>
<td>0.36</td>
<td>0.36</td>
<td>11,276,631</td>
<td>3,904,382</td>
<td>15,352,974</td>
<td>30,533,987</td>
</tr>
<tr>
<td>2022</td>
<td>0</td>
<td>0.28</td>
<td>0.18</td>
<td>8,324,645</td>
<td>15,639,574</td>
<td>26,334,186</td>
<td>50,298,405</td>
</tr>
<tr>
<td>2021</td>
<td>0</td>
<td>0.15</td>
<td>0.12</td>
<td>3,917,610</td>
<td>32,253,591</td>
<td>23,582,820</td>
<td>59,754,020</td>
</tr>
<tr>
<td>2020</td>
<td>&gt; 0*</td>
<td>0</td>
<td>0</td>
<td>29,092,166</td>
<td>12,786,796</td>
<td>41,878,962</td>
<td>54,687,962</td>
</tr>
<tr>
<td>2019</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13,717,146</td>
<td>10,723,272</td>
<td>24,440,417</td>
<td>48,173,819</td>
</tr>
<tr>
<td>2018</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7,372,249</td>
<td>9,334,361</td>
<td>16,706,610</td>
<td>24,076,610</td>
</tr>
<tr>
<td>2017</td>
<td>0.49</td>
<td>0.49</td>
<td>0</td>
<td>13,919,971</td>
<td>7,522,163</td>
<td>21,442,134</td>
<td>42,882,134</td>
</tr>
</tbody>
</table>

*SAMS Area-specific F rate not recorded
SMAST Drop Camera

HAPC
Station: 17    Quadrat: 2
Temperature: 7.56°C    Depth: 63.59 Fathom
42.149125N 67.243220W    3:38:46.000 AM 6/7/2023

"High Complexity Area"
- HAPC
- Concept 1 (Full)
- 2023 Drop Cam

3/25/2024
- 2020-2022 aggregated scallop VMS hours fished
- Most fishing activity occurs in < 55 fathoms
- Some activity in deeper water
Closed Area II North Biomass Estimates

![Graph showing biomass estimates over years from 2015 to 2023. The graph displays the biomass in pounds (lb) and the years. There are multiple estimates for different methods, indicated by different line colors.]
Concept Area 1
5-year interval

Start at 0% ➔ April 2026 15% ➔ March 2027 52%
➔ March 2032 6% ➔ ... ➔ 5%
Concept Area 2
5-year interval

Start at 0% → April 2026 11% → March 2027 22%
→ March 2032 3% → ... → 2%

Fishing occurs:
April 2026-March 2027
April 2032-March 2033
April 2038-March 2039
Concept Area 3
5-year interval

Start at 0% → April 2026 13% → March 2027 39%
→ March 2032 5% → ... → 3%

Fishing occurs:
April 2026-March 2027
April 2032-March 2033
April 2038-March 2039

April 16, 2024
Concept Area 4
5-year interval

Start at 0% → April 2026 12% → March 2027 32%
→ March 2032 4% → … → 3%

Fishing occurs:
April 2026-March 2027
April 2032-March 2033
April 2038-March 2039

Disturbance
1.00
0.75
0.50
0.25
0.00

Option4_HighDensity
Option1_FullArea
Option3_South
Complex_habitat
Option2_North

April 16, 2024
5-year recovery period: % habitat disturbance

<table>
<thead>
<tr>
<th>Concept Area</th>
<th>Mean, median, minimum non-zero, and maximum disturbance values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 2026</td>
</tr>
<tr>
<td>Disturbance after initial month of fishing</td>
<td>Disturbance after 1\textsuperscript{st} year of fishing</td>
</tr>
<tr>
<td>1 – Full Area</td>
<td>15%, 7%, 6%, 41%</td>
</tr>
<tr>
<td>2 – North</td>
<td>11%, 0%, 14%, 68%</td>
</tr>
<tr>
<td>3 – South</td>
<td>13%, 8%, 8%, 51%</td>
</tr>
<tr>
<td>4 – High Density Area</td>
<td>12%, 0%, 9%, 50%</td>
</tr>
</tbody>
</table>
## 5-year recovery: Sum of Habitat Disturbance (km²)

<table>
<thead>
<tr>
<th>Concept Area</th>
<th>Sum of disturbance across all grid cells by model run, km²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area of all grid cells within each concept area (km²)</td>
</tr>
<tr>
<td>1 – Full Area</td>
<td>464</td>
</tr>
<tr>
<td>2 – North</td>
<td>161</td>
</tr>
<tr>
<td>3 – South</td>
<td>372</td>
</tr>
<tr>
<td>4 – High Density Area</td>
<td>286</td>
</tr>
</tbody>
</table>
Potential adjustments to Concept area boundaries

- Scallop AP recommended an adjustment to area boundaries on the northern boundary of the HCA to better capture high densities of scallops.
- Trade-offs in impacts: Less swept area in high densities.
  - Optical data sets could be used to investigate sediment, organisms.