FLC: Performance Metrics and Other Considerations for Halibut ABM

Please consider the following suggested performance metrics for analysis of the ABM alternatives, in particular as the ABM alternatives relate to the BSAI H&L CP sector. We are assuming that the operating model will be able to show the effects of ABM PSC alternatives on each sector individually. We have also provided some additional points for consideration that maybe relevant to the ABM action but do not necessarily fall under performance metrics.

Performance metrics: While most of these suggested metrics could be applied to all ABM proposals, specific reference is given to the ABM proposal submitted by the FLC (i.e. "look-up" table). Given the complexity and interplay of numerous metrics (even within a single Council objective), we are not recommending a specific value for each metric but identifying metrics that could be relevant in addressing ABM objectives.

Background: FLC halibut monitoring program: The BSAI CP H&L sector began a voluntary halibut monitoring program in 1992 (FIS – Janet Smoker) and is now managed by Sea State. The program monitors inseason PSC use, encounter rate, mortality rate, DMR and viability sampling, and groundfish CPUE. From 1994 to 2018, bycatch mortality in the BSAI CP H&L fleet has been reduced -88%.

This reduction in PSC use by this sector is due to the combination of factors: changes in halibut biomass, changes in p-cod distributions, changes in DMR, and changes in the prosecution of the fishery. However, it is not possible to apportion the historic reduction in PSC use between each of these factors – thus complicating the selection of metric(s) that is indicative of cause and effect.

Council Objective 1: Flexibility to avoid unnecessarily constraining the groundfish fishery particularly when halibut abundance is high.

The "look-up" table proposal for BSAI H&L is based on the concept of determining an appropriate initial PSC limit based on average halibut biomass as measured by both the NMFS EBS BTS and IPHC Area 4 setline survey (weighted equally)[1]. The "look-up" table addresses average, low, and high halibut biomass levels. The surveys are standardized to the mean as the BSAI H&L PSC use (and both surveys) have a large historic range.

- PSC use by BSAI H&L groundfish ranges from 967 mt (1994) to 120 mt (2018).
- The IPHC survey (standardized to the mean) ranges from 0.68 (2018) to 1.77 (1998).
- The EBS BTS (standardized to the mean) ranges from 0.67 (2002) to 1.29 (2010).
- The starting point is to determine an appropriate PSC limit at average halibut biomass (the intersection of 1.0 of both surveys, at the midpoint of the table).
- The average PSC use (1994-2018) = 558 mt.

[1] Equal weighting is explicitly stated in the ABM committee proposal but is not explicitly stated in the Council motion of February 2019.

- The starting point PSC limit = 594 mt. Average PSC use is 94% of the starting point. The starting point is the mid-point between the floor (355 mt) and the ceiling (833 mt).
- The ceiling of 833 mt is the 2015 PSC limit and would have been exceeded or have been constraining in six years between 1994 and 2018.[2]
- While the ceiling is potentially historically constraining at high halibut abundance, more recent changes in the BSAI H&L groundfish fishery may alleviate some of that concern in the near term. There have been improvements in handling mortality (lower DMRs) as well as changes in the prosecution of the fishery (from a competitive derby fishery to a slower paced mostly cooperative-style fishery) as well as a northerly shift of the BS cod stock (where halibut encounters are generally less in the northern BS).
- However, as bottom temperatures (and resulting feed distributions) are subject to change, the expectation is that cod will shift southward as water temperatures cool.[3]

Suggested performance metrics for this objective:

- Average and historic PSC limits. The PSC limits in the BSAI H&L groundfish fishery have been 900 mt (1992); 833 mt (1998); and 710 mt (2016).
- Annual change in PSC limit (resulting from ABM alternatives)
- Number of times the resulting PSC limit becomes constraining (e.g., when at 80% or 90% of PSC limit) and when in the fishing season the PSC limit becomes constraining.
- Number of times PSC limit is reached (and when in the fishing season).
- Potential groundfish target TAC (mt and %) uncaught by a sector due to the constraint of the PSC limit.

Council Objective 2: Provide for some stability in PSC limits on an inter-annual basis.

The 11X11 "look-up" table provides for incremental change in the annual PSC limit in response incremental changes in survey estimates of halibut biomass. However, a large change in one survey in any one year could result in a large change in the PSC limit. A limit on a 15% change in the PSC limit would limit the upward and downward movement of the PSC cap in any one year and provide stability to the sector.

Suggested performance metrics for this objective:

- Annual change in PSC limit (from ABM alternatives) in both mt and %.
- Annual change in PSC limit (mt and %) and the number of times the 15% restriction on PSC change is utilized (if any).
- Effect on subsequent years PSC limit when 15% restriction on PSC change is utilized.
- Annual change in historic PSC use (in mt and %)
- Annual change in halibut biomass estimates from EBS BTS & IPHC surveys), in mt and %.

[2] 1994, 1995, 1996, 1997, 2000, and 2001

[3] The surveys in the NBS for p-cod (2010 compared to 2017 and 2018) indicate this relationship between bottom temperature and p-cod distribution trend as does the NMFS EBS surveys for p-cod in the NW strata (1986-2018).

Council Objective 3: Halibut spawning stock biomass should be protected especially at lower levels of abundance.

Currently, the IPHC estimates halibut spawning biomass on a coastwide basis.[4] The current 2019 estimate of coastwide spawning biomass is 199 M lbs. Similarly, the IPHC control rules of B20 and B30 are also applied coastwide.[5] To the best of our knowledge, halibut spawning biomass is largely composed of O32 females. The directed halibut fishery targets mature females (O32) and therefore has the largest impact on halibut spawning biomass.

Given the coastwide nature of the spawning biomass estimate, it is difficult to "protect" coastwide spawning biomass from the Bering Sea region. The apportionment of TCEY at SPR 46% between the Bering Sea and the Gulf of Alaska is approximately 22% BSAI and 78% GOA. It is also unlikely to trigger coastwide B20 and B30 control rules from actions or environmental conditions from in the Bering Sea alone.

The 2018 PSC use by the BSAI CP H&L sector is 120 mt (or 0.129% of coastwide spawning biomass). The average (2008-2016) portion of O32 bycatch mortality in the BSAI CP H&L sector is 10%.

Suggested performance metrics for this objective:

- Historic range of annual estimates of spawning biomass.
- Interannual variability of spawning biomass estimates (in M lbs and %).
- Annual risk assessment (probability) of reaching B30 and B20 (coastwide).
- Annual and long-term average size compositions in the EBS BTS and IPHC Area 4 surveys (U26/026 and also O32) in terms of % and magnitude.
- Annual and long-term average size compositions in the PSC use by sector (U26/026 and also O32) in terms of % and magnitude. We are not suggesting an annual performance standard as was reviewed and rejected at the June 2018 NPFMC meeting.[6]
- Relationship between the change in PSC limits (in mt and %) and the change in BSAI and coastwide spawning biomass (in M lbs and %).
- Relationship between the change in PSC use (in mt and %) and the change in BSAI and coastwide spawning biomass (in M lbs and %).

[4] However, it appears that for purposes of the Operating Model, the IPHC will be making distinct spawning biomass estimates for the BSAI and GOA. It would be helpful to the public if the process (and assumptions) for this estimation process be included in the analysis.

[5] It is our understanding that even if separate spawning biomass estimates are estimated for the BSAI and GOA, the B20 and B30 control rules will be applied coastwide.

[6] The June 2018 analysis showed that there was considerable inter-annual variability in all sectors for U26/026. There is also issues in some sectors on determining U26/O26 due to deck sorting

Council Objective 4: Provide for directed halibut fishing operations [in the Bering Sea].

The IPHC sets the FCEY for the Area 4 halibut fishery. The IPHC process is outside the Council purview and the IPHC may make harvest limit decisions that include biological, policy, and political considerations. While the Council cannot specify a FCEY for Area 4, reductions in bycatch will be partially beneficial to the directed halibut fishery. In 2018, the CP H&L groundfish sector was 5.78% of total BSAI halibut bycatch mortality; 2.67% of total halibut removals in the BSAI; and 0.66% of total halibut removals in Alaska (all areas). As halibut abundance decreases, the ABM PSC limits will decrease as well.

Suggested performance metrics for this objective:

- Relationship between changes in PSC limit (by sector) and changes in FCEY (in terms of O26 and O32). Different assumptions could result in a range.[7]
- Relationship between changes in PSC use (by sector) and changes in FCEY (in terms of O26 and O32). Different assumptions could result in a range. [8]
- Range of both TCEYs and FCEYs for Area 4.[9]
- Number of times IPHC harvest limit decisions deviate from the reference SPR 46% within Area 4 (up or down) or deviate from the target harvest rate within Area 4.
- Range of halibut DMRs in groundfish fisheries.
- Range of halibut DMR for the directed halibut fleet (currently 16%, unchanged since 1995).

Council Objective 5: Halibut PSC limits should be indexed to halibut abundance.

Each survey measures halibut abundance differently in terms of gear, area sampled, and size composition. Each groundfish fishery has different halibut size compositions in their bycatch.

- The average (2008-2016) size composition of halibut for the EBS BTS survey is 80% U26 and 20% O26 (and 6% O32).
- The average (2008-2016) size composition of halibut for the IPHC Area 4 survey is 10% U26 and 90% O26 (and 55% O32).
- The BSAI H&L groundfish average (2008-2016) size composition of halibut bycatch is 57% U26 and 43% O26 (and 10% O32).

[7] It would help public understanding if the assumptions were clearly stated with the accompanying rationale.
[8] Same as above.
[9] Historical FCEYs in Area 4 were retrospectively found to have exceeded the target harvest rate. Therefore the use of average FCEYs is not appropriate unless the FCEY is post-adjusted to the level that would result in the target harvest rate not being exceeded.

Suggested performance metrics for this objective:

- Track annually and compare the U26/O26 (and O32) size composition proportions (and magnitude) in the EBS BTS and IPHC Area 4 surveys.
- Compare the two surveys estimate of biomass to the 1998-2018 mean.
- Track annually (and the trend) of the U26/O26 (and O32) size compositions proportions in the PSC use[10] and compare to long term average size composition of PSC use (and compare to surveys).

Other Considerations:

- **Transferability of PSC between sectors:** Concerns related to constraining PSC limits could be alleviated in part by allowing transfers of halibut PSC between all sectors (either expanding NMFS inseason authority or market-based transfers between sectors or both). This would likely require regulatory action as the current ability to transfer BSAI PSC is limited.
- **Changes in Bering Sea p-cod distribution (NBS and SEBS):** In warm years, p-cod spend more time further north (where halibut encounter rates are generally lower). In cold years, cod spend more time further south (where halibut encounter rates are generally higher). A change in the distribution of p-cod will significantly influence halibut encounter rates and PSC use in the CP H&L sector. Currently, the analysts do not plan to incorporate the distribution of p-cod in the model. However, the changes in distribution of p-cod in the Bering Sea has a significant effect on encounter rates in the CP H&L sector and should be included in the analysis.
- **Changes in halibut distribution:** Any information on the distribution of halibut (both pre-and post-season) from surveys or otherwise will help in bycatch avoidance efforts. For example, halibut biomass may have remained unchanged or static, but the distribution of the same halibut biomass within the Bering Sea could change due to environmental factors and impact sectors differently (depending where they fish).
- **Changes in methodologies:** All of the ABM alternatives rely on survey estimates (NMFS and IPHC) of halibut biomass. Changes to survey or biomass estimation methodologies could result in significant changes to halibut biomass estimates and subsequently result in a change in a PSC limit. There may be a need to establish a protocol between the Council and IPHC on proposed changes in survey methods and expansions. Similarly, changes in methods of estimating coastwide spawning biomass will also have a direct effect on the Council objective regarding spawning biomass. Any methodologies on estimating U26 contribution to biomass or TCEY should be reviewed by the SSC.

[10] We are not suggesting a U26/O26 annual performance standard. There was considerable inter-annual variability in all sectors. But it might be informative to track/compare the size compositions in both the surveys and PSC use and to determine if any trend is developing – or not.