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## Alternative projections for 2019 (last year) adjusted for the effects of U26 Pacific halibut discard mortality in non-directed fisheries ('bycatch')

PREPARED BY: IPHC SECRETARIAT (I. STEWART, 24 OCTOBER 2019)

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### PURPOSE

To provide the Commissioners with alternative projections for 2019 (last year) for comparison with adopted mortality limits from AM095.

### INTRODUCTION

Discussions during the 2019 IPHC Work Meeting (WM2019) related to the treatment of discard mortality in non-directed fisheries ('bycatch') of fish less than 26 inches in length (U26) resulted in an informal request that the IPHC Secretariat provide alternative projections for 2019 (last year) in order to evaluate the effects of U26 discard mortality in non-directed fisheries on the coastwide and IPHC Regulatory Area-specific TCEYs.

These calculations are based on the results presented in [IPHC-2019-AM095-INF07<sup>1</sup>](#), which found that there were 3.24 million pounds of additional TCEY associated with a 2019 projection that did not include any U26 discard mortality in non-directed fisheries. The potential yield gain ([IPHC-2019-IM095-11](#)) due to reductions in discard mortality from non-directed fisheries will vary year-to-year, so these projections will need to be recalculated for 2020 if this approach is to be evaluated again, and the results may differ based on changes in the fisheries as well as the demographics and biology of the stock.

### METHODS

Projected alternative 2019 TCEYS are calculated based on the following starting conditions ([TABLE 1](#)):

- The adopted 2019 limit establishing a fixed TCEY of 1.65 Mlb for IPHC Regulatory Area 2A.
- The adopted 2019 limit for IPHC Regulatory Area 2B, which represented a weighted average of the historical allocation (20%) to IPHC Regulatory Area 2B (weighted 70%) and the allocation (12.3%) based on the interim management procedure (weighted 30%). The interim management procedure TCEY distribution is itself based on the product of the estimated O32 stock distribution and the relative harvest rates of 1.0 for IPHC Regulatory Areas 2A-3A and 0.75 for 3B-4CDE. The result of this calculation for 2B was 17.7% for 2019.
- The adopted 2019 TCEYs for IPHC Regulatory Areas 2C-4CDE.

From these starting conditions, three steps were taken to derive the final TCEYs:

- 1) The TCEY for each IPHC Regulatory Area is first proportionally increased to include the potential yield available if no U26 discard mortality in non-directed fisheries was projected.
- 2) The increased TCEY for IPHC Regulatory Area 2B is fixed, and the TCEY for IPHC Regulatory Area 2A is fixed at the original value (1.65).

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<sup>1</sup> There was a small amount (0.02 million pounds) of U26 discard mortality in non-directed fisheries prosecuted in IPHC Regulatory Area 2B in 2018. This would be excluded from future calculations, but is not here to retain consistency with the results reported in IPHC-2019-AM095-INF07.

- 3) Finally, all TCEYs for Alaska (IPHC Regulatory Areas 2C-4CDE) are reduced in proportion to the original allocation such that the original total coastwide TCEY is achieved.

## RESULTS

This alternative approach to accounting for U26 discard mortality in non-directed fisheries results in an additional 0.57 million pounds allocated to IPHC Regulatory Area 2B under the distribution of the 2019 adopted catch limits ([TABLE 1](#)). The reductions to IPHC Regulatory Areas 2C-4CDE range from 0.03 million pounds in 4B to 0.26 million pounds for 3A under the distribution of the 2019 adopted catch limits ([TABLE 1](#)).

**TABLE 1.** Summary of TCEY calculations (millions of pounds) corresponding to the 2019 adopted limits and adjusted to account for the effects of U26 discard mortality in non-directed fisheries.

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
2019 Adopted TCEYs	1.65	6.83	6.34	13.50	2.90	1.94	1.45	4.00	38.61
2019 adopted TCEY distribution	4.3%	17.7%	16.4%	35.0%	7.5%	5.0%	3.8%	10.4%	100%
2019 adopted TCEYs adjusted as if there were no U26 non-directed discard mortality	1.79	7.40	6.87	14.63	3.14	2.10	1.57	4.34	41.85
Difference	0.14	0.57	0.53	1.13	0.24	0.16	0.12	0.34	3.24
2019 adopted TCEYs with 2B and Alaska adjusted to account for U26 non-directed discard mortality	1.65	7.40	6.22	13.24	2.84	1.90	1.42	3.92	38.61

## DISCUSSION

This analysis provides an example, using the 2019 projections (last year), of one possible approach for accounting for the effects of U26 discard mortality in non-directed fisheries on directed fishery limits across all IPHC Regulatory Areas. The approach is consistent with the options outlined in [IPHC-2019-IM095-10](#) for determining the coastwide scale of U26 discard mortality in non-directed fisheries based on either the *status quo* approach (setting TCEYs), or setting a combined total mortality limit based on the previous year's estimates. It is also consistent with determining the distribution of U26 within a total mortality limit based on the previous year's estimates of U26 distribution.

This approach consists of proportionally adjusting (decreasing) the projected TCEYs in Alaskan waters to account for the effects of U26 discard mortality in non-directed fisheries while simultaneously adjusting (increasing) the TCEY in IPHC Regulatory Area 2B. The calculation accounts for the effects of U26 discard mortality in non-directed fisheries on the coastwide SPR, and distributes those effects based on where they occur.

## RECOMMENDATION/S

That the Commission:

- a) **NOTE** paper IPHC-2019-IM095-12 which provides an alternative approach for accounting for U26 discard mortality in non-directed fisheries, as requested by the Commission.

- b) **REQUEST** this or another method to be applied as a basis for the mortality projection tool for use in the decision making processes at AM096.

#### **REFERENCES**

IPHC Secretariat. 2019. Treatment and effects of Pacific halibut discard mortality (bycatch) in non-directed fisheries projected for 2019. IPHC-2019-AM095-INF07. 10 p.