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## Revised IPHC Regulatory Area 2A fishery-independent setline survey plan for 2017: Additional questions, responses and final decision

PREPARED BY: IPHC SECRETARIAT (06 MARCH 2017)

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### PURPOSE

To document the additional information provided to the Commission regarding the proposal for a revised IPHC Regulatory Area 2A 2017 fishery-independent setline survey plan ([IPHC-2017-AM093-06 ADD 1](#)), as well as the final decision made by the Commission.

### BACKGROUND

Subsequent to paper [IPHC-2017-AM093-06 ADD 1](#), on 24 February 2017 the Commission requested additional information on a number of aspects of the proposal as detailed below:

1. How can we be sure that this change in survey design will not bias the survey results in Area 2A? We are concerned that surveying in known “hotspots” can positively bias indices of abundance. Conversely, if the expansion is unlikely to have an effect on overall WPUE for 2A, as the Secretariat’s response above [[IPHC-2017-AM093-06 ADD 1](#)] predicts, what is the value of adding the survey stations, particularly given the additional costs incurred?
2. What impact will this increased doubling of setline survey stations in a portion of Area 2A have on other Regulatory areas?
3. What would determine whether this proposed 2A expansion was successful or not? Additionally, if this trial were to prove successful, how often would the increased number of stations be part of the sampling protocol? Would this be a permanent addition of these stations or would these additional stations be undertaken periodically? If periodically what would be the frequency?
4. How would the IPHC Secretariat handle future requests from other Regulatory areas? Again, we are concerned with setting a precedent for surveying in areas of known higher abundance.
5. What is the impact to this change in plan to remove the 17 most southern setline survey stations for 2017?

*Additional comments:* There is some concern that adopting this expansion in Area 2A may undermine an unbiased estimate of abundance in all regulatory areas and/or undermine the perception of unbiased estimates. We know that this not the intent of this request but we are concerned that may be an outcome. We also note that the cost of this experiment is not that small at \$632,647. This is not an insignificant cost on top of an already very significant cost of the setline survey estimated to be \$5.5 million.

### DISCUSSION

The IPHC Secretariat provided responses on 28 February 2017 to assist the Commission in reaching a decision on whether or not to endorse the ad-hoc expansion (densification) of the Regulatory Area 2A fishery-independent setline survey for 2017, as detailed in paper [IPHC-2017-AM093-06 ADD 1](#):



1. How can we be sure that this change in survey design will not bias the survey results in Area 2A? We are concerned that surveying in known “hotspots” can positively bias indices of abundance. Conversely, if the expansion is unlikely to have an effect on overall WPUE for 2A, as the Secretariat’s response above [[IPHC-2017-AM093-06 ADD\\_1](#)] predicts, what is the value of adding the survey stations, particularly given the additional costs incurred?

**IPHC Secretariat response:** The current survey grid provides unbiased samples because survey stations are evenly distributed and are located independently of any underlying habitat characteristics or any knowledge of Pacific halibut density. On average, all types of habitat and all levels of density will be equally represented by such a grid. This also holds for the proposed ad-hoc expansion (densification) grid off the north Washington Coast; new station locations have been selected based only on distances from existing stations in order to double the station density, without reference to information on habitat or Pacific halibut density. Such a design will not result in biased estimates, and is why it was selected for the denser grid, as it allows us to easily incorporate the data into our density index estimation and stock assessment modelling.

As noted by the IPHC Secretariat leading up to the Annual Meeting, we anticipate that this denser grid is unlikely to have a large effect on the biomass estimate for Regulatory Area 2A. Historically, Regulatory Area 2A has had a higher variance in its annual estimates, although this was ameliorated to some degree by previous expansions, changes in the patchiness of the biomass, and the adoption of the space-time model. The IPHC Secretariat does expect some reduction in the variance due to the addition of these stations.

2. What impact will this increased doubling of setline survey stations in a portion of Area 2A have on other Regulatory areas?

**IPHC Secretariat response:** The primary goal of the IPHC’s fishery-independent setline survey is to estimate the trend and biological characteristics of the coastwide Pacific halibut stock. To this end, better data in any Regulatory Area means an improvement in the science on which all areas are based. When estimating setline survey density indices or undertaking the annual stock assessment model, we always aim to use the best available data. Thus, when setline survey expansions are undertaken, the new data are incorporated into our estimation and modelling. While we recognise that an expansion in one area may have an effect on biomass distribution proportions in other areas, this does not and should not affect whether we use the data or not. Having said that, Regulatory Area 2A is an area with low density and a small estimated share of the coastwide biomass, and recent expansions to the setline survey and the bottom area in Regulatory Area 2A have had minimal impact on estimates of biomass distribution in other Regulatory Areas. For example, the 2013 expansion into northern California reduced biomass distribution estimates by no more than 0.1% in each of the other Regulatory Areas, while an expansion of bottom area in 2015 in southern Regulatory Area 2A led to decreases in biomass shares of at most 0.03% in other regulatory areas. We anticipate minor impacts on other areas due to the expansions proposed in Regulatory Area 2A for 2017.

3. What would determine whether this proposed 2A expansion was successful or not? Additionally, if this trial were to prove successful, how often would the increased number of stations be part of the sampling protocol? Would this be a permanent addition of these stations or would these additional stations be undertaken periodically? If periodically what would be the frequency?



- IPHC Secretariat response:** This proposal will be successful if it improves the precision of the overall estimate of Regulatory Area 2A's density indices and biomass share. Whether or not such an expansion is repeated in the future and with what frequency depends on the degree of improvement in precision, and how long such an improvement might persist in the absence of a repeat of the expansion. Such an evaluation can only be undertaken once the data are collected. This is an important aspect of all of the proposed setline survey expansions: that a cost-benefit analysis of those regions can only be conducted once those regions have been sampled at least once in order to directly estimate the accuracy and precision of predictions based only on surrounding areas in time and/or space.
4. How would the IPHC Secretariat handle future requests from other Regulatory areas? Again, we are concerned with setting a precedent for surveying in areas of known higher abundance.
- IPHC Secretariat response:** Future requests for additional survey effort would be addressed on a case-by-case basis by the Commission during its annual deliberations concerning the setline survey operations. In all such discussions, the extensions and/or densification should be consistent with the current sampling grid (as is proposed for Regulatory Area 2A) such that bias is not introduced into the estimates.
5. What is the impact to this change in plan to remove the 17 most southern setline survey stations for 2017?

**IPHC Secretariat response:** The impact of removing the 17 stations south of 37°45'N is most likely to be very small. At present, we assume there are no Pacific halibut in the region covered by these 17 stations, and reports of Pacific halibut captured or observed that far south are uncommon. The IPHC Secretariat proposed fishing this region in order to complete the setline survey coverage of possible Pacific halibut habitat in Regulatory Area 2A, and thereby avoid potential future expansions to the south. It is likely that that catches may be very low in the expansion area proposed just north of 37°45'N, and that even without surveying the 17 additional stations this year, this region will not need to be sampled in the future.

*Additional comments:* There is some concern that adopting this expansion in Area 2A may undermine an unbiased estimate of abundance in all regulatory areas and/or undermine the perception of unbiased estimates. We know that this not the intent of this request but we are concerned that may be an outcome.

**IPHC Secretariat response:** See the answer to 1 above. The proposed design does not introduce bias into estimates from Regulatory Area 2A setline survey data, and therefore does not add bias to coastwide estimates or estimates from other Regulatory Areas.

*Additional comments:* We also note that the cost of this experiment is not that small at \$632,647. This is not an insignificant cost on top of an already very significant cost of the setline survey estimated to be \$5.5 million.

**IPHC Secretariat response:** The approved budget for FY2017 (including the 17 southernmost California stations) has total Regulatory Area 2A budgeted expenses of \$637,374. With the proposed modification, which involves the ad-hoc expansion (densification) of the northern Washington grid, the removal of the 17 southernmost stations, and the reduction in skates fished per station from 7 to 6, the anticipated expenses drop to \$632,647. However, setline survey revenue is also anticipated to drop from \$224,615 to \$210,447, thus the projected result is an aggregate net additional cost of **\$9,348** for these changes to the Regulatory Area 2A survey design.



**IPHC Secretariat summary response:** The IPHC Secretariat responded to the request for additional survey effort around ‘hotspots’ in Washington by proposing a survey design that would increase the precision of the *existing* survey, would likely encounter more Pacific halibut to aid in reaching biological sampling goals, but would NOT create bias relative to the current design. The unbiased treatment of this region of denser stations, as well as all of the historical and proposed expansion efforts is greatly facilitated through the use of the space-time model introduced in 2016. Future changes to the standard survey design (e.g. repeated sampling of expansion areas, reductions or increases in sampling density within standard regions, etc.), can be directly evaluated with regard to accuracy and precision after the completion of all the proposed expansion efforts in 2019.

## **DECISION**

In reaching a decision, the Commission **CONSIDERED** the revised IPHC fishery-independent setline survey for Regulatory Area 2A in 2017, as described in this paper IPHC-2017-AM093-06 ADD\_1, as well as the additional information provided by the IPHC Secretariat, as detailed in this current paper (IPHC-2017-AM093-06 ADD\_2), and in particular the following two points:

*“Whether or not such an expansion is repeated in the future and with what frequency depends on the degree of improvement in precision, and how long such an improvement might persist in the absence of a repeat of the expansion”* and

*“Future requests for additional survey effort would be addressed on a case-by-case basis by the Commission during its annual deliberations concerning the setline survey operations. In all such discussions, the extensions and/or densification should be consistent with the current sampling grid (as is proposed for Regulatory Area 2A) such that bias is not introduced into the estimates.”*

**NOTING** the above, the Commission **ENDORSED** the revised IPHC fishery-independent setline survey for Regulatory Area 2A in 2017, as described in this paper ([IPHC-2017-AM093-06 ADD\\_1](#)).