M E M O R A N D U M

Date: September 26, 2019

To: Council

From: Jason Didden, staff

Subject: *Illex* In-Year Quota Adjustment Working Group Terms of Reference Review

The *Illex* In-Year Quota Adjustment Working Group is close to finalizing its *terms of reference*, which describe the relevant tasks that seem feasible and productive in the short and long terms.

Staff will provide an overview of the current draft terms of reference and summarize recent input from the MSB Advisory Panel and the Scientific and Statistical Committee (SSC). The working group will use the recommendations from these groups and the Council's input to finalize the terms of reference and begin several of the potential short-term projects.

The draft terms of reference and MSB Advisory Panel (AP) input are provided below (the MSB AP was asked for input and a joint comment for four AP members was submitted). The SSC's input is contained in the Committee Reports tab of this (October 2019) briefing book.

Draft Terms of Reference for *Illex* Quota Working Group
August 28, 2019

The *Illex* Working Group will address two closely related problems. The first is to develop an approach for in-year quota adjustments. The second is to lay the basis for a benchmark stock assessment (Research Track) in 2021. To some extent the data needs and analyses overlap. Each task will require involvement of scientists, industry, and managers. Both tasks are focused on the challenge of identifying appropriate catch limits for a dynamic, short-lived species whose survival, growth and abundance on the US shelf are driven by a complex interplay of environmental conditions. The relationship between removals and stock abundance is poorly understood; as a result no stock assessment model has been developed for this stock. The potential data needs and approaches for *Illex* are numerous, so the working group has first identified several topics/tasks that can potentially be addressed in a 4-8 month timeframe and might produce information useful for in-year quota adjustments. More complex and longer-term data collection and research projects are described second.

Short-Term Topics/Tasks

In the short term, the only currently-identified practicable process would be for the SSC to identify certain measurable conditions that would be hard-wired into the specifications to automatically adjust the ABC. For example, the existing quota might be adjusted upwards or downwards depending on the real-time trend in CPUE after X% of the quota had been taken. Alternatively, a swept-area biomass estimate from a stratified survey conducted after catching Y% of the quota might also serve as a basis for adjusting the quota within previously defined bounds. Environmental conditions could also be used as a basis for adjustment if such information can help estimate stock availability. A sequence requiring an SSC evaluation of performance in-season, followed by a Council meeting and NMFS rulemaking does not appear practicable given the required timelines. Hardwiring in-year quota adjustments is feasible within current specifications processes <u>if</u> a justification can be made and <u>if</u> the necessary data will be available.

1. Review assessment and management approaches for ommastrephid squid populations (like *Illex illecebrosus*) used worldwide and summarize previous attempts for real-time management (RTM) in Northeast US.

2. List key existing available data sources for *Illex*
      -Sources: Dealer, VTR, observer, surveys, Study Fleet, fishery participants,
          environmental data
      -Elements: data fields that are recorded and available for analysis
      -Metadata: design elements like duration, area covered, etc.

        -Timeliness of data reporting and availability
        -Cost and burden

3. Describe what we know (highlight our relative confidence) and don't know, about typical patterns of *Illex* growth and distribution on the NE shelf. Describe the fine-scale changes in average size-at-capture over the fishing season and in NEFSC spring and fall bottom trawl surveys, and relevant differences among years.

4. Use samples collected by industry in 2019 to expand knowledge of *Illex* aging and growth. Council staff requested sample collection by several fishery participants and is exploring options for processing and aging.

5. Identify a meaningful measure of effort for each component (freezer, RSW, fresh/ice) of the *Illex* fleet, or identify a path toward doing so. Evaluate utility of CPUE by fleet for estimation of *Illex* productivity.

6. Evaluate CPUE and environmental parameters as potential real-time predictors of defined relative abundance conditions (e.g., poor, average, good). Examples include, but are not limited to Markov and hierarchical models. Can system state {poor, average, good} be identified with partial year empirical data? What fraction of year is required to determine system state?

7. Consider (and if appropriate design) pilot pre- and/or mid- and/or post-season industry-platform based surveys (any or all) to inform in-year quota adjustments.

Long-Term Topics/Tasks

1. Explore use of acoustics for *Illex* assessment.

2. Explore alternative processes for in-year quota adjustments.

    a. Define the ideal management timeline. With respect to this timeline, address the following questions regarding needed data (any type):
        i. What will be collected?
        ii. Who will collect?
        iii. Who will process?
        iv. Who will monitor (at-sea observers and quota or effort monitoring)?
        v. What are the costs?
        vi. When are the data needed?
        vii. What can we do under the applicable law
    b. Address impacts of
        i. Imprecise data (i.e. responding to noise versus actual situation)

ii. Lagged data (i.e., time between data collection and availability for scientific use)
iii. Non-biological factors, especially market effects
iv. Delayed Decisions (e.g., close too early or too late)
v. Assumption about self-regulated effort during low abundance years

3. Describe the in-season dynamics of fishing effort and catch with a particular focus on:

a. Market prices
b. Species abundance/availability on the U.S. shelf
c. Influence of pending quota decisions and other regulations
d. Using the above factors and others, distinguish between poor, average and good abundance years.
e. From an economic perspective, determine magnitude of acceptable change (e.g., +/- 10%, +/-20%). associated with potential in-season catch adjustments.

4. Address influence of harvesting on stock dynamics.

5. Systematically determine age composition of catches prior to, during and after the fishery using a structured sampling design to identify the cohorts (and seasonal and spatial differences in age composition). Also determine age composition of NEFSC spring and fall survey catches.

6. Explore other real-time management approaches, e.g. tow-based real-time e-VTR data and biological data (similar to NEFSC 1999-2001 *Illex* RTM project).

7. Determine persistence of linkages (CPUE, environmental) to abundance across years. Consider the same for effort (e.g. market conditions).

8. Develop a prototype model of *Illex* immigration/emigration dynamics on the US shelf during the fishing season that includes seasonal changes in relative abundance as influenced by oceanographic conditions. Much of this work will be speculative, but it will help to piece together different perspectives of stock dynamics. A key concern will be evaluation of feasibility of migration of large squid to spawning areas.

a. Determine if meaningful biological reference points (e.g., target of 40% spawner escapement) can be developed, especially with respect to critical biomass levels.

b. Estimate *Illex* fecundity and reproductive state by size and age (age data are critical).

September 6, 2019

Dear Jason:

We would like to jointly submit the following initial comments on the Draft TORs for the *Illex* Quota Working Group:

Introduction:

The draft TORs state that *"Each task will require involvement of scientists, industry, and managers".* However, with the exception of MSB Committee Chair, Mr. Hughes, the Working Group members are all fisheries policy makers or fisheries scientists. While they bring an expertise crucially important to this issue we feel strongly that we also have equal expertise to offer.

We appreciate this opportunity and believe it is the first step for meaningful development of an effective approach to science and management of this stock or to fulfill the Working Group tasks as stated. This is particularly important when considering that only the industry has true access to the stock and the ability to provide important, applicable data.

Short-Term Topics/Tasks:

Here, the draft TORs state that the *"currently-identified practicable process would be for the SSC to identify certain measurable conditions that would be hard-wired into the specifications to automatically adjust the ABC. For example, the existing quota might be adjusted upwards or downwards depending on the real-time trend in CPUE after X% of the quota had been take (Option1). Alternatively, a swept-area biomass estimate from a stratified survey conducted after catching Y% of the quota might also serve as a basis for adjusting the quota within previously defined bounds (Option 2)".*

Option 1: An index based on real-time trend in CPUE, requires an in-depth understanding of the socio-ecological drivers of the fishery including: a) the economics of the fishery relative to area-specific shoreside and at sea processing capacity and investment; and differences in CPUE of the vessels in the fishery, and; b) the potential impacts of Gulf Stream ring dynamics and other physical and biological drivers of stock availability and fishing effort.

Option 2: A swept- area biomass estimate derived from an in-season survey, requires defining what party(ies) will conduct the survey, and if the survey would be an industry-based survey using standard gears/protocols, or if it would be a Science Center-driven survey.

Both options require deep understanding of the investments made by the fishing industry, at least in terms of the opportunity costs of underutilizing the resource available annually. Both options will be difficult but may be achievable, and could be complimentary, but only if there is significant engagement with the fishery as an equal partner in the co-development of the science and policy, and the distribution of costs, from the beginning.

While we have some trepidation about a survey leading to fluctuations in quotas, we believe that recent and historic performance of the fishery indicates that catches up to 26,000 mt have not been detrimental to the resource and expect that quotas should not fall below that amount in the future.

The introduction to this section states that *"Environmental conditions could also be used as a basis for adjustment if such information can help estimate stock availability."* Extensive research including field research and evaluation over the long term would be required to develop a tool with enough accuracy and precision that it could serve as a part of the foundation for timely management decisions. To effectively conduct this research, full industry partners are necessary.

Topic #3: Suggests "Describ(ing) the fine-scale changes in average size-at-capture over the fishing season and in NEFSC spring and fall bottom trawl surveys, and relevant differences among years." We do not know to what degree size/abundance at capture in the NEFSC survey have to do with population process or inter-annual variations in factors driving availability of different age classes during the fixed periods of the NEFSC surveys.

Understanding this will require significant research involving members of the fishing industry who have access to the shelf break and the fish during times when the NEFSC surveys are not being conducted. Similar research/engagement will also be necessary to understand the relevance of data coming from the industry, including the potential for sampling catch with fish in spawning condition. It is not clear that the current Working Group has enough direct engagement with the industry to accomplish these tasks but we are committed to fostering that relationship and achieving mutually important scientific goals.

Thank you for the opportunity to comment.

Sincerely,

Meghan Lapp, Seafreeze Ltd.

Jeff Kaelin, Lund's Fisheries, Inc.

Greg DiDomenico, GSSA

Katie Almeida, Town Dock, Inc.