



Mid-Atlantic Fishery Management Council
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MEMORANDUM

Date: May 24, 2019
To: Council
From: Jason Didden, Staff
Subject: *Illex* Working Group Update

The *Illex* Working Group held its first meeting on May 2, 2019 jointly with members of the Atlantic Mackerel, Squid, and Butterfish (MSB) Committee and MSB Advisory Panel (AP). A summary of that meeting is below.

The workgroup currently consists of the following members: Jason Didden (MAFMC Staff, co-chair), Paul Rago (MAFMC Scientific and Statistical Committee (SSC), co-chair¹–population dynamics), Wendy Gabriel (MAFMC SSC, NMFS NEFSC–population dynamics), Sarah Gaichas (MAFMC SSC, NMFS NEFSC–ecosystems), Lisa Hendrickson (NMFS NEFSC–population dynamics), Kim Hyde (NMFS NEFSC–oceanography), Ben Galuardi (NMFS GARFO–Statistics), Doug Christel (NMFS GARFO–Policy), Peter Hughes (MAFMC, MSB Committee Chair), and Anna Mercer (NMFS NEFSC–Cooperative Research). Because *Illex* has replaced longfin squid as a 2021 research track assessment, this group (or part of it) will also serve as the research steering committee for that assessment. Input from and collaboration with the MSB AP will be incorporated as work proceeds and is considered an integral part of this effort.

Besides simply getting the workgroup started after scheduling delays related to the 2018/2019 federal shutdown, the purpose of the May 2 workgroup meeting was to: 1) develop a common baseline of knowledge about recent fishery performance, 2) review past *Illex* assessment efforts, and 3) have an initial discussion about workgroup goals and Terms of Reference (i.e. what can the workgroup achieve). Participants in the meeting included:

Illex workgroup: Jason Didden, Paul Rago, Wendy Gabriel, Lisa Hendrickson, Kim Hyde, Ben Galuardi, and Peter Hughes.

MSB Committee: Stew Michels (DE), Peter Christopher (NMFS), Roger Mann (VA), Eric Reid (RI), John Maniscalco (NY), and Laurie Nolan (NY).

¹ Paul Rago has agreed in principal to serve as co-chair and provide analytical assistance.

MSB AP: Eleanor Bochenek, Katie Almeida, Greg DiDomenico, Gerry O' Neill, Meghan Lapp, and Jeff Kaelin.

Other: Steve Ellis, Teresa Johnson, Chris Legault, Jim Gartland, and Aly Pitts.

Jason Didden and Lisa Hendrickson first provided an overview of recent fishery performance and past *Illex* assessment efforts. Key themes that emerged from this portion of the meeting included:

Substantial efforts toward real-time management were undertaken from 1995-2006 but the difficulty in fully understanding *Illex* productivity/growth and challenges in gathering sufficient ongoing real time data ultimately meant real time management was not achieved. Also, given the relatively low landings from 2005-2016, real time *Illex* management was not a high management priority relative to other issues.

Good expectation-setting and communication is going to be critical, and related issues have either fostered or hampered cooperative research efforts in the past. There is a strong desire by industry to assist with providing data and on-the-water perspective, but they need to know that their efforts (which have real costs to them) will result in actual advances in understanding *Illex* productivity.

There was some confusion about what kinds of data (length, weight, condition, etc.) are collected from the various sources (observer, portside, survey, industry, etc.). Staff will create a table that describes which kinds of data are available from different sources, but preliminary findings were that only industry data collections include weight, otherwise only length data is typically collected.

An overview of the relationship of U.S. *Illex* and NAFO *Illex* would be useful. This has been produced and is attached below. It would also be useful to create a library of research on real-time squid/*Illex* assessment/management.

The workgroup discussed various issues with squid aging, which highlighted that aging *Illex* is a very labor intensive process (and currently has to be outsourced internationally). Aging and maturity information can help determine what cohorts are moving through the fishing grounds. Aging and maturity data are not currently routinely collected.

Assessing squid in a real-time fashion will be difficult. Failure to achieve a new peer-reviewed and accepted assessment should not create a feedback loop of diminished quotas (i.e. the current quota seems relatively conservative given recent fishery performance). There is a tension regarding the possibility of real-time assessment suggesting higher quotas in some years and lower quotas in other years, and whether the fishery can simply self-manage itself during low productivity years because of low catch rates and the costs incurred in searching for *Illex* offshore.

Discussion regarding the goals and outcomes of the workgroup is summarized below:

There are gaps in both understanding why productivity happened retrospectively, and in predicting what the ocean system will produce in the future. If productivity is tied to something measurable and persistent across years then understanding past productivity may lead to an ability to predict upcoming productivity.

The variable availability/abundance of *Illex* suggests the need for near-instantaneous reactions and probably simple decision rules. Research in other species of similar squid has also documented highly variable growth among cohorts and potentially latitudinally. This may ultimately limit our ability to predict future productivity. Landings and indices have been highly variable for much of the time series, which is not surprising given their life history, including substantial migration. Industry participants have not seen the same declining trend in mean body weight that has been observed in the NMFS fall survey, and voluntarily-submitted industry data are currently being digitized for further evaluation of this issue.

To be usable, any prediction/analysis component will have to occur at a much faster pace than is typical in fisheries, which raises practicability questions. The difficulty of processing some kinds of data (age) will also limit what data can be used for real-time management, and on what scale adjustments can be made (there may be a better possibility for quota adjustments based on simply low, medium, high productivity). The limited area in which the fishery targets *Illex* compared to its range also complicates interpreting the information provided from the fishery (CPUE, biological information, etc.) since it is fishing on only a portion, and possibly a small portion, of the stock. Evaluating causes for the robust 2017-2018 fisheries via oceanographic or other data and testing predictive tools may be a good initial step and is being evaluated by L. Hendrickson and K. Hyde. Correlations between squid weight and boom/bust cycles could also be examined.

From a management procedure perspective, we will have to evaluate the pros and cons of using NMFS authority for ad-hoc in-season adjustments versus hardwiring control/decision rules for quota adjustments into the fishery management plan. There was some discussion of whether a management strategy evaluation could be useful to guide development of real-time control rules.

Moving to accurate and useful real time management is a difficult task given the nature of *Illex*, but is worth pursuing because our tools have advanced (e.g. remote sensing and electronic reporting), and there is the potential for increasing production if productivity can be understood.

Next steps:

Paul Rago and Jason Didden will work on creating refined terms of reference that reflect the ideas and concerns raised on the call and then distribute to the workgroup/AP/Committee for further development.

Management of the *Illex illecebrosus* resource in the Northwest Atlantic Ocean

The *Illex illecebrosus* resource is considered to be a unit stock throughout its range in the Northwest Atlantic Ocean (Dawe and Hendrickson 1998). The only documented spawning area for the stock, despite numerous international surveys conducted throughout the species' range, is on the US fishing grounds in the Mid-Atlantic Bight (Hendrickson 2004). Like most ommastrephid squid stocks, the *I. illecebrosus* stock straddles the Exclusive Economic Zone (EEZ) of the United States and Canada as well as international waters beyond both EEZs; an area known as the NAFO Regulatory Area (NRA, Figure 1). Thus, the stock is managed separately by each of these three bodies. The portion of the stock inhabiting the EEZs of the US (NAFO Subareas 5+6, the southern stock component) and Canada (NAFO Subareas 3+4, the northern stock component) are managed by the Mid-Atlantic Fishery Management Council (MAFMC) and the CA Department of Fisheries and Oceans, respectively. The NRA is managed by the Northwest Atlantic Fisheries Organization (NAFO). Although the quota for the northern stock component is 34,000 mt, NAFO has allocated this quota amongst the 12 Contracting Parties. The US is a NAFO Contracting Party, and as such, any US fishing vessel may apply annually through the Greater Atlantic Regional Fisheries Office (GARFO) to fish in the NRA for the US quota allocation of *I. illecebrosus* (453 mt). No United States fishing vessels have done so to-date.

Management measures differ between the two stock components and are more stringent for the NAFO-managed *I. illecebrosus* fishery. Although both NAFO and the U.S. have implemented fixed Total Allowable Catches (TAC) which are established annually, by the NAFO Commission and the MAFMC, respectively, different methods are used to compute the each TAC. In addition, the US fishery has no minimum codend mesh size or fishery start date restrictions, unlike the NAFO fishery, which is subject to a minimum codend mesh size of 60 mm and July 1 fishery start date. Captains of NAFO fishing vessels are required to take a NAFO fishery observer on every trip and a Vessel Monitoring System (VMS), compliance reporting and tow-based electronic logbook reporting are also required.

If the NAFO and U.S. quotas were to be combined into a single, stock-wide quota, catches from both stock components would obviously need to be monitored and applied to the combined TAC. This could result in a stock-wide quota through which a U.S. allocation would be determined through negotiations at NAFO, provided the MAFMC established an approved process for adopting the results of such negotiations. Such a process, however, would have to allow the MAFMC and NMFS full discretion as to whether to be bound by a NAFO-prescribed allocation. The consequences of a stock-wide NAFO quota are unknown, but could range from the U.S. having either more or less quota than currently available. The development of a single fishery management plan for the *I. illecebrosus* stock would not be a simple undertaking for technical reasons (e.g., data limitations) as well as management reasons (e.g., 12 NAFO Contracting Parties would be involved in the quota-setting and allocation process). It should also be noted that relative abundance and biomass indices from bottom trawl surveys conducted in NAFO

Subareas 3+4 and Subareas 5+6 indicate that years of high (or vice versa) abundance of *I. illecebrosus* on the U.S. fishing grounds do not imply that similarly high (or low) levels of abundance exist concurrently on the Canadian and/or NAFO fishing grounds.

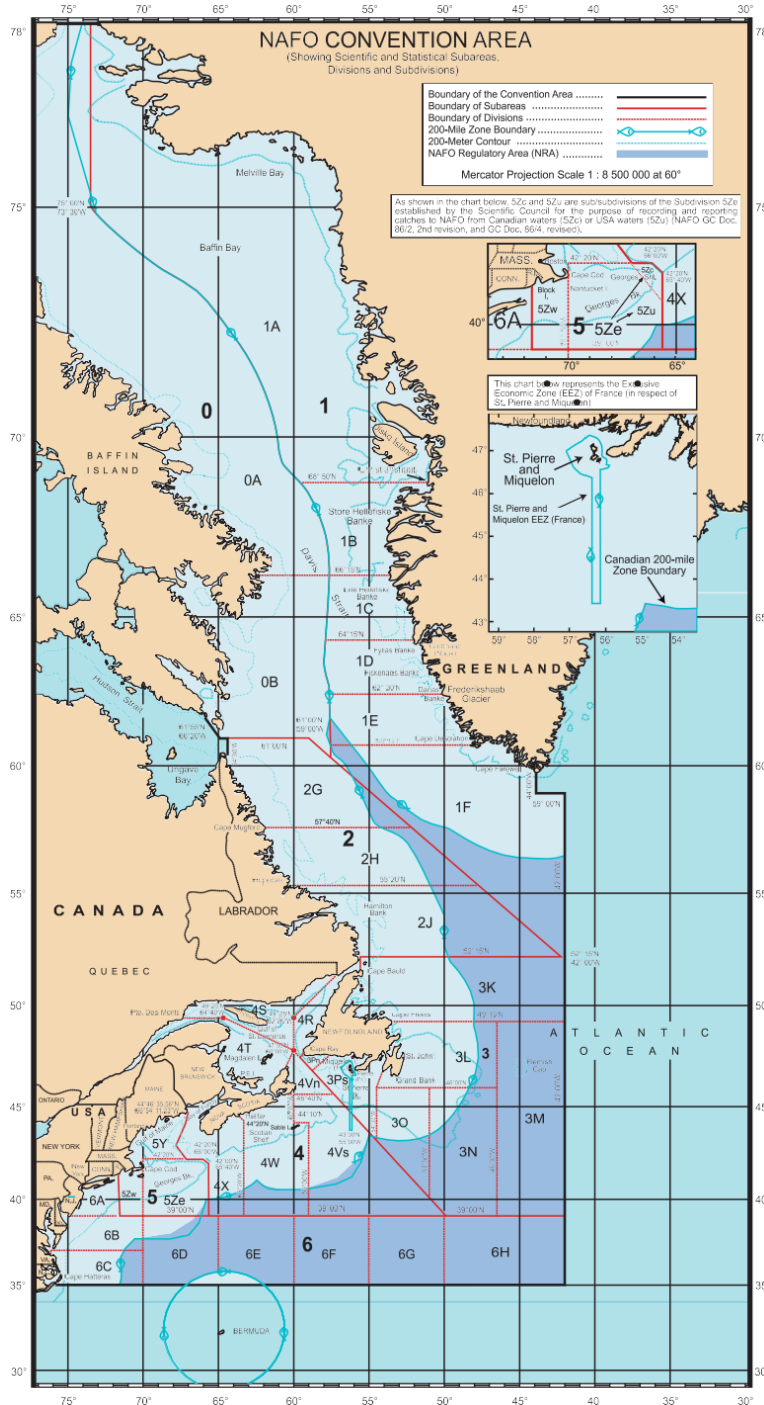


Figure 1. Catch reporting areas, by Subarea and Division, for Contracting Parties who are members of the Northwest Atlantic Fisheries Organization.