



Mid-Atlantic Fishery Management Council
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Michael P. Luisi, Chairman | G. Warren Elliott, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: June 4, 2020
To: Council
From: J. Didden
Subject: May 27, 2020 MSB Monitoring Committee Summary and Staff Recommendations

The Mackerel, Squid, and Butterfish (MSB) Monitoring Committee (MC) met to make recommendations for *Illex* specifications based on the Scientific and Statistical Committee's (SSC) recommendation of a 30,000 metric ton (MT) Acceptable Biological Catch for both 2020 and 2021.

MC members attending included Jason Didden, Doug Christel, Lisa Hendrickson, and Ben Galuardi. Others attending included: Drew Minkiewicz, Kara G, Katie Almeida, Peter Hughes, Kate Wilke, Alissa Wilson, Jeff Kaelin, Eric Reid, Greg DiDomenico, Aly Pitts, Pam Lyons Gromen, James Fletcher, and Dan Farnham Jr.

J. Didden provided an overview of the regulatory charge to the MC: to make recommendations from a list of measures (see §648.22) to ensure that the specifications are not exceeded. Quotas were exceeded by about 5% in 2018 and 10% in 2019. GARFO staff indicated that the causes of the 2019 overage included higher prediction error associated with higher volumes, and incomplete data at the time closure projections are made (due to typical reporting lags).

The MC noted that for 2020, measures to change closure thresholds, discards, and/or reporting are not feasible. The best route forward for 2020 would be for GARFO to make an in-season adjustment after consulting with the Council in June 2020. Council staff will create the necessary NEPA documents, and staff recommends that the Council should request that *Illex* processors voluntarily decrease the time lag between vessel landing and dealer reporting to not more than 48 hours, especially after 50% of the quota is landed.

Subsequent examination of reporting lag by GARFO staff indicates that there was generally consistent and meaningful (but often legal) lag in 2019, and GARFO can use that information and data from 2020/21 to improve their forecasting in 2020/21 by correcting projections for reporting lag. This will reduce the likelihood of exceeding the specifications, especially if the main processors adhere to 48-hour (or less) reporting.

The MC discussed several aspects of potential 2021 specifications. Expected discards are deducted from the ABC, and currently the Council sets aside 4.52% (mean plus one standard deviation of most recent 10 years of observed discard rates in the last assessment: 1994-2004). 2016 and 2017

SBRM-year (July-June) discard rates were very similar to the current set-aside. The preliminary July 2018-June 2019 rate was about double however. The upcoming assessment will estimate typical calendar-year estimates and explore seasonal trends. If the assessment confirms consistently higher discard rates, additional quota may need to be set aside for discards.

The MC discussed whether changes to closure thresholds or reporting requirements may help ensure that the 2021 specifications are not exceeded. Reporting requirements are technically outside the scope of the MC's regulatory direction, but the MSB Committee and Council could make such recommendations. Subsequent analysis by GARFO staff (attached) indicates that a substantial number of trips and amount of landings are reported more than 4 days after a vessel lands (4 days is still often within current requirements). This suggests to staff that moving to requiring reporting within 48 hours of landing could improve GARFO's ability to monitor this fishery. Pending clarification that daily catch VMS reporting by vessels is required (in the *Illex* Amendment) should also improve monitoring, but will be most effective if coupled with faster dealer reporting.

The MC recommended that the Council consider some lower closure threshold depending on reporting changes the Council might also recommend, informed by the additional analysis by GARFO (attached below). Staff reached out to several dealers, and a 48-hour reporting requirement after July 15 for landings over 50,000 pounds (50,000-pound trips covered 95% of August 2019 landings) appears practicable. Public comments on the call were generally supportive of investigating reporting options rather than measures that would decrease available quota.

The MC discussed that lowering the closure threshold from 95% would reduce the likelihood of overages, but could lead to under-harvest. Staff noted the fishery was catching near 10% of the quota per week before increasing to near 15% of the quota per week just before the 2019 closure. If partnered with reporting improvements (e.g. 48-hour reporting), and a commitment from GARFO to continue exploring projection improvements, staff currently recommends a system where the closure threshold is tied to the rate of landings from the most recently-available week (so it may change week to week), with some closure thresholds slightly more cautionary than current when the fishery is most active:

- Closure threshold 95% if catching less than 5% of quota/week
- Closure threshold of 94% if catching 5-10%/week
- Closure threshold of 93% if catching >10%/week

GARFO would continue to attempt to close the fishery on the day landings are projected to hit the threshold in effect at the time.

While there will be some uncertainty until tested, staff believes that the combination of improved reporting, improved projecting, and incrementally-lowered closure thresholds during high-volume periods will likely result in the specifications not being exceeded. Monitoring performance will be evaluated on an ongoing basis, and it is likely that additional modifications (more or less restrictive) may be appropriate to consider in the future. Staff believes that consistent adherence to more rapid reporting may be critical to avoid overages and additionally-restrictive future closure thresholds. Likewise, if there is **not** hastening of reporting planned for 2021, staff currently

recommends the following reduced closure thresholds to ensure avoid exceeding the specifications:

- Closure threshold 95% if catching less than 5% of quota/week
- Closure threshold of 91% if catching 5-10%/week
- Closure threshold of 87% if catching >10%/week

The resulting specifications for the option **with** reporting modification would be:

2020: ABC of 30,000 MT and IOY = DAH = DAP = 28,644 MT. Other measures would stay the same. The Council could write a letter to the relevant processors encouraging voluntary rapid reporting.

2021: ABC of 30,000 MT and IOY = DAH = DAP = 28,644 MT.

- Closure threshold 95% if catching less than 5% of quota/week
- Closure threshold of 94% if catching 5-10%/week
- Closure threshold of 93% if catching >10%/week

Require a 48-hour reporting requirement after July 15 for landings over 50,000 pounds.

The MC is meeting for a second time June 15, 2020 and may provide some additional input for the Council meeting. Staff will produce a follow-up memo highlighting any substantial findings.

Other Included Briefing Materials:

SSC Report – see Tab 9

Supplemental GARFO reporting analyses

Staff ABC Memo

2020 Advisory Panel Fishery Performance Report

2020 Fishery Information Document

May 2020 *Illex* Working Group Summary

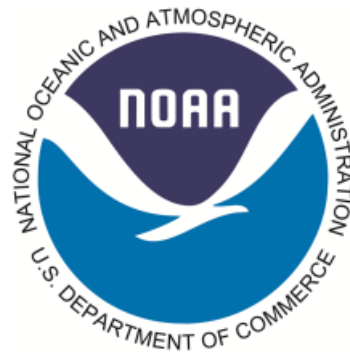
Public Comments received for inclusion in the briefing book

For a deep dive, see the *Illex* Working Group materials for the May 2020 SSC meeting: <https://www.mafmc.org/ssc-meetings/2020/may-12-13>.

Illex 2019 Landings Dates vs. Dealer Reporting Dates

Benjamin Galuardi (NOAA/NMFS/GARFO/APSD)

2020-05-29



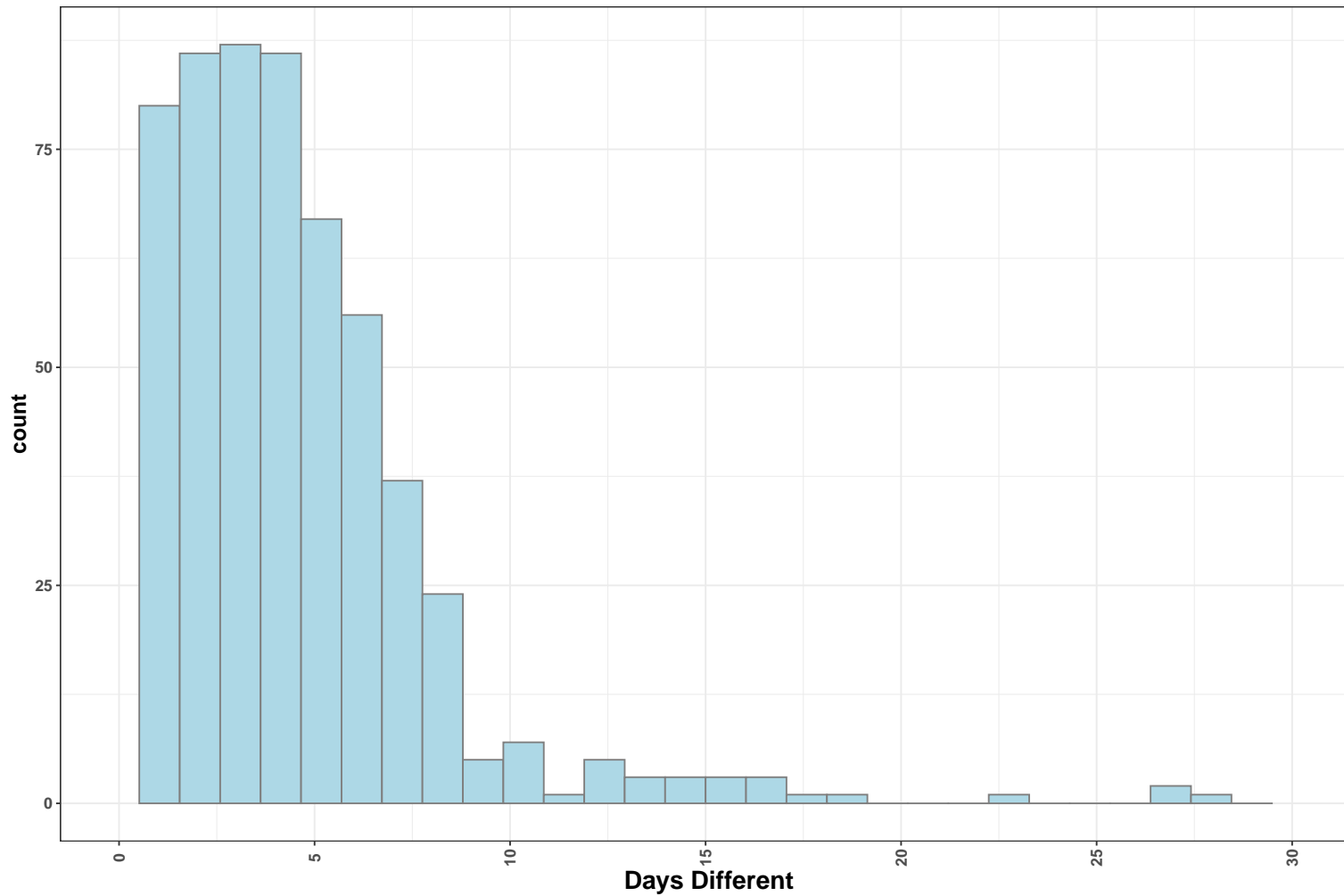


Figure 1: Lag, in days, between date sold and date recorded

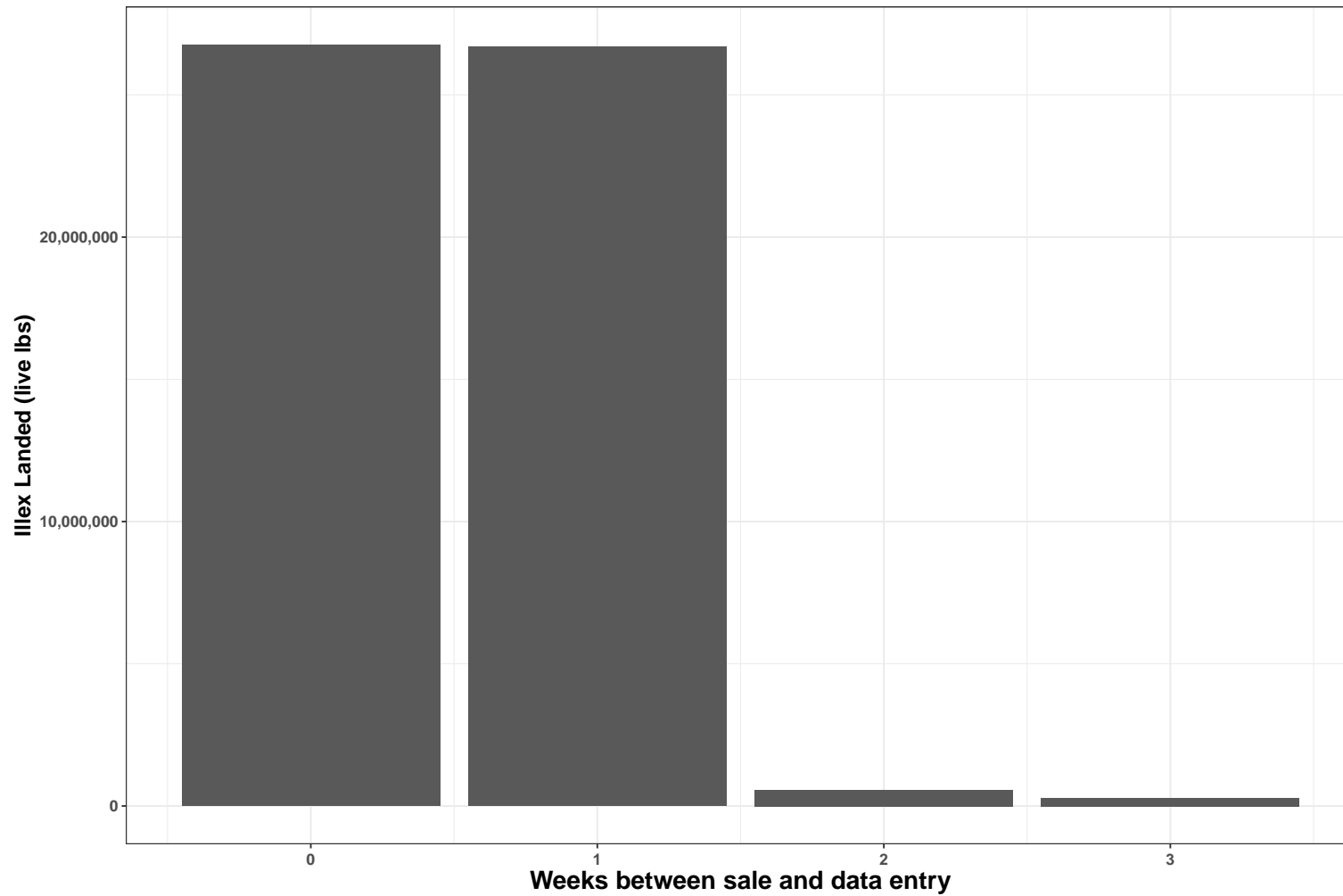


Figure 2: Week Difference between Sale and Report. Week begins on Sunday

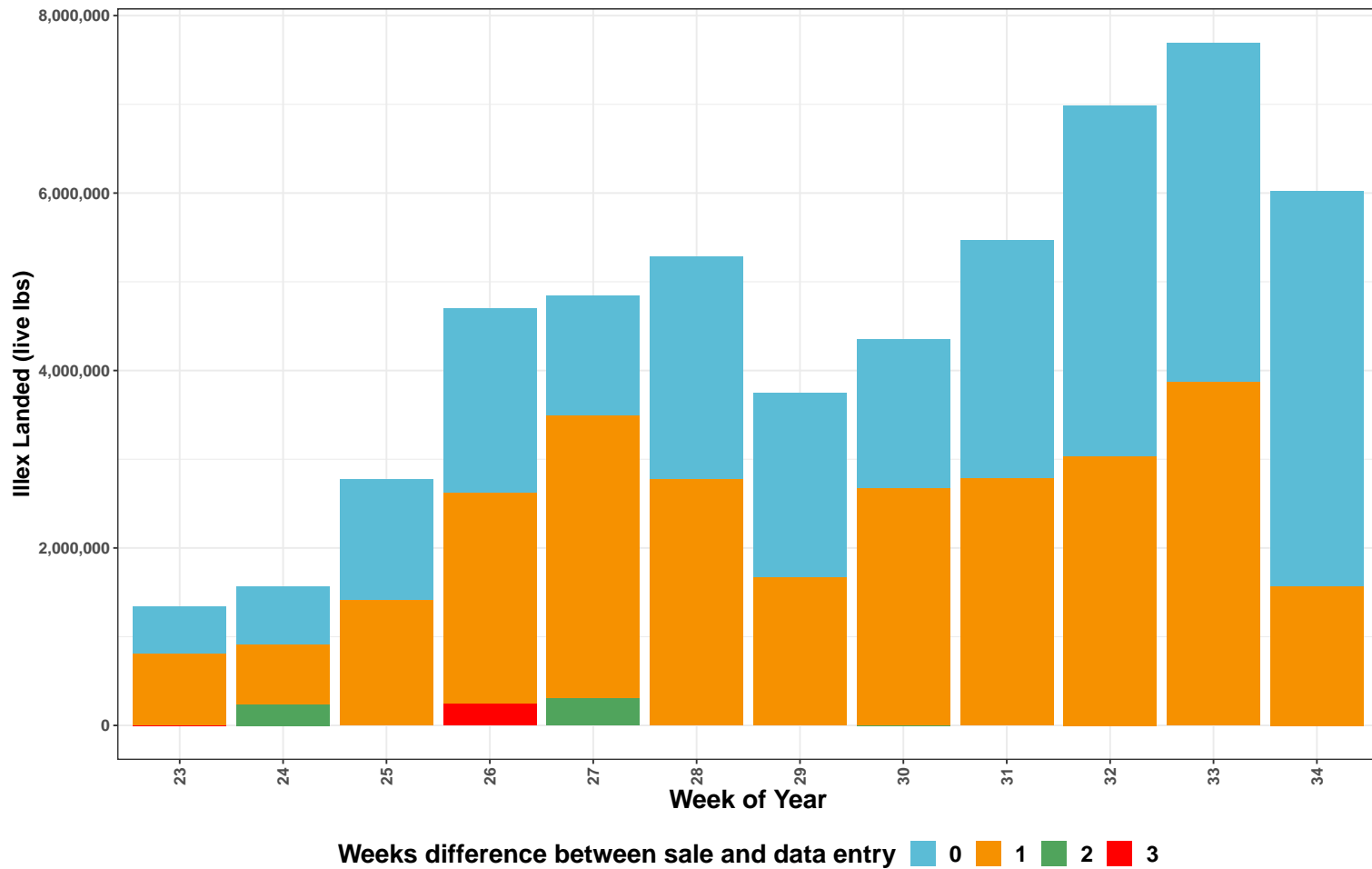


Figure 3: Difference in weeks, by week, between date sold and and date entered

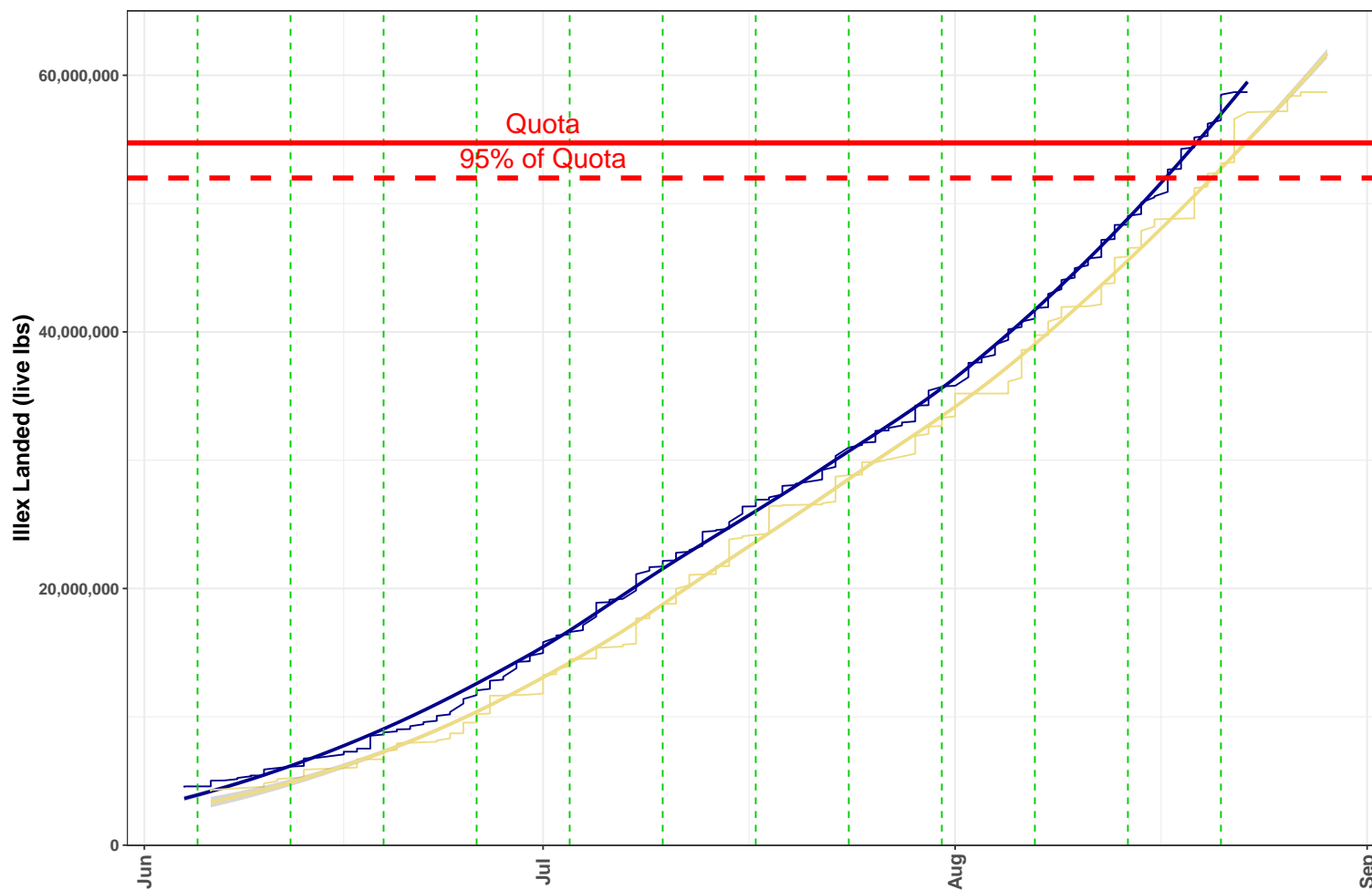


Figure 4: Illex 2019: Daily comparison of date sold (blue) vs. date entered (yellow). Green lines represent the Wednesday of each week



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MEMORANDUM

Date: May 5, 2020
To: SSC, Council
From: J. Didden, staff
Subject: *Illex* Squid ABC

The current *Illex* acceptable biological catch (ABC) of 26,000 MT is based on the SSC's 2018 finding that landings of 24,000-26,000 MT (the highest catches in the time series to that point) do not appear to have caused harm to the *Illex* stock. The SSC judged that *Illex* has been lightly exploited historically given the relatively small portion of its range within which the commercial fishery operates.

2019 *Illex* landings totaled 27,163.5 metric tons. Given the assumed 4.52% discard rate (the mean plus one standard deviation of the most recent 10 years of observed discard rates in the last assessment), this would translate into a 2019 catch of 28,449.4 MT. Recent SBRM discard rates have been similar.

Given the fall 2019 NMFS NEFSC survey was within the range of typical variability, and the *Illex* working group materials generally support that recent landings are still unlikely to have caused harm to the *Illex* stock, an ABC of 28,449.4 MT for 2020 appears justifiable. Staff understands that there is some danger of catch "creep" if NMFS continues to have difficulty closing the fishery on time, but approaches to mitigate monitoring challenges can be addressed from the management perspective, separately from the setting of ABC.

Staff recommends that the SSC also authorize a conditional 2020 in-season increase to 30,000 MT based on a trigger from the Cusum approaches developed through the *Illex* working group. The exact trigger would be determined by the SSC after reviewing and discussing the materials from the *Illex* working group. If the 3-4 primary *Illex* processors can produce sample data voluntarily in an electronic format provided by NMFS to allow rapid analysis, NMFS already has the authority to make in-season adjustments to the *Illex* quota.

Staff recommends that the SSC also provide an identical preliminary ABC recommendation for 2021. Staff will build in additional alternatives into relevant 2021 NEPA documents, so that flexibility would be available for 2021 if a modification to the preliminary recommendation became warranted (after reviewing the 2020 season and any related future analyses).



***Illex* Fishery Performance Report**

March 2020

The Mid-Atlantic Fishery Management Council's (Council) Mackerel-Squid-Butterfish (MSB) Advisory Panel (AP) met via webinar on March 31, 2020 to review the *Illex* Fishery Information Document and develop the following Fishery Performance Report. The purpose of this report is to contextualize catch histories for the Scientific and Statistical Committee (SSC) by providing information about fishing effort, market trends, environmental changes, and other factors. Fishery Performance Reports for the other MSB species will be developed later in the year. Trigger questions noted below were posed to the AP to generate discussion. Please note: the advisor comments described below are not necessarily consensus or majority statements.

Advisory Panel members present: Katie Almeida (MA -Towndock (RI)), Howard King (MD), Eleanor Bochenek (NJ - Rutgers), Gerry O'Neil (MA - Cape Seafoods), Jeff Kaelin (NJ - Lund's Fisheries), Meghan Lapp (RI - Seafreeze), Pete Kaizer (MA - Althea K Sportfishing), Hank Lackner (NY - FV Jason and Danielle), Pam Lyons Gromen (Wild Oceans), and Greg DiDominico (NJ - GSSA).

Others present: Jason Didden, Alissa Wilson, Andy Jones, Anna Mercer, Ben Galuardi, Brooke Wright, Chris Batsavage, Kim Hyde, Lisa Hendrickson, John Manderson, Paul Rago, Sarah Gaichas, Sonny Gwin, and Doug Christel.

Trigger questions:

The AP was presented with the following trigger questions:

1. What factors have influenced recent catch (markets/economy, environment, regulations, other factors)?
2. Are the current fishery regulations appropriate? How could they be improved?
3. What would you recommend as research priorities?
4. What else is important for the Council to know?

General

It has been previously requested that the NEFSC data updates include information on what is known and not known about ecosystem relationships for MSB species and how the various assessments already account for natural mortality/forage needs. Some AP members believe that consumption of forage stocks by marine mammals likely dwarfs mortality from fishing. There are both concerns that natural mortality may be over or under considered, and some AP members think the Council should direct the SSC to consider forage needs through a forage-based ABC control rule and further implement the policy goals of the Ecosystem Approaches to Fishery Management (EAFM) Guidance Document (<http://www.mafmc.org/eafm>). See 2018 FPR for additional details on this point <http://www.mafmc.org/ssc-meetings/2018/may-8-9>).

Staff mentioned that a new process is being developed for assessment and data updates.

A request was made previously for more information on the size distribution of landings and discards, and/or more information regarding the numbers of various fish species discarded (staff note: these are not traditionally part of the MSB FPR process but could be requested from NMFS).

AP members continued to note that several factors could be negatively impacting catches for all MSB species. Spiny Dogfish can create interference (loading nets), and/or be an ecological barrier (e.g. maybe mackerel won't go into areas with high dogfish concentrations). High dogfish populations seem to be associated with other species declining and this issue should be an important component of ecosystem management. Existing regulations, including the Northeast Canyons and Seamounts Marine Monument reduce fishing opportunities. There is strong concern that the size and breadth of all wind energy areas need consideration in terms of not just fishing but also related to loss of survey access, which could then in turn impact uncertainty/ABCs/quotas. Also, the various opportunities in the entire suite of fisheries in the area can drive effort into and out of particular fisheries in a given year.

Market/Economic Conditions

Demand drives the *Illex* fishery and participation. Price/demand are mostly dependent on the international market, which drives world trade prices and/or demand for U.S. *Illex*. Annual variability and price combine to drive interest in fishing for *Illex*. A strong dollar may also impact demand and effort. Market demand for *Illex* was robust in 2016-2019 and new markets are opening up (bait and food). MSC certification should help open new markets and increase prices. Meghan Lapp followed up after the call that SeaFreeze's sales personnel noted that combined world production of Japanese flying squid, Argentine shortfin squid, our *Illex*, and Jumbo flying squid has been down, and these species fill similar product niches, contributing to higher prices for our *Illex*.

Environmental Conditions

Availability changes quickly even in a year (waves of squid "come up onto the bank"). Quota levels have not hurt the stock and are unnecessarily impacting catches in some years; we need to think out of the box regarding quotas. Understanding migration is key and we don't understand the migration behavior and only access a small portion of the population. Real-time

assessment would be optimal to avoid leaving excess *Illex* (and revenues) in the water without a conservation purpose during natural peaks. We need to research ways to take advantage of boom years, including considering the size of squid (taking large squid means harvesting fewer animals). Current management is not sensitive to actual *Illex* productivity or the impact of the fishery. The fishing community should be an integral part of any effort; make changes carefully but don't just get stuck where we are.

Abundance generally and of large squid was unprecedented in 2017-2018, especially near the closures (300-400 grams). One industry representative reported slightly smaller squid in 2018 but noted the early closure prevented access to larger squid later in the year as they grow. In a follow-up email exchange, multiple AP members reported they saw very good size near the end of the 2019 season, and that landing rates improved right up to the end of the 2019 season.

Some have noted the decline in survey indices (individual weight) and high variability of *Illex* should give the SSC pause for concern.

There is also interest in learning more about spawning habitat and timing, and NEFSC staff noted that they have been discussing with the observer program about getting more data on spawning condition from samples.

Management Issues

In the future, deep-sea coral closures may impact the ability of vessels to operate depending on where squid are in a given year – this may become an issue especially in slower years that last longer – *Illex* patterns are changing like other fish – they seem to be deeper in recent years.

Reduced herring quotas may increase participation in the *Illex* fishery.

A higher incidental longfin limit for *Illex* vessels during longfin closures or a more gradual slowing of longfin fishing could avoid regulatory longfin discarding. The new (since 2014) higher limit (15,000 pounds for Tier 1 longfin permit, 5,000 pounds for Tier 2 when on an offshore *Illex* trip and having more than 10,000 pounds of *Illex*) may not totally solve this problem. There is also interest in seeing commercial size data included annually for review by the AP (this is being used by the working group). Staff notes that some public comments for the *Illex* Amendment also recommended for the primary *Illex* vessels an incidental possession limit increase to 20,000 pounds when possessing 10,000 pounds or more of longfin squid, after the *Illex* fishery closes, to allow for bycatch of *Illex* in the longfin squid fishery to be turned into landings.

Advisors noted ongoing Lobster/RGA issues and were interested in a better way to transition gears/area. (the Council tried to engage the ASMFC a number of years ago but there was not much interest). Fixed/mobile gear “gentlemen agreements” are used inshore and may be a solution, but might not be practicable for *Illex* given the patchiness of fish and the amount of gear out in the depth where *Illex* is fished. GARFO did have incidents of lobster gear interactions in 2020.

Jonah crab fixed gear is also an issue – boats are seeing more of this gear and it's becoming a problem.

Other Issues

For refrigerated sea water vessels to participate, they need high densities to drive participation because they have to return to the dock within two days of starting to put *Illex* onboard due to spoilage issues. The fleet is changing from freezers to RSW, increasing catch rates. 3 boats in last 18 months have been converted from freezers to RSW. Some new mackerel/herring boats (besides the ones that have typically participated in *Illex*) have jumped in with more efficient pumping technology, increasing landing rates.

2019 was another really good season but did not unfold as similar to 2018 as the quota line suggests. Catches were low the first few weeks and started later in the southern areas. The quota would have been caught even faster if the southern areas had started strong at more recently typical (higher) catch rates. One of primary Sea Freeze vessels was out of the fishery early for a few weeks but we didn't see overall slower landings due to more vessels participating.

Passing of vessels is getting more difficult with the amount of vessels in the fishing areas given the length of tow line (500 fathoms of wire) out in deep water.

Research Priorities noted included:

Real-time management with cooperative research.

Spawning information.



***Illex* Fishery Information Document**

March 2020

This Fishery Information Document provides a brief overview of the biology, stock condition, management system, and fishery performance for *Illex* squid with an emphasis on 2019. Data sources for Fishery Information Documents include unpublished National Marine Fisheries Service (NMFS) survey, dealer, vessel trip report (VTR), permit, and Marine Recreational Information Program (MRIP) databases and should be considered preliminary. For more resources, including previous Fishery Information Documents, please visit <http://www.mafmc.org/msb>.

Key Facts

- 2019 was the third banner year in a row for *Illex*, with the quota being harvested on a similar timeline as 2018. 2017-2019 represent the first sequence in the history of the fishery of three consecutive boom *Illex* years.
- Substantial variability is to be expected with any squid species.

Basic Biology

Illex squid is a semi-pelagic/semi-demersal schooling cephalopod species distributed between Newfoundland and the Florida Straits, and lives less than one year. *Illex* is a semelparous, terminal spawner whereby spawning and death occur within several days of mating. The northern stock component, located north of the USA-Canada border in NAFO Subareas 3 and 4, is assessed annually and is managed by the Northwest Atlantic Fisheries Organization (NAFO), though landings have been low in recent years. The NAFO assessment is not based on recent data. The southern/U.S. stock component is located in NAFO Subareas 5 and 6 between the Gulf of Maine and Cape Hatteras, NC and is managed by the Mid-Atlantic Fishery Management Council (the Council or MAFMC). Additional life history information is detailed in the EFH document for the species, located at:

<http://www.nefsc.noaa.gov/nefsc/habitat/efh/>.

Status of the Stock

The status of *Illex* is unknown with respect to being overfished or not, and unknown with respect to experiencing overfishing or not. Results from the NEFSC Trawl surveys are highly variable and without apparent long-term trend. The Council has established a working group (<http://www.mafmc.org/actions/illex-working-group>) to investigate if current information

suggests that adjustments to the *Illex* quota are appropriate, and if there are ways to make the quota more responsive to real-time conditions. There is also a benchmark *Illex* assessment planned for 2021. At this time, the outcome of these endeavors is uncertain. Some short-term results of the workgroup will be known by June 2020 and may influence SSC discussions regarding short-term ABCs, but there are also longer-term tasks that may be in progress beyond 2020.

Management System and Fishery Performance

Management

The Council established management of *Illex* in 1978 and the management unit includes all federal East Coast waters.

Access is limited with moratorium permits. Trip limits are triggered when the quota is approached. Incidental permits are limited to 10,000 pounds per trip. Additional summary regulatory information is available at <https://www.fisheries.noaa.gov/new-england-mid-atlantic/resources-fishing/resources-fishing-greater-atlantic-region>. An ongoing action may change *Illex* permitting – see <https://www.mafmc.org/newsfeed/2020/msb-illex-public-hearing-webinars>.

The current quota is 24,825 MT¹, based on a 26,000 MT Acceptable Biological Catch (ABC) and a 4.52% discard rate (the mean plus one standard deviation of the most recent 10 years of observed discard rates in the last assessment). Recent SBRM discard rates have been similar.

Recreational catch of *Illex* is believed to be negligible. There are no recreational regulations except for party/charter vessel permits and reporting.

Commercial Fishery

Figure 1 describes *Illex* catch 1963-2019 and highlights the early foreign fishery and then domestication of the fishery. Figures 2-3 describe domestic landings, ex-vessel revenues (nominal), and prices (inflation adjusted) since 1982. Figure 4 illustrates preliminary 2018 (yellow-orange) and 2019 (blue) landings through the year.

Table 1 describes 2019 *Illex* landings by state, and Table 2 describes 2019 *Illex* landings by gear type. Figure 5 describes the location of 2018 *Illex* landings. Table 3 provides preliminary information on *Illex* landings by statistical area for 2019.

¹ 1 metric ton = approximately 2,204.62 pounds

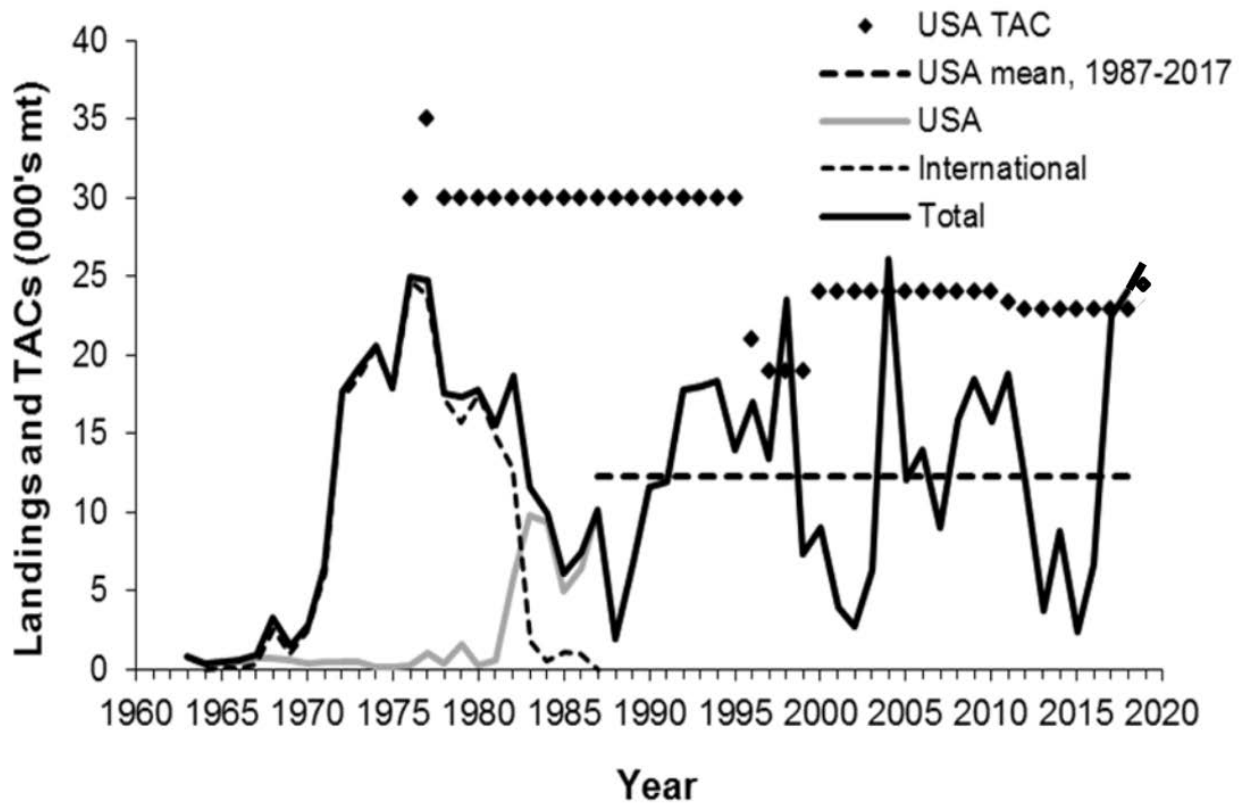


Figure 1. Total annual *Illex* landings (mt) by the U.S. and other countries for 1963-2019. Sources: NEFSC *Illex* Data update, available at <http://www.mafmc.org/ssc-meetings/2018/may-8-9> and NMFS unpublished dealer data.

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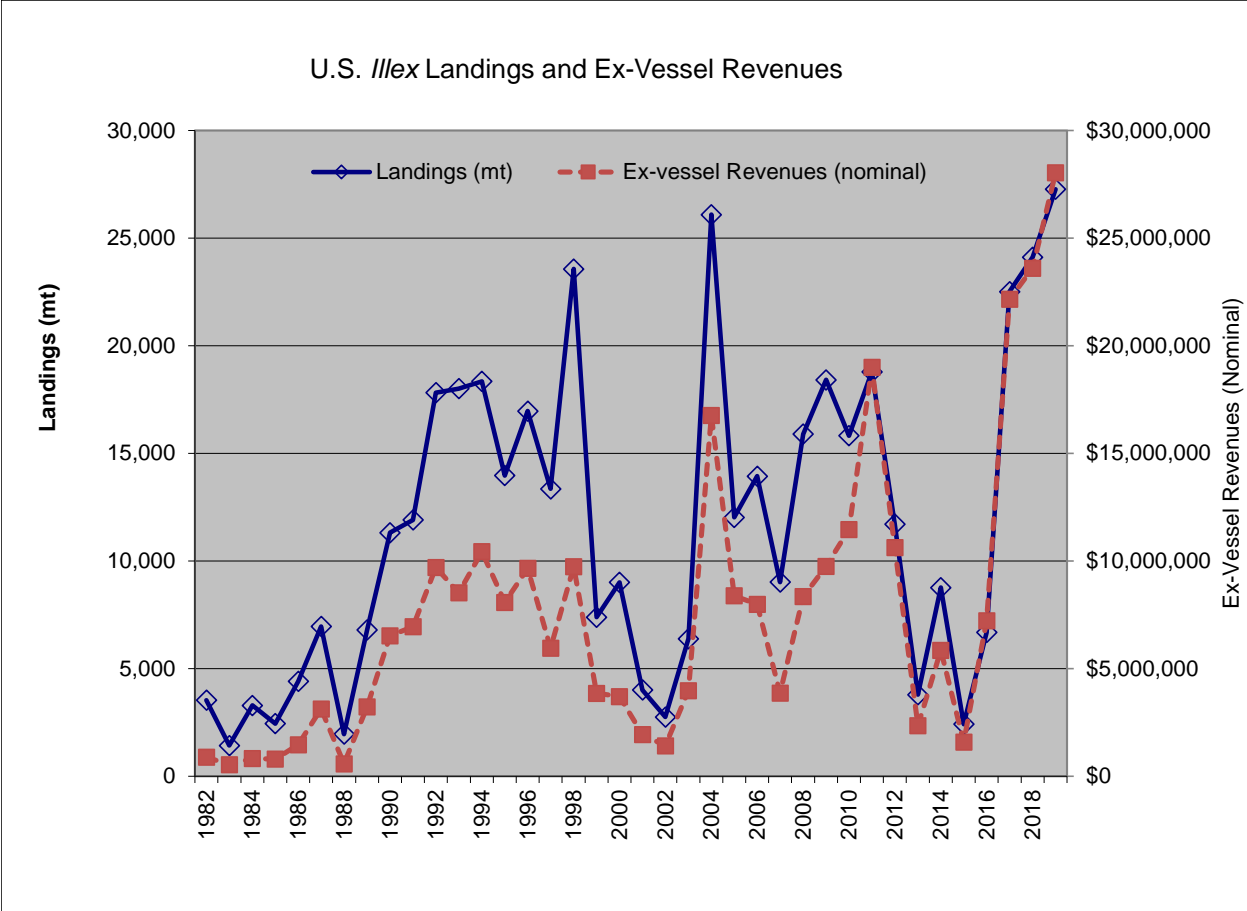


Figure 2. U.S. *Illlex* Landings and Nominal *Illlex* Ex-Vessel Values 1982-2019. Source: NMFS unpublished dealer data.

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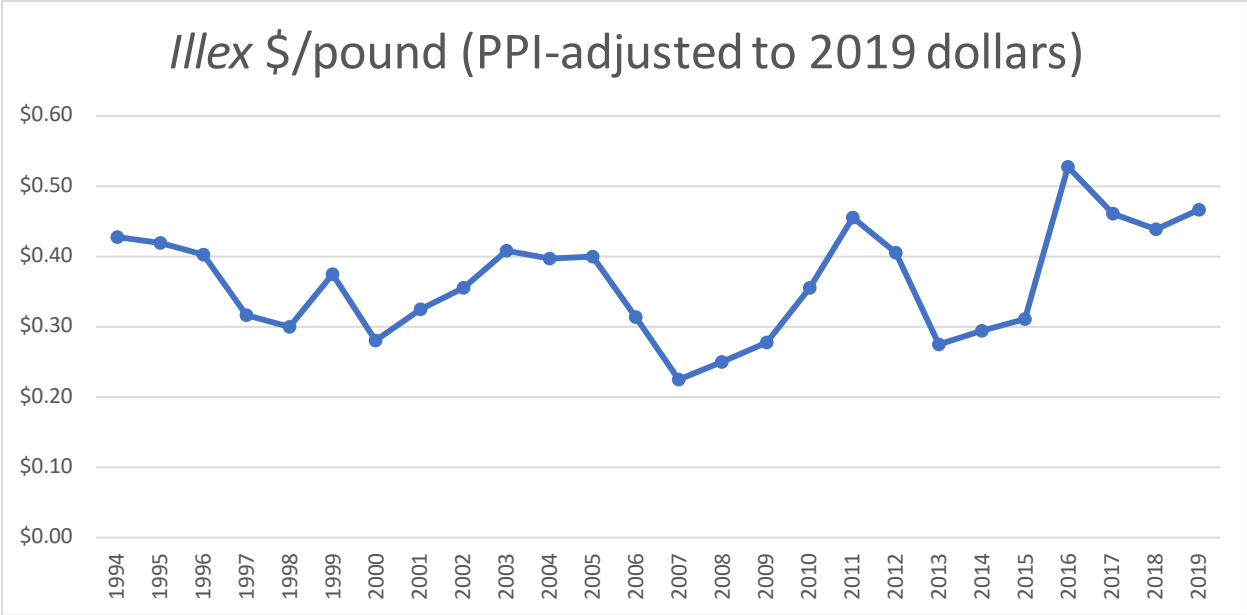


Figure 3. Ex-Vessel *Illex* Prices 1994-2019 Adjusted to 2019 Dollars Based on Producer Price Index (PPI). Source: NMFS unpublished dealer data.

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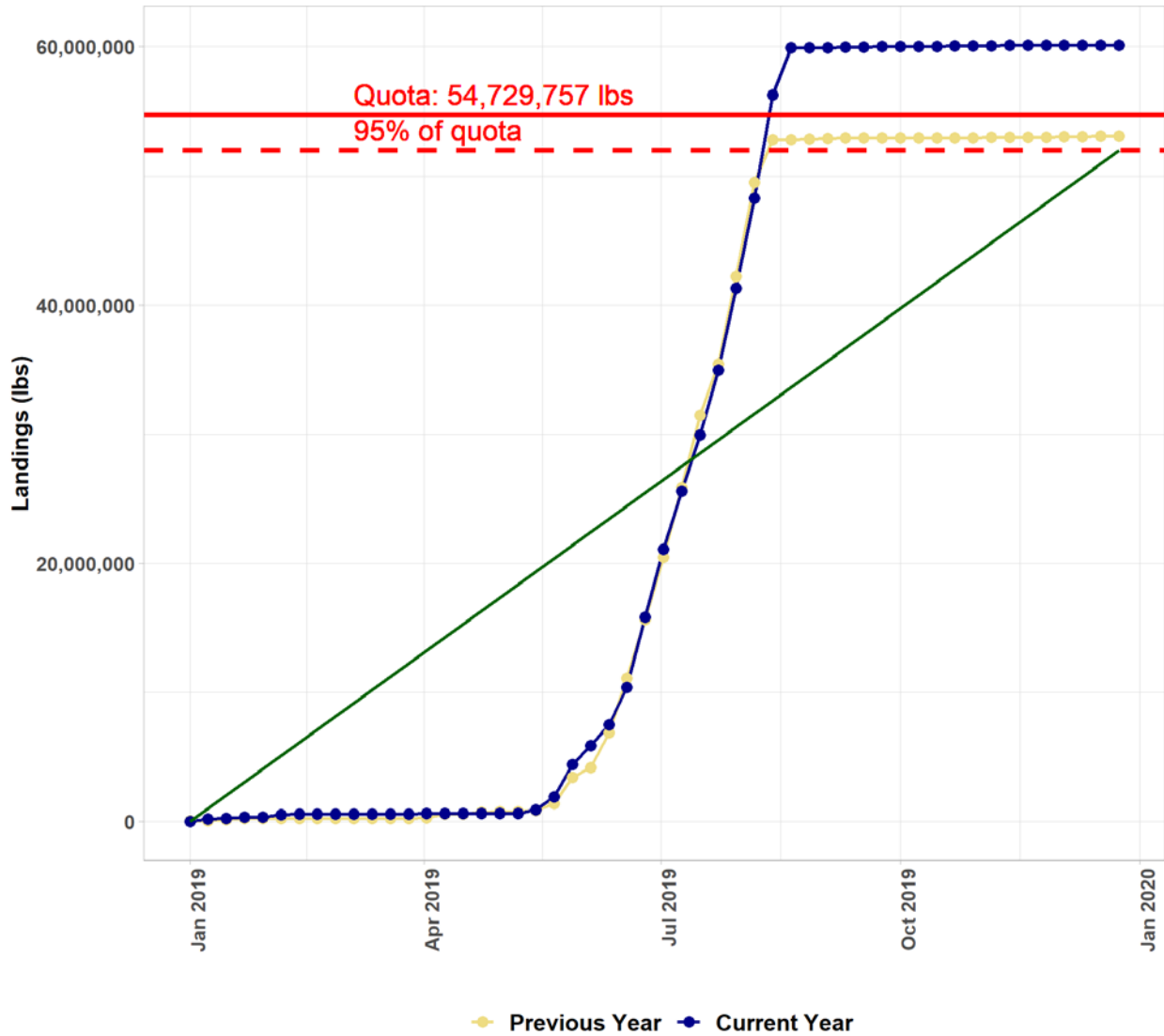


Figure 4. U.S. Preliminary *Illex* landings; 2019 in blue, 2018 in yellow-orange. Source: <https://www.fisheries.noaa.gov/new-england-mid-atlantic/commercial-fishing/quota-monitoring-greater-atlantic-region>.

Table 1. Commercial *Illex* landings (live weight) by state in 2019. Source: NMFS unpublished dealer data.

State	Metric Tons	Percent of Total
NJ	9,910	36%
RI	8,480	31%
MA	8,146	30%
Other	740	3%
Total	27,276	100%

Table 2. Commercial *Illex* landings (live weight) by gear in 2019. Source: NMFS unpublished dealer data.

GEAR	Metric Tons	Percent
TRAWL,OTTER,BOTTOM,FISH	24,276	89%
TRAWL,OTTER,MIDWATER	1,213	
PAIRED		4%
TRAWL,OTTER,MIDWATER	488	2%
Other/Unknown	1,300	5%
Total	27,276	100%

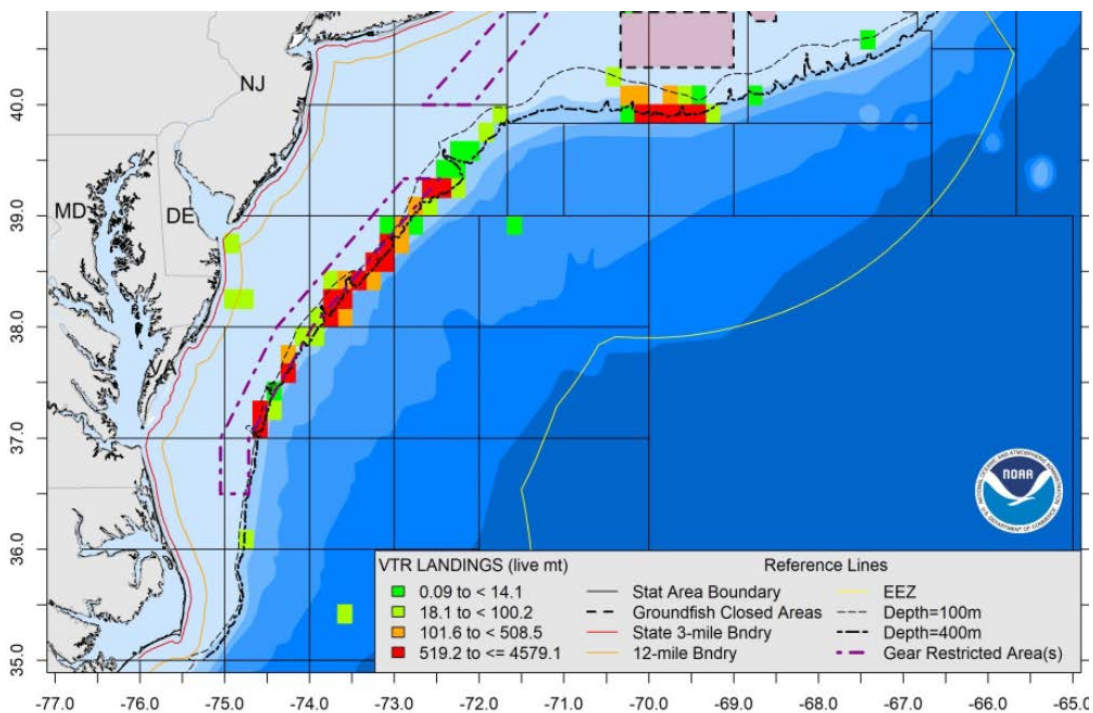


Figure 5. Approximate Primary 2018 *Illex* Catch Locations (from dealer and VTR data)

Table 3. Commercial *Illex* landings by statistical area in 2019. Source: NMFS unpublished VTR data.

Stat Area	Metric Tons 2019	Percent
622	12,474	47%
526	8,801	33%
537	2,135	8%
525	1,211	5%
616	985	4%
Other	1,161	4%
Total	26,766	100%

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MEMORANDUM

Date: May 5, 2020
To: SSC
From: J. Didden, P. Rago
Subject: Co-Chairs' *Illex* Working Group Update/Short Term Tasks Results Summary

Since May 2019, the *Illex* working group (WG) has been meeting and working to explore options for alternative *Illex* ABCs and/or ABC-setting processes. Efforts were divided into short, medium, and long-term terms of reference (TORs) (<https://www.mafmc.org/s/2019-10-Illex-WG.pdf>).

Short-term TORs included reviewing squid management approaches, listing key data sources, summarizing growth/industry sampling data, initiating analysis of growth and age from 2019 samples provided by industry, conducting CPUE analyses, and exploring implications of the NAFO assessment. The goal was to address these to the extent possible for the May 2020 Scientific and Statistical Committee (SSC) meeting. All of these tasks have been initiated and most have produced some results.

Medium-term TORs include considering additional surveys, developing details on in-season dynamics, and incorporating environmental parameters into analyses of CPUE. Even longer-term tasks include exploring acoustics, developing alternative processes for in-year quota adjustments, considering the influence of harvesting on stock dynamics, identifying cohorts in-season, developing other real-time management approaches, determining the persistence of linkages (CPUE, environmental) to abundance, and developing a prototype model of *Illex* immigration/emigration dynamics. Work on short-term TORs has started to at least inform possible explorations of some medium and longer-term TORs.

Documents were prepared by the WG to address the short-term terms of reference. They should be considered preliminary analyses unless otherwise noted. In addition, a summary document from the *Illex* Summit [S1], held in November 2019, was influential in guiding various investigations of the WG. Many of the WG members participated in the Summit, which reflected on perspectives of harvesters, processors, scientists, and managers. Collectively the working papers represent a broad overview of the current state of the *Illex* fishery, its management, and either underlying or developing science. The methodologies described in these papers may prove useful for addressing future needs related to real-time management of the *Illex* resource and/or ABC-setting in the meantime. Integration of industry-based information is a common theme throughout the reports. The Mackerel, Squid, and Butterfish (MSB) Advisory Panel (AP) was incorporated at the initiation of the WG, and asked for input periodically in 2019. Beginning in 2020 the MSB AP was formally

convened when the workgroup met. There is also an MSB AP meeting scheduled for May 11 for a final round of input from the AP after they had a chance to review the working group documents.

As a starting point, five papers (3,4,5,6,7) address either current conditions in the U.S. fishery and/or other assessment/management approaches. All assessment approaches identify the difficulties of dealing with short-lived species. These difficulties have been addressed using a variety of approaches whose utility seems to depend on the magnitude and value of the fishery which in turn affects the availability and timing of information for updating current harvest recommendations. Few assessment or monitoring approaches seem to exist that have proven track records of accurately predicting outcomes.

Available data include survey data from both federal and NEAMAP bottom trawl surveys [6], comprehensive Vessel Trip Reports [17, 9, 10, 13, 8, 6] and Vessel Monitoring Systems [11]. Quota monitoring data collected by GARFO was used to examine its use for real-time monitoring [16a]. Industry-sponsored data include biological samples from harvesters [6, 10, 13, 14, 16b] and information from study fleets [8]. A research project on aging of *Illex* [15] is ongoing but incomplete.

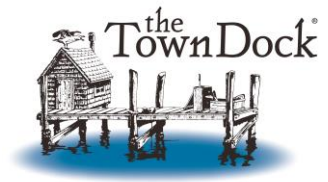
The process of providing information for real-time management of *Illex* can be conceptualized as three distinct steps: Identification, Estimation and Detection. First is identifying the relative status of the fishery and the resource in a given year (Identification). “Status” can be determined on an ordinal or ratio scale and can be done on a post hoc basis. Catch per unit effort from the commercial fleet was investigated in paper [10] and for a subset of study fleet data in paper [8]. Both [10] and [8] used advanced state of the art generalized linear models to account for differences associated with year, season, vessel type and permit. Further comparisons of the results in [10] and [8] would be useful to evaluate the representativeness of the study fleet data. Crude rates of CPUE estimation were combined with other metrics of fishery performance, average weight, price, and survey data to examine the potential utility of multivariate methods for identifying system state [13]. Survey data from several sources were combined with information from VTRs to estimate probability of occurrence over the entire resource area and measures of overlap with the fishing fleet [9]. The model-based survey estimation methodology could be valuable for refining the overall distribution of *Illex*.

One of the central tenets of current management is that the fishery has had a modest or low effect on stock dynamics (Estimation). Nothing produced by the WG has suggested otherwise. Under this premise, upward adjustments to the quota are assumed to have a low effect on the potential for overfishing if “good years” can be identified. Depletion models are used in many squid fisheries around the world and have been applied to *Illex* in earlier NEFSC assessments. The Leslie-Davis version of the depletion model was applied to 1997 to 2018 data base in [14]. Results suggested a high degree of indeterminacy owing to failures to satisfy many of the underlying model assumptions. An alternative approach, using assumptions about minimum and maximum values of assumed fishing mortality and trawl capture efficiency was used to develop an “envelope” of potential biomass levels that are constrained by the extremes of each assumption [12]. A similar range of potential fishing mortality rates can then be compared to a suite of possible biological reference points for fishing mortality. Additional confirmation of the low potential mortality rates for *Illex* was obtained by examining VMS records for 2017-2019 [11]. VMS reveals that overall fishing effort is highly concentrated along the shelf break. The consequences for the magnitude of

fishing mortality were investigated in terms of necessary replenishment of squid from adjacent areas and exploration of overlap with the total resource area as estimated in working paper [9].

Detection is the third essential component for real-time management of *Illex*. Currently, there are no accepted procedures for estimating or projecting pre-season abundance of *Illex*. Post hoc determination of system state {poor, average, good} is not useful if real time measures are desired. A methodology developed for statistical process control, known as Cusum was modified to test whether the system state could be determined within the year. This approach was tested by applying it to weekly landings data collected by GARFO for the period 1996-2019 [16a]. Fishermen and processors reported that changes in average size of landed squid were also important factors in characterizing the season. The Cusum method was also applied to the industry-supplied weekly average weight data for 1997-2019 [16b]. The Cusum approach appears promising for identification of system state using either approach and may serve as a basis for testing in the 2020 fishing year. The process for collecting weekly landings data is already in place. If the weekly changes in average weight in the fishery were judged acceptable, rapid processing of representative biological samples by industry would be necessary.

2019 landings totaled 27,163.5 metric tons. In order to facilitate the same landings, an ABC of 28,449.4 MT would be needed (4.52% of the ABC is set aside for expected discards). Given A) the current approach of setting the ABC around the highest observed catch as long as no ill effects have been observed, B) the WG results, and C) that the fall 2019 survey was within the range of typical variability, 28,449.4 MT could be an option for a 2020/2021 ABC. The only other option that appears close to shelf-ready would be to use the Cusum approach for average weight per landed squid, total landing by week, or both variables to modify the quota in-season. Given the generally early detection of non-poor and above average status in good years (weeks 22, 20, 28, 22, 22), data through July 1 (week 26) could potentially be used to determine the existence of a “non-poor and above average” year, and a quota modification be made. This would by nature be experimental to some degree, and an incremental approach might be warranted. The only way for such an experiment to run in 2020 would be for the three major processors to supply weight data on a voluntary basis in an electronic format supplied by GARFO. GARFO already has the authority to make in-season adjustments to the *Illex* quota, in consultation with the MAFMC, during the fishing year by publishing notification in the Federal Register. A particular weight-based statistical trigger criterion would need to be identified. A combined approach, starting at 28,449.4 MT, and followed by a potential modification based on the weight-based Cusum approach could also be utilized. Given timing and regulatory issues, the most that that 2020 ABC could practically be increased to is 30,000 MT. There is substantially more flexibility for 2021, and the results of any 2020 processes could be evaluated post-season and integrated into final 2021 specifications through GARFO’s in-season adjustment authority or expedited regulatory measures, if appropriate.



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June 2, 2020

Dr. Chris Moore
800 North State Street
Suite 201
Dover, DE 19901

Dear Dr. Moore,

As an active AP Member and participant on the Council's *Illex Working Group*, I am writing to support the recent actions and suggestions by the SSC, Council staff, and Monitoring Committee. Last month, the SSC approved the Council staff's recommendation of an ABC of 30,000 MT for Illex for FY 2020 and 2021. This is an increase from 2019's ABC of 26,000 MT. During the two-day SSC meeting the group delivered and discussed many positive findings from the Illex Working Group regarding the Illex stock.

These positive findings include:

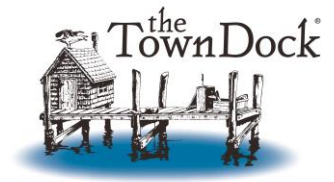
- The stock is still considered "lightly exploited"
- Only a very small portion of the Illex Biomass is exposed to fishing activity each season
- Illex are not vulnerable to the fishery at a single chokepoint
- The mortality rate is low
- There are multiple cohorts thought the year
- Along with many other positive findings with this stock

These reasons, in addition to many others, contributed to the SSC's decision to increase the ABC by 4000 tons (8.8 million pounds). After reading through the many working group documents and listening to the SSC's discussion we were pleased to hear the conclusions and ultimately their show of support to increase the ABC.

We are in support of both the Monitoring and S/M/B Committee looking into possibly revising Illex reporting requirements and in-season adjustments to prevent future quota overages. "*Monitoring Difficulties*" is mentioned in the Illex Amendment as a reason to move forward with reducing participation and effort for some permit holders. In our public comments and conversations with Council members we have stated that this issue can be resolved through other management measures, rather than a reduction of permits and access to the fishery. In recent correspondence, it seems that the Council Staff and the RO also agree. We



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are pleased to see a solution to the problem that does not take the drastic step of reducing permits or fishing effort.

Sincerely,

Katie Almeida
Fishery Policy Analyst



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