Longfin Inshore Squid (*Doryteuthis pealeii*) Snapshot Ecosystem & Socioeconomic Profile (ESP)

Spring 2026

Key Findings from the Life History Working Group

Lifespan and aging

Some literature sources estimate growth to be 1 statolith ring/day, and literature review supports a lifespan of less than 1 year. Participants at the longfin squid summit estimated a maximum age of 15 months. SQUIBS statolith aging (2024) indicates maximum ages of 7 months for females and 8.6 months for males (right) from squid caught in the fishery.

Maturity (from SQUIBS)

For squid caught in 2024, most stage 4 squid were caught in summer and very few the rest of the year. The majority of stage 1 squid were caught in the second half of 2024. Of 912 squid assessed, the dominant maturity stage in females increases from fall to spring. The highest percentage of mature male squid were caught in spring and summer.

Migration and movement dynamics

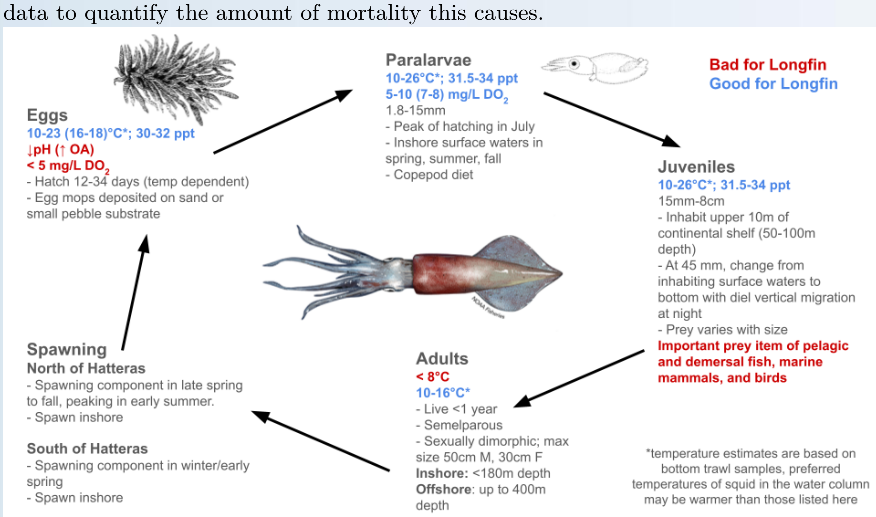
In November/December, longfin migrate from the inshore shelf to deep, warm slope waters to overwinter. By May/June of the next year, they migrate back to shallow coastal shelf waters to spawn [1]. The fishery follows this pattern, occurring offshore in winter and inshore in summer. Recent work hypothesizes a winter cohort that hatches south of Cape Hatteras and migrates onto the Northeast shelf [2]. Fishery observations describe a spatial gradient of 1-6 cm mantle length (ML) squid from waters south of Hatteras through southern New England, with the smallest squid detected further south. The Gulf Stream and warm core rings may facilitate the recruitment transport of juvenile squid, but potential for inputs to the population from the South and offshore are difficult to quantify.

Reproductive dynamics

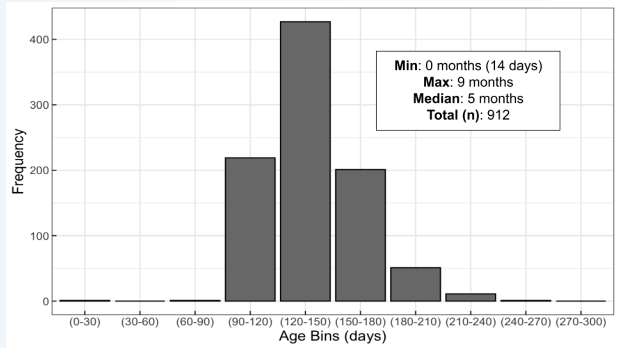
Spawning peaks inshore from late spring to early summer in the Mid-Atlantic and southern New England [3] [1] with hatching in late summer [4]. Consideration of the hypothesis of a winter cohort spawning south of Hatteras indicates the presence of multiple cohorts with some outside of the traditional Northeast shelf stock area, and provides evidence of year-round spawning.

Natural mortality

Although natural mortality is expected to be age-dependent, lack of accurate age data makes further study difficult. Using the equation derived by Hamel and Cope [5], natural mortality for longfin squid can range from 0.36 (max. age = 15 mo.) to 0.675 (max. age = 8 mo.). Cannibalism impacts natural mortality, but there is no available data to quantify the amount of mortality this causes.



Age Frequency from SQUIBS

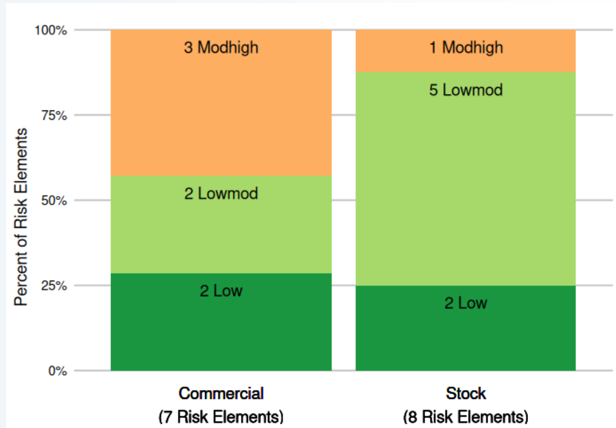


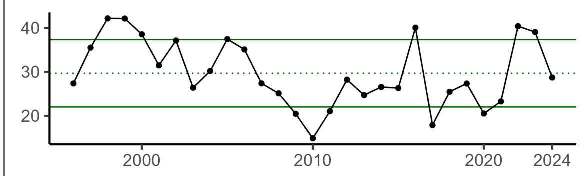
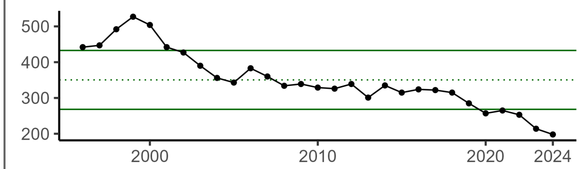
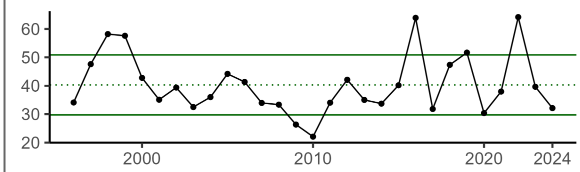
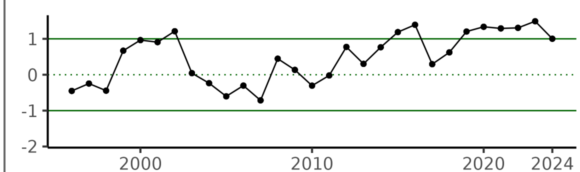
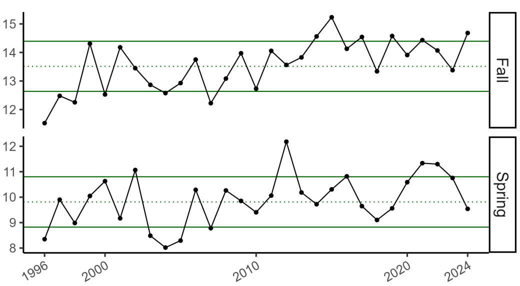
Key Points from the Mid-Atlantic Risk Assessment

The 2025 Mid-Atlantic EAFM Risk Assessment Update [6] determined that there are moderate-high risks related to:

- Potential and observed distribution shifts of longfin squid
- Not achieving optimum yield due to interactions with non-MAFMC managed species
- Regulatory complexity: occasional recent changes in regulations and moderate (3-4) recreational regulation differences across states. Compliance is challenging for fishery participants given complex regulations.
- Discards: While various management measures have minimized discards to the extent practicable, ecosystem changes may affect existing measures.

Risk elements are aspects that may threaten achieving the biological, economic, or social objectives that the MAFMC desires from a fishery; risk to achieving optimal yield. Longfin squid did not score in the "high" risk category for any risk elements in 2025.



Indicator Units	Status In 2024	Implications	Time Series
Commercial landings (millions of lbs.)	Near long term (1996-2024) average	Environmental dynamics vary between locations/timing of the summer and winter squid fisheries. An increase in landings since 2020 but decrease in number of vessels could indicate targeted trips in specific times of year and fishers targeting other species when longfin are not available.	
Number of commercial vessels (# of federally-permitted vessels landing over 1lb of longfin squid)	Below long term (1996-2024) average	Number of commercial vessels has been steadily decreasing since around 2000 consistent with decreasing fleet diversity and continued risk to fishery resilience [7]. Permit requalification in 2019 and a decrease in the post-closure trip limit for trimester 2 may cap participation, although these actions were designed to accommodate recent fishing trends and activity.	
Commercial revenue (millions, inflation adjusted to 2024 USD)	Below long term (1996-2024) average	Average longfin ex-vessel prices in 2024 increased slightly from 2023 (+10%), but commercial revenue has decreased from 2023, driven by the overall decrease in landings by 23% [7].	
Western Gulf Stream Index (shift in the western part of the Gulf Stream North wall: mean position: >0 = more northerly, <0 = more southerly)	Above long term (1996-2024) average	Since the mid-1990s, north and westward shifts in the Gulf Stream have resulted in an increase in warm core rings and deep water, high salinity heat waves. The position of the Gulf Stream influences seasonal temperature and water mass mixing dynamics that affect longfin squid habitat suitability, temperature-dependent growth, and prey availability (https://noaa-edab.github.io/catalog/gsi.html).	
Bottom temperature in MAB and SNE(°C)	Above long term (1996-2024) average (Fall); near long term (1996-2024) average (Spring)	Inshore temperature thresholds (around 14°C) initiate migration of squid from offshore overwintering habitats. Longfin squid seasonal distribution and growth rates are likely temperature dependent, avoiding water <8°C. Stronger and/or more persistent Mid-Atlantic Cold Pool conditions (not shown) may limit habitat availability (https://noaa-edab.github.io/catalog/cold_pool.html).	

* [7] = Longfin Squid Fishery Information Document

Data Gaps/Uncertainty

- Bottom temperature data comes from GLORYS [8], a modeled re-analysis product that incorporates insitu data.
- The Gulf Stream Index indicator is a yearly value and may not be indicative of changes in oceanographic processes on a smaller time scale.
- Aging uncertainty creates uncertainty around life history processes, spawning location and timing, and natural mortality.
- While survey data in the 1970s and 80s indicate larval squid south of Cape Hatteras in the winter months that are transported north into the Mid-Atlantic Bight, there is a lack of definitive data to prove this hypothesis.
- Effects of cannibalism on the population are unknown at this time.

We welcome your observations! Please contact northeast.ecosystem.highlights@noaa.gov with any on-the-water insights or changes observed in the black sea bass fishery and nefsc.esp.leads@noaa.gov with questions or comments on the information presented in this report.

The code used to create this report can be viewed online: github.com/NEFSC/READ-EDAB-longfinESP

References

1. W. Macy & J. Brodziak, Seasonal maturity and size at age of (*Loligo pealeii*) in waters of southern new england. *ICES Journal of Marine Science*, **58** (2001) 852–864. https://doi.org/10.1006/jmsc.2001.1076.
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3. E. M. C. Hatfield & S. X. Cadrin, Geographic and temporal patterns in size and maturity of the longfin inshore squid (*Loligo pealeii*) off the northeastern united states. *Fishery Bulletin*, **100** (2002) 200–213.
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5. O. S. Hamel & J. M. Cope, Development and considerations for application of a longevity-based prior for the natural mortality rate. *Fisheries Research*, **256** (2022) 106477. https://doi.org/10.1016/j.fishres.2022.106477.
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8. L. Jean-Michel, G. Eric, B.-B. Romain, G. Gilles, M. Angélique, D. Marie, B. Clément, H. Mathieu, L. G. Olivier, R. Charly, C. Tony, T. Charles-Emmanuel, G. Florent, R. Giovanni, B. Mounir, D. Yann, & L. T. Pierre-Yves, The Copernicus Global 1/12° Oceanic and Sea Ice GLORYS12 Reanalysis. *Frontiers in Earth Science*, **9** (2021) 698876. https://doi.org/10.3389/feart.2021.698876.