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Comparison of a bottom longline survey and a bottom trawl survey for 2 groundfish species in the Gulf of Maine to evaluate habitat-related availability of large fish

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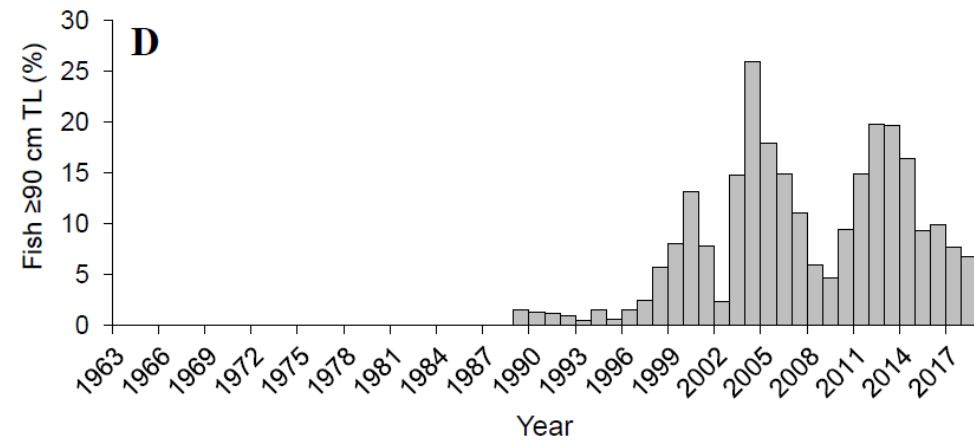
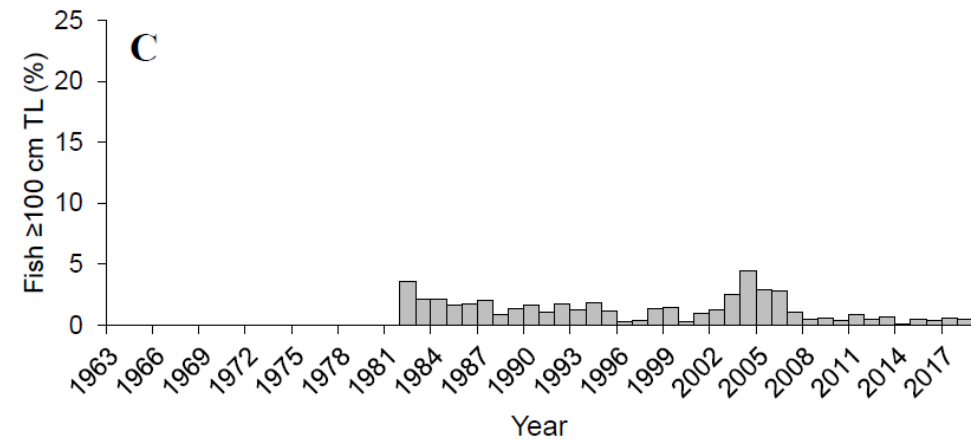
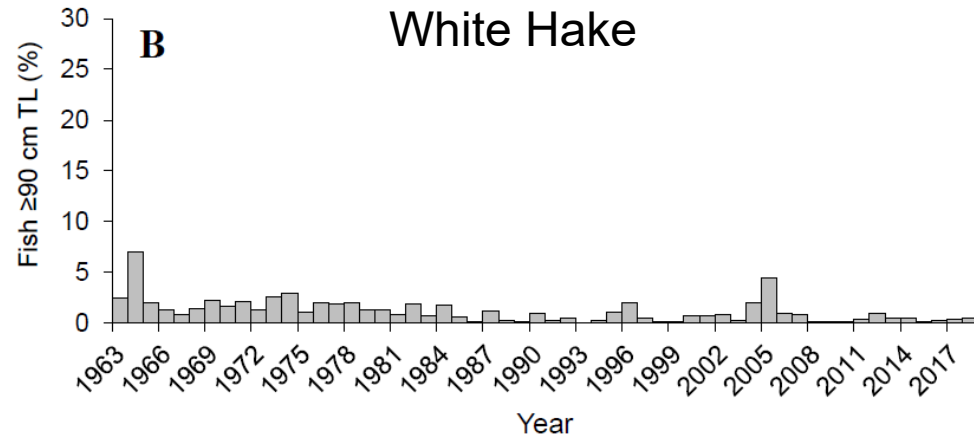
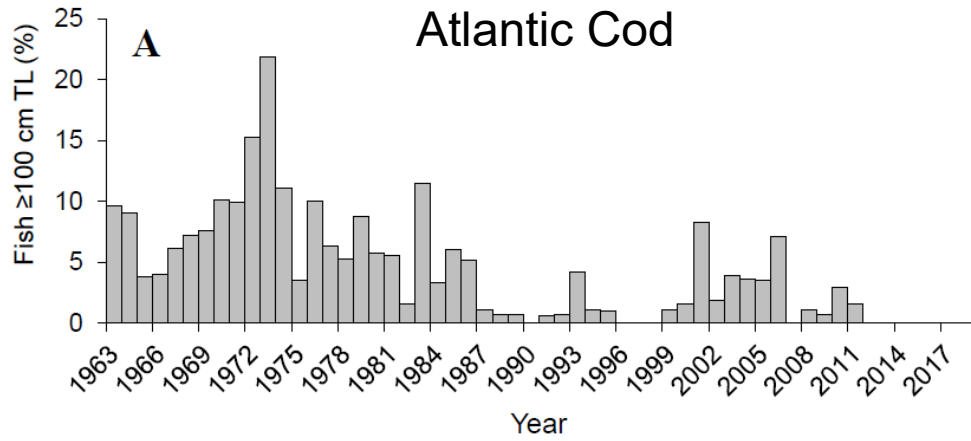
Cooperative Research Branch, NEFSC

NEFSC Bottom Trawl Survey (BTS) and Bottom Longline Survey (BLLS)

- Research Question: Are large cod or white hake less available to the BTS due to greater occurrence in structured habitats?
 - Does the BLLS's focus on rough bottom provide a data source to explore differences in availability?
 - Do these results provide evidence supporting or countering the current selectivity for the BTS used in the assessments for these species?
- White hake provide a good comparison to cod as a co-occurring gadid that has stronger evidence for size-related availability differences in the BTS catches
- Long standing question raised at NEFSC cod assessments by constituents and researchers



Atlantic Cod and White Hake Size Compositions in the Gulf of Maine (GOM) for the BTS and Commercial Landings



BTS

Commercial Landings

- Percentage of large fish (≥ 100 cm TL for cod and ≥ 90 cm TL for white hake)
- Fish ≥ 50 cm TL for cod, and all lengths for white hake

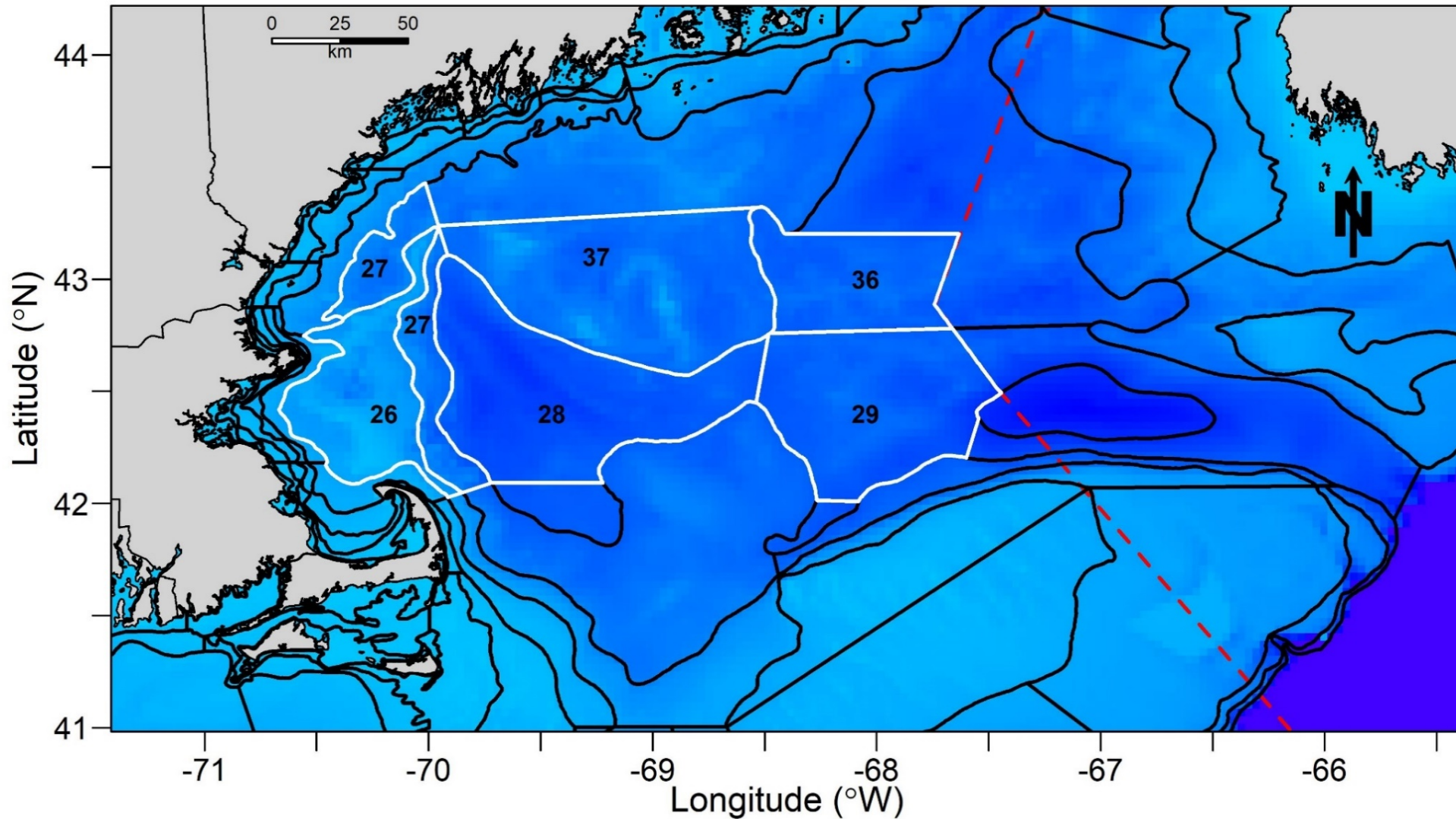


BLLS Description

- Objective: Provide complimentary data from structured habitats not well-sampled by BTS with a focus on data-poor species and important groundfish
- Random stratified survey built on the BTS design further sub-stratified by bottom type (rough and smooth)
- [NEFSC CRB](#) run industry-based survey
 - Survey design document (2014-2017): Tech Memo [249](#)
 - Rough/Smooth strata determined using rugosity quantified using terrain ruggedness index (TRI) using a bathymetric grid (1.3 km²)
- Tub-trawl BLL gear w/1000 EZ-baiter 12/0 semi-circle hooks, baited w/ *Illex* squid
 - 1 nm mainline (approx. distance of a BTS tow)
 - 2 hour soak time, set across slack tide (set 1 hr prior to slack)

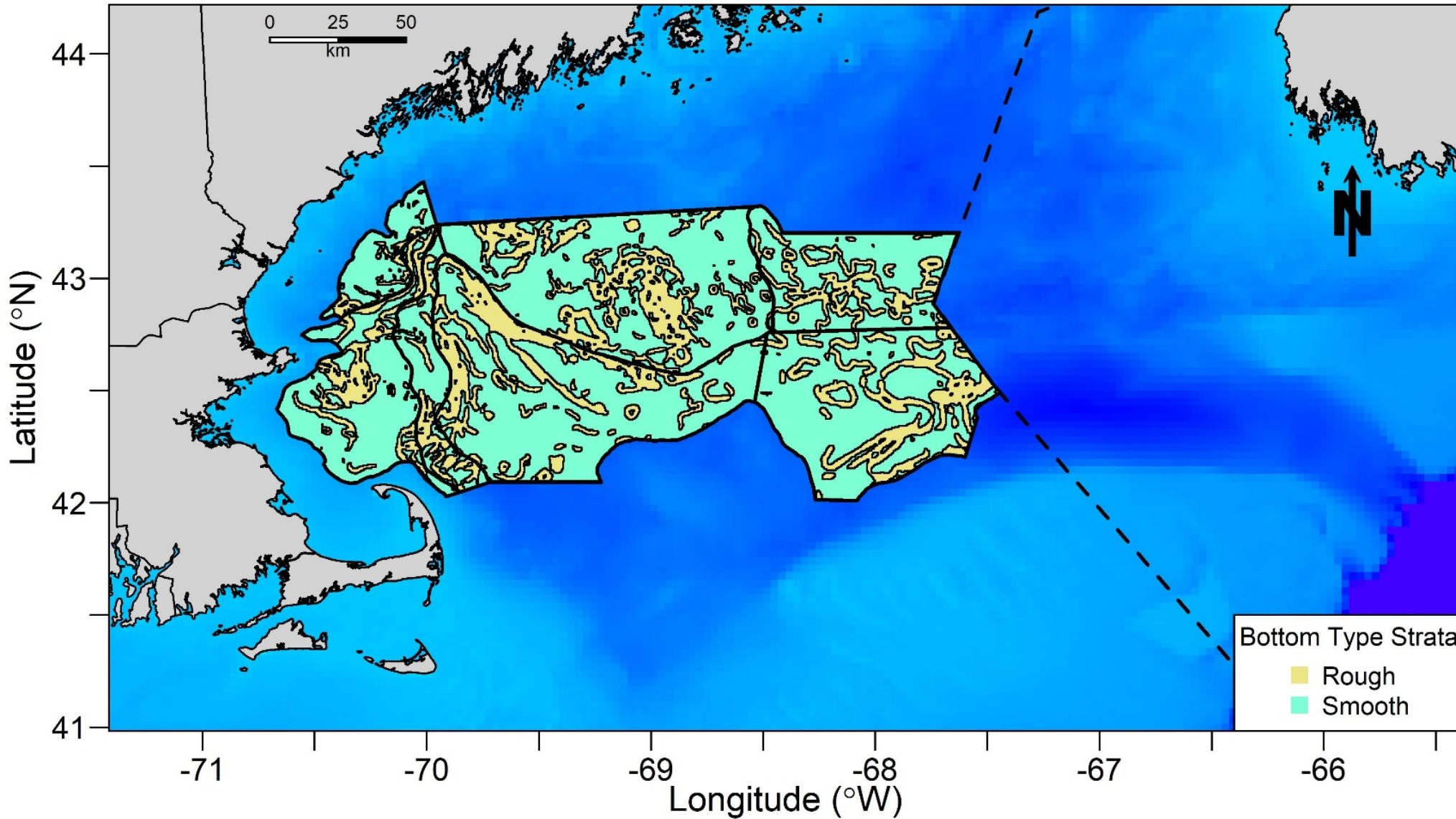


BLLS Strata Map



BLLS strata (white)
BTS strata (black)

BLLS Bottom Type Map

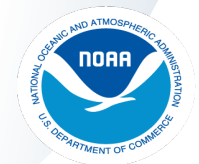


BLLS
bottom type
sub-strata



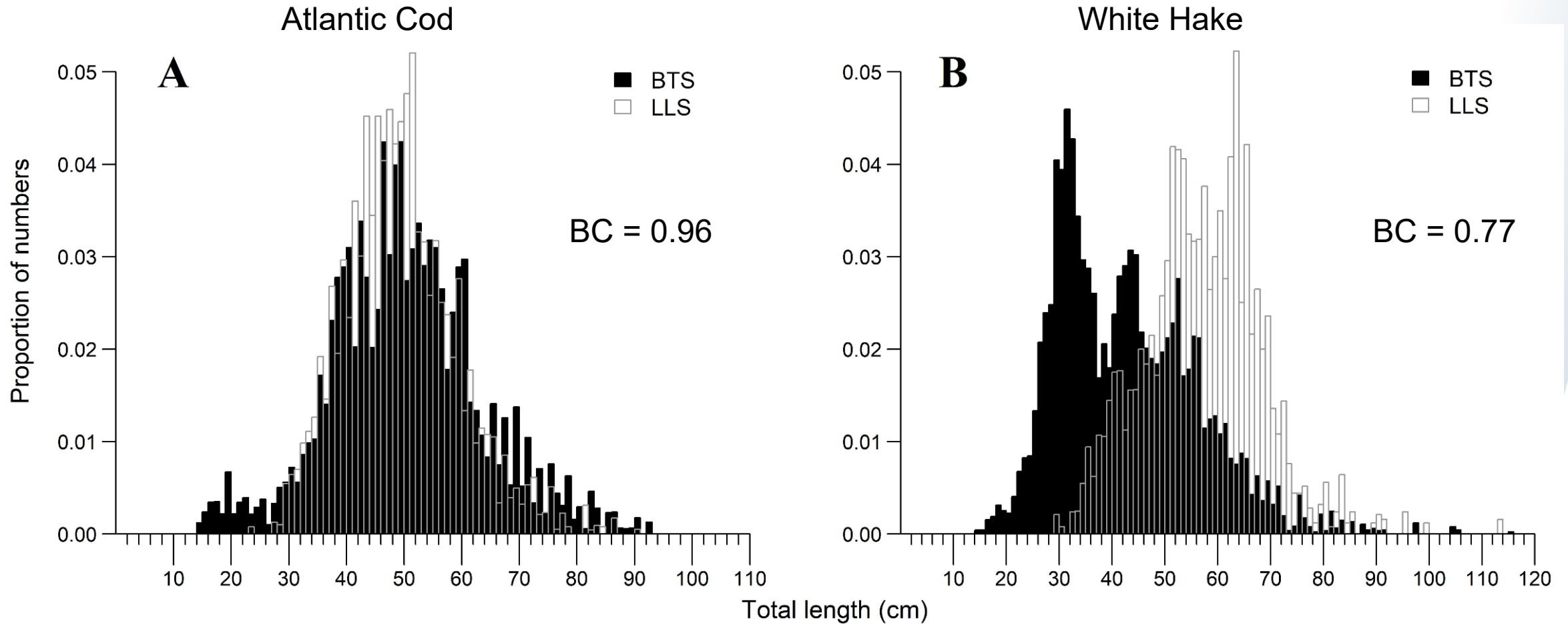
BLLS and BTS Size Composition Comparisons

- Data from 2014-2018 for both surveys from valid stations
 - Compared by season & year, and overall
- Data from all rough strata for BLLS, and from strata used in each assessment for BTS
- Length compositions were compared using the stratified mean abundance at length
 - Proportional number at length
- Bhattacharyya coefficient as a measure of overlap of the length frequencies
 - 0 to 1, with 1 indicating identical distributions



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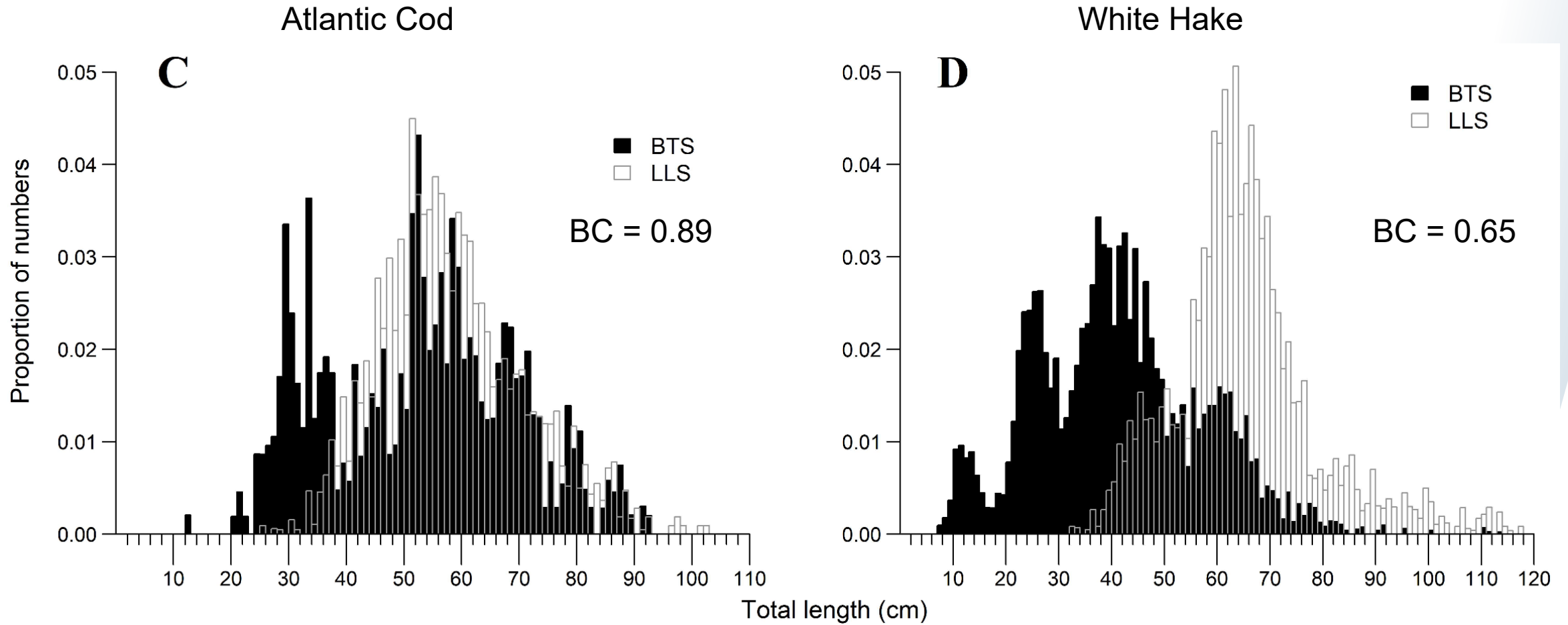
BLLS and BTS Size Composition Comparisons Spring, 2014-2018 combined



Proportion of fish at length for each survey



BLLS and BTS Size Composition Comparisons Fall, 2014-2018 combined



Proportion of fish at length for each survey



BLLS and BTS Size Composition Comparisons - Conclusions

- Large differences between the surveys observed at small sizes (<35 cm)
 - Small fish poorly represented in BLLS catches
- Some evidence that habitat could influence the availability of large white hake to the BTS
- No evidence for habitat-related availability for large cod to the BTS
- Survey comparisons were consistent with comparisons between BTS and commercial landings data
- Results support the continued use of dome-shaped selectivity for white hake in BTS
- Results support the continued use of asymptotic selectivity for cod in BTS

