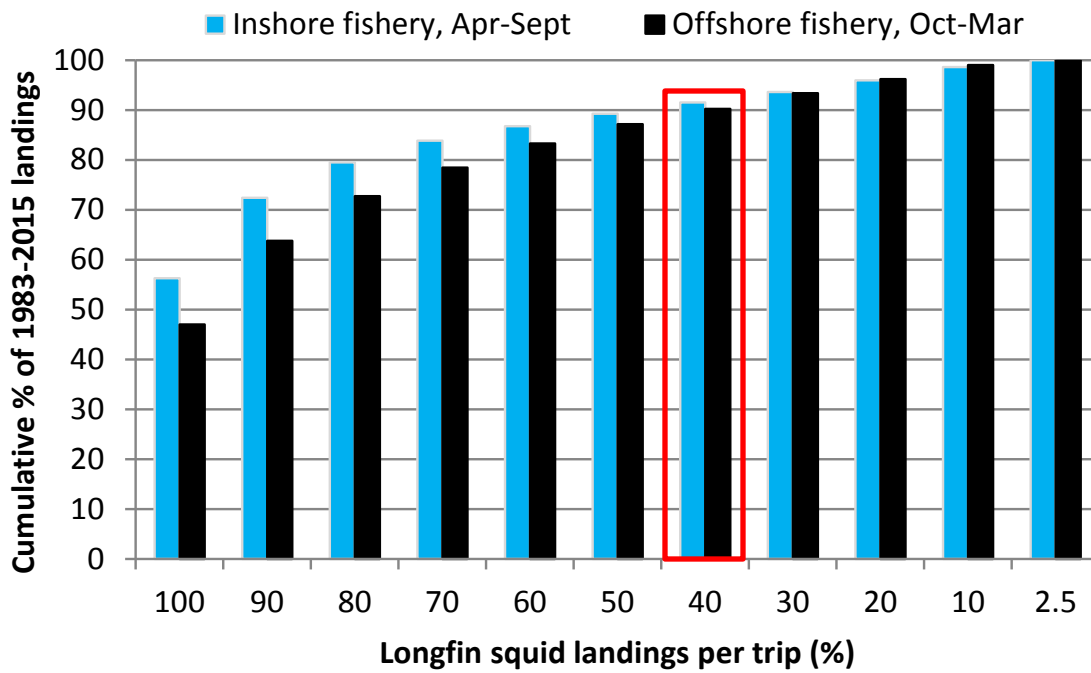
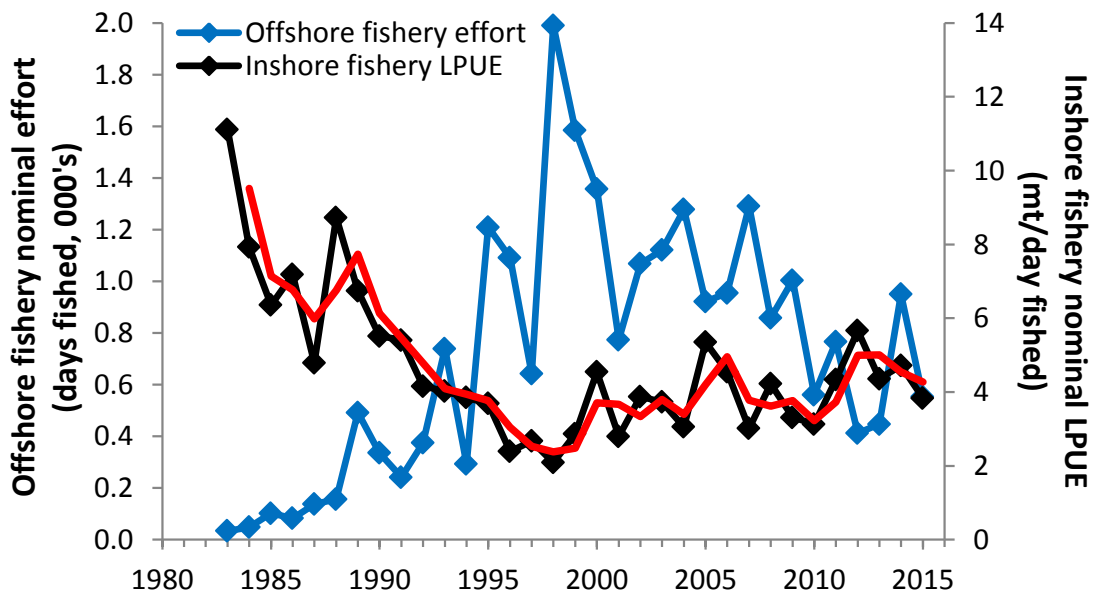
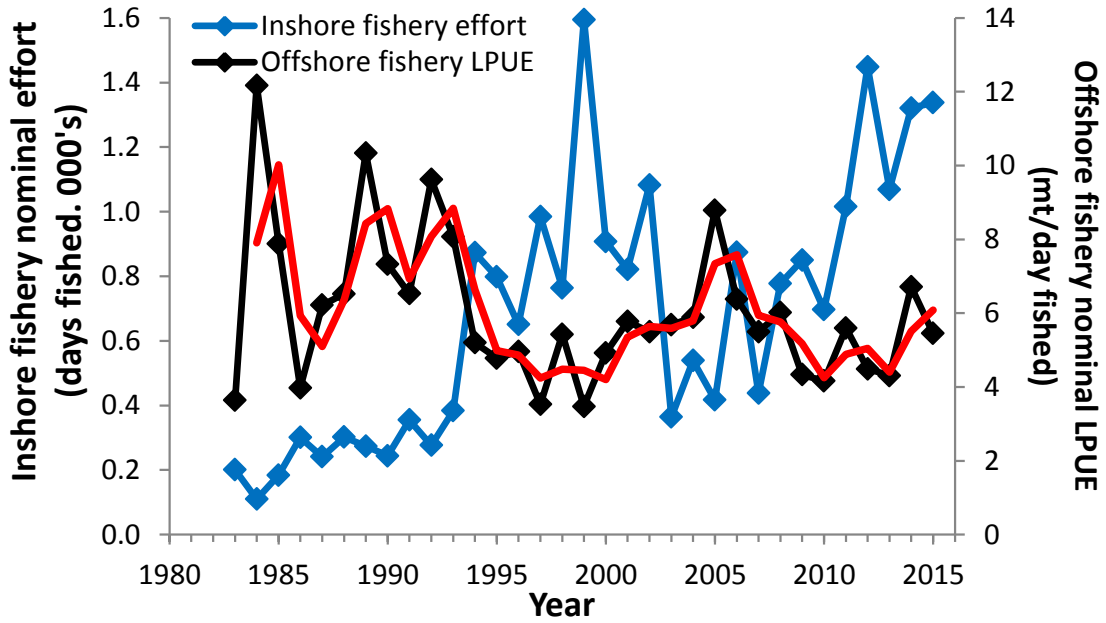


In this briefing document there are several analyses/documents provided by the Science Center (i.e. Dr. Lisa Hendrickson). Lisa will provide presentations on the results of these analyses.

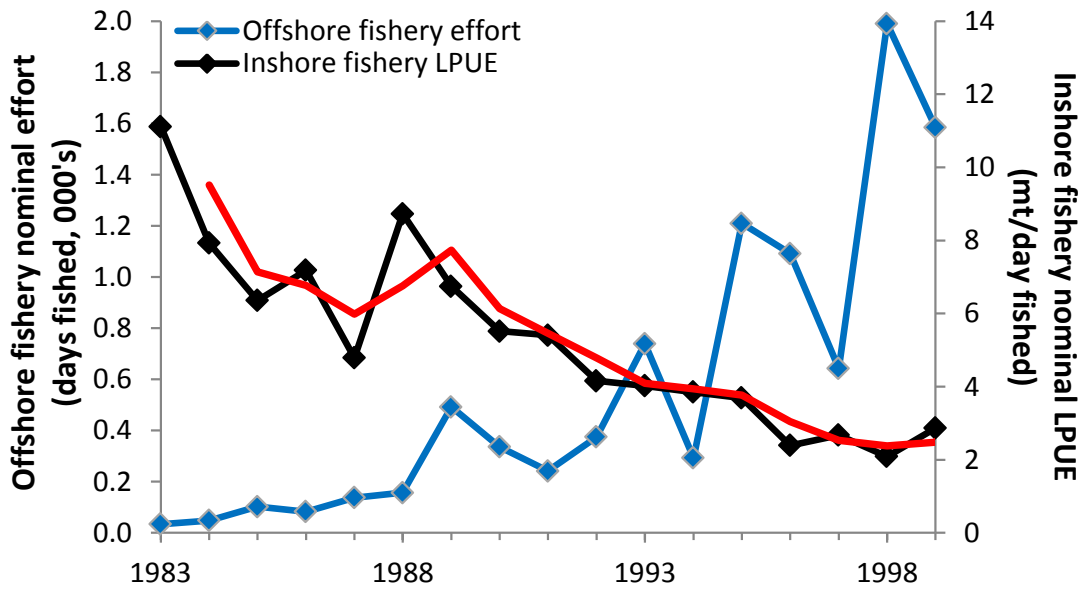
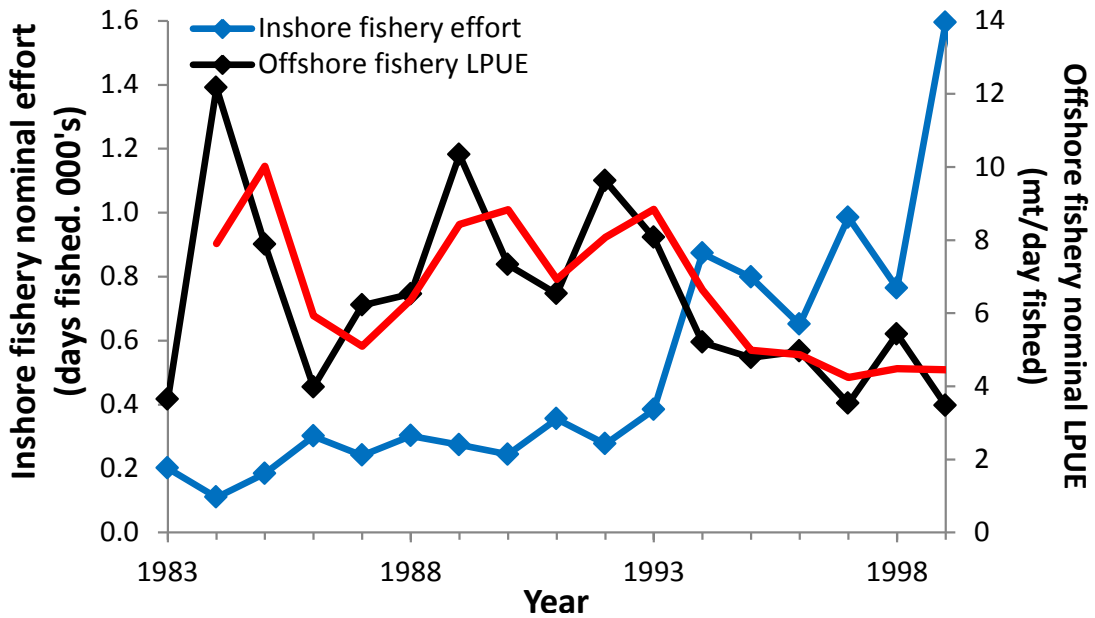
1. Inshore-Offshore longfin relationships (relates to trimester allocation issue)
2. Longfin three region analyses (related to Nantucket & Marth's Vineyard issue)
3. Longfin EFH Map (general)
4. MA longfin squid survey Indices (general)
5. ME-NH longfin squid survey Indices (Maine Issue)



Trips with > 40% longfin squid landings were used in the analysis of fishing effort and LPUE (mt per day fished) for the inshore (Apr-Sept) and offshore (Oct-Mar) longfin squid fisheries during 1983-2015. This landings threshold accounted for 92% of the inshore fishery landings and 90% of the offshore fishery landings.



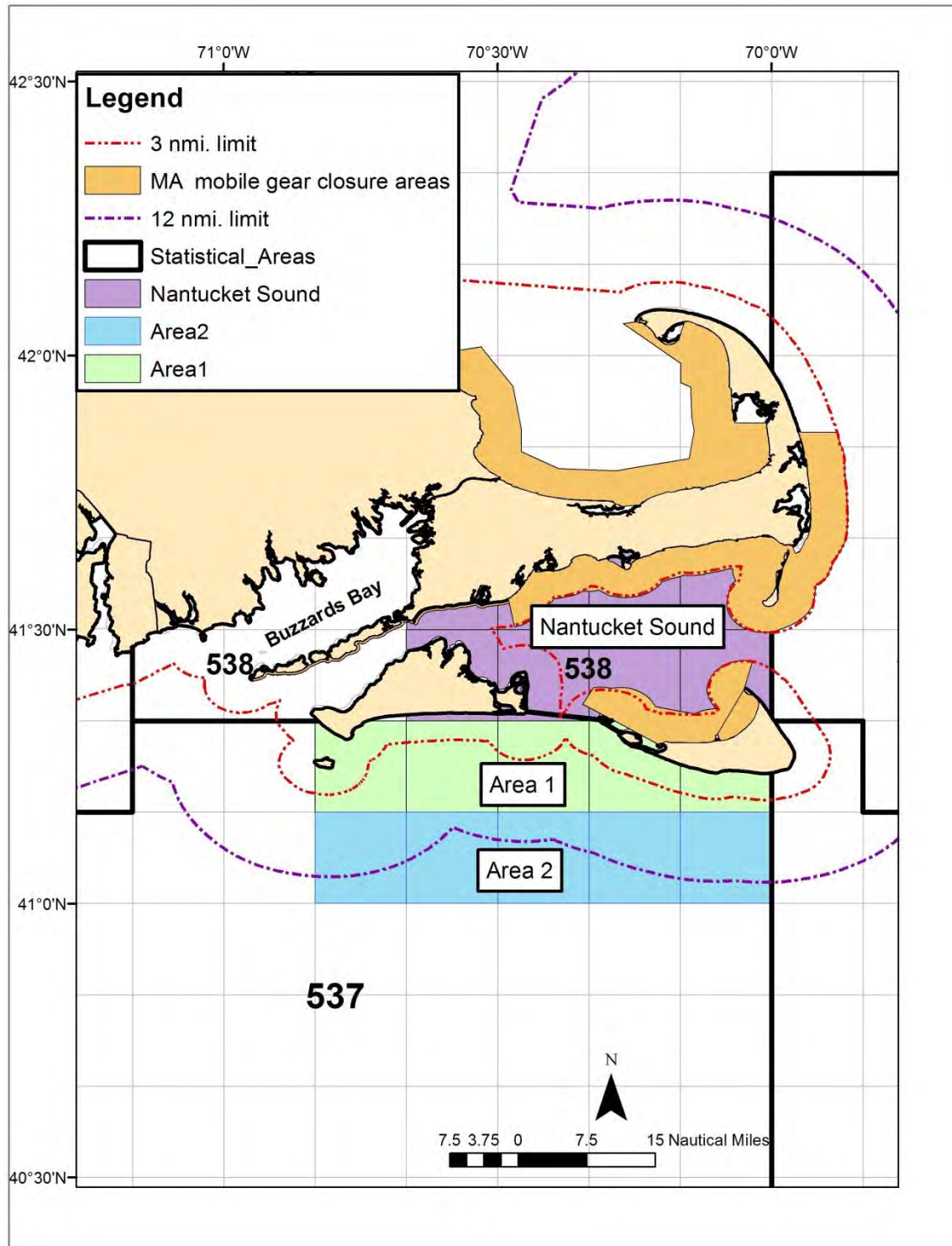
Relationship between declines in longfin squid offshore fishery LPUE (mt per day fished) and increases in longfin squid inshore fishery effort (top panel), and vice versa, during 1983-2015. Likewise, the bottom panel indicates that inshore fishery LPUE declined as offshore fishery effort increased and vice versa. Thus, effort in one fishery affects the relative biomass of the other fishery.



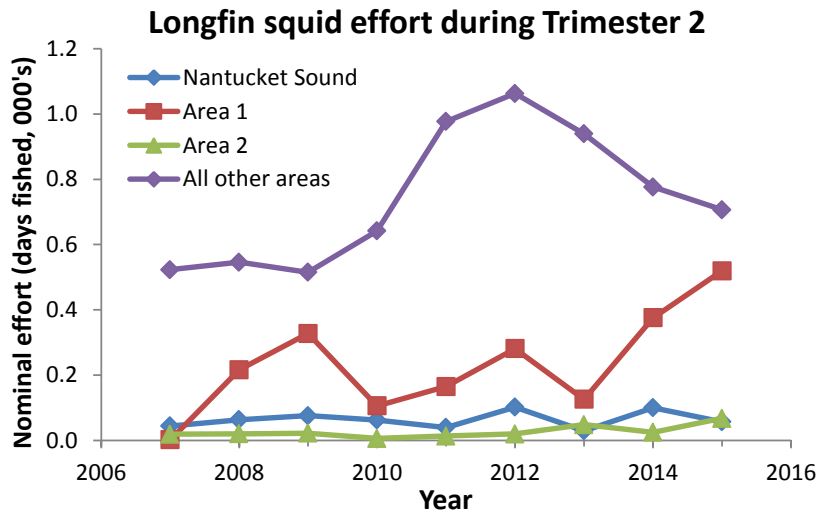
The effect of inshore fishery effort on offshore fishery LPUE (top panel) and the reverse (bottom panel) is especially pronounced during 1983-1999; a period when in-season closures and the related trip limits were not in effect.

Pearson correlation coefficients indicate highly significant negative correlations between inshore fishery effort (days fished) and offshore fishery LPUE (mt per day fished), and vice versa, during 1983-2015.

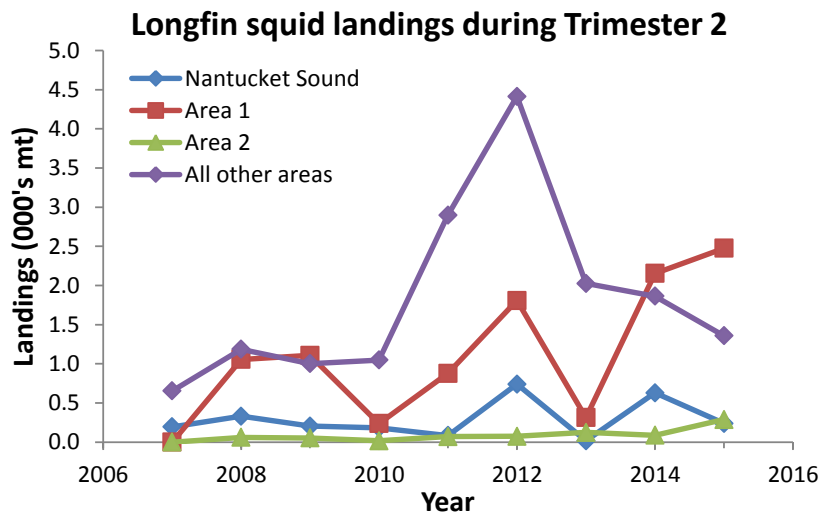
	<b>Year</b>	<b>Inshore_df</b>	<b>Offshore_df</b>	<b>Inshore_LPUE</b>	<b>Offshore_LPUE</b>
<b>Year</b>	1	0.72	0.47	-0.55	-0.35
		<.0001	0.0063	0.0009	0.0489
<b>Inshore_df</b>	0.72	1	0.45	-0.48	-0.53
	<.0001		0.0091	0.0044	0.0014
<b>Offshore_df</b>	0.47	0.45	1	-0.69	-0.28
	0.0063	0.0091		<.0001	0.1114
<b>Inshore_LPUE</b>	-0.55	-0.48	-0.69	1	0.29
	0.0009	0.0044	< <b>0.0001</b>		0.1046
<b>Offshore_LPUE</b>	-0.35	-0.53	-0.28	0.29	1
	0.0489	<b>0.0014</b>	0.1114	0.1046	



The three regions (defined by ten-minute squares) for which longfin squid fishery effort was quantified. Nantucket sound is regulated solely by the MA DMF, as are the portions of Area 1 (green TNMS) located south of Martha's Vineyard and Nantucket that lie within the red dashed line (3 nmi. limit). NOAA Fisheries has jurisdiction over the waters in Area2 and beyond three nmi. in Area 1.



Year	Nominal days fished for longfin squid during Trimester 2				Total	Proportion in Area 1
	Nantucket Sound	Area 1	Area 2	All other areas		
2007	44	2	19	523	588	0.00
2008	63	216	20	546	846	0.26
2009	76	327	22	515	941	0.35
2010	63	106	6	642	816	0.13
2011	40	165	14	977	1,195	0.14
2012	102	281	20	1,063	1,465	0.19
2013	30	126	48	940	1,144	0.11
2014	100	376	25	776	1,277	0.29
2015	57	519	68	707	1,350	0.38

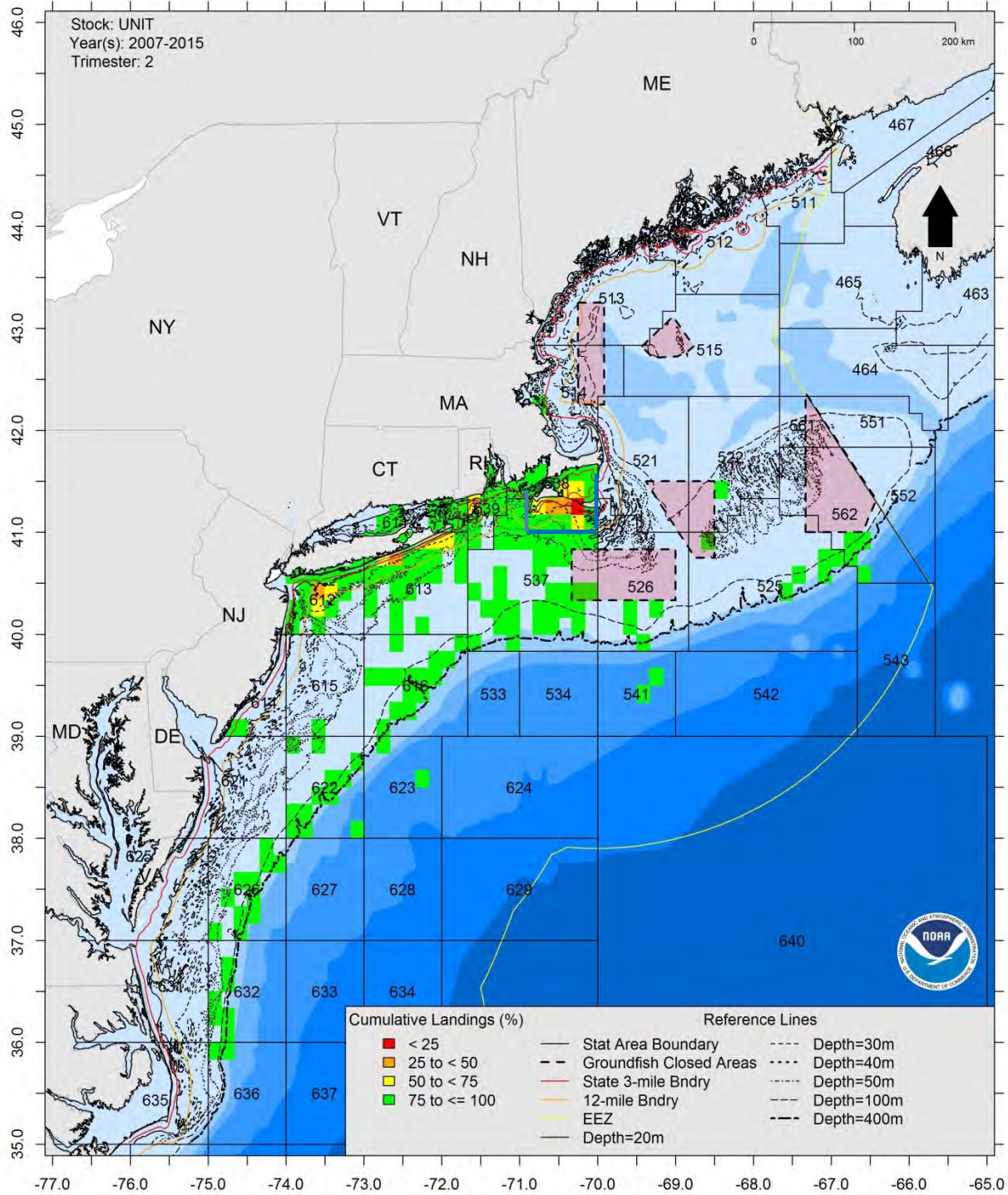


Year	Longfin squid landings during Trimester 2				Total	Proportion in Area 1
	Nantucket Sound	Area 1	Area 2	All other areas		
2007	196	< 1	1	655	852	0.00
2008	332	1,057	61	1,187	2,638	0.40
2009	205	1,108	55	1,004	2,372	0.47
2010	184	238	18	1,048	1,488	0.16
2011	85	878	72	2,899	3,933	0.22
2012	740	1,809	75	4,413	7,037	0.26
2013	19	314	125	2,026	2,484	0.13
2014	630	2,154	89	1,864	4,737	0.45
2015	240	2,476	289	1,359	4,364	0.57

During 2008-2015, nominal effort (days fished) for longfin squid (within the three study regions) occurred predominately () in Area 1 during Trimester 2 and was highest during 2014 and 2015 (totaling 29% and 39%, respectively, of the longfin squid effort during Trimester 2). Landings (mt) during the same time period were also predominately from Area 1 and were the highest of all areas during 2014 and 2015 (totaling 45% and 57%, respectively, of the longfin squid landings during Trimester 2).

# Longfin Inshore Squid

*Doryteuthis pealeii*

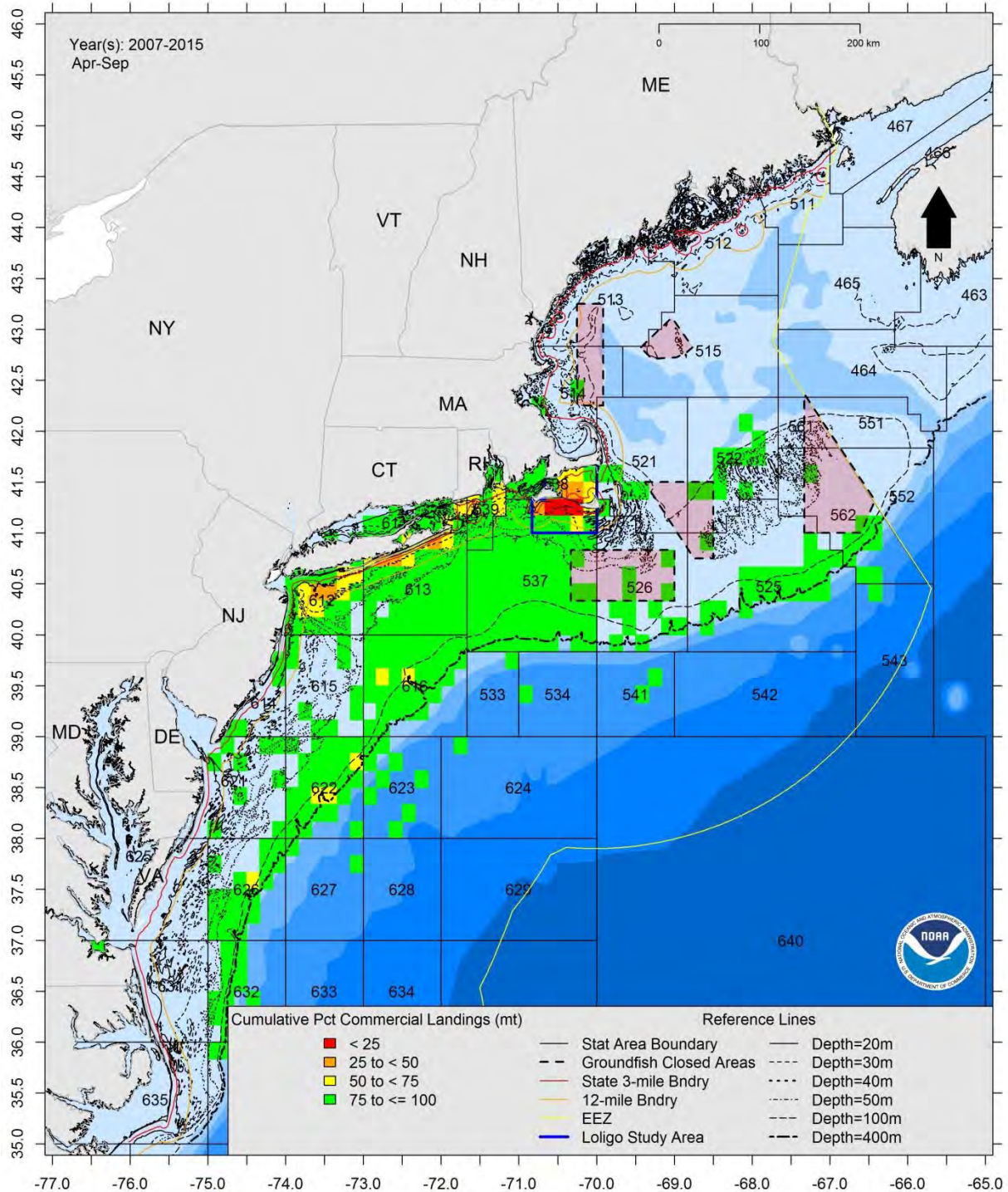


Cumulative landings (% mt by ten-minute square) for bottom trawl trips with landings > 2,500 lbs of longfin squid in Trimester 2 during 2007-2015. The boundary of the study area is shown in blue.



# Longfin Inshore Squid

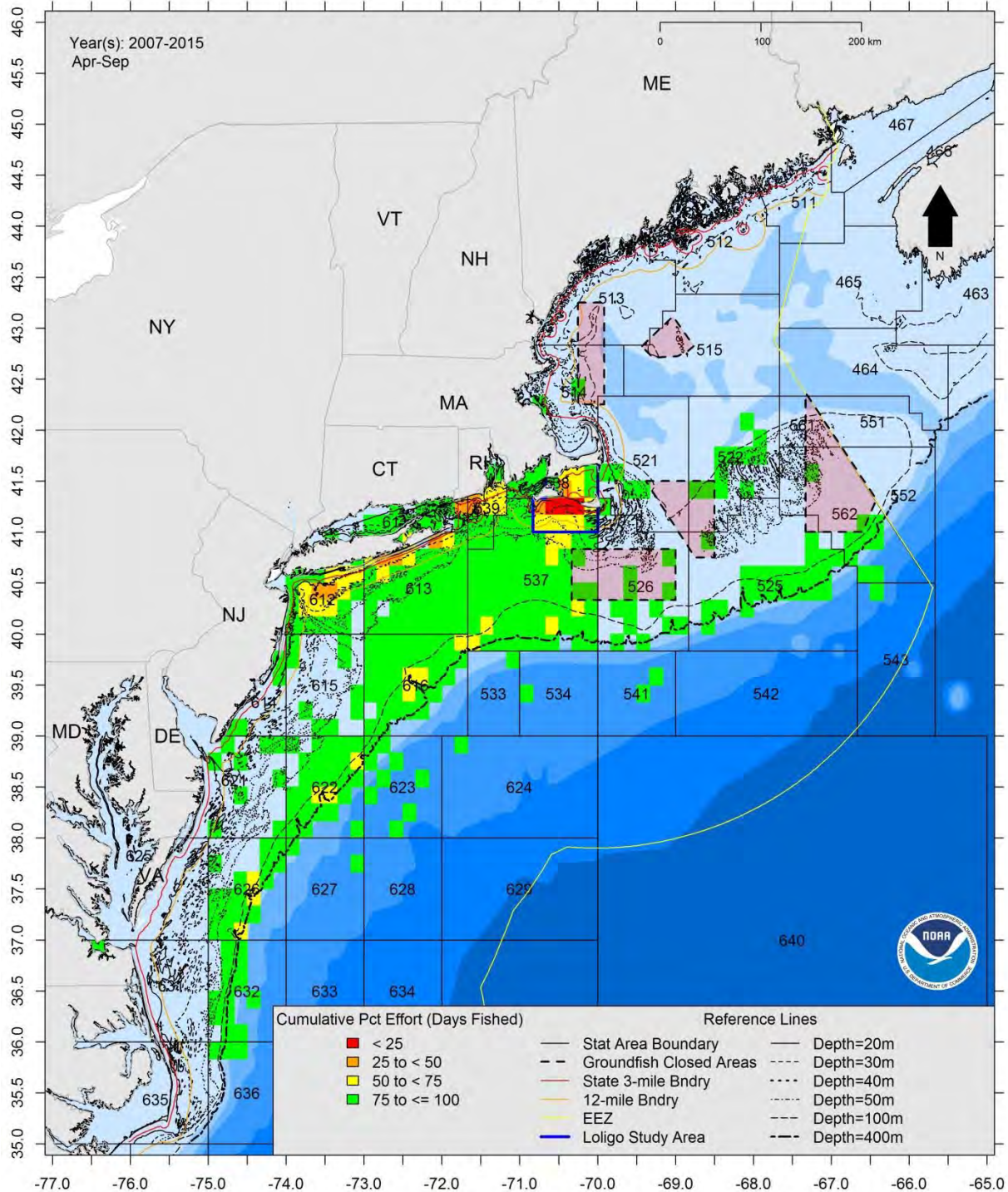
*Doryteuthis pealeii*



Cumulative landings (% , mt by ten-minute square) for bottom trawl trips with landings > 500 lbs of longfin squid in April-September during 2007-2015. The boundary of the study area is shown in blue.

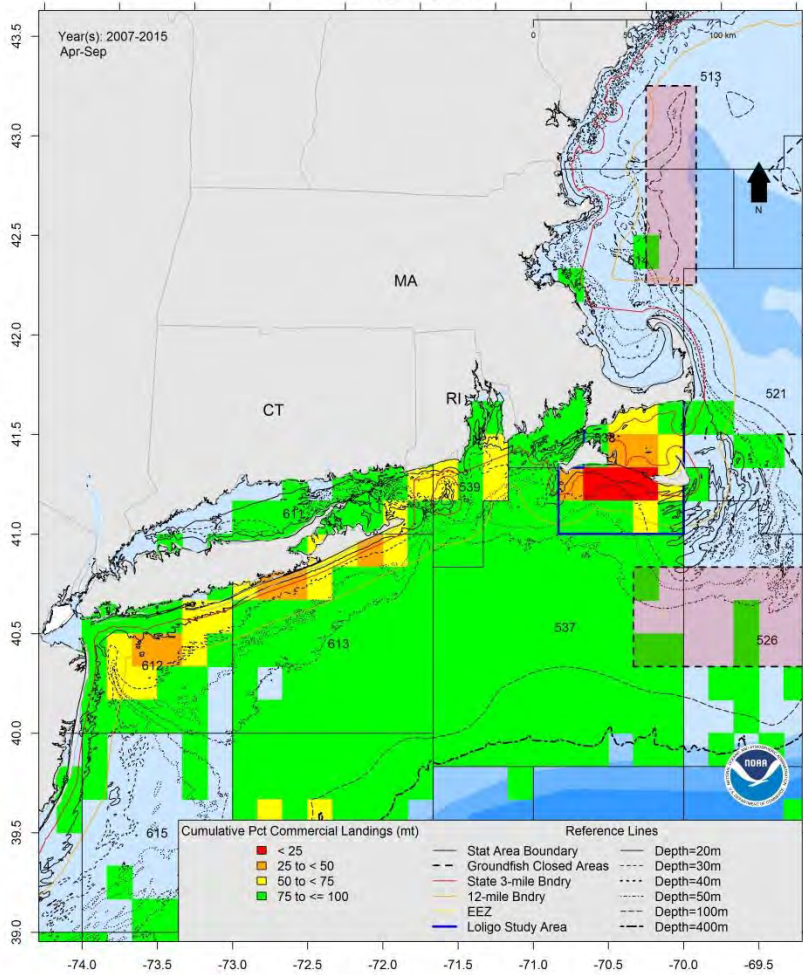
# Longfin Inshore Squid

*Doryteuthis pealeii*

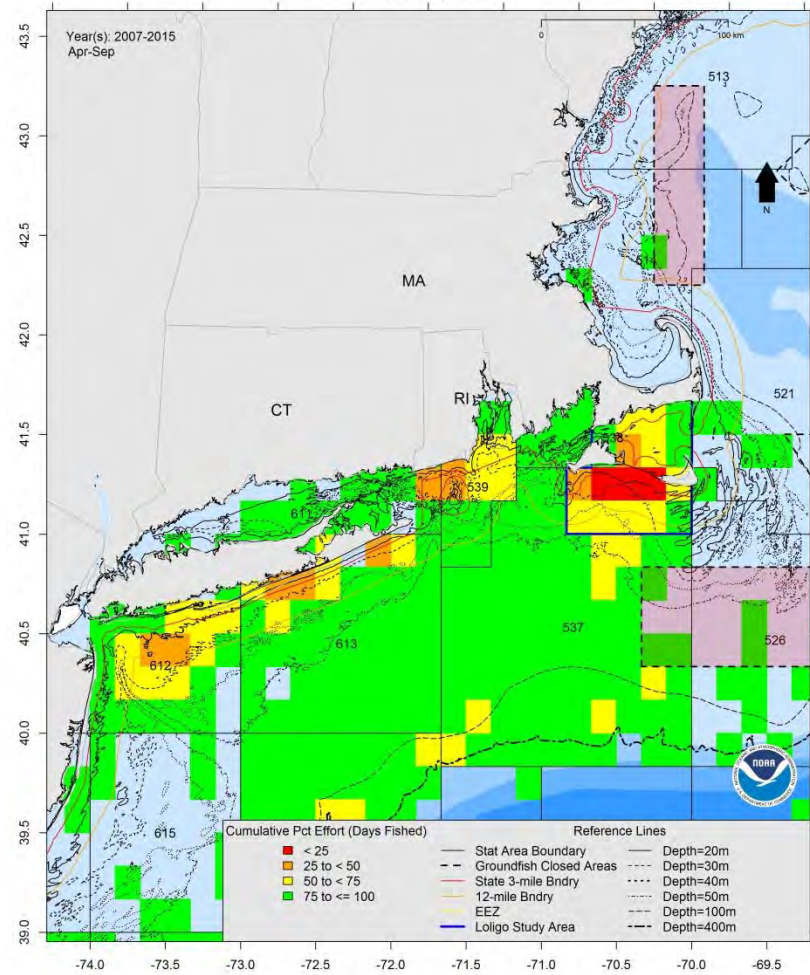


Cumulative effort (% days fished by ten-minute square) for bottom trawl trips with landings > 500 lbs of longfin squid in April-September during 2007-2015. The boundary of the study area is shown in blue.

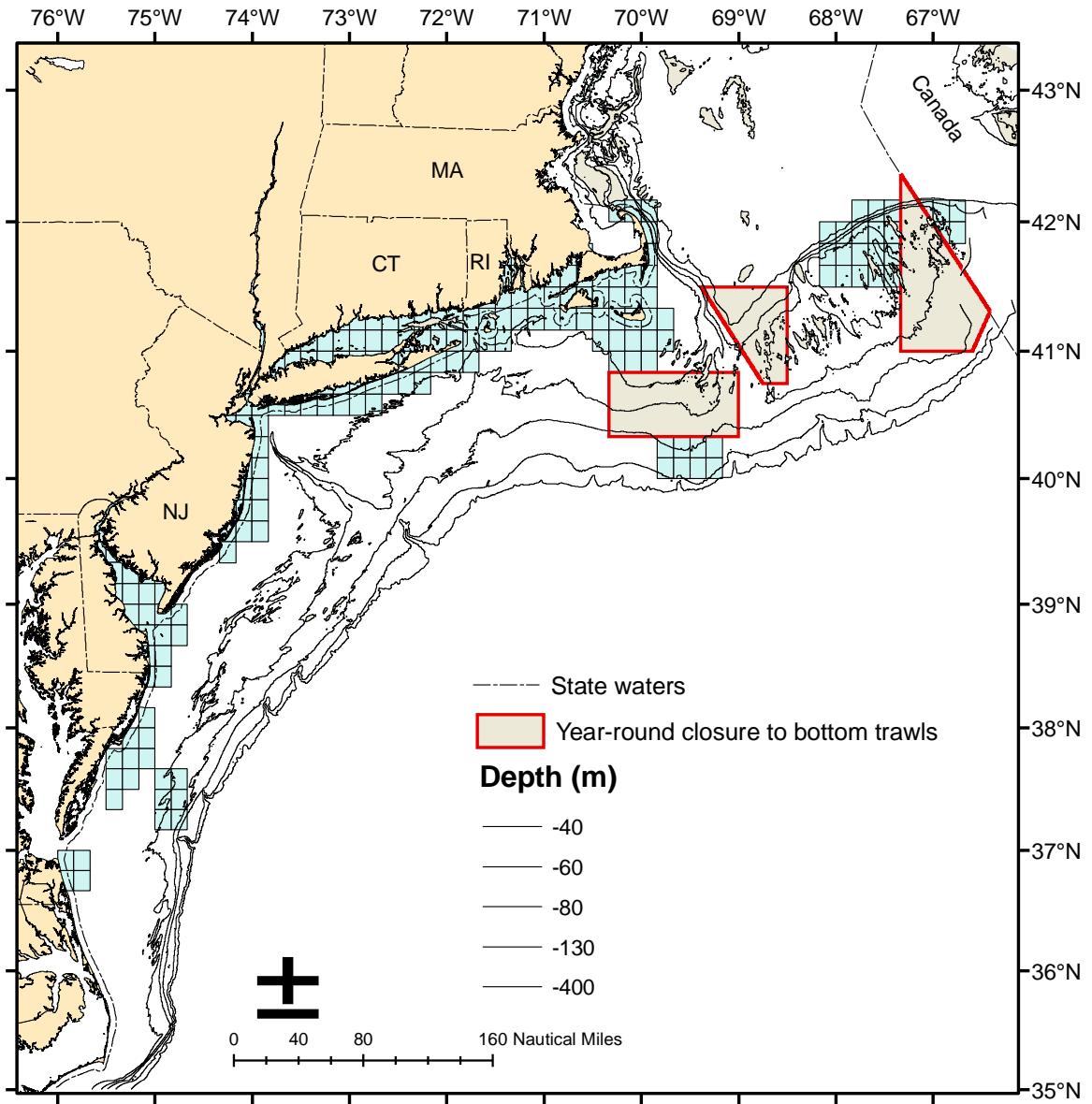
### Longfin Inshore Squid *Doryteuthis pealeii*



### Longfin Inshore Squid *Doryteuthis pealeii*



Cumulative landings (% mt by TNMS, left panel) and effort (% days fished by TNMS) for bottom trawl trips with > 500 lbs of longfin squid landings in April-September during 2007-2015. The boundary of the study area is shown in blue.



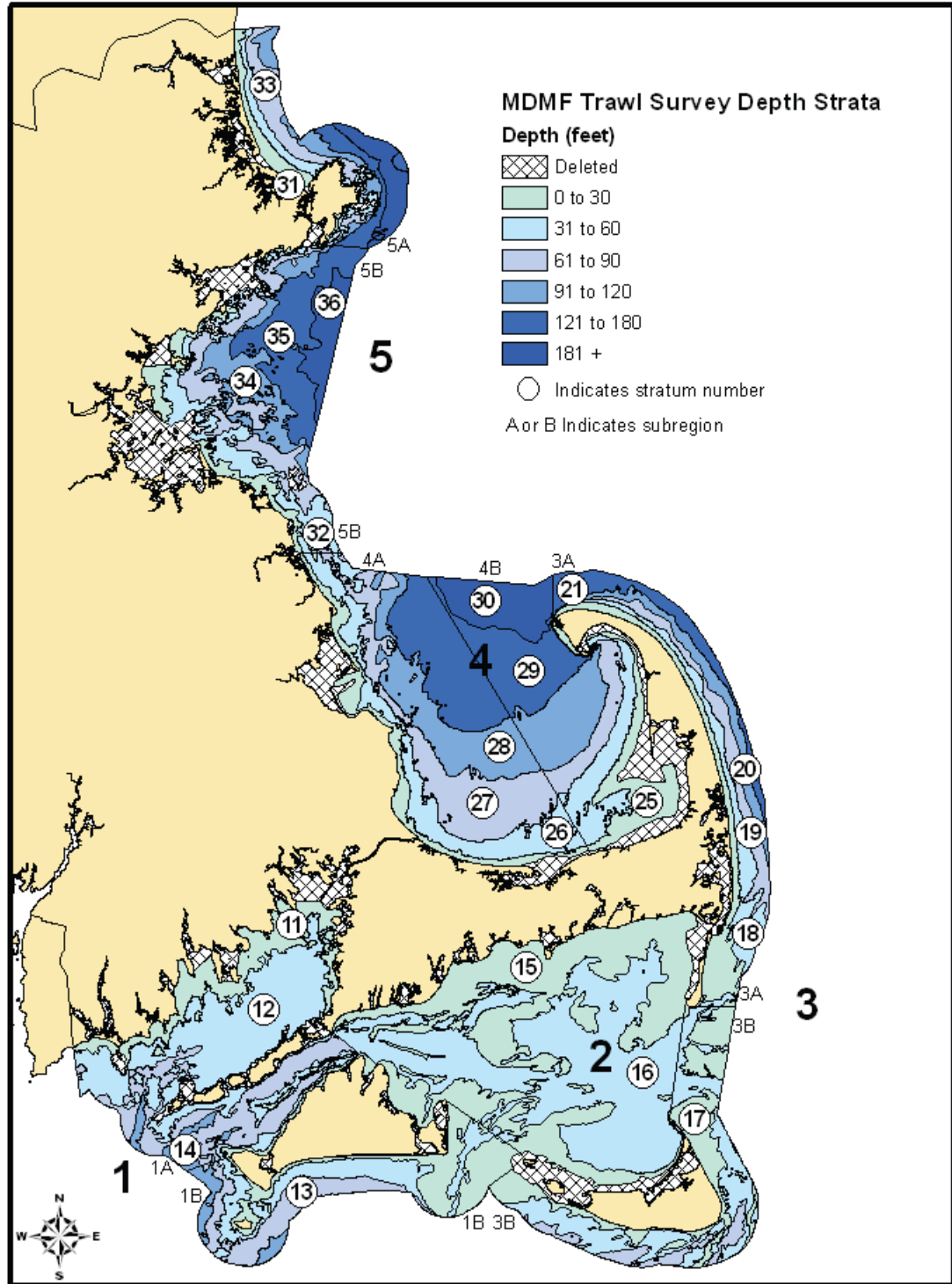
Essential Fish Habitat, by ten-minute square, for longfin squid egg masses based on incidental catches of the benthic egg masses in the longfin squid bottom trawl fishery.

# MA DMF BT Survey Strata

Nantucket Sound is < 18 m deep (60 ft)

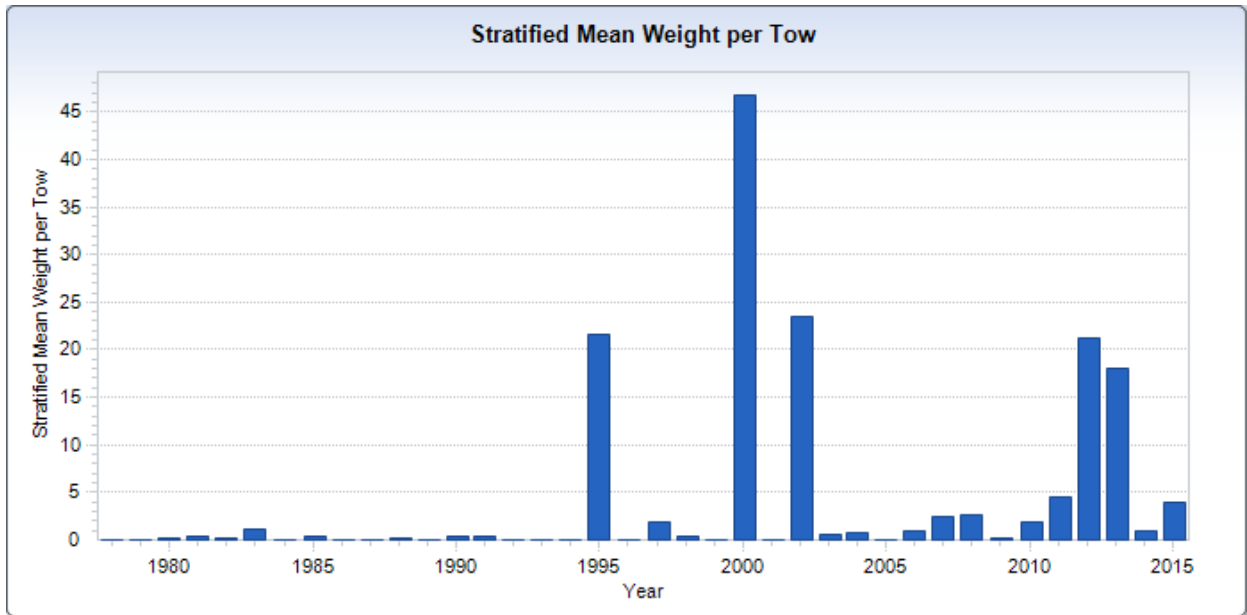
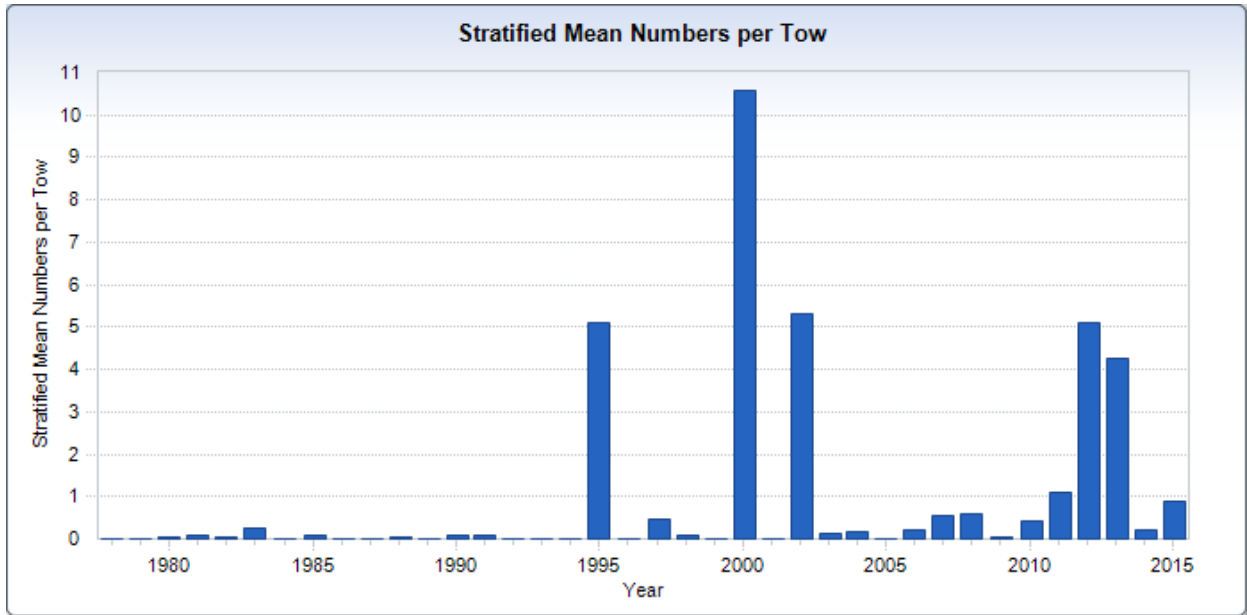
South of MV and Nantucket islands, the depth is < 27 m (90 ft)

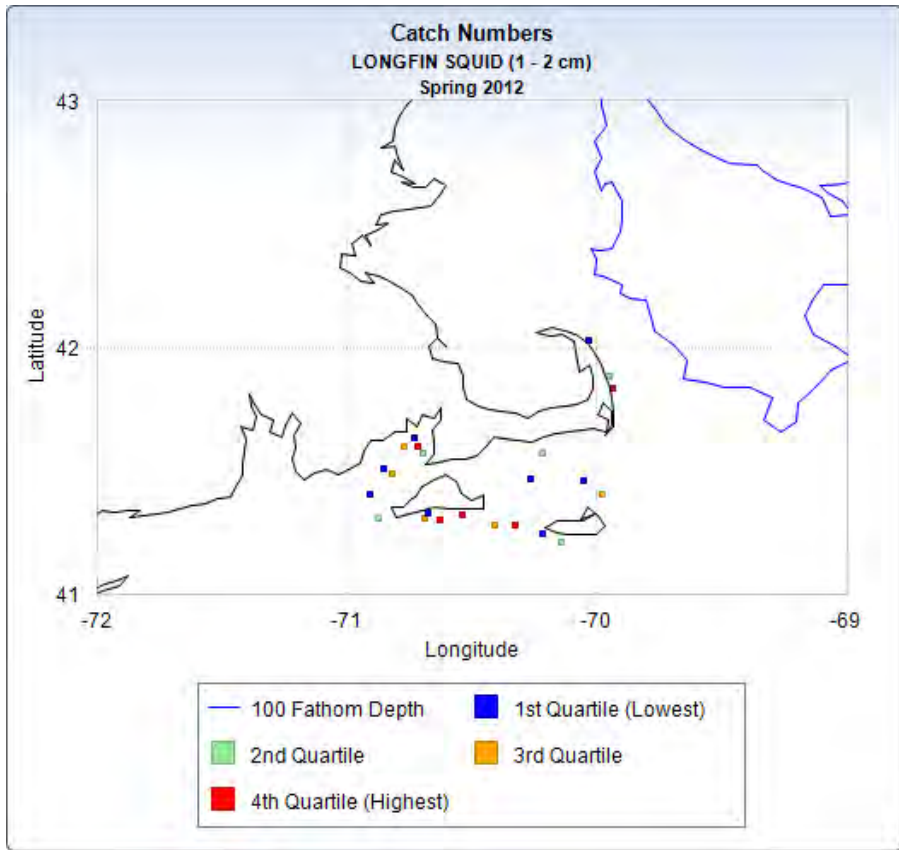
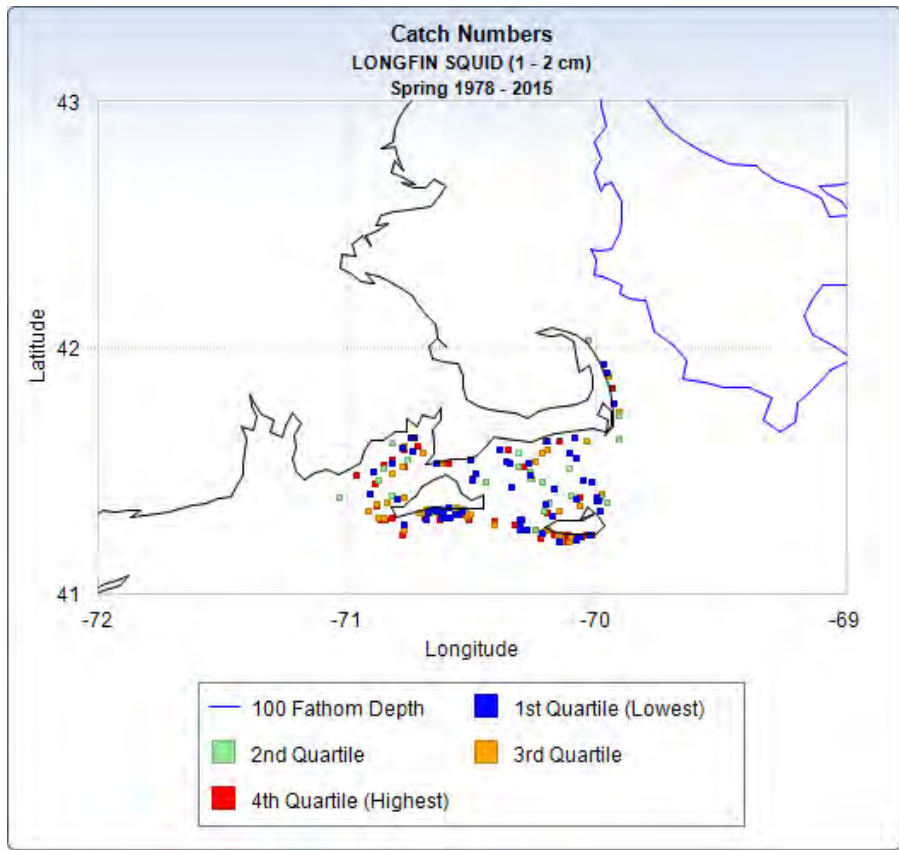
Survey sampling occurs in waters as shallow as 6 m



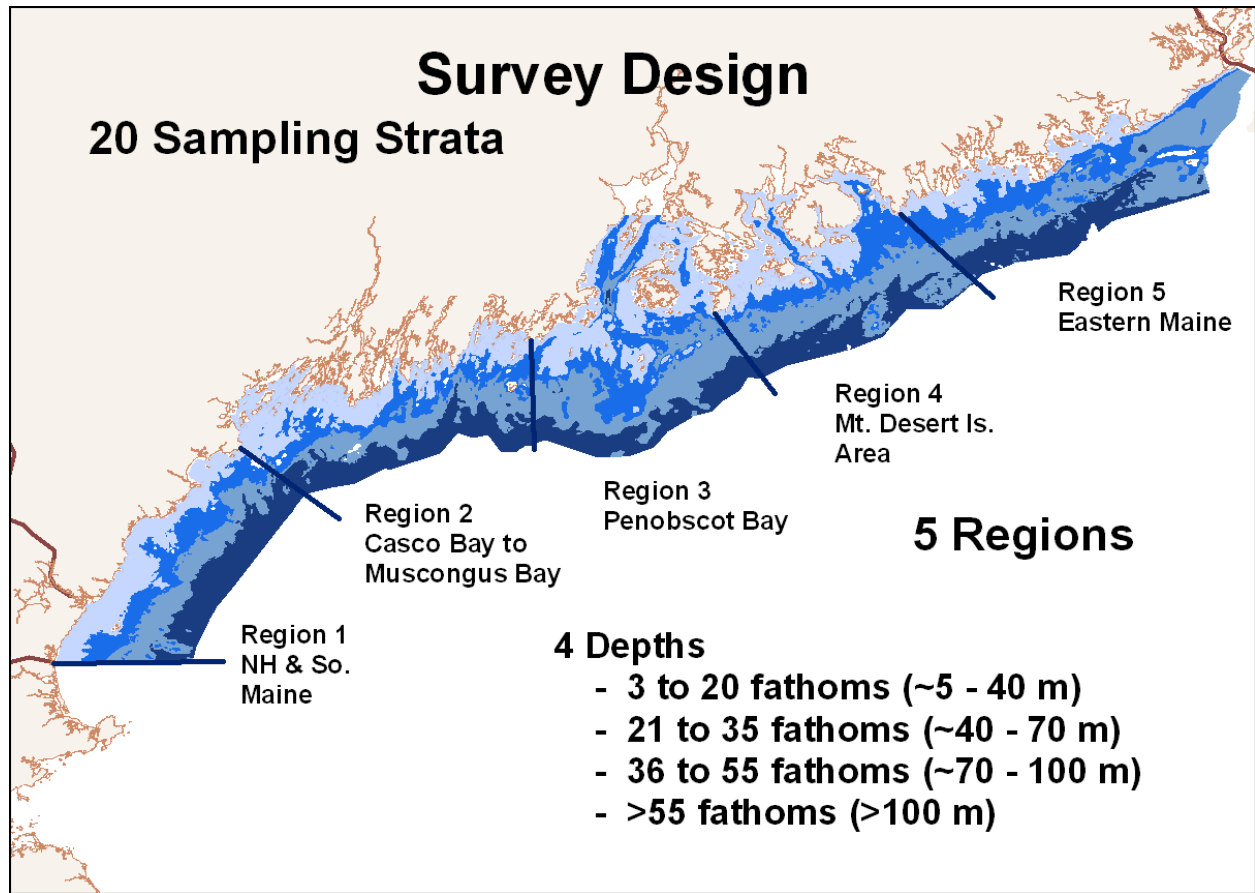
## Survey strata 11-21

### MA DMF survey indices for longfin squid $\leq 2$ cm DML



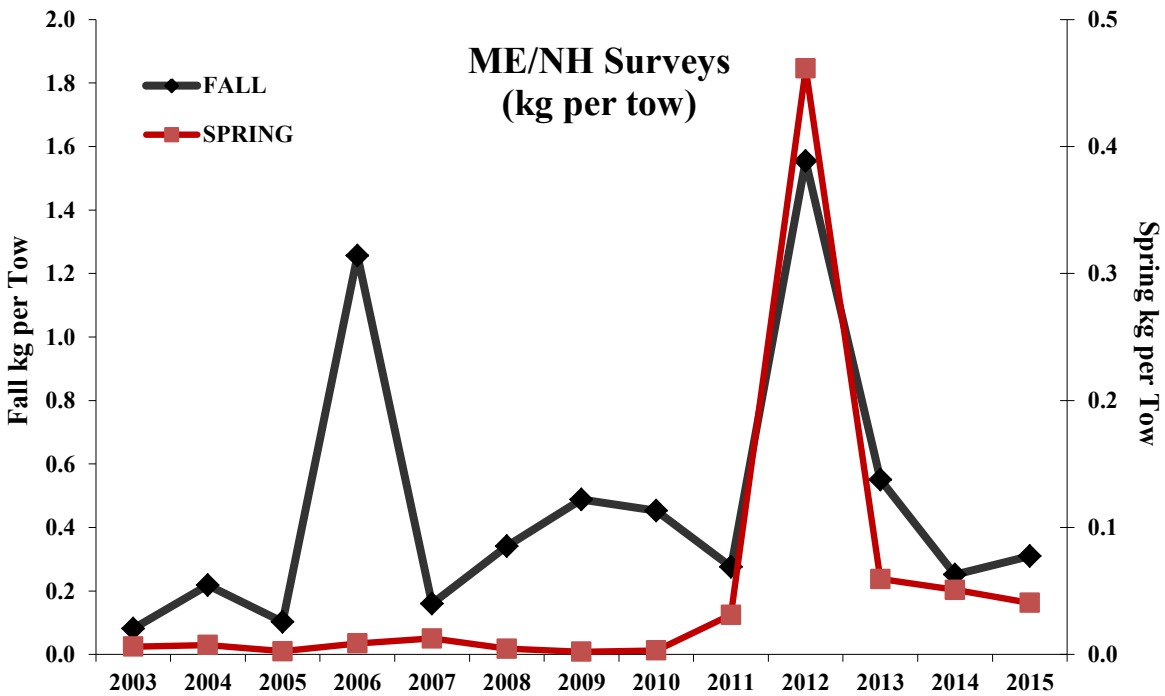
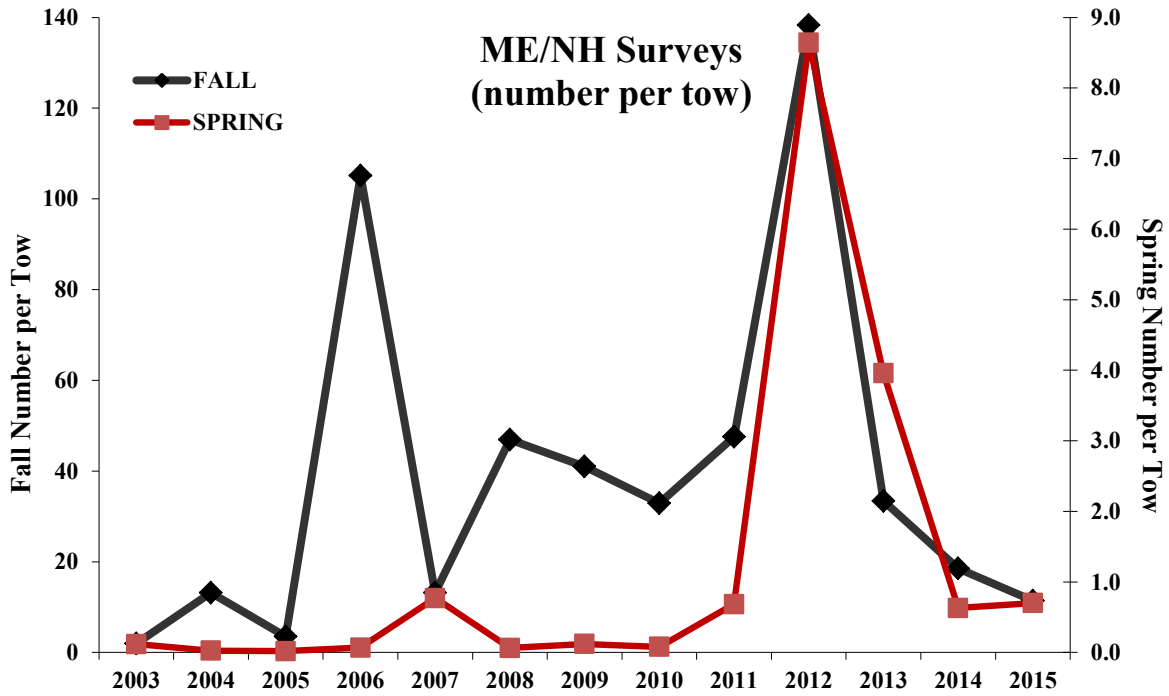


Distribution of small longfin squid ( $\leq 2$  cm dorsal mantle length) in MA DMF May bottom trawl surveys, strata 11-21, during 1978-2015 (top panel) and 2012 (bottom panel).



Maine-New Hampshire bottom trawl survey strata.





During 2003-2015, longfin squid were more prevalent in the ME-NH fall (mid-Sept through mid-Oct) bottom trawl surveys than during the spring (May) surveys. Relative abundance was highest in both surveys during 2012, but declined to thereafter to the low levels observed in most years during 2003-2011.