

2020 SMAST Drop Camera Survey Results

Kevin D. E. Stokesbury and Kyle S. Cassidy
Scallop PDT Meeting
15 October 2019

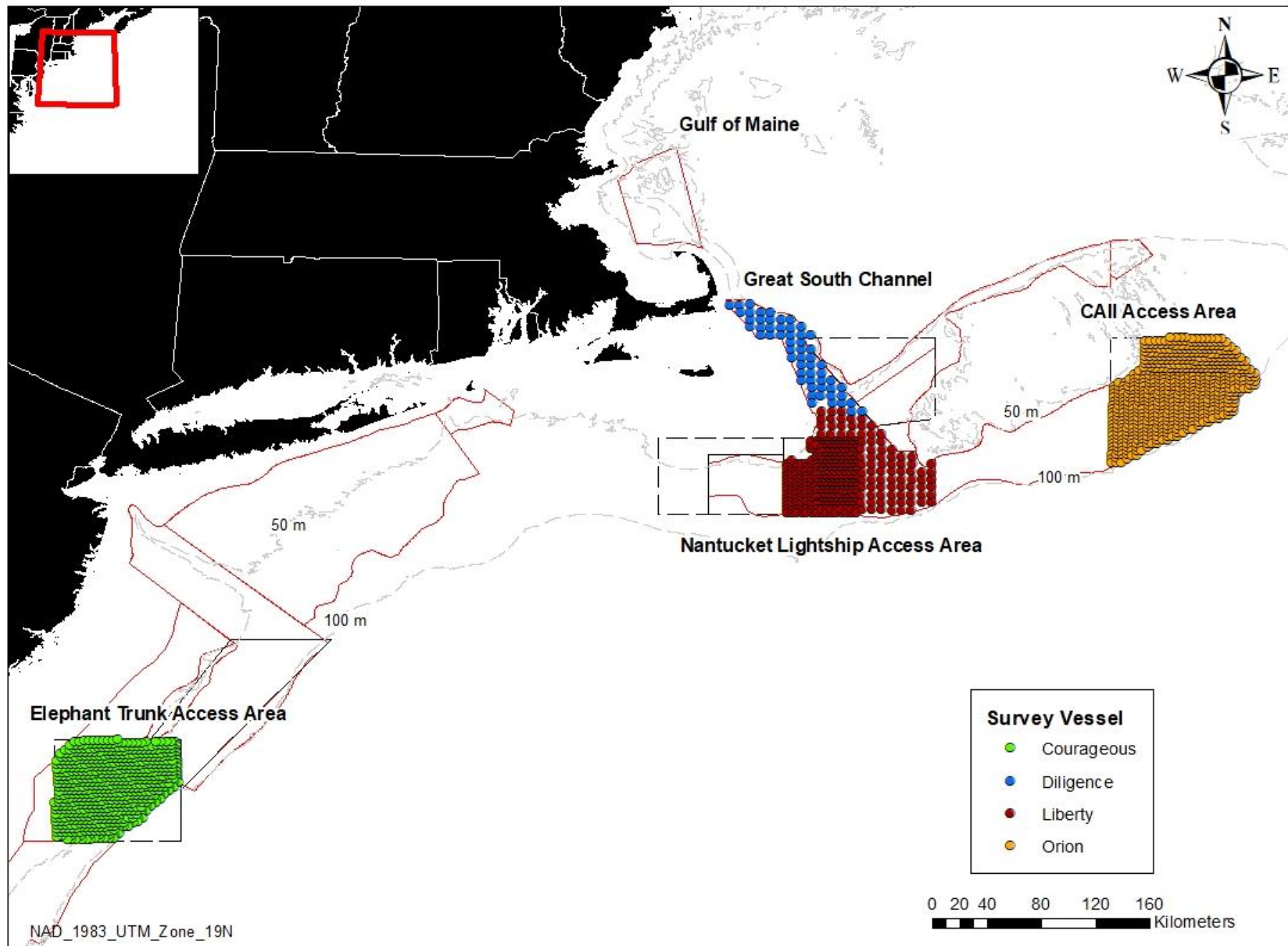


Department of Fisheries Oceanography
School for Marine Science and Technology
University of Massachusetts Dartmouth

Gom2
Station: 241 Quadrat: 2

Temperature: 2331.23°F
Depth: 1513.31 ft

42.695232N 70.367730W
3:24:31.000 PM 9/12/2020



Procedure

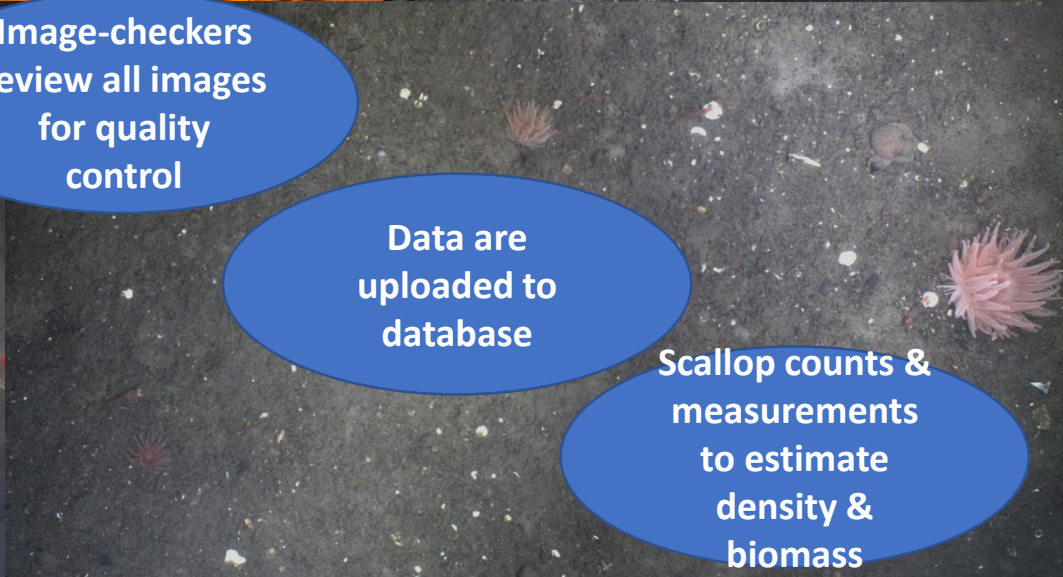
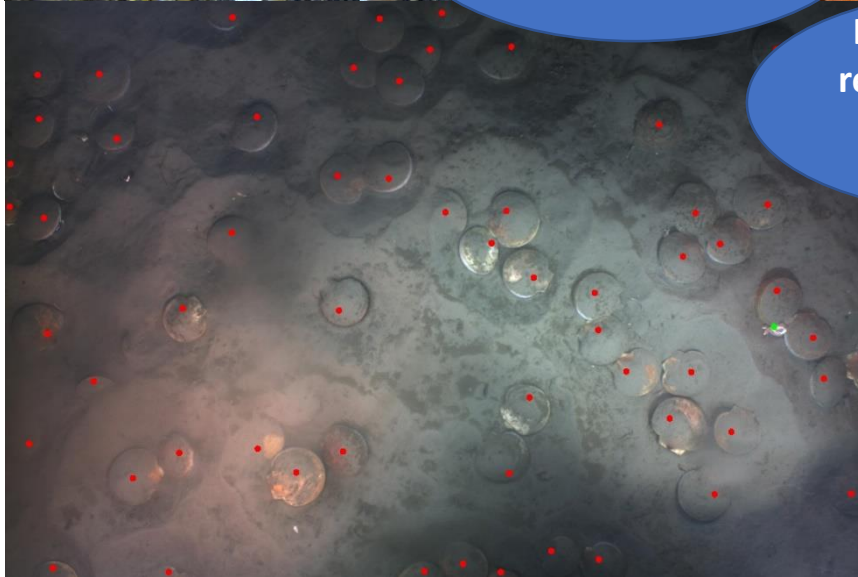
Technicians
collect data in
the field

Digitizers process
each image in the
lab

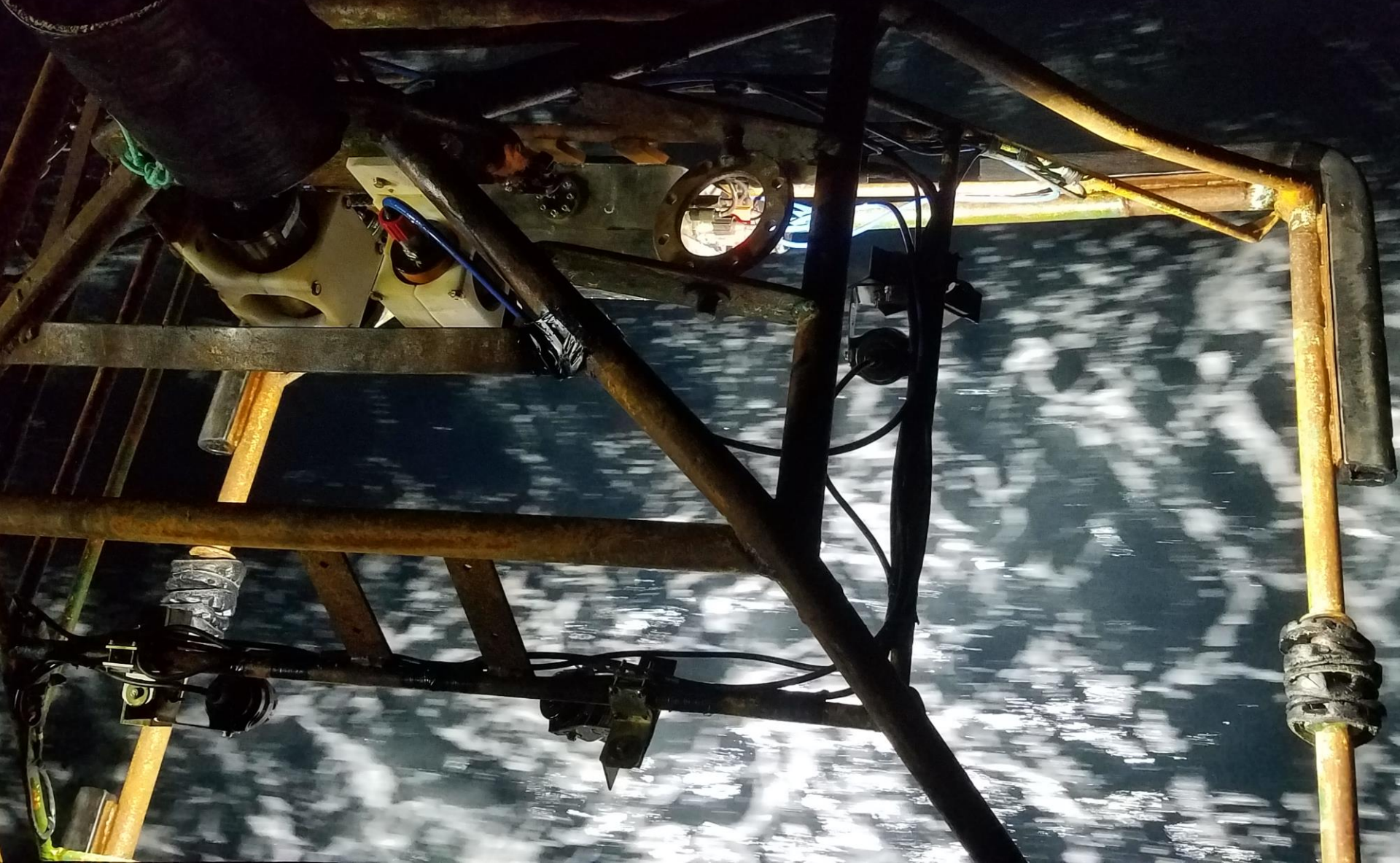
Image-checkers
review all images
for quality
control

Data are
uploaded to
database

Scallop counts &
measurements
to estimate
density &
biomass



Bethoney, N.D., Stokesbury, K.D. Methods for Image-based Surveys of Benthic Macroinvertebrates and Their Habitat Exemplified by the Drop Camera Survey for the Atlantic Sea Scallop. *J. Vis. Exp.* (137), e57493, doi:10.3791/57493 (2018).



Covid-19 Pandemic



Survey groups should develop biomass estimates using following the SARC 65 questions (Scallop PDT Chair 9/2/2020):

NLS-South: $W = \exp(-11.84 + 3.167 * \ln(\text{shell height}))$

Mid-Atlantic: $W = \exp(-9.48 + 2.51 * \ln(\text{shell height}) + -0.1743 + -0.059094 + -0.0033 * \text{depth} + 0.021 * \text{latitude} + -0.031 * \text{Clop} + 0.00525 * (\ln(\text{shell height}) * 21) + -0.000065 * (21 * \text{depth}))$

Georges Bank: $W = \exp(-6.69 + 2.878 * \ln(\text{shell height}) + -0.0073 * \text{depth} + -0.073 * \text{latitude} + 1.28 * \text{Clop} + -0.25 * (\ln(\text{shell height}) * \text{Clop}))$

VIMS 2016 – 2020 SH/MW Equations (email S Roman 10/6/20):

For the North SAMS Area.

$W = \exp(-24.04 + (2.87 * \ln(\text{shellheight})) + (-0.25 * \ln(\text{depth}) + (0.37 * \text{latitude})))$

For the South Deep

$W = \exp(-24.04 + (2.87 * \ln(\text{shellheight})) + (-0.25 * \ln(\text{depth}) + (0.37 * \text{latitude}) + -0.27))$

For the NLS West

$W = \exp(-24.04 + (2.87 * \ln(\text{shellheight})) + (-0.25 * \ln(\text{depth}) + (0.37 * \text{latitude}) + -0.08))$

All scallops measured	quad area	mean SH	# Meas	per m2	stations	SE	CV%	Area km2	Scallops (10⁶)
GB NLS-North-1.5nm SAW 65	2.767	98.7	122	0.088	179	0.0145	16.39	1381	122.0
GB NLS-South Deep-1.5nm SAW 65	2.749	93.4	2723	3.691	90	0.6923	18.75	695	2563.9
GB CL2-Access-SEast-1.5nm SAW 65	2.645	62.4	823	0.296	316	0.0348	11.78	2439	721.3
GB CL2-Access-SWest-1.5nm SAW 65	2.774	100.9	897	0.756	135	0.1462	19.33	1042	787.9
GB CL2-Ext-1.5nm SAW 65	2.694	77.1	1237	0.808	179	0.0981	12.14	1381	1116.5
GB GSC-3 nm SAW 65	2.661	67.1	145	0.124	143	0.0368	29.79	4414	545.3
MA-ET-Flex-1.5nm SAW 65	2.784	103.7	347	0.180	229	0.0209	11.65	1767	317.4
MA-ET-Open-1.5nm SAW 65	2.760	96.7	620	0.211	354	0.0159	7.53	2732	577.4

All scallops measured	Estimation of Total Biomass				Estimation of Exploitable Biomass			
	mwt	mill lbs	in mt	SE	mwt	mill lbs	in mt	SE
GB NLS-North-1.5nm SAW 65	30.43	8.2	3714	608.6	47.46	6.9	3119	511.1
GB NLS-South Deep-1.5nm SAW 65	13.16	74.4	33733	6326.4	15.35	31.5	14311	2683.9
GB CL2-Access-SEast-1.5nm SAW 65	10.06	16.0	7257	854.7	31.64	9.6	4363	513.8
GB CL2-Access-SWest-1.5nm SAW 65	22.49	39.1	17722	3426.0	27.34	18.6	8449	1633.5
GB CL2-Ext-1.5nm SAW 65	13.92	34.3	15539	1886.5	24.70	13.9	6309	766.0
GB GSC-3 nm SAW 65	11.72	14.1	6391	1903.9	33.14	9.3	4225	1258.6
MA-ET-Flex-1.5nm SAW 65	25.97	18.2	8244	960.4	33.89	15.7	7106	827.8
MA-ET-Open-1.5nm SAW 65	22.17	28.2	12799	963.6	32.38	23.8	10800	813.1
GB NLS-North-1.5nm VIMS 2nd Eq	33.34	9.0	4068	666.7	51.96	7.5	3414	559.6
GB NLS-S Deep-1.5nm VIMS 2nd eq	13.63	77.1	34945	6553.7	15.70	32.3	14636	2744.9

40 mm scallops removed	quad area	mean SH	# Meas	per m2	stations	SE	CV%	Area km2	
GB NLS-North-1.5nm SAW 65	2.812	112.0	103	0.073	179	0.0142	19.41	1381	101.4
GB NLS-South Deep-1.5nm SAW 65	2.751	93.9	2704	3.663	90	0.6919	18.89	695	2544.3
GB CL2-Access-SEast-1.5nm SAW 65	2.685	74.2	823	0.207	316	0.0343	16.57	2439	505.2
GB CL2-Access-SWest-1.5nm SAW 65	2.774	100.9	897	0.758	135	0.1469	19.37	1042	790.0
GB CL2-Ext-1.5nm SAW 65	2.703	79.8	1165	0.759	179	0.0978	12.89	1381	1047.9
GB GSC-3 nm SAW 65	2.735	89.2	90	0.075	143	0.0358	48.00	4414	329.3
MA-ET-Flex-1.5nm SAW 65	2.842	120.7	289	0.148	229	0.0205	13.84	1767	261.7
MA-ET-Open-1.5nm SAW 65	2.823	115.2	497	0.166	354	0.0156	9.39	2732	452.5

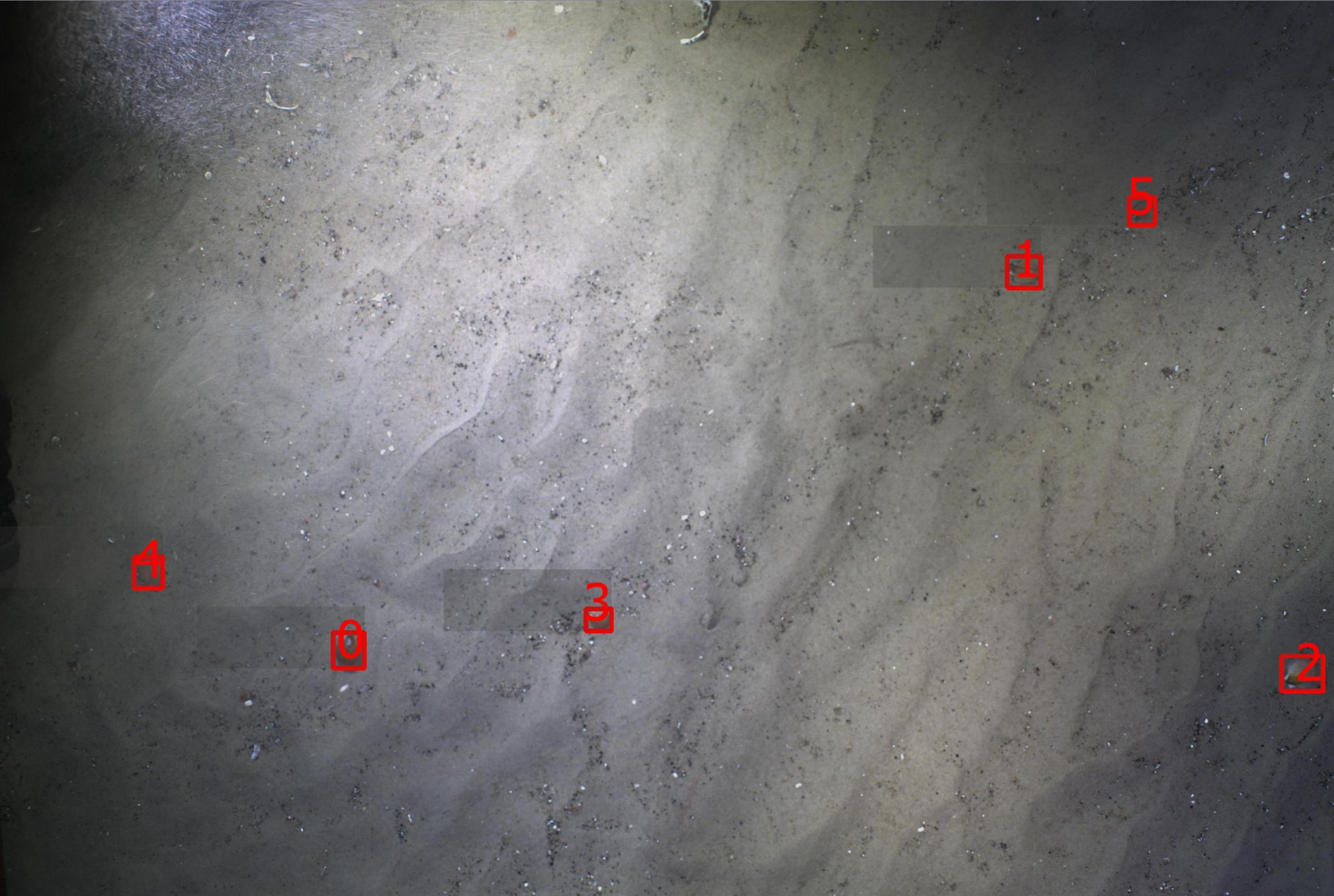
40 mm scallops removed	Estimation of Total Biomass				Estimation of Exploitable Biomass			
	mwt	mill lbs	in mt	SE	mwt	mill lbs	in mt	SE
GB NLS-North-1.5nm SAW 65	35.94	8.0	3643	707.1	47.48	6.8	3068	595.6
GB NLS-South Deep-1.5nm SAW 65	13.25	74.3	33709	6366.4	15.35	31.5	14302	2701.1
GB CL2-Access-SEast-1.5nm SAW 65	10.06	11.2	5083	842.2	31.64	6.7	3056	506.3
GB CL2-Access-SWest-1.5nm SAW 65	22.49	39.2	17769	3441.6	27.34	18.7	8472	1640.9
GB CL2-Ext-1.5nm SAW 65	14.70	34.0	15401	1985.5	24.71	13.9	6287	810.6
GB GSC-3 nm SAW 65	18.45	13.4	6077	2916.7	33.24	9.1	4110	1972.7
MA-ET-Flex-1.5nm SAW 65	31.12	18.0	8143	1127.3	33.89	15.5	7033	973.6
MA-ET-Open-1.5nm SAW 65	27.55	27.5	12469	1171.2	32.39	23.3	10560	991.8
GB NLS-North-1.5nm VIMS 2nd Eq	39.36	8.8	3990	774.5	51.98	7.4	3359	652.1
GB NLS-S Deep-1.5nm VIMS 2nd eq	13.72	77.0	34918	6594.8	15.70	32.2	14626	2762.4



CAII
Station: 369 Quadrat: 2

Temperature: -242.03°C
Depth: -348.30 Fathom

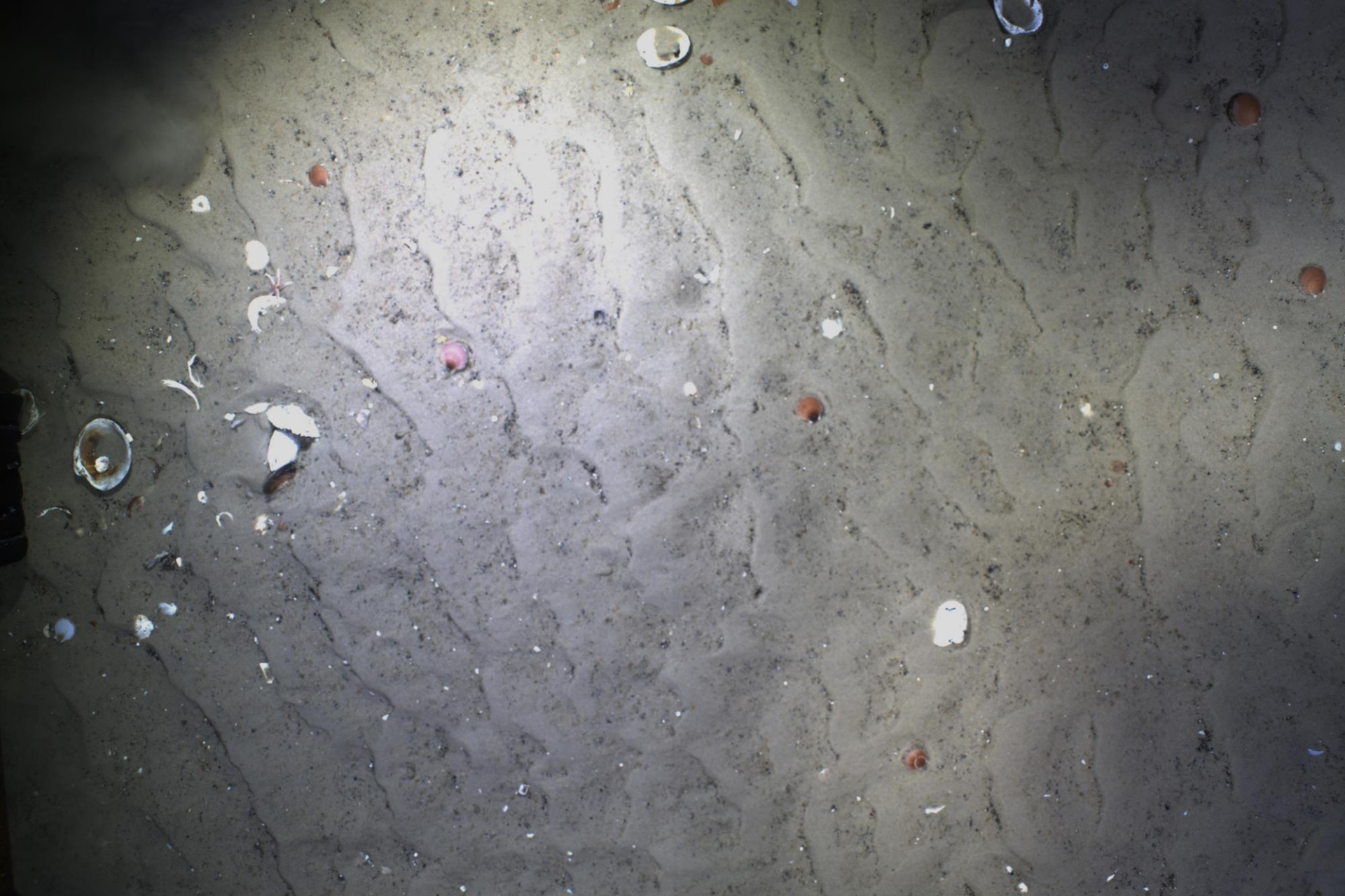
40.965928N 66.684280W
1:14:24.000 AM 8/24/2020



CAII
Station: 369 Quadrat: 2

Temperature: -242.03°C
Depth: -348.30 Fathom

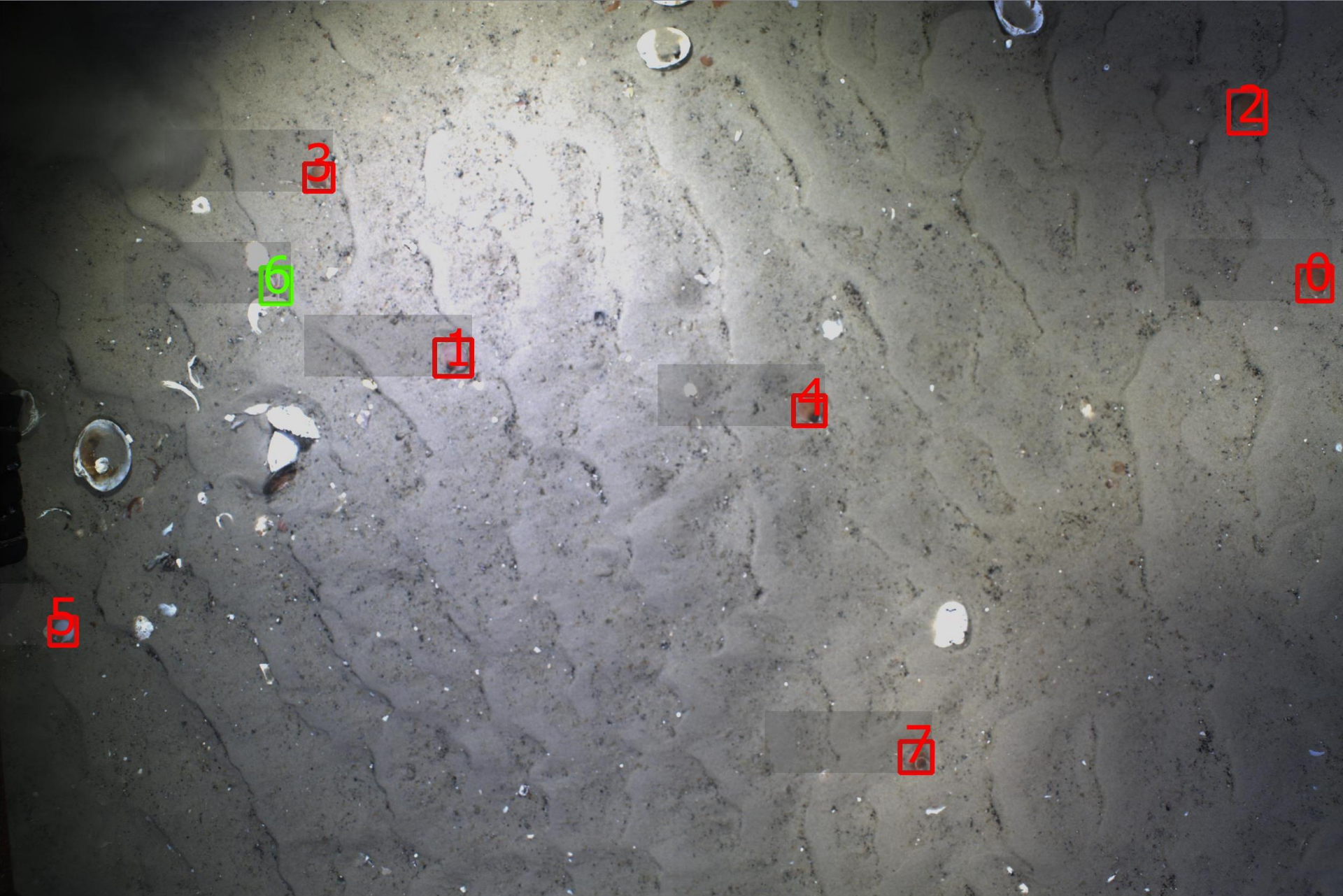
40.965928N 66.684280W
1:14:24.00 AM 8/24/2020



CAII
Station: 393 Quadrat: 1

Temperature: -242.03°C
Depth: -348.30 Fathom

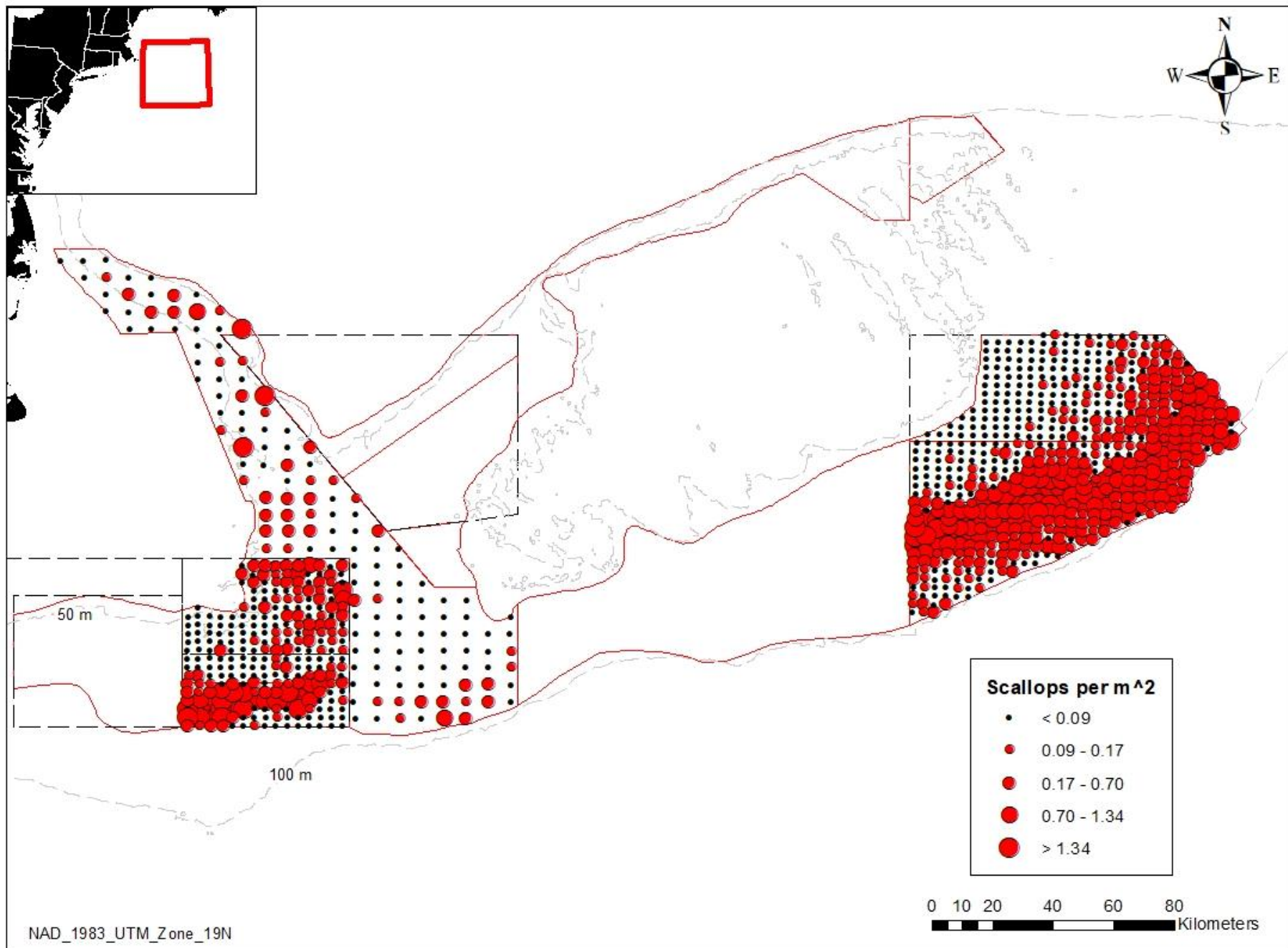
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7:32:44.000 AM 8/24/2020



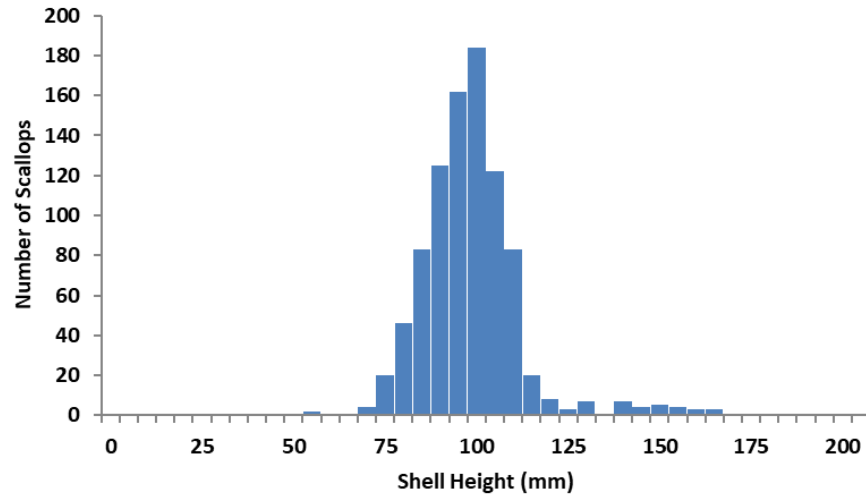
CAII
Station: 393 Quadrat: 1

Temperature: -242.03°C
Depth: -348.30 Fathom

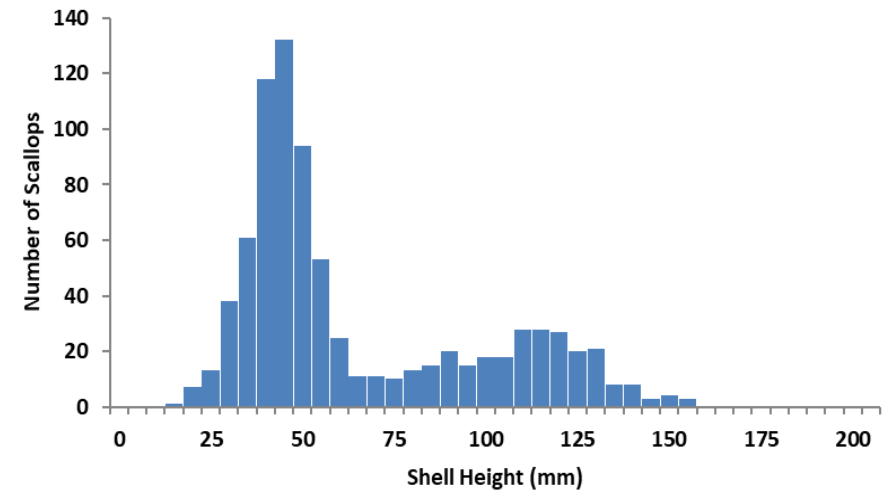
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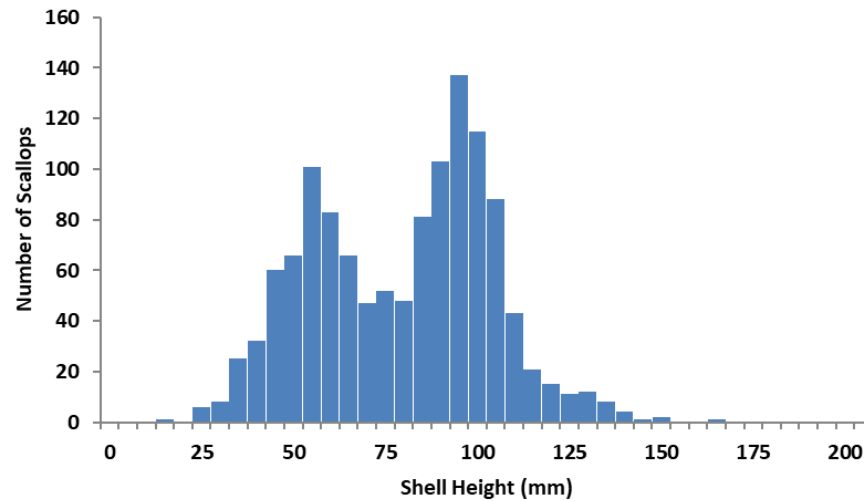
GB CL2 Access-Southwest 2020



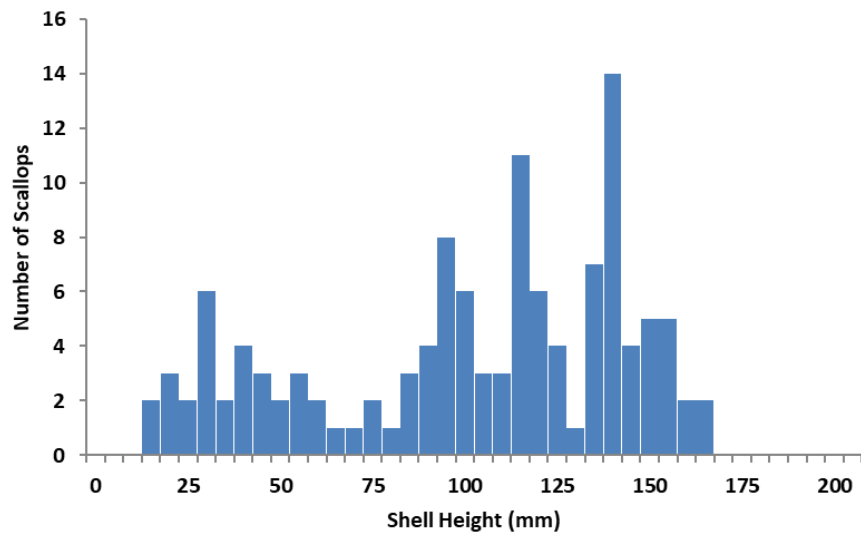
GB CL2 Access-Southeast 2020



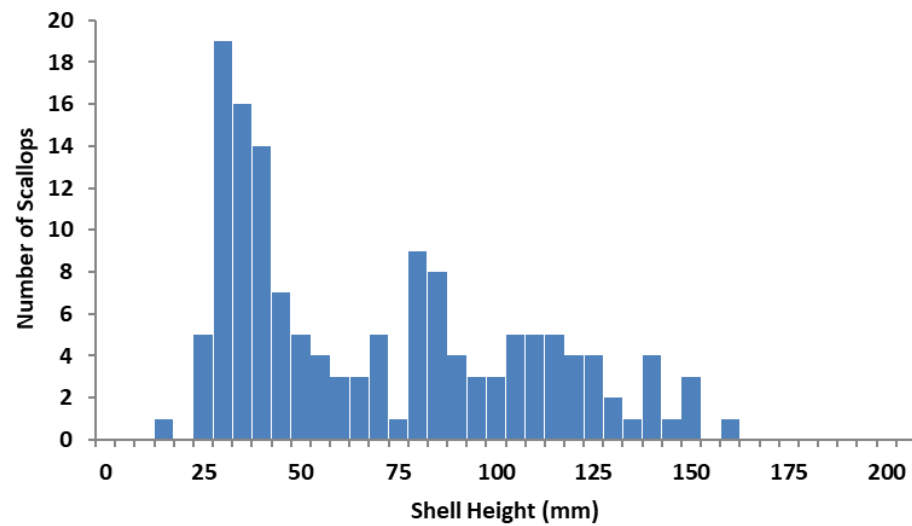
GB CL2 Access-Ext 2020



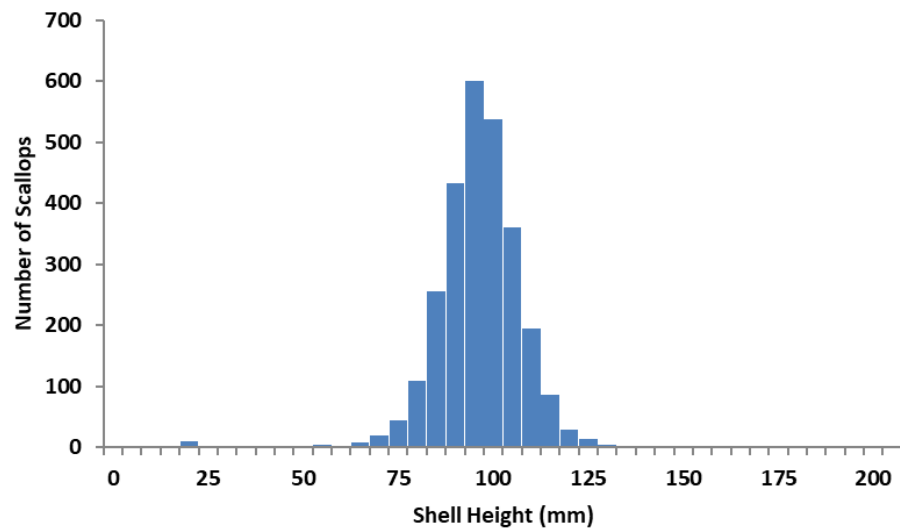
GB NLS-North 2020



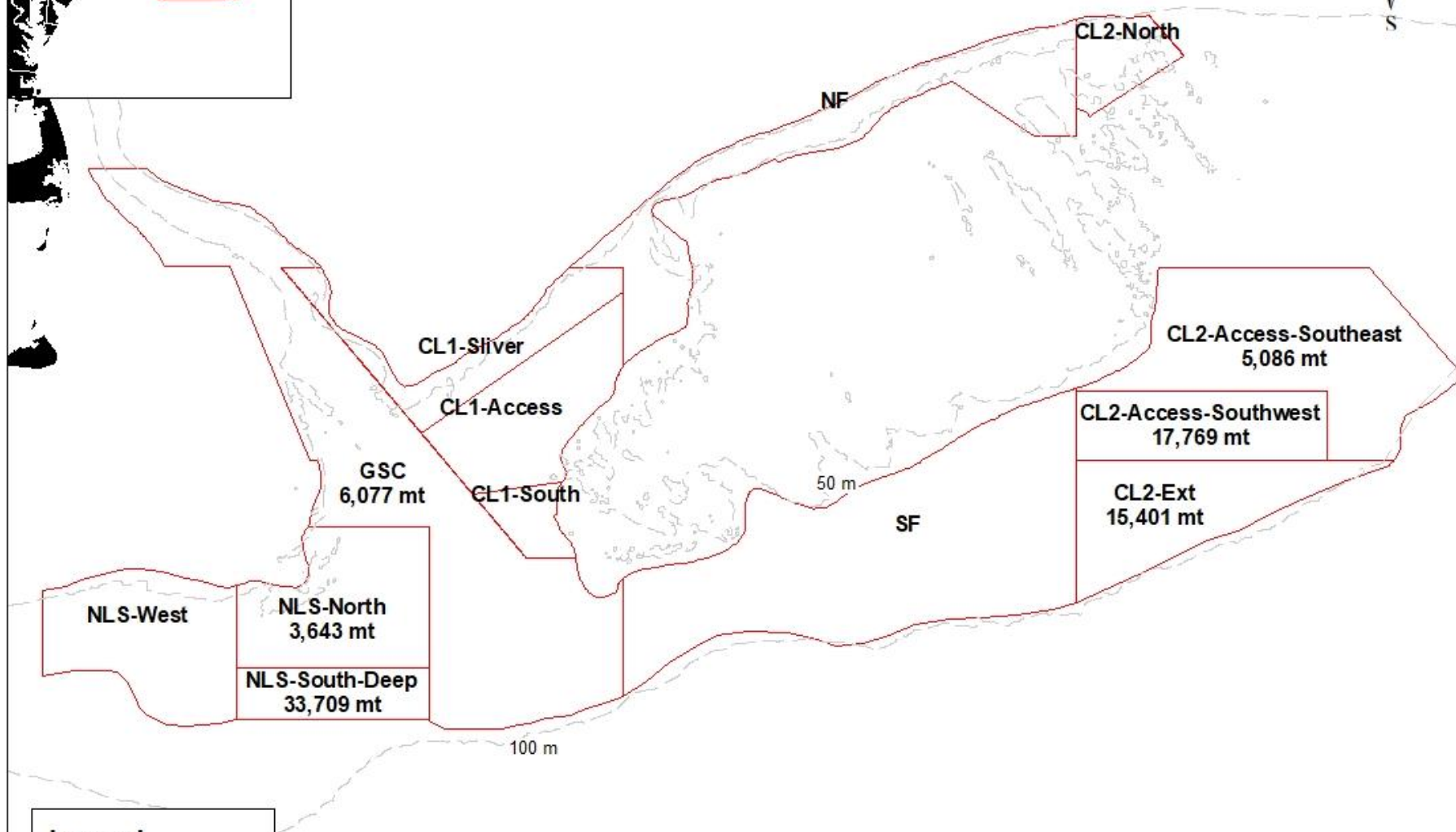
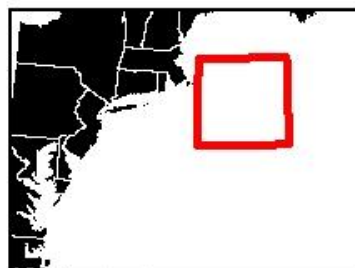
GB GSC 2020




GB NLS-South Deep 2020



2020 Total Biomass



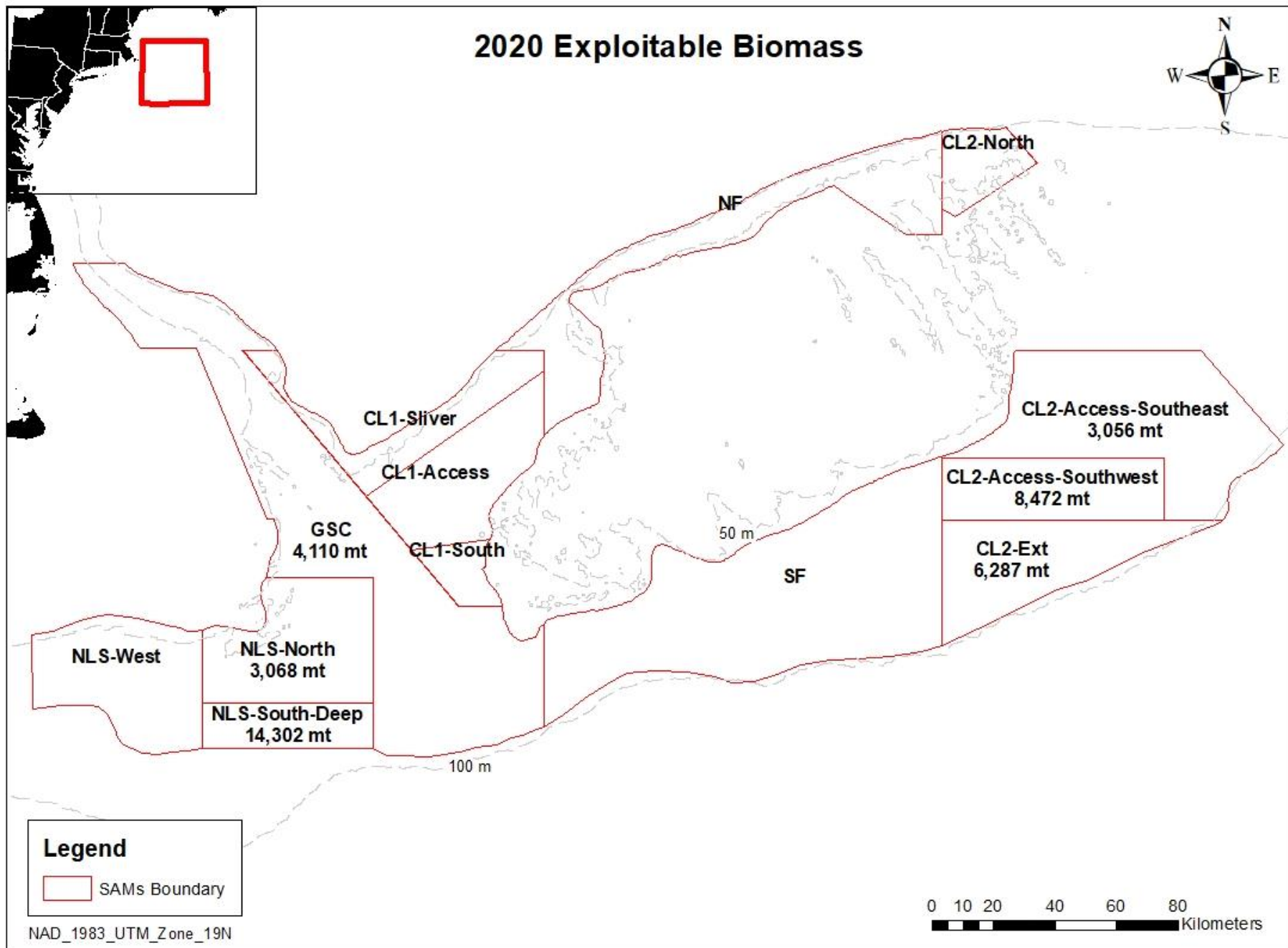
Legend

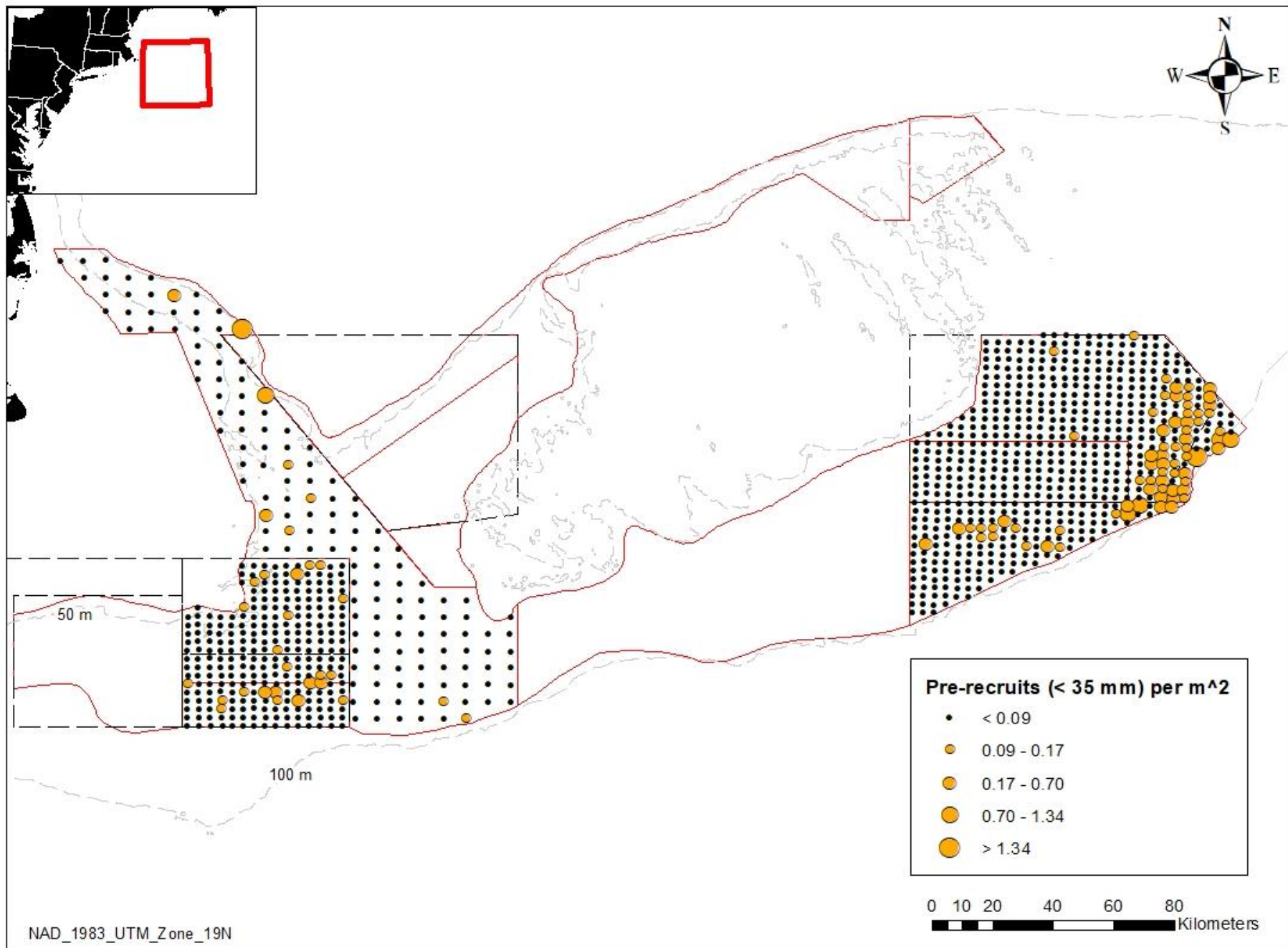
 SAMS Boundary

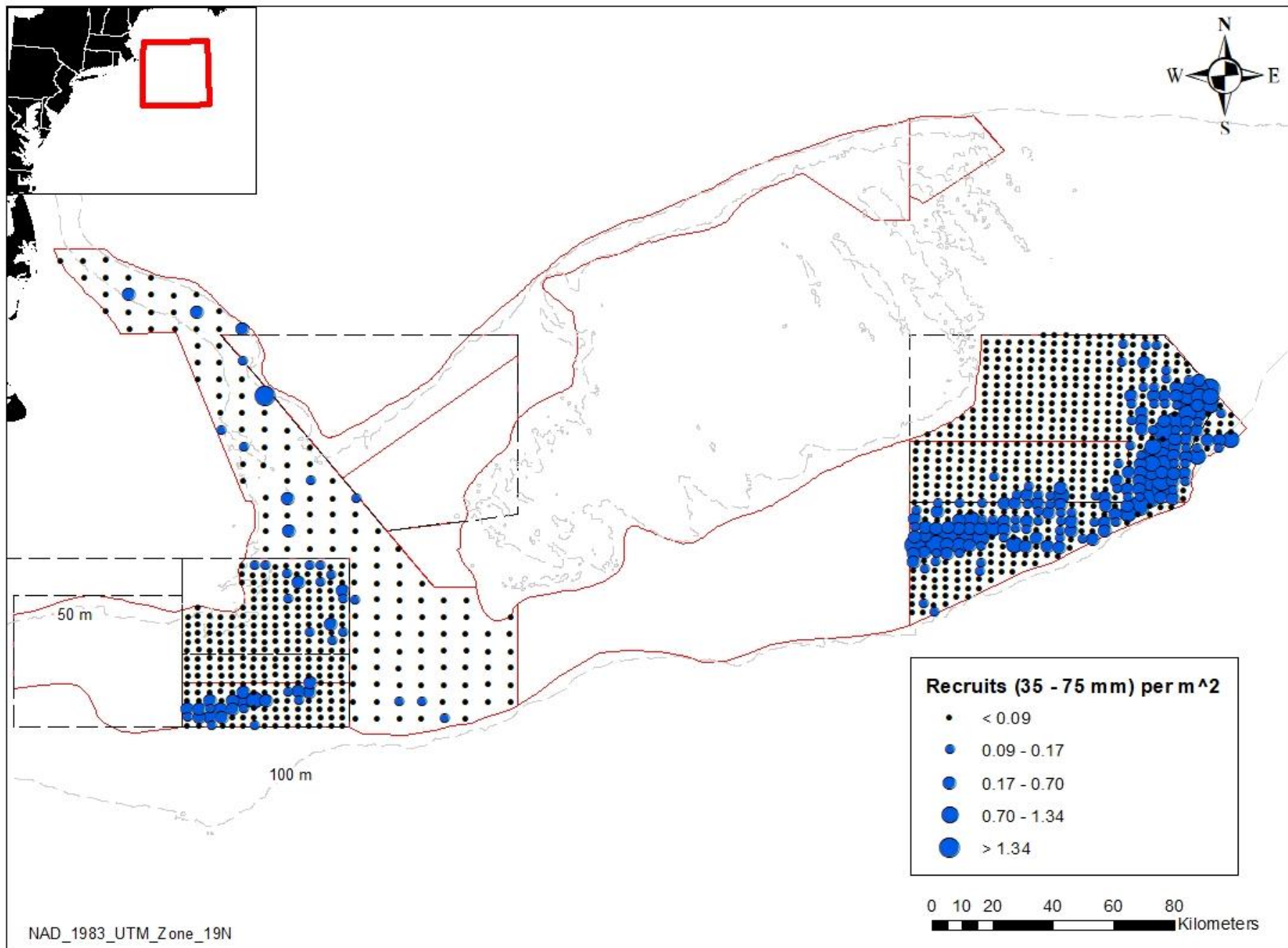
NAD_1983_UTM_Zone_19N

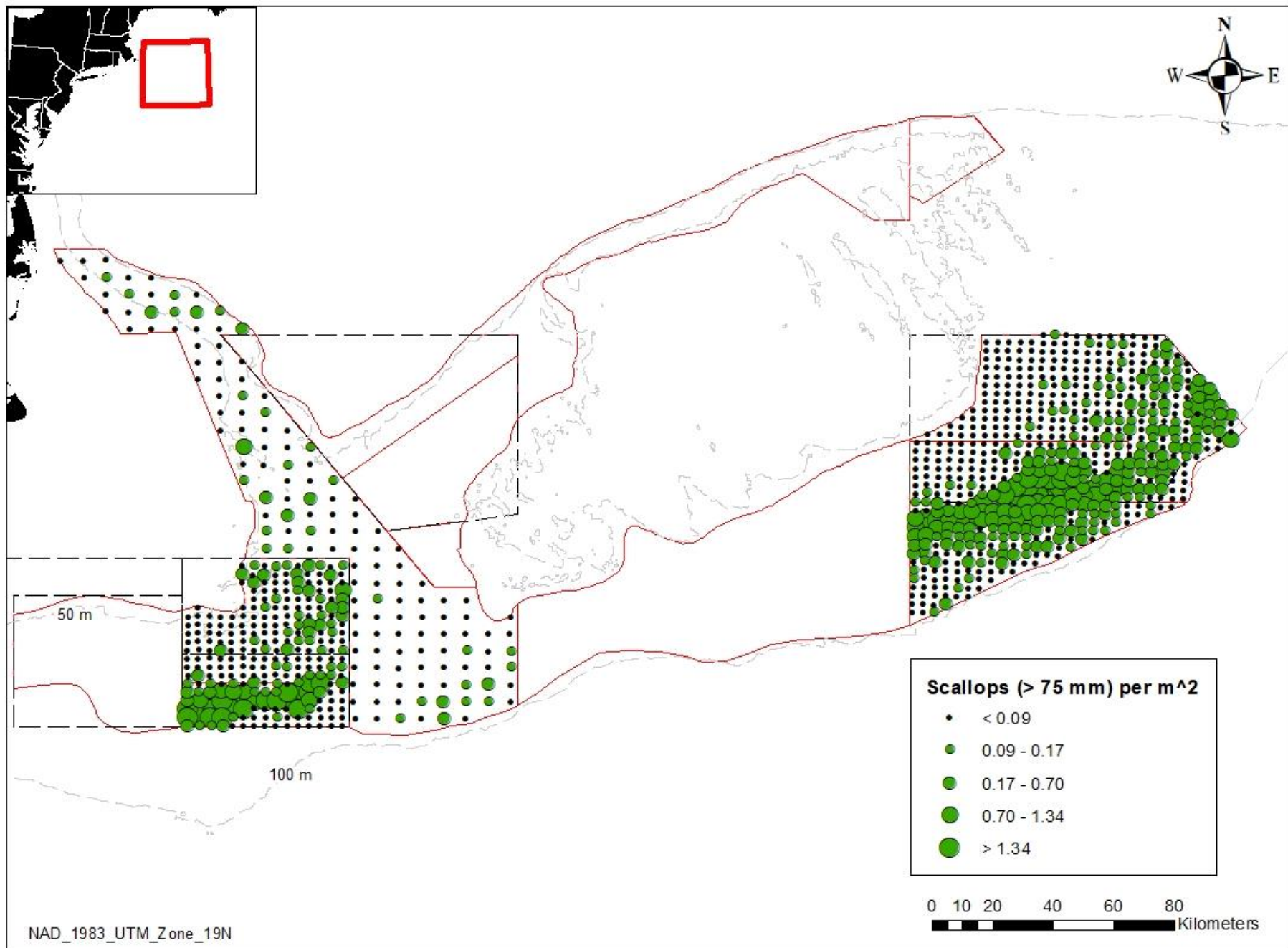
0 10 20 40 60 80
Kilometers

2020 Exploitable Biomass

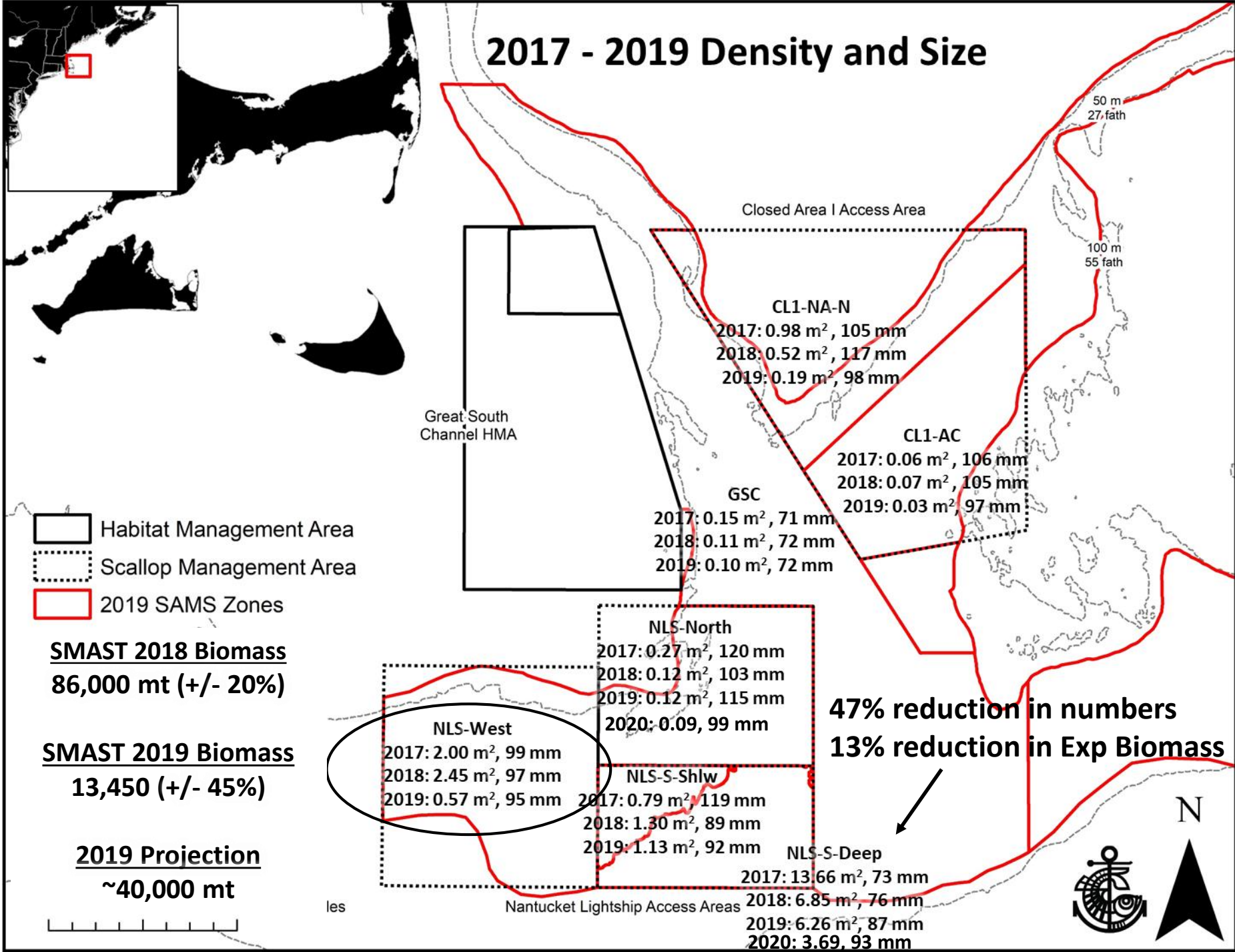


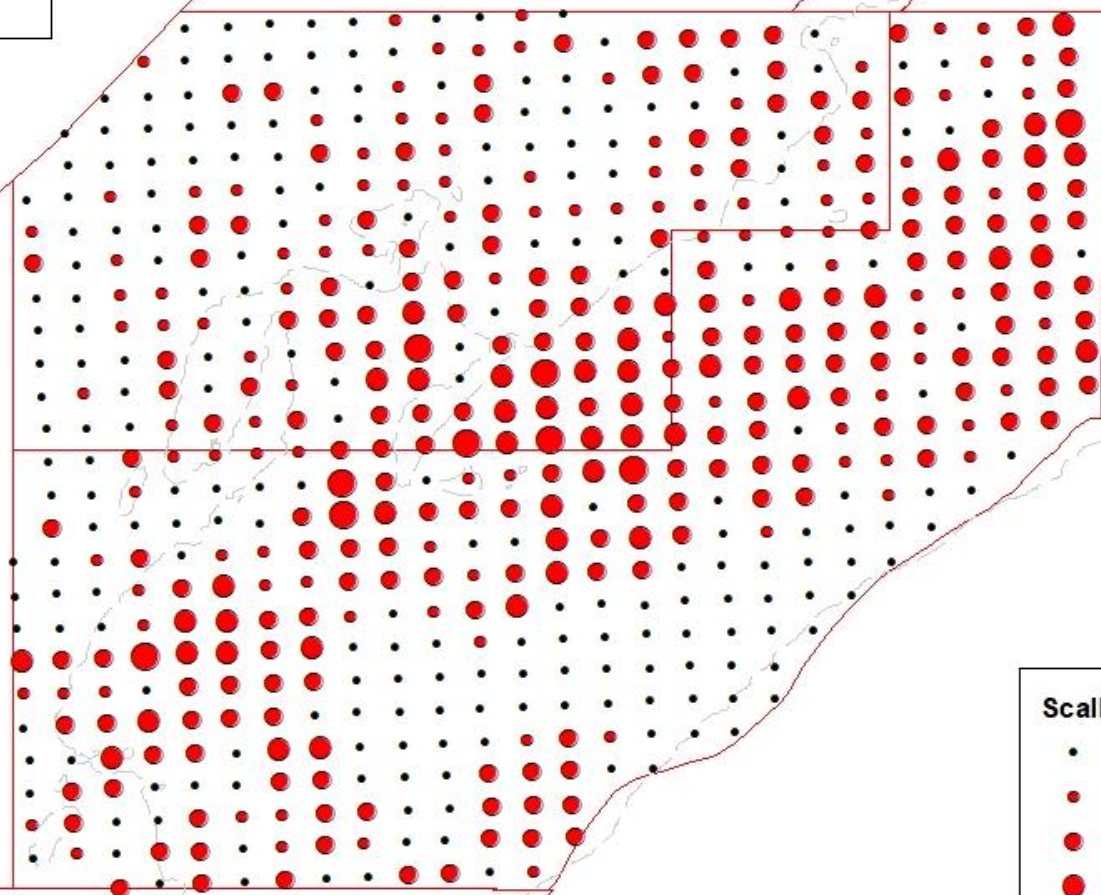






2017 - 2019 Density and Size





50 m

100 m

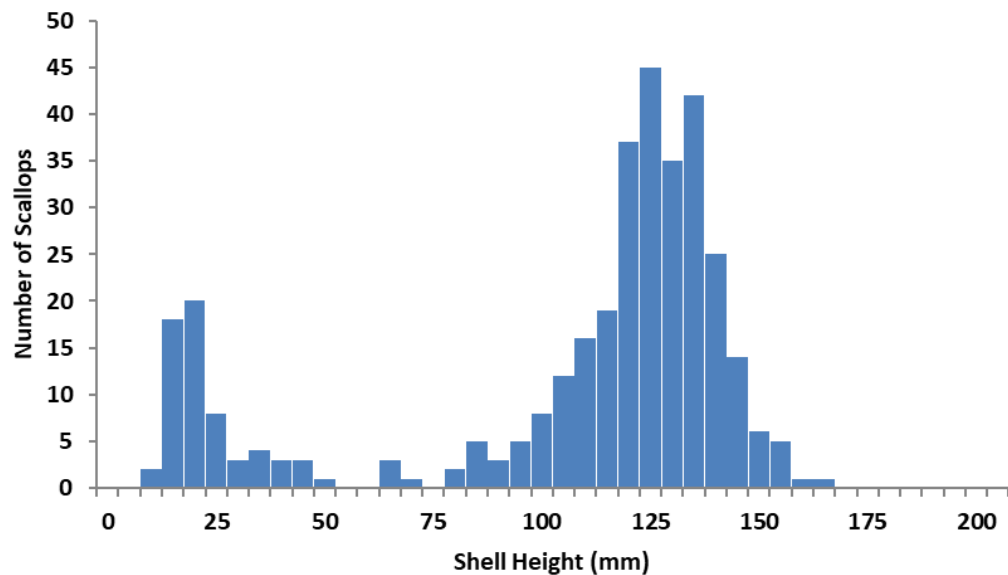
Scallops per m²

- < 0.09
- 0.09 - 0.17
- 0.17 - 0.70
- 0.70 - 1.34
- > 1.34

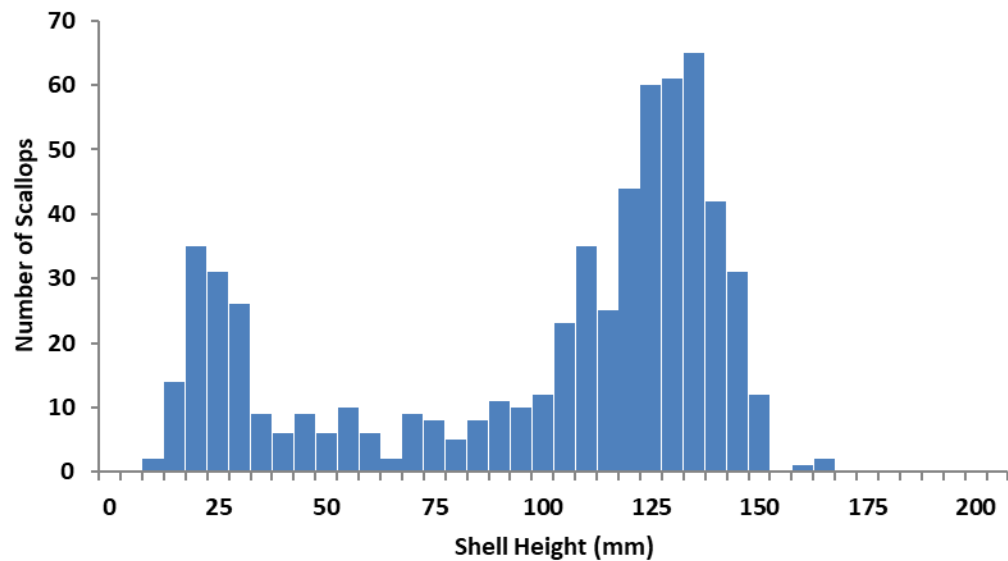
0 3.5 7 14 21 28
Kilometers

NAD_1983_UTM_Zone_19N

MA ET-Flex 2020



MA ET-Open 2020





2020 Total Biomass

MAB-Nearshore

NYB

HCS

NYB

ET-Flex
8,143 mt

MAB-Nearshore

ET-Open
12,469 mt


50 m

DMV


100 m



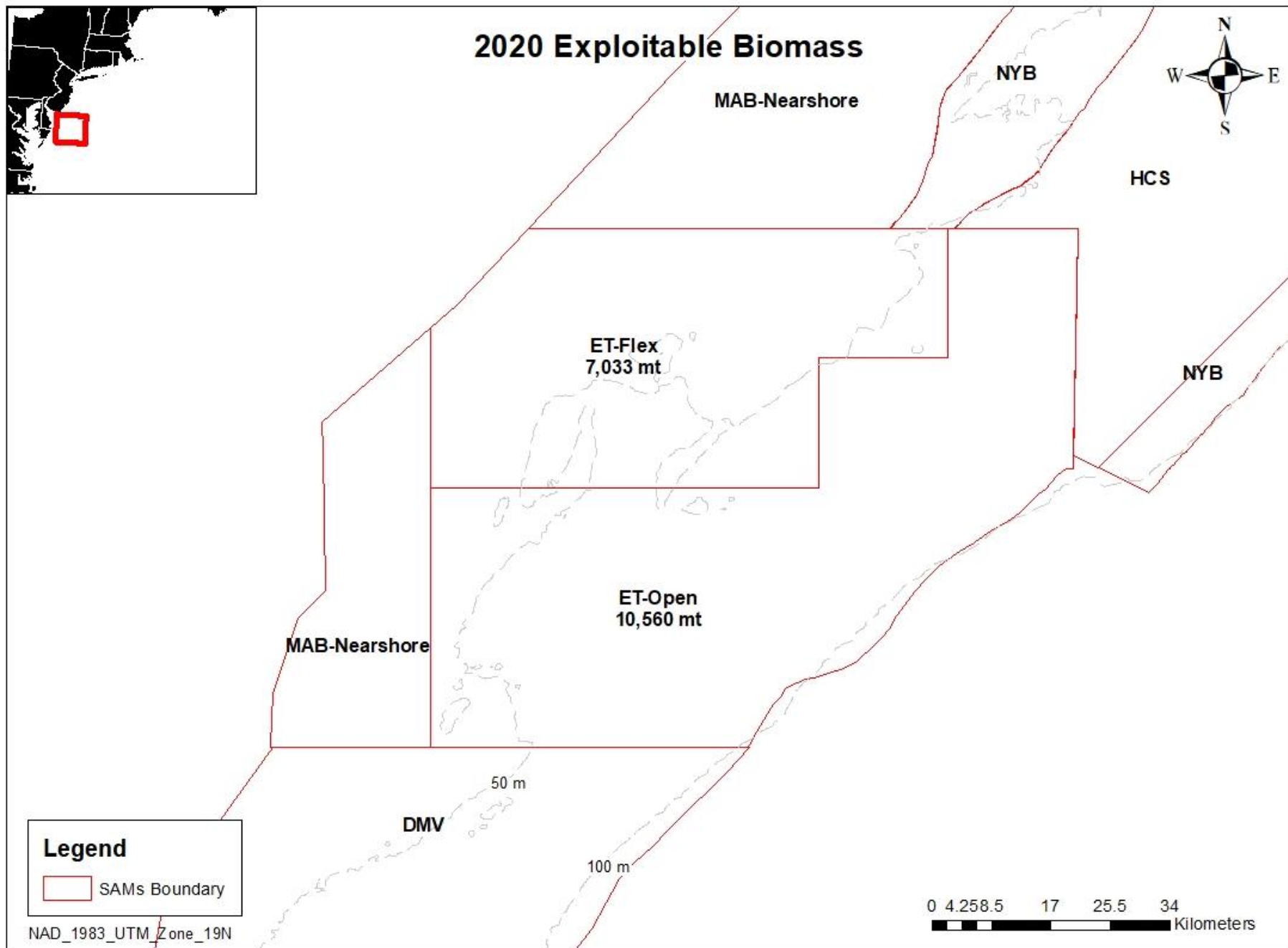
Legend

 SAMs Boundary

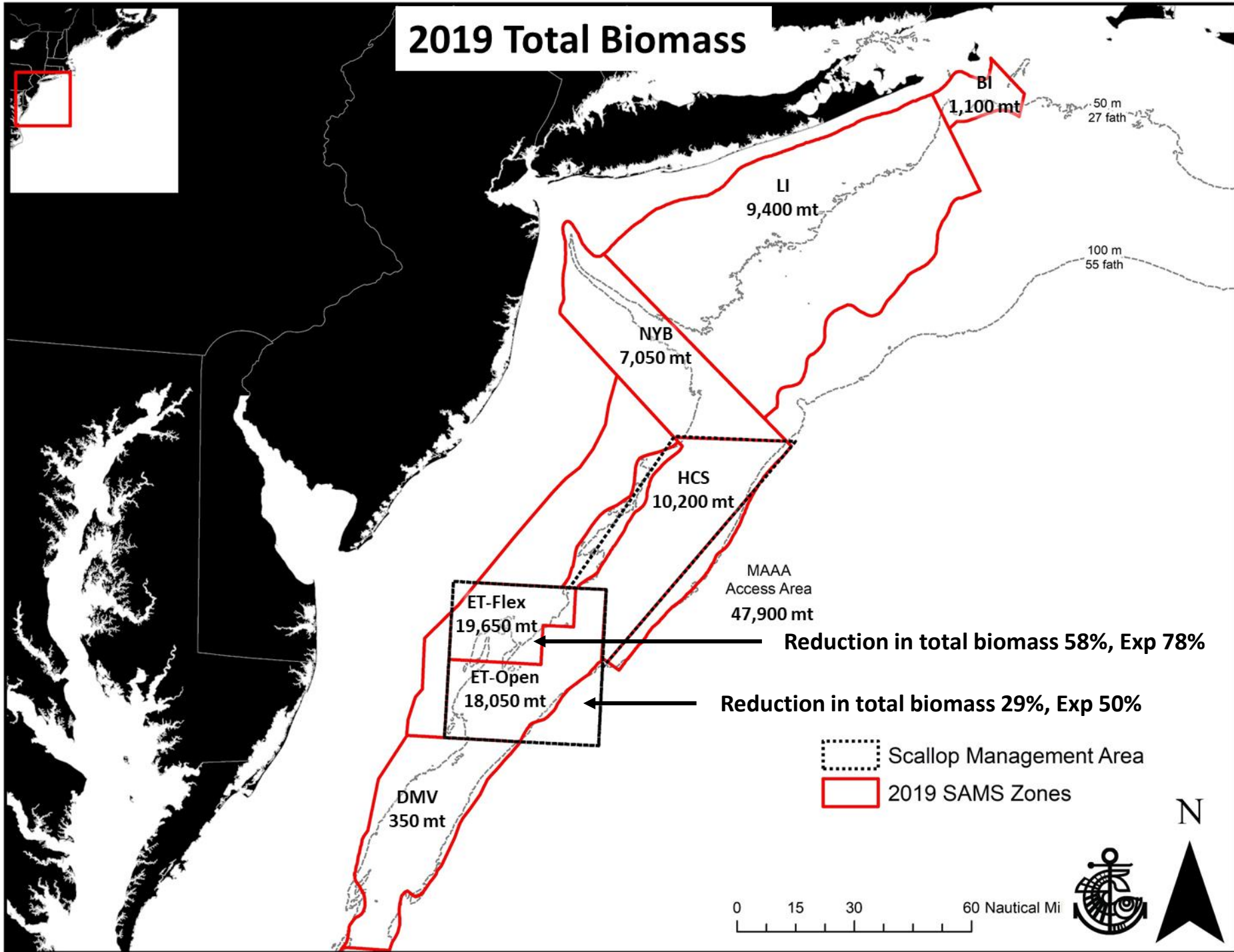
NAD_1983_UTM_Zone_19N

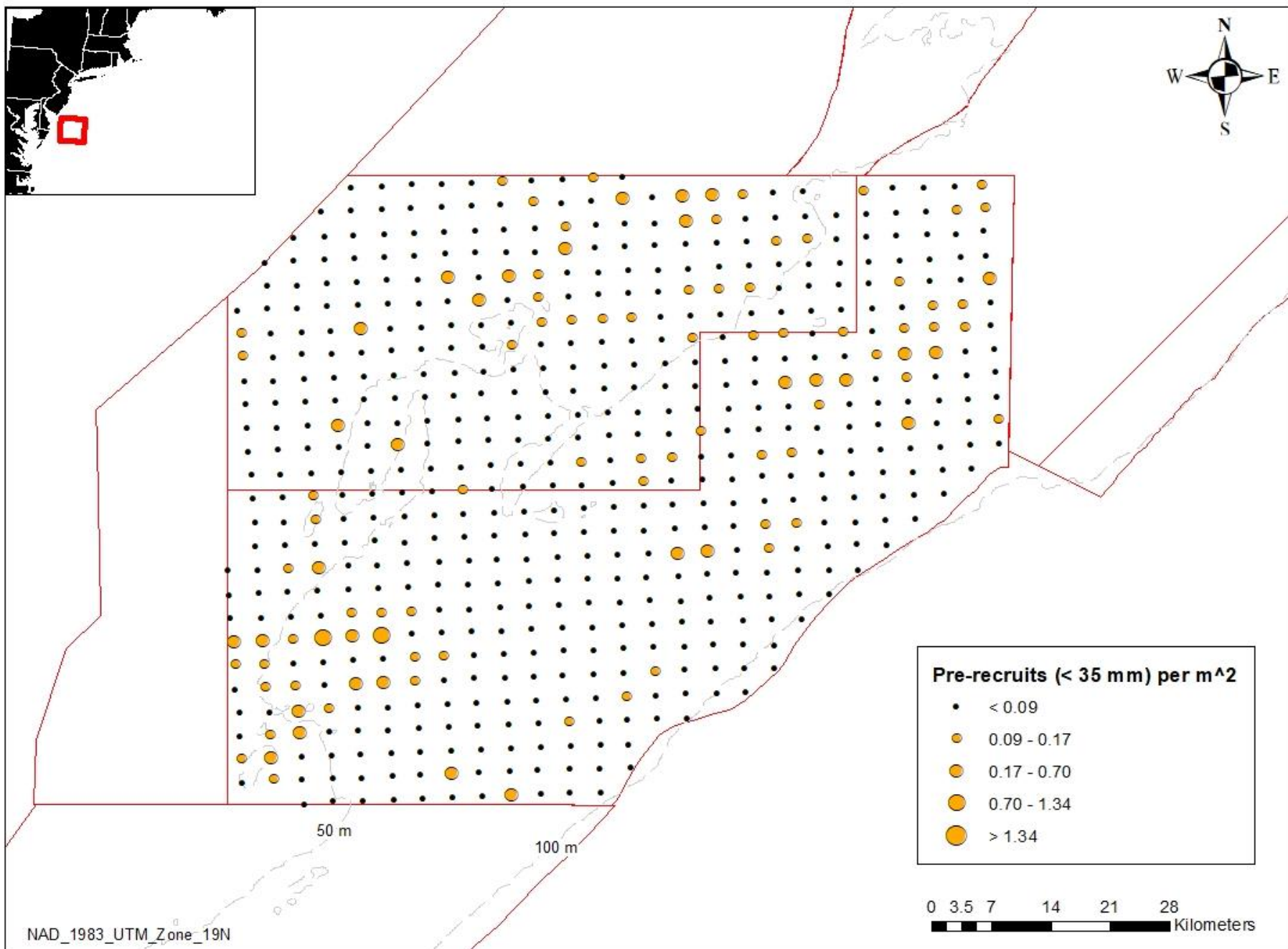
0 5 10 20 30 40
 Kilometers

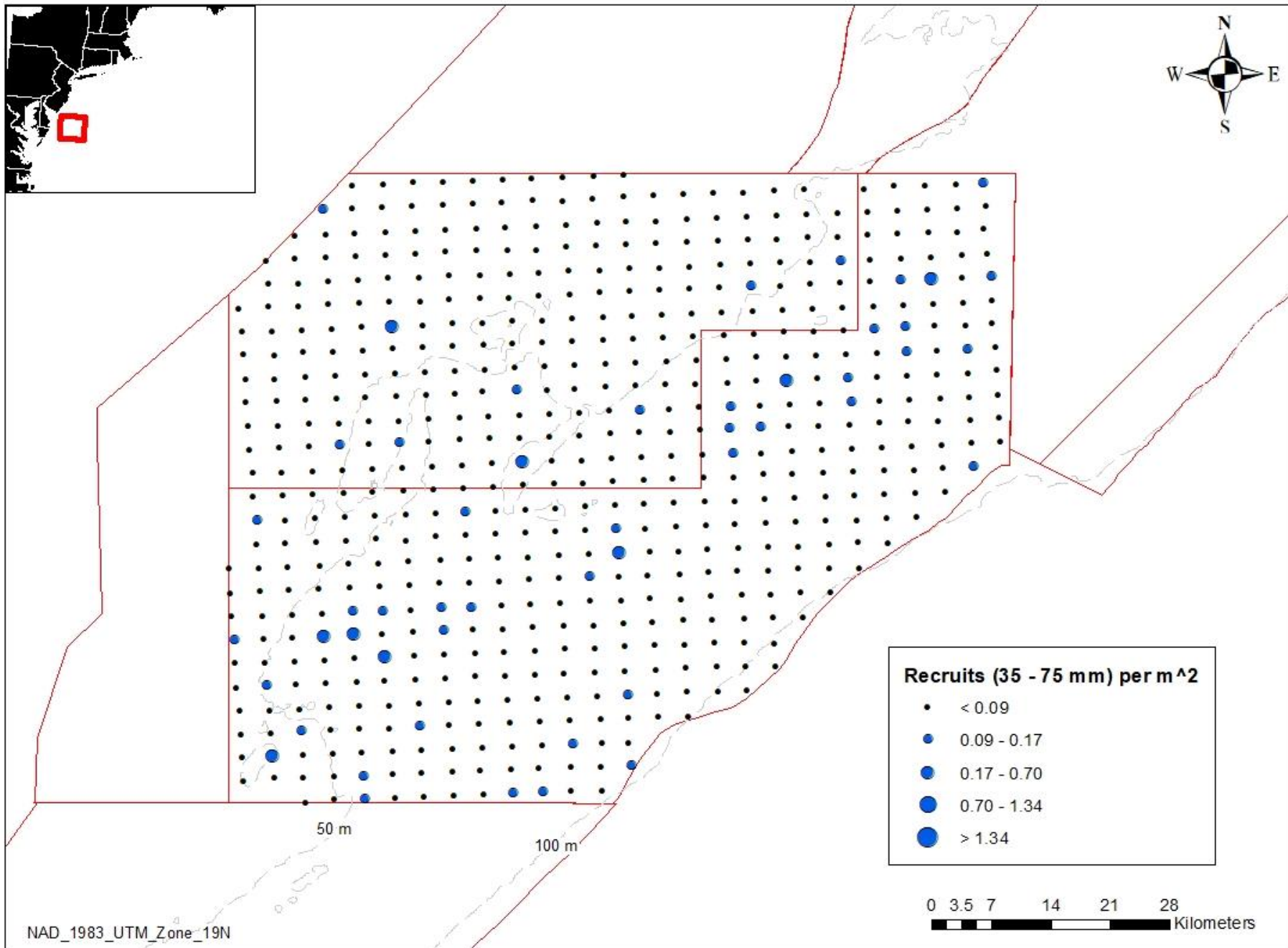
2020 Exploitable Biomass

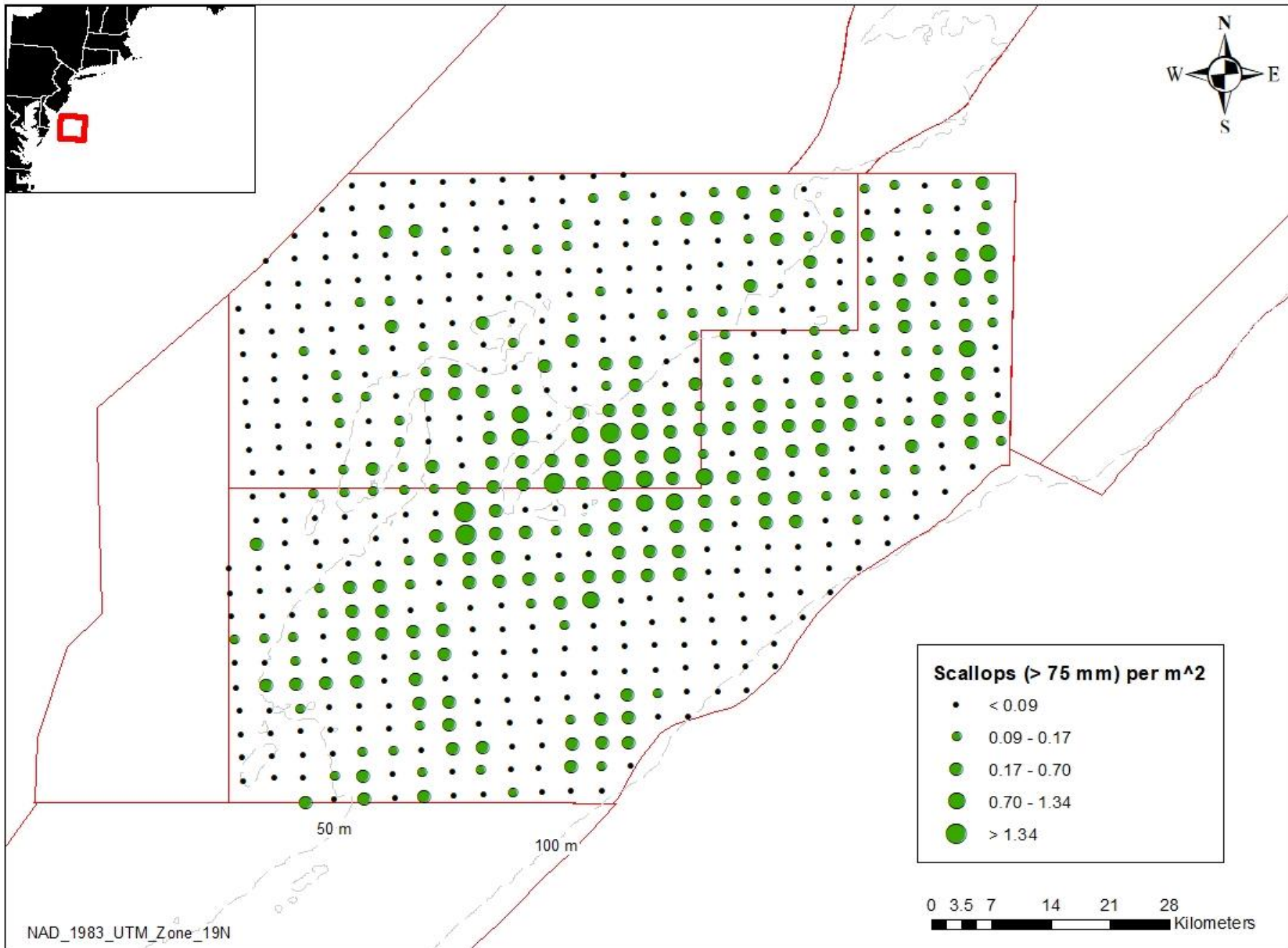


2019 Total Biomass









Summary of Exploitable biomass for 2020

SMAST Drop Camera				
Georges Bank	NumMill	Exploitable BmsMT	SE	MeanWt
CL2-Southeast	138	3,056	506	31.6
CL2-Southwest	309	8,472	1,641	27.3
CL2-Ext	255	6,287	811	24.7
NLS-North	66	3,068	596	47.5
NLS-South-Deep	932	14,302	2,701	15.4
GSC	127	4,110	1,973	33.2
MidAtlantic				
ET Open	333	10,560	992	32.4
ET Flex	210	7,033	974	33.9