2021 CFF RSA HabCam v3 Survey

Georges Banks: CAII-SE, CAII-SW, CAII-Ext, SF, NLS-S-D
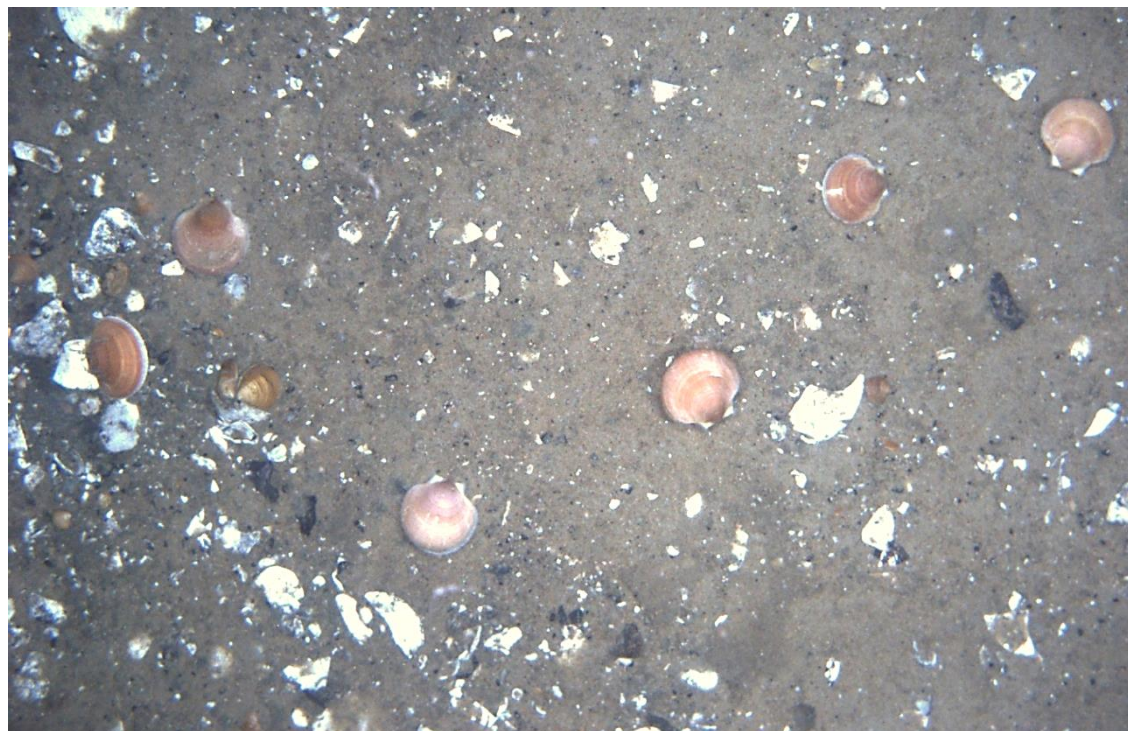
Mid-Atlantic: Delmarva, ET-Open, ET-Flex, HCS, MAB-Nearshore, NYB, LI, BI

Tasha O'Hara[1], Luisa Garcia[1], Liese Siemann[1]; Jose Correia[2], Arnie DeMello[2]

1. Coonamessett Farm Foundation, Inc.; 2. Arnie's Fisheries

Atlantic Sea Scallop Plan Development Team Meeting

September 01, 2020

HabCam v3 Vehicle Overview

System Highlights

- Stereo cameras:
  - 2 AVT Prosilica
- 4 Strobes
- SBE37 CTD
- Benthos altimeter
- Telemetry / Control Bottle
  - Attitude sensor
  - Media converters
  - Network hardware

SBE 37 CTD

Altimeter

Strobes (4)

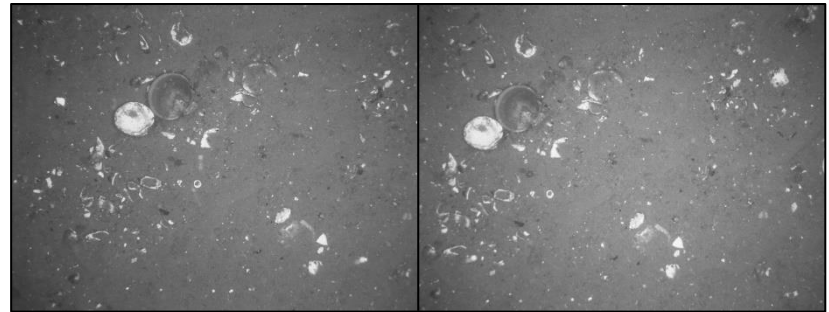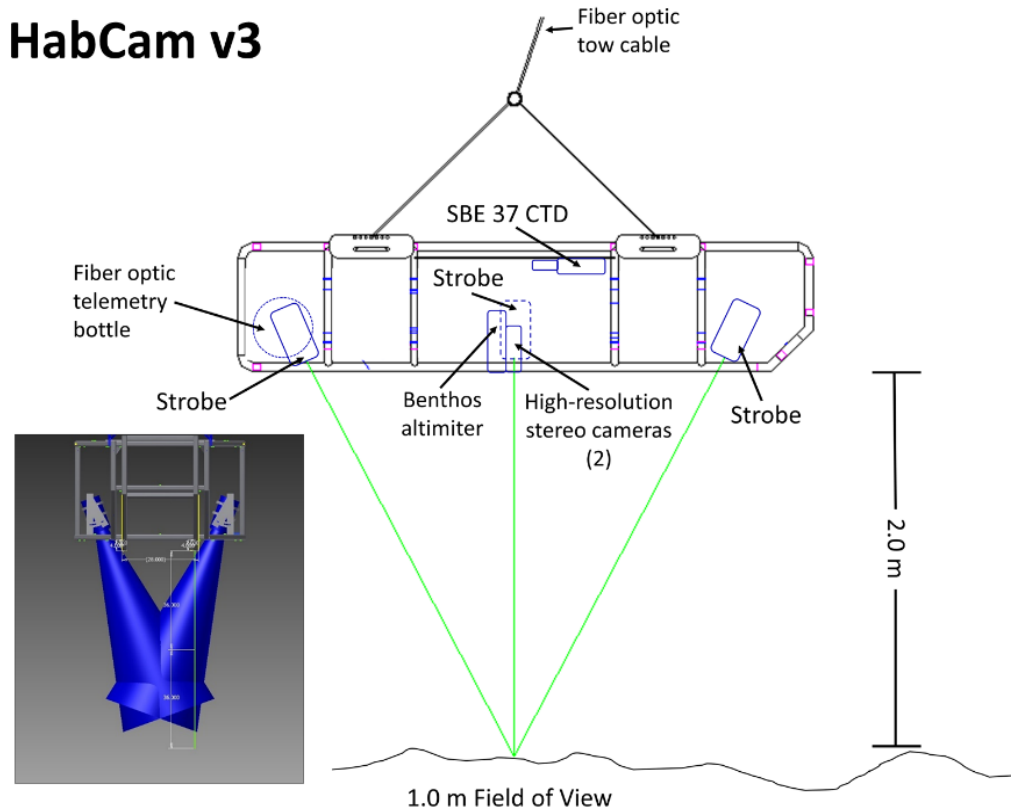Stereo cameras (2)

Telemetry and control bottle
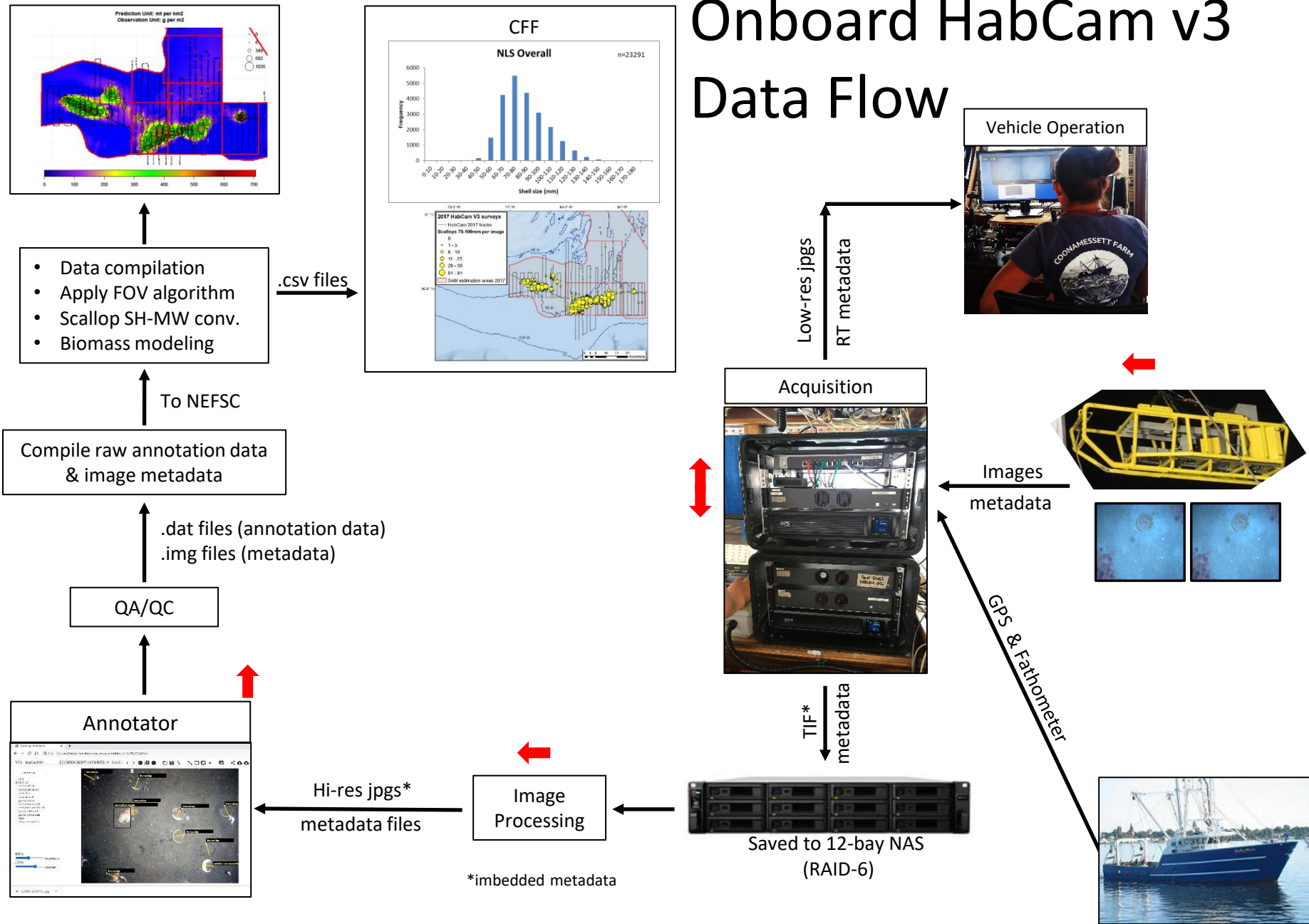
System Overview

HabCam v3 – Deployment

- Target altitude 1.7 - 2.0 m
- FOV 0.7 – 1.0 m^2
- Average speed: 4.5-5.2 knots
- Images and data transmitted over armored fiber optic cable
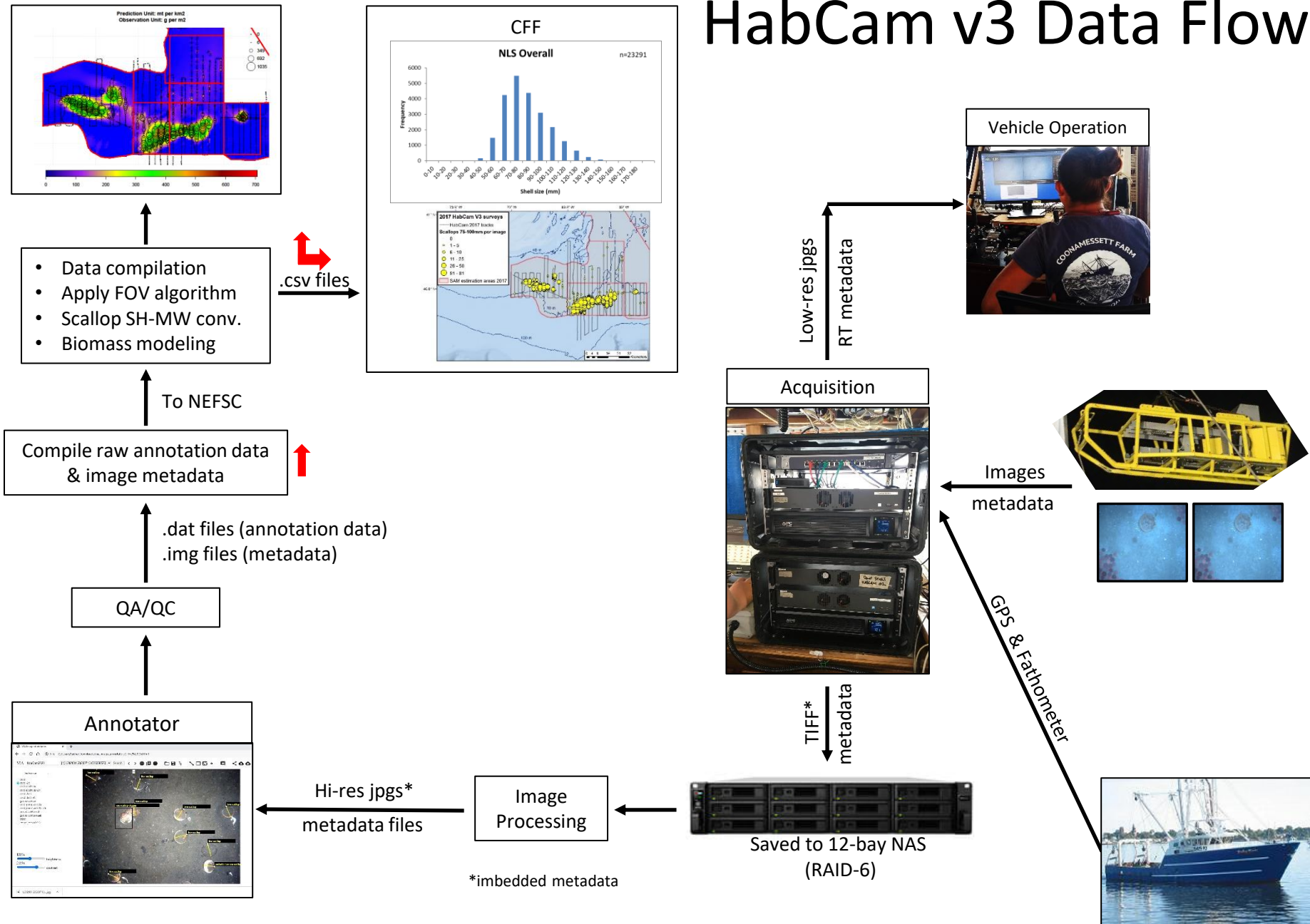 - Collects 6 images/second
- Integrated shipboard metadata

HabCam v3

Fiber optic tow cable

SBE 37 CTD

Strobe

Fiber optic telemetry bottle

Strobe

Benthos altimiter

High-resolution stereo cameras (2)

Strobe

2.0 m

1.0 m Field of View

Onboard HabCam v3 Data Flow

Vehicle Operation

Low-res jpgs
RT metadata

Acquisition

Images
metadata

GPS & Fathometer

- Data compilation
- Apply FOV algorithm
- Scallop SH-MW conv.
- Biomass modeling

.csv files

To NEFSC

Compile raw annotation data & image metadata

.dat files (annotation data)
.img files (metadata)

QA/QC

Annotator

Hi-res jpgs*
metadata files

Image Processing

TIF*
metadata

Saved to 12-bay NAS
(RAID-6)

*imbedded metadata

CFF

HabCam v3 Data Flow

- Data compilation
- Apply FOV algorithm
- Scallop SH-MW conv.
- Biomass modeling

.csv files

CFF

Vehicle Operation

Low-res jpgs
RT metadata

To NEFSC

Compile raw annotation data
& image metadata

Acquisition

Images
metadata

.dat files (annotation data)
.img files (metadata)

QA/QC

GPS & Fathometer

TIFF*
metadata

Annotator

Hi-res jpgs*
metadata files

Image
Processing

Saved to 12-bay NAS
(RAID-6)

*imbedded metadata

Coonamessett Farm Foundation

Data Analysis

All annotators trained and assessed on control set

QAQC performed on a minimum of 50-75% of image annotations

Similar annotation protocol to NOAA survey

In-house biomass estimates completed using stratified mean estimation by depth,

Images aggregated over ~2000m segments (10 images per segment)
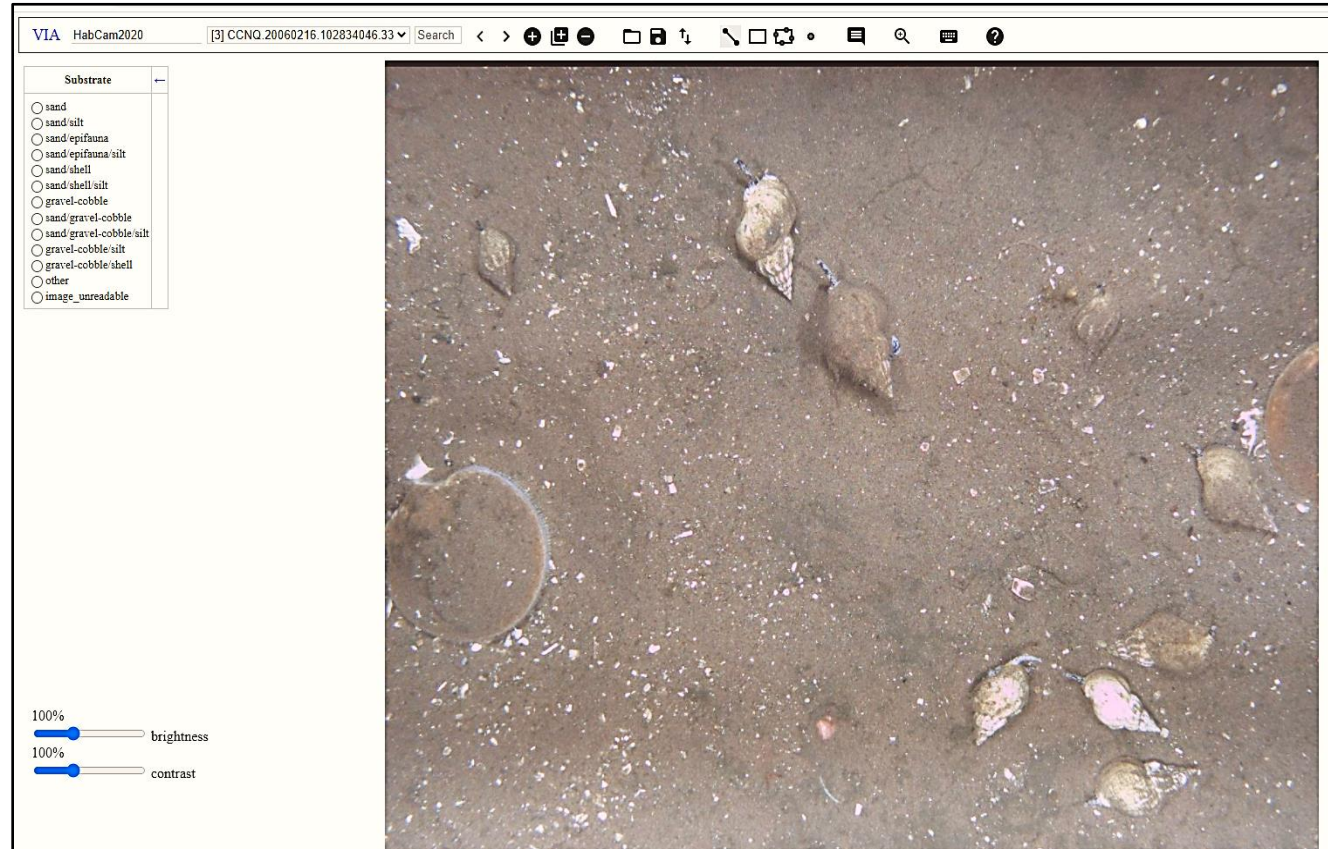
VIA annotator GUI. Annotations are made for pre-determined species and substrate lists. Brightness and contrast bars and zoom function added to improve annotations.

2021 CFF HabCam Survey

Project Objectives:

1. Photographic imagery from proposed optical transects in the survey areas

2. GIS-based plots of scallop distribution and density by size and length-frequency distributions of scallops within the survey areas

3. Overall biomass (total and exploitable) within each SAMS area surveyed
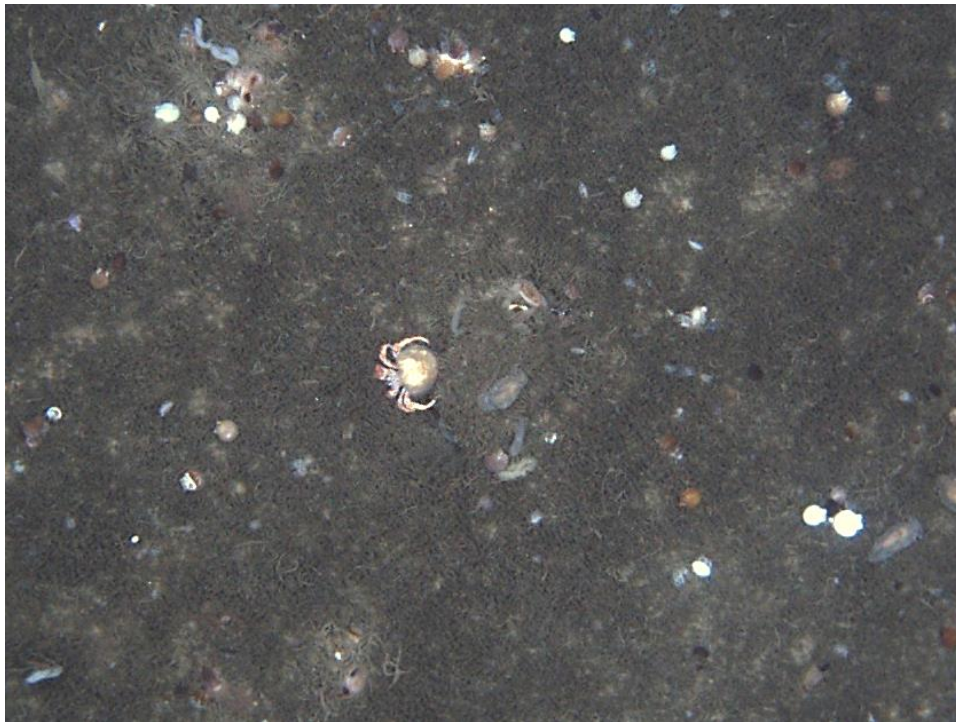
Juvenile scallops on bryozoan mats in CAII-SE

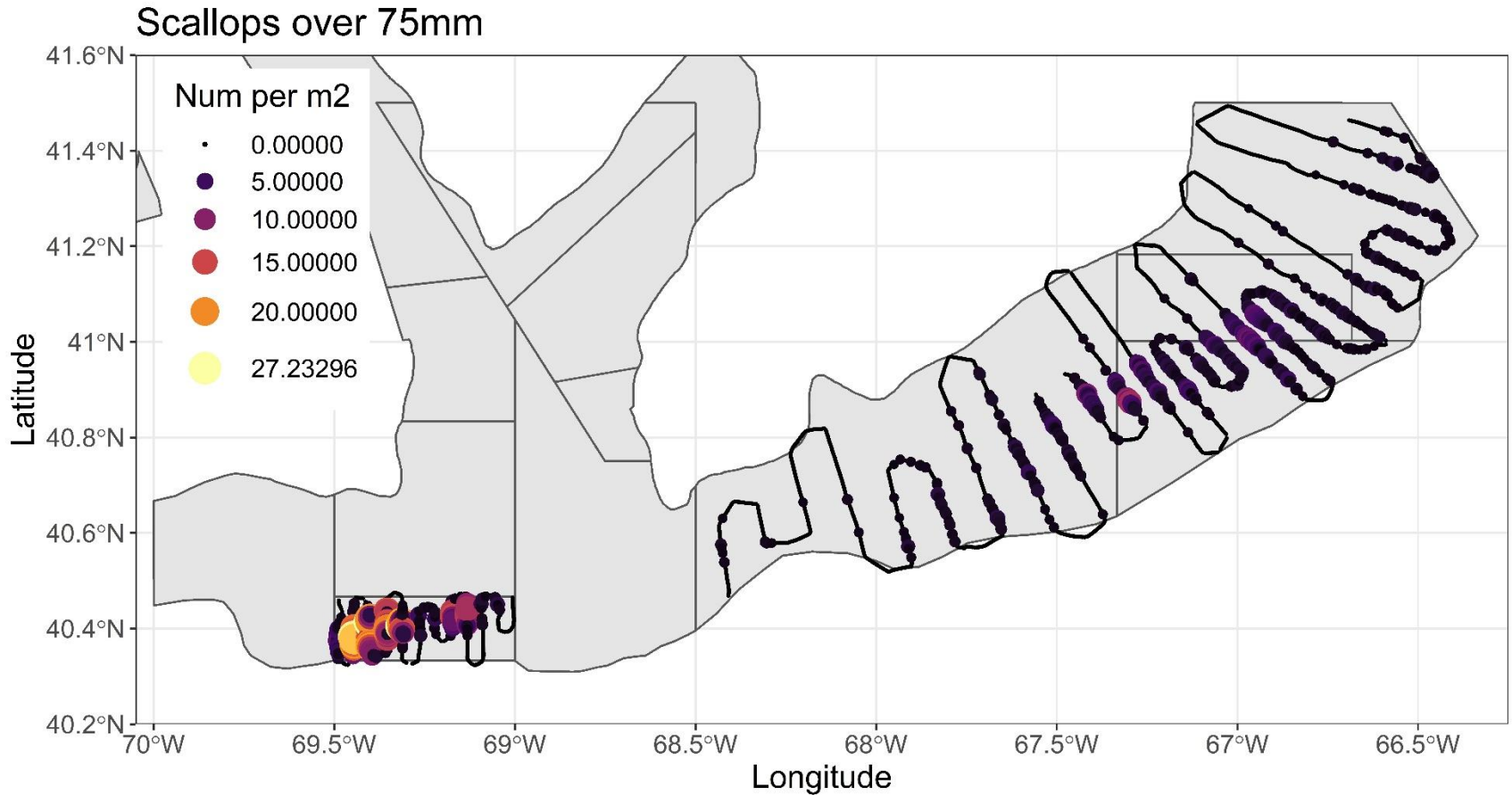HabCam v3 on the F/V *Kathy Marie*

Georges Bank Track Coverage

Track map

Survey Stats

Leg 1
- June 17th - 25th 2021
- Distance: 622 nm
- Collected: ~4.8 million pairs
- Annotated: 6,117 images
- Annotation Rate ~1:400

Sea scallop density and distribution maps by size class

Scallops under 35mm
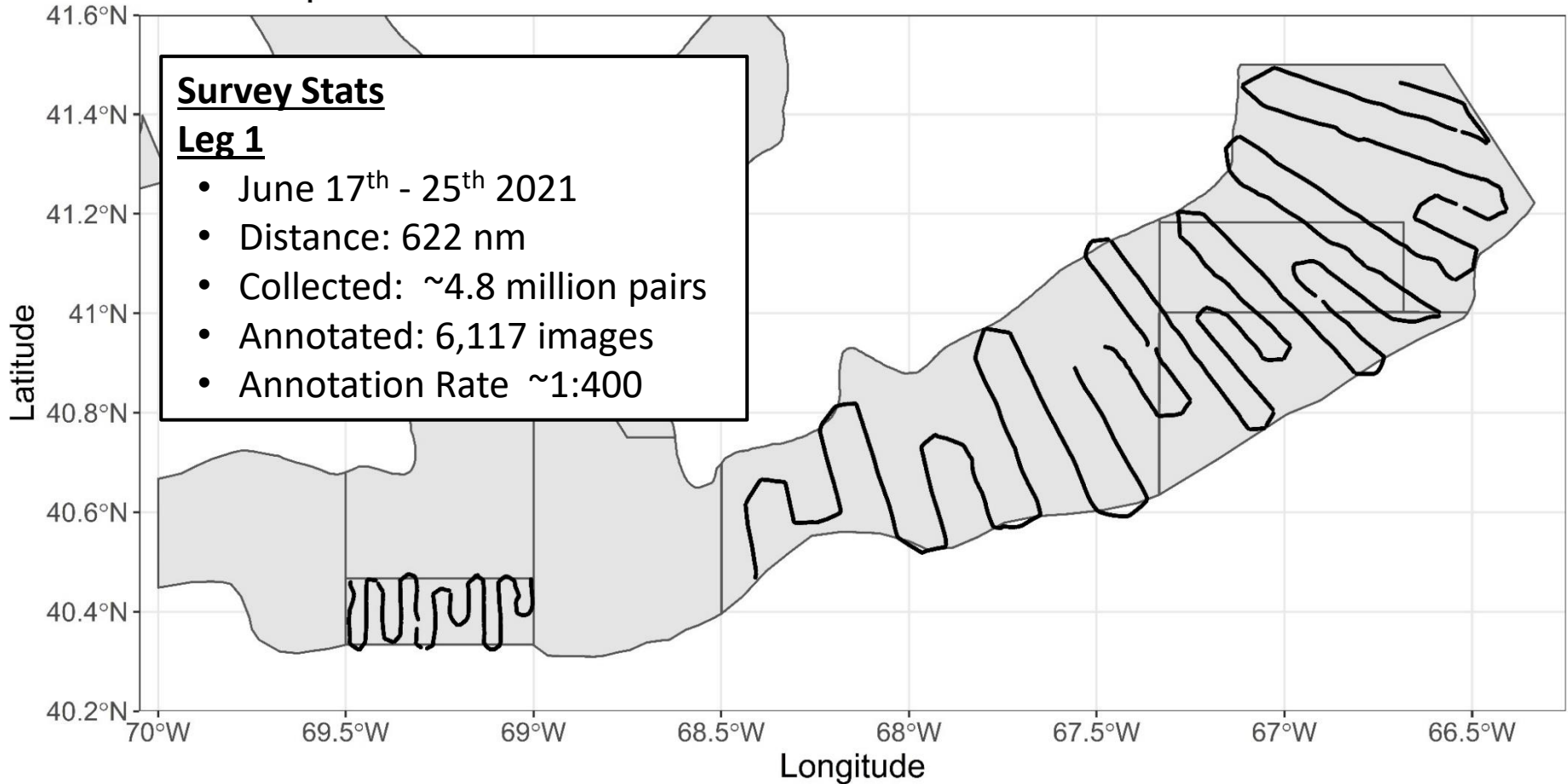
Sea scallop density and distribution maps by size class

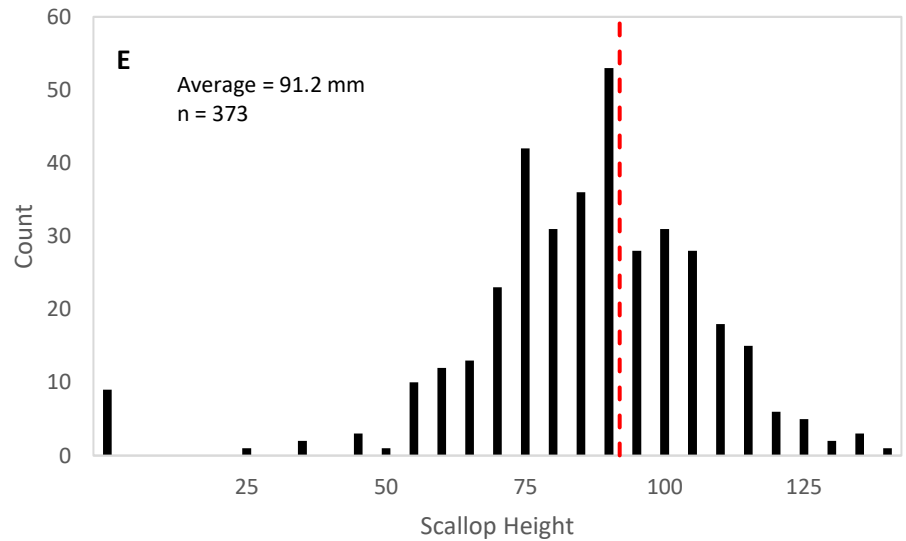# Sea scallop density and distribution maps by size class

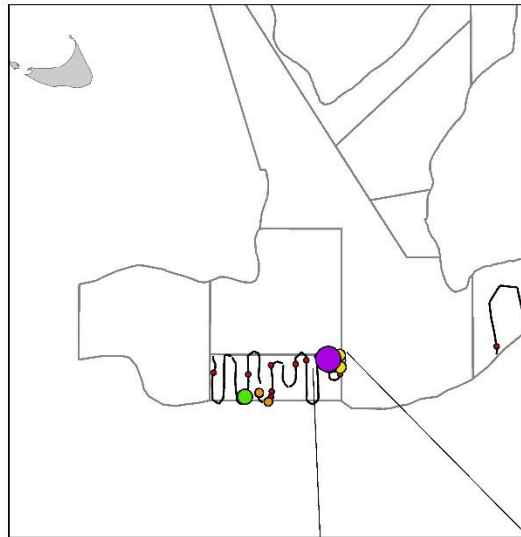Scallops over 75mm

Sea scallop length-frequency by SAMS area

Closed Area 2- Extension

A
Average = 91 mm
n = 835

Closed Area 2- Southeast

B
Average = 82 mm
n = 512

Closed Area 2-Southwest

C
Average = 105.5 mm
n = 711
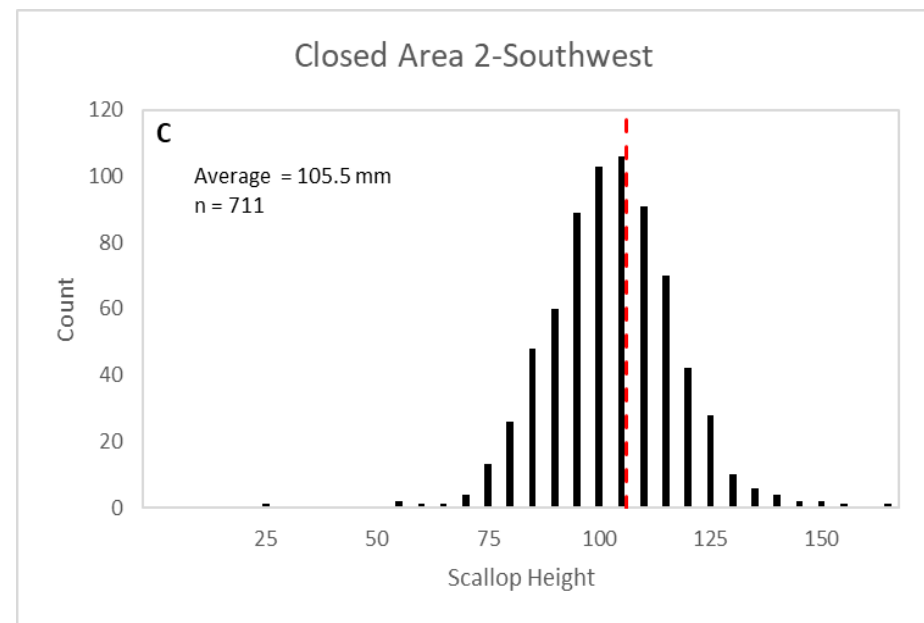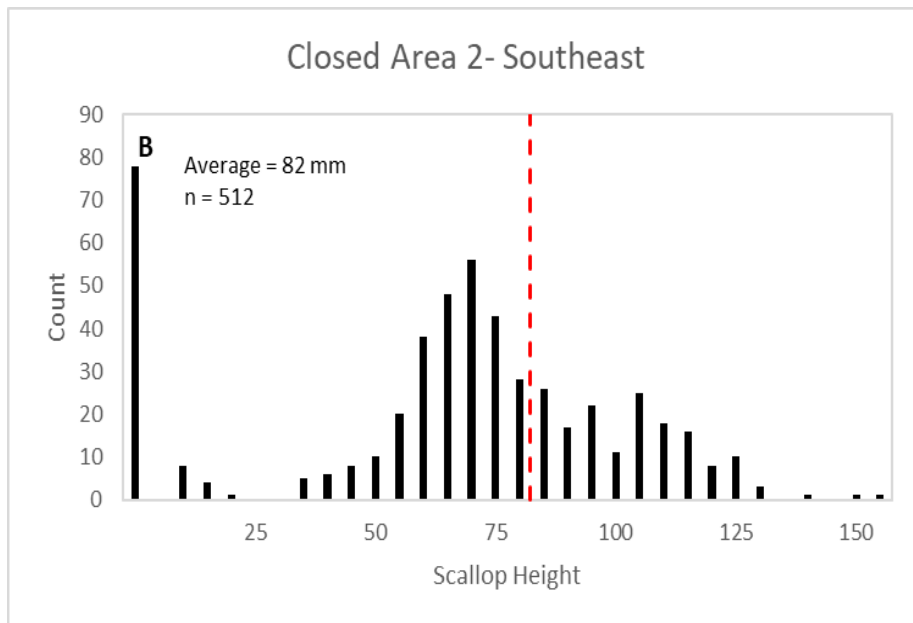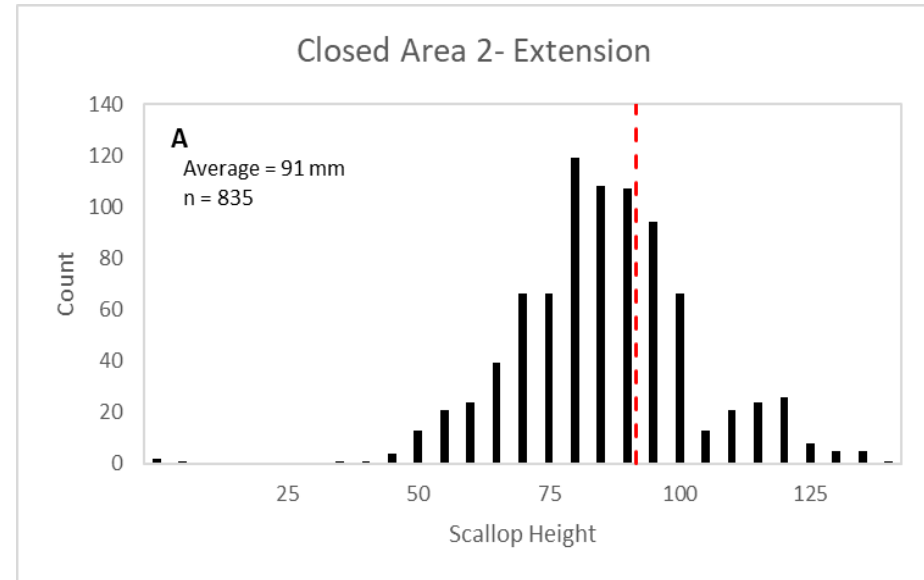
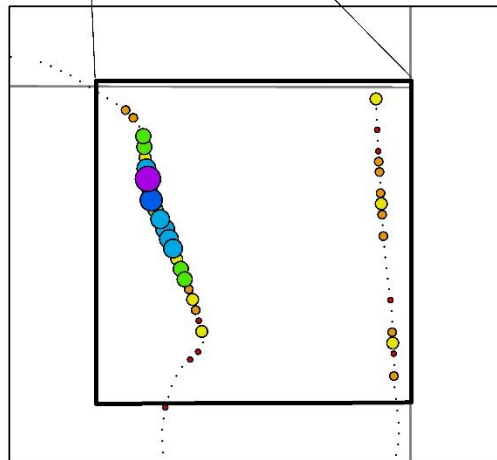# Sea scallop length-frequency by SAMS area

Nantucket Lightship-South

D

Average = 92 mm
n = 2478

Southern Flank

E

Average = 91.2 mm
n = 373
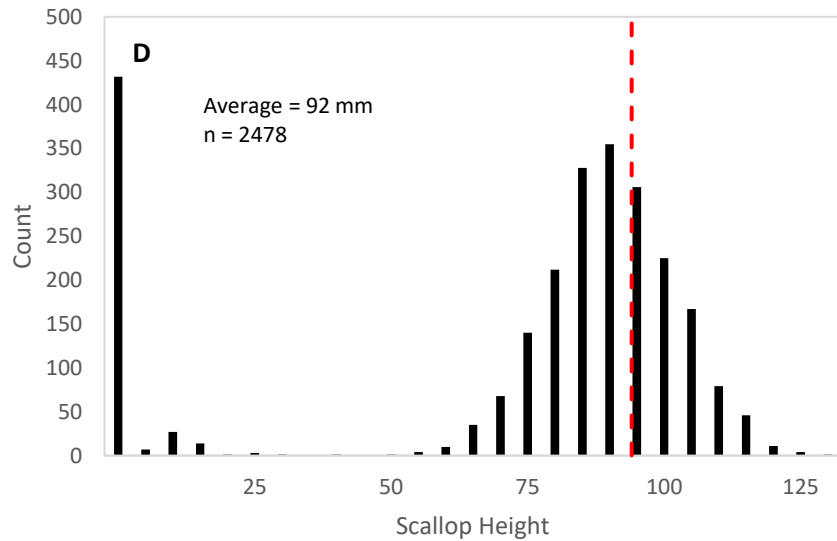
Northeast NLS- S Seed Scallops

Box coordinates

Latitude	Longitude
40.468	-69.059
40.468	-69.0
40.422 `	-69.0
40.422	-69.059

Scallops <35mm
Number per M2

- 0.4 - 2.0
- 2.0 - 5.0
- 5.0 - 10.0
- 10.0 - 25.0
- 25.0 - 50.0
- 50.0 - 75.0
- 75.0 - 102.0
- · HabCam tracks
- ☐ SAMS areas
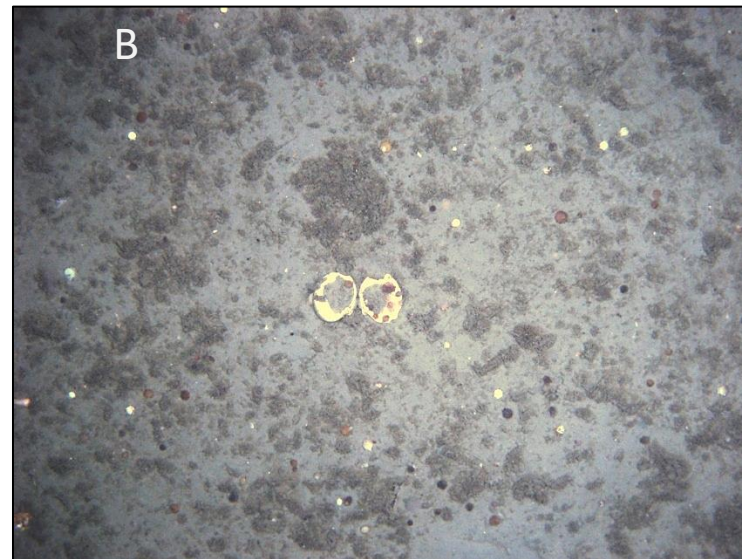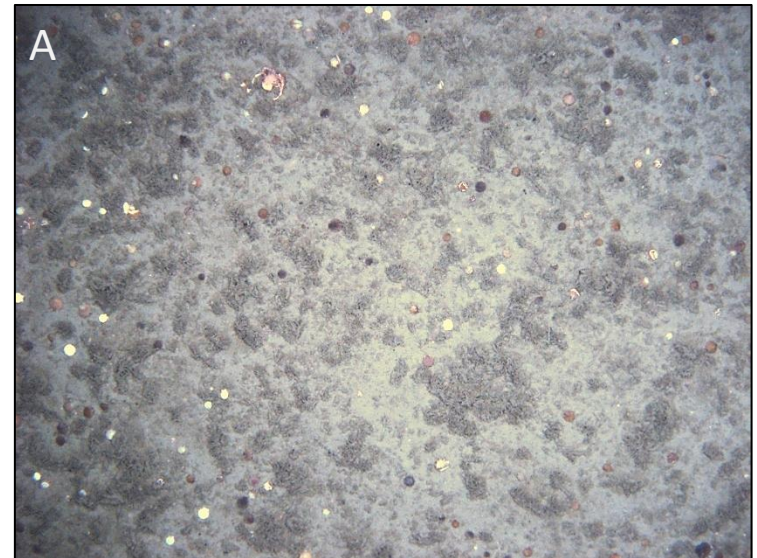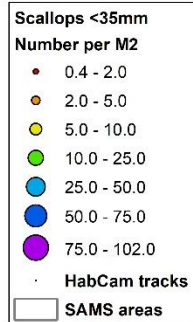
Images A and B taken in northeast corner of NLS-S

Mid-Atlantic Track Coverage

Survey Stats

Leg 2

- June 29th-July 8th, 2021
- Distance: 807 nm
- Collected: ~6.3 mill paired images
- Annotated: 7,892 images
- Annotation Rate ~1:400
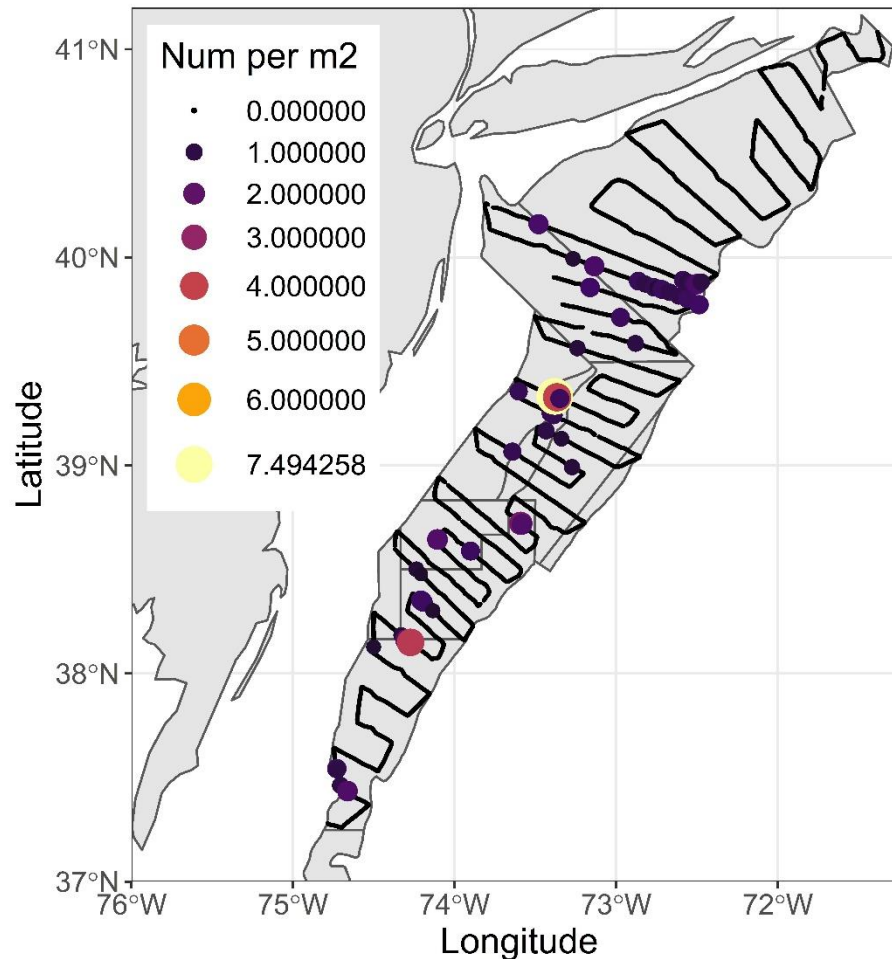- Black line

Leg 3

- July 13st-July 19th, 2021
- Distance: 621 nm
- Collected: ~4,4 mill paired images
- Annotated: 5,507 images
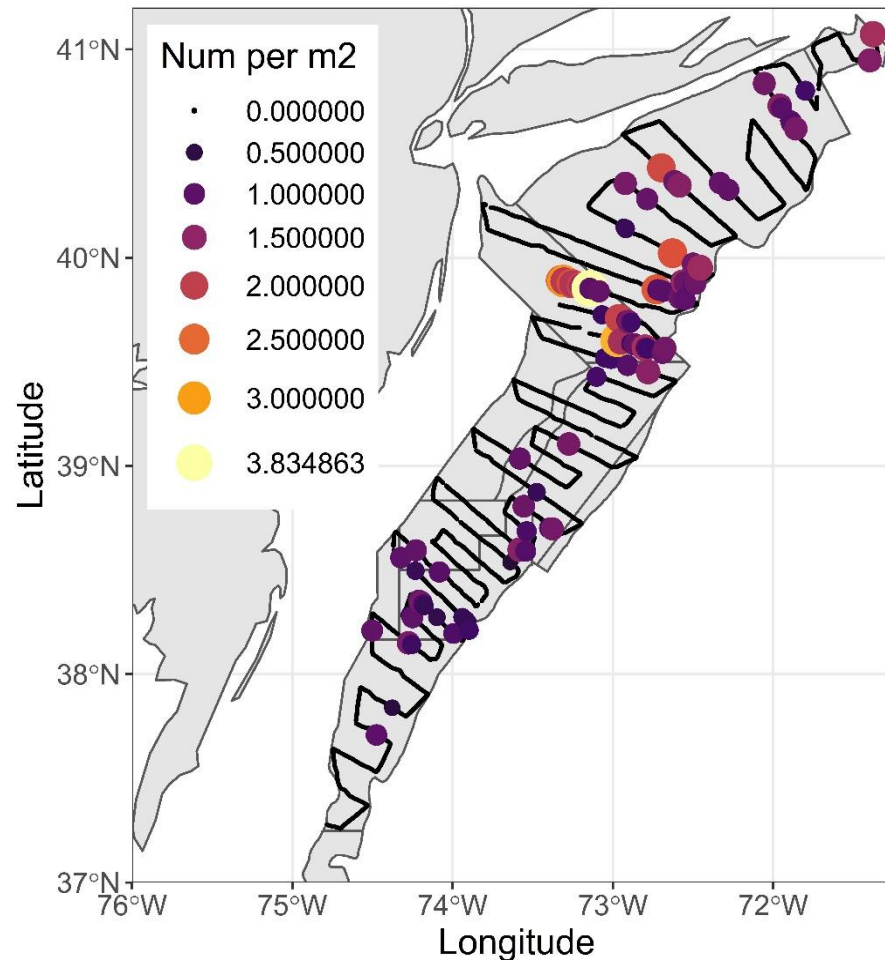- Annotation rate: ~1:400
- Red line

Track map
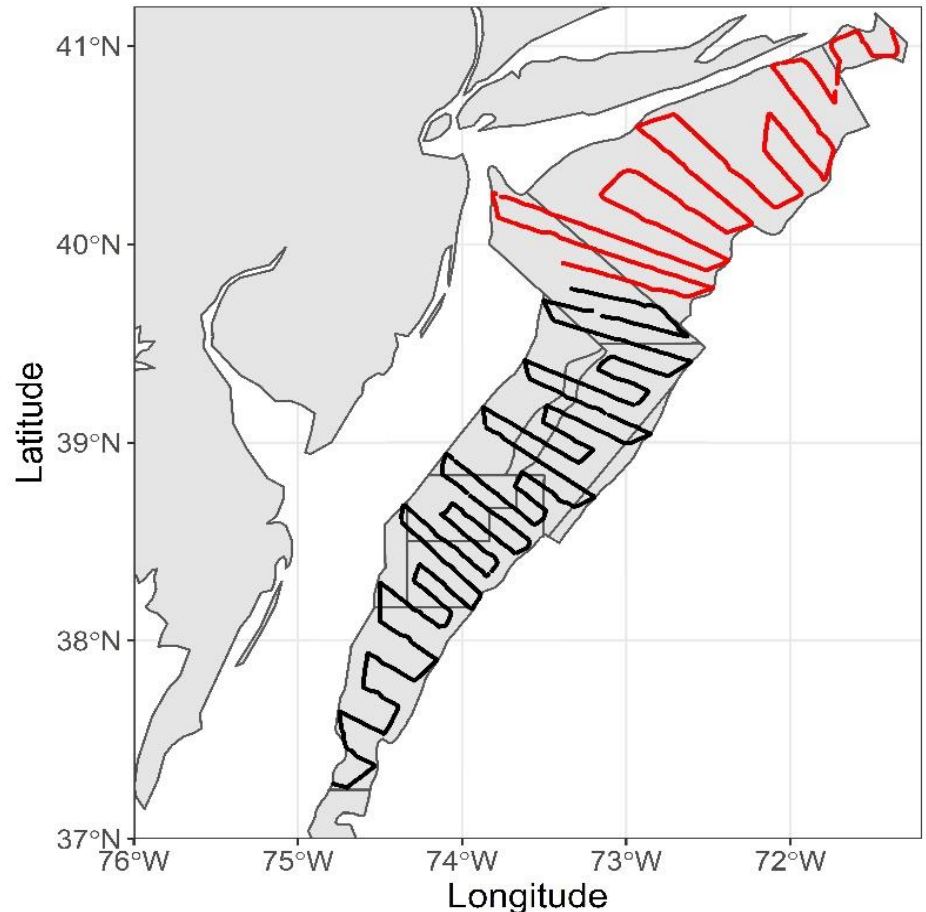
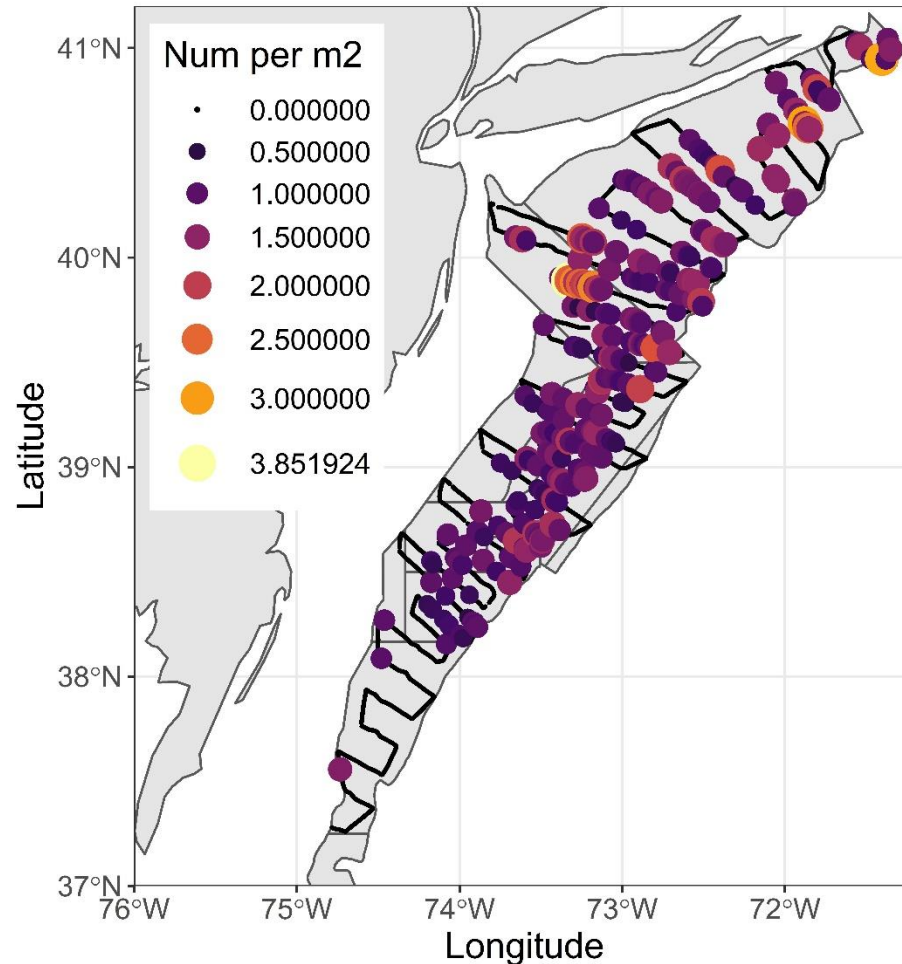# Sea scallop density and distribution maps by size class

Scallops under 35mm

Sea scallop density and distribution maps by size class
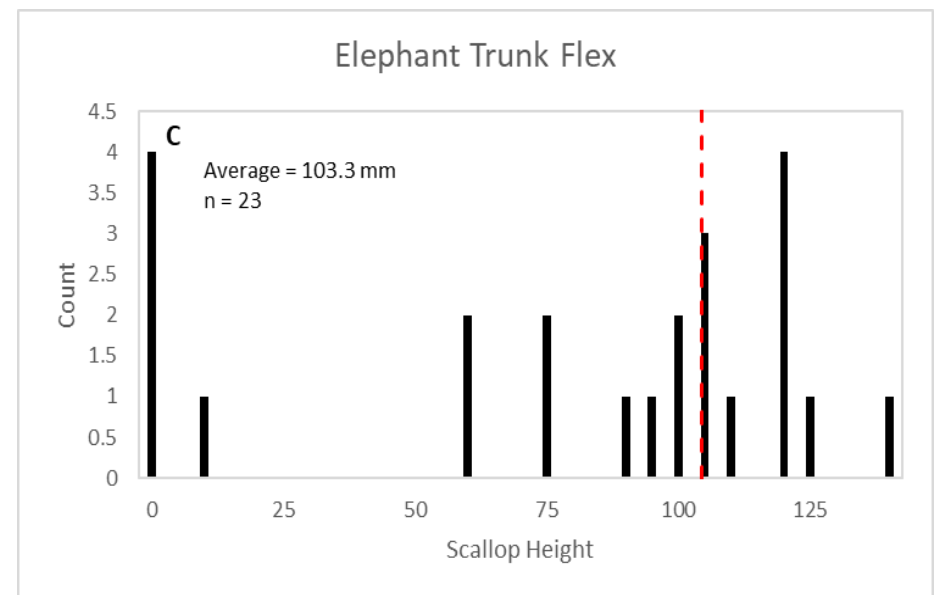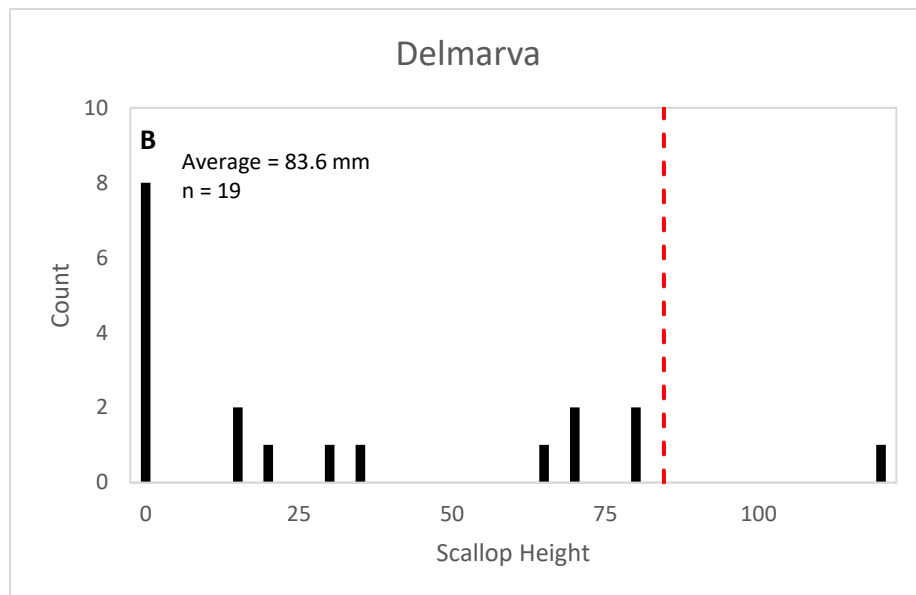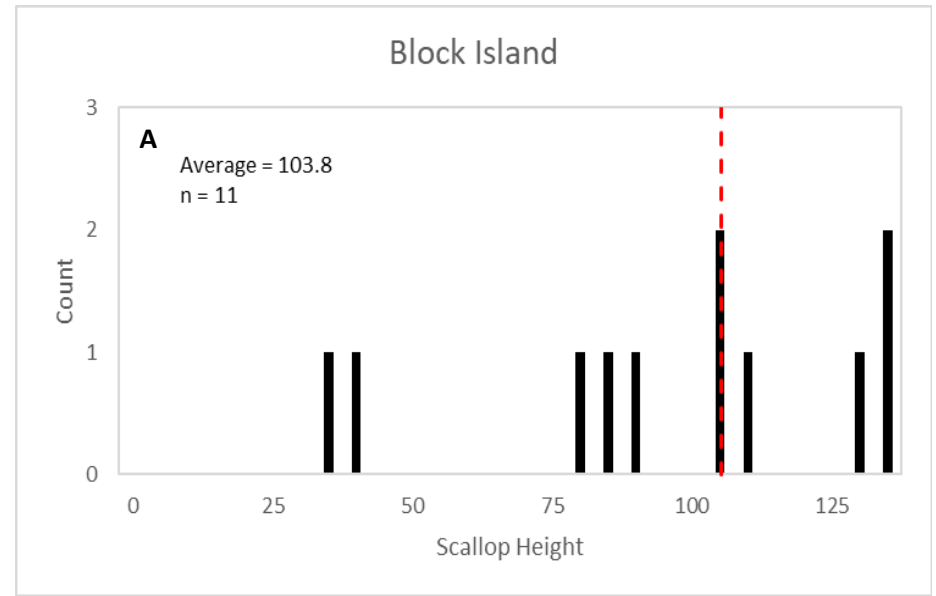

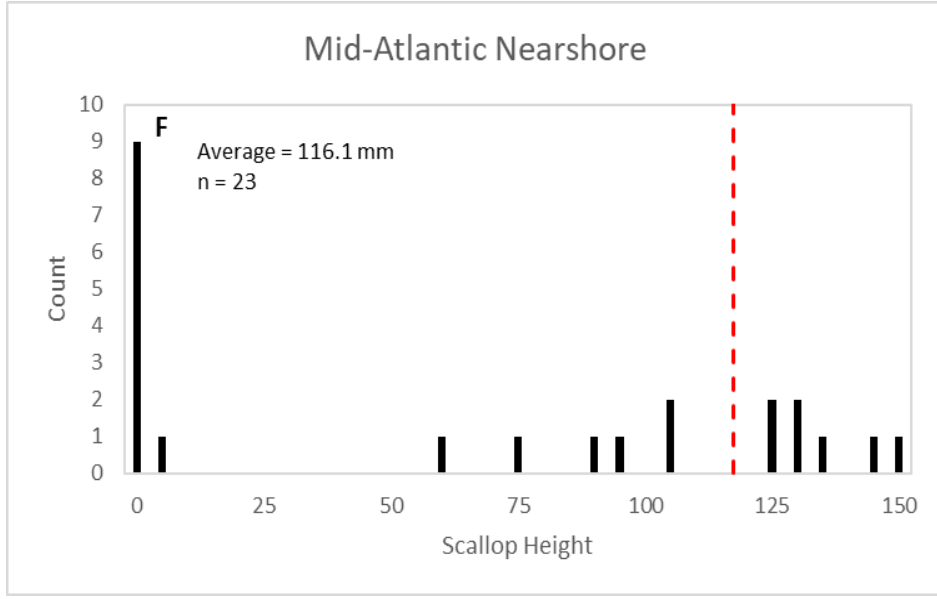Scallops 35-75mm
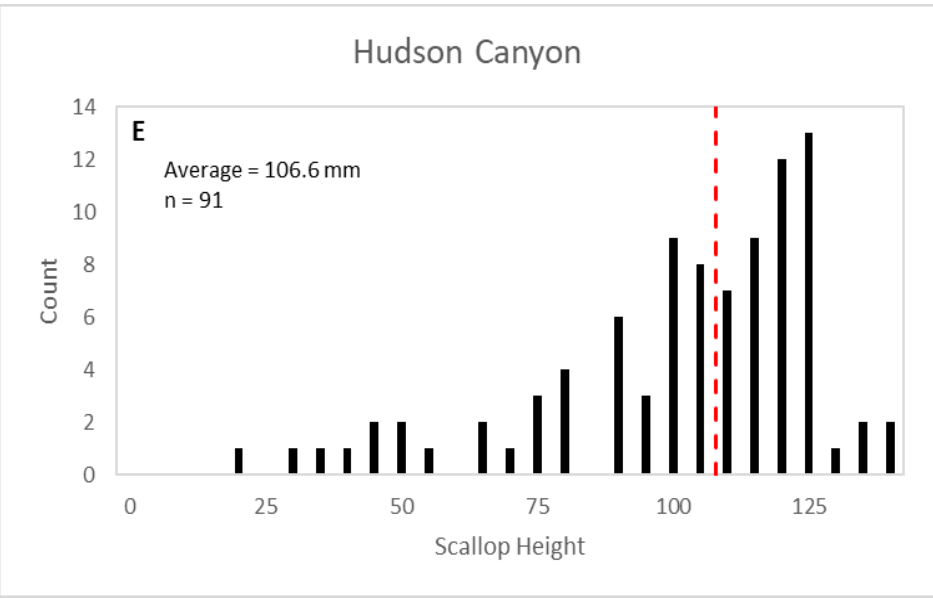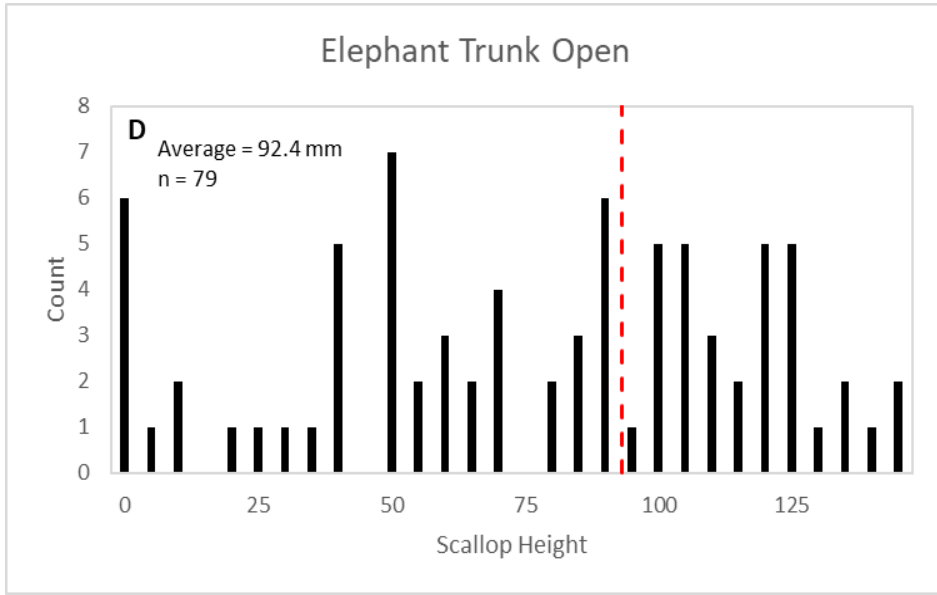
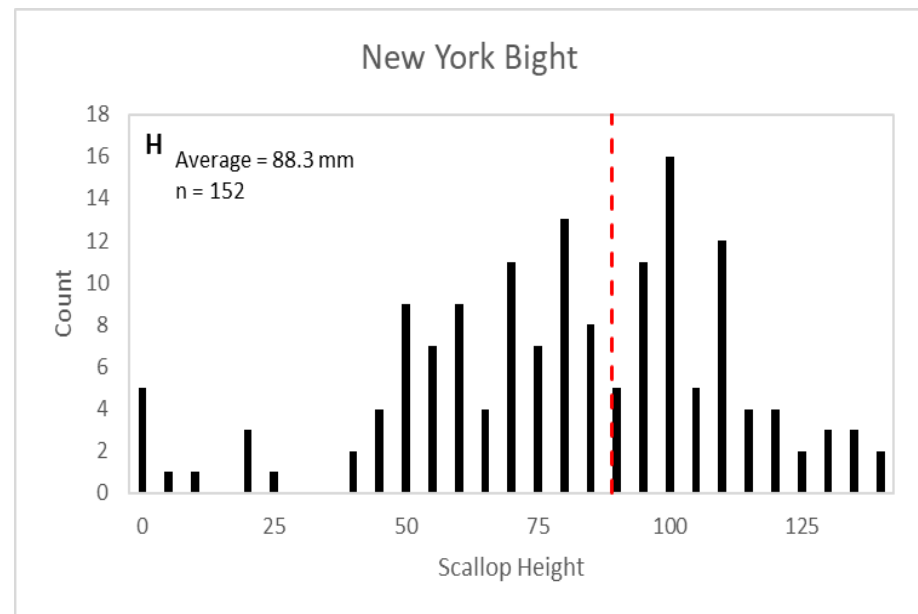# Sea scallop density and distribution maps by size class

Scallops over 75mm

Sea scallop length-frequency by SAMS area

Coonamessett Farm Foundation

Sea scallop length-frequency by SAMS area

Coonamessett Farm Foundation

Sea scallop length-frequency by SAMS area

Long Island

G
Average = 99.5 mm
n=198

New York Bight

H
Average = 88.3 mm
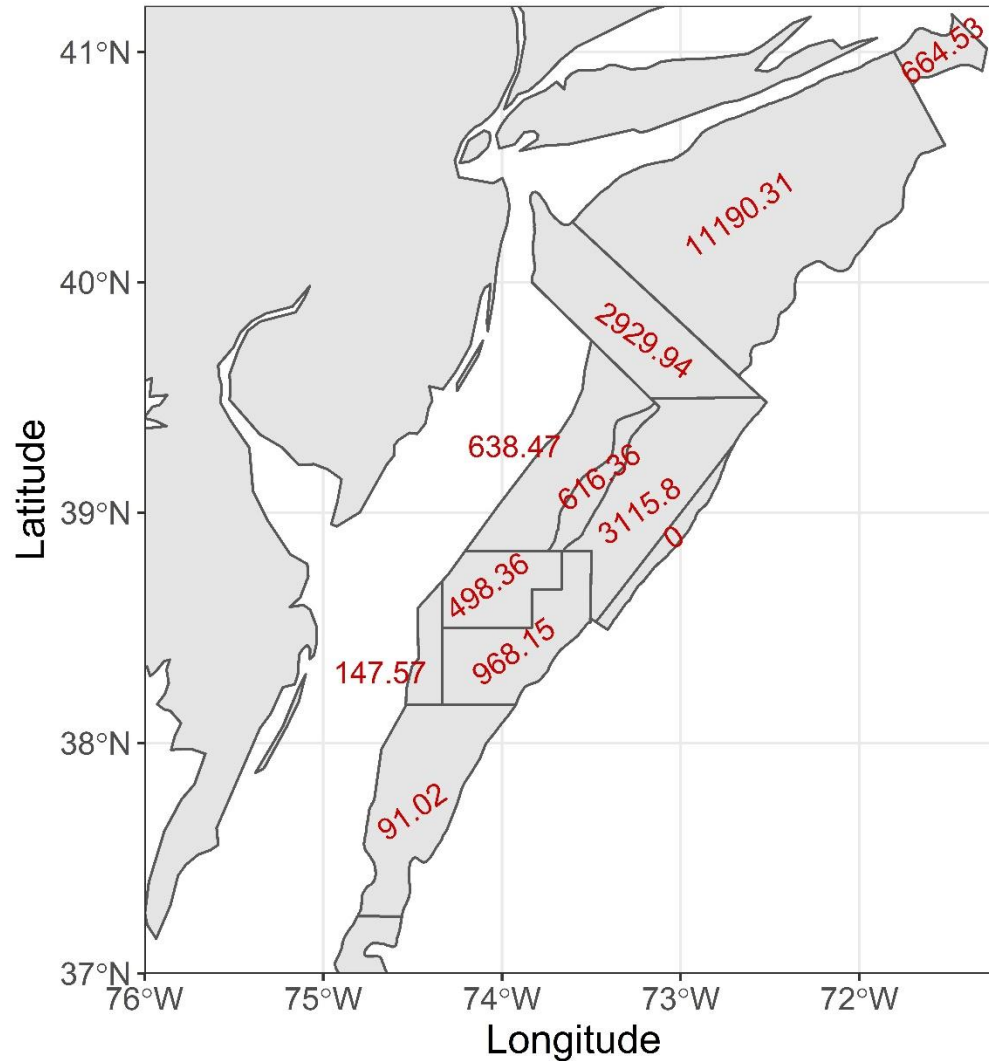n = 152
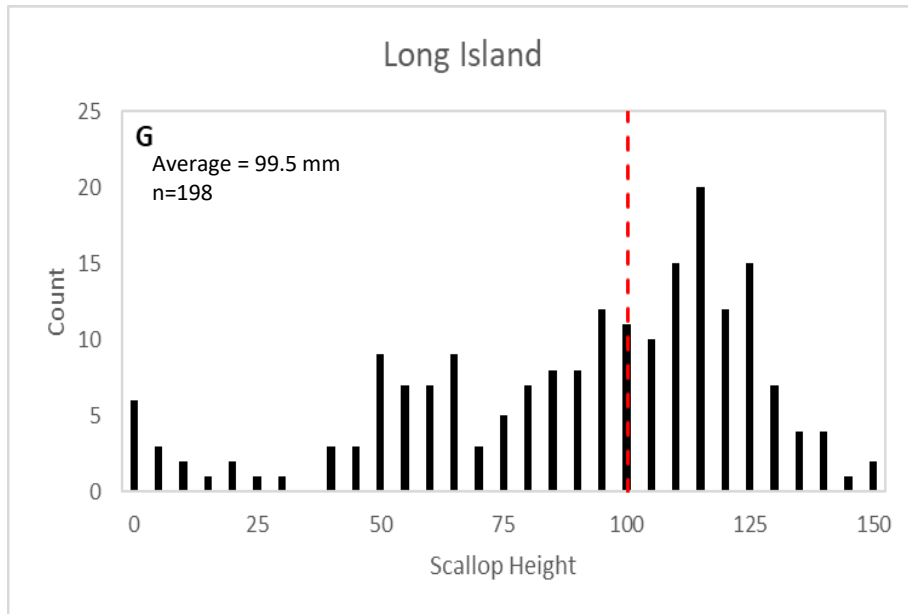
Estimated Exploitable Biomass
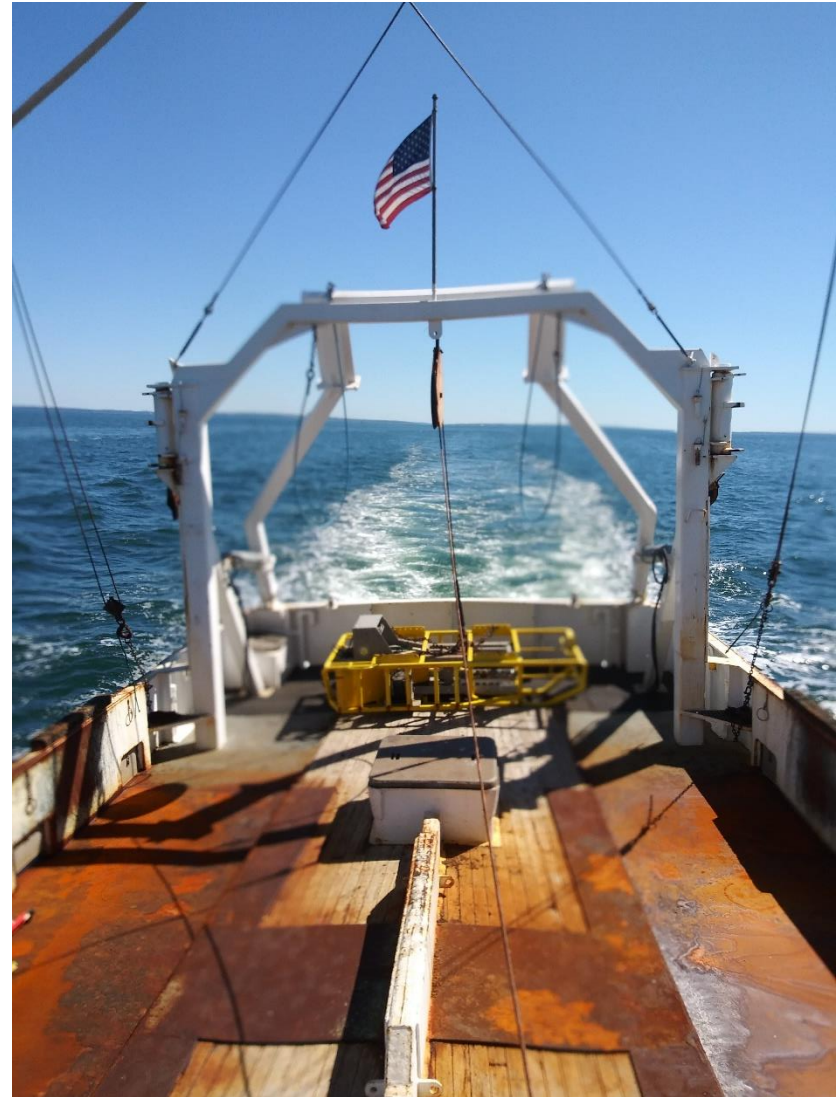

Exploitable biomass map
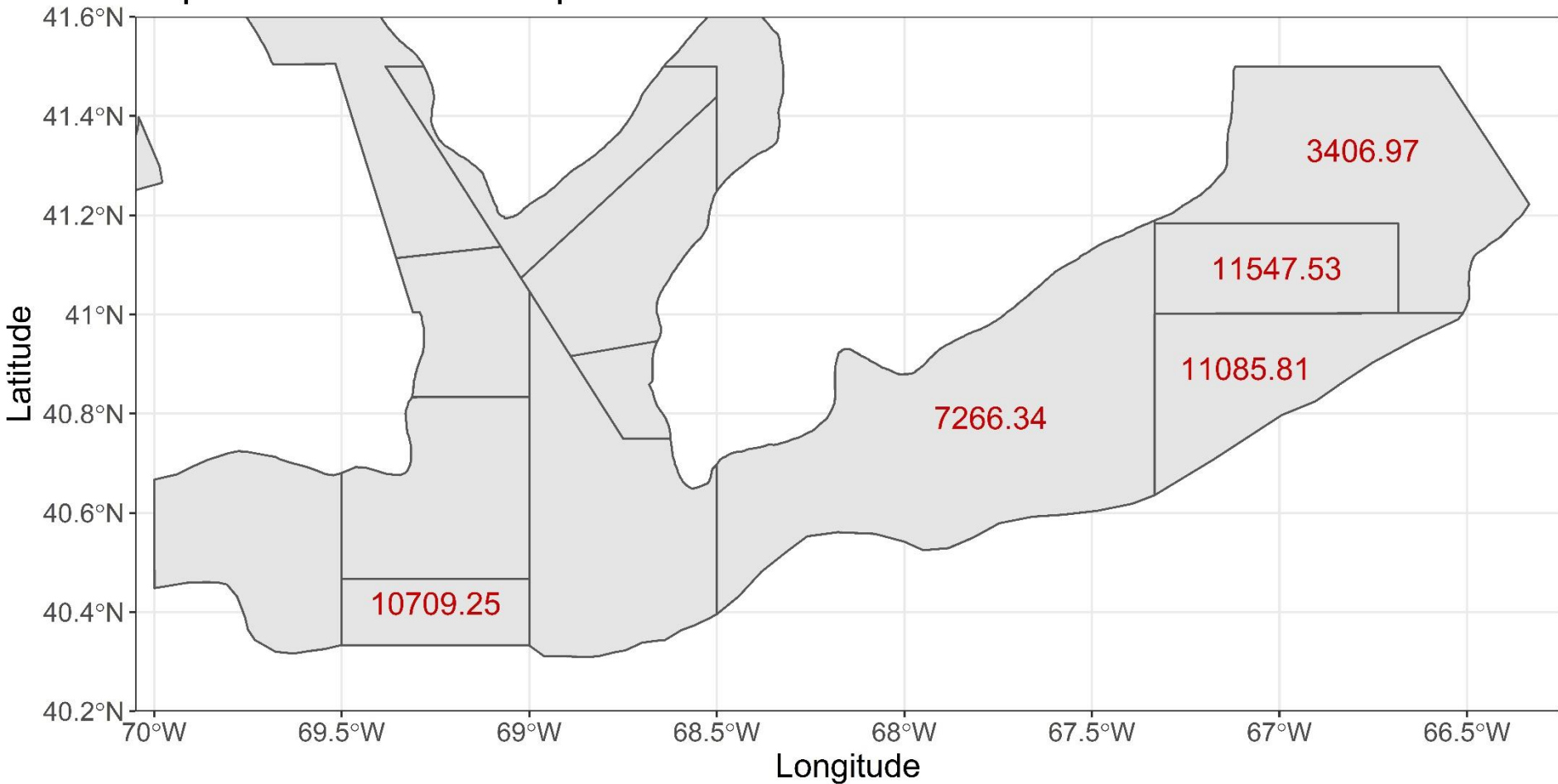
Estimated Exploitable Biomass

Exploitable biomass map

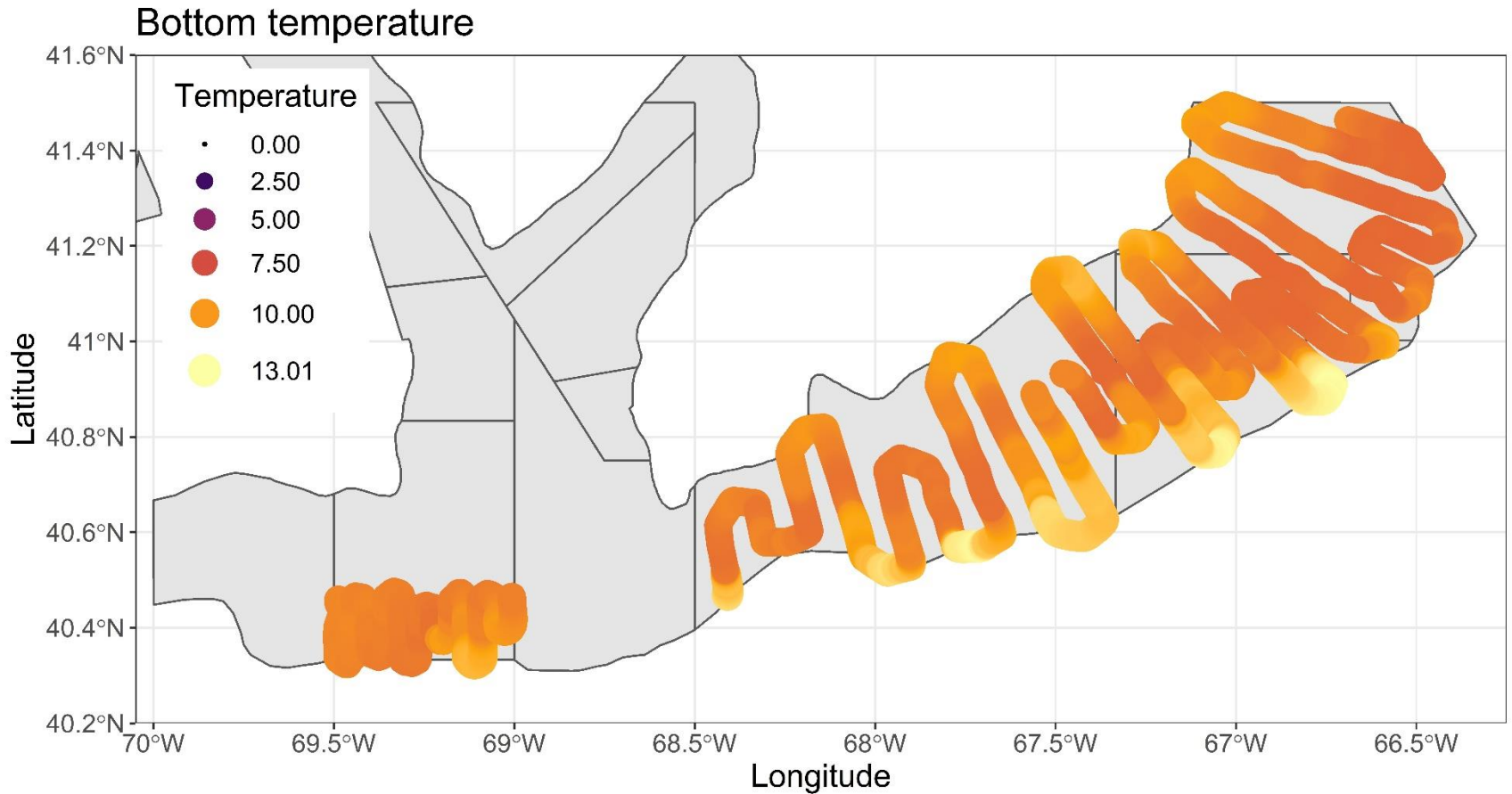# Acknowledgements

- Crew of the F/V *Kathy Marie* | Capt. Jose Correia

- Scallop RSA Program Staff

- NEFSC staff

- Jon Howland – WHOI Glen Manchester – NE Marine Services

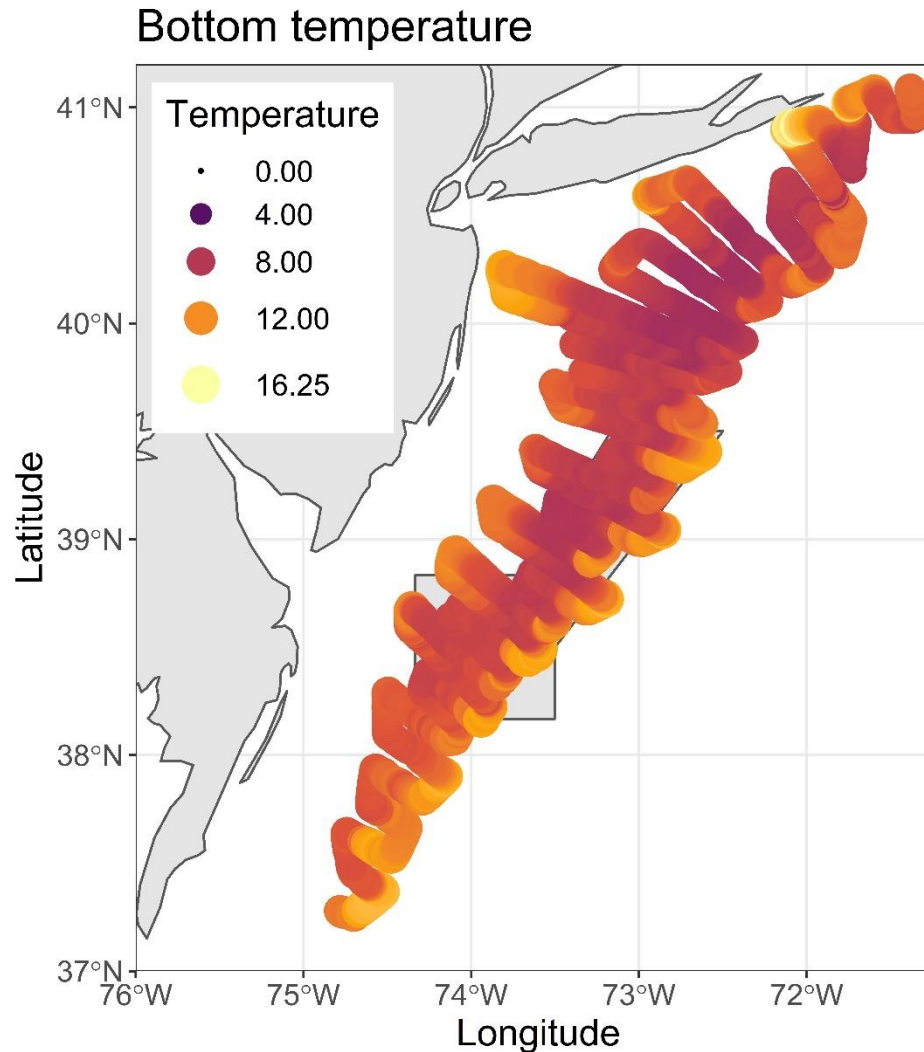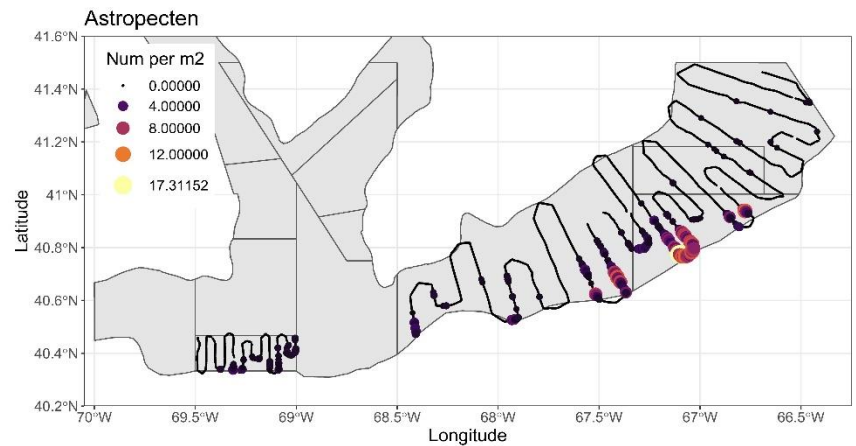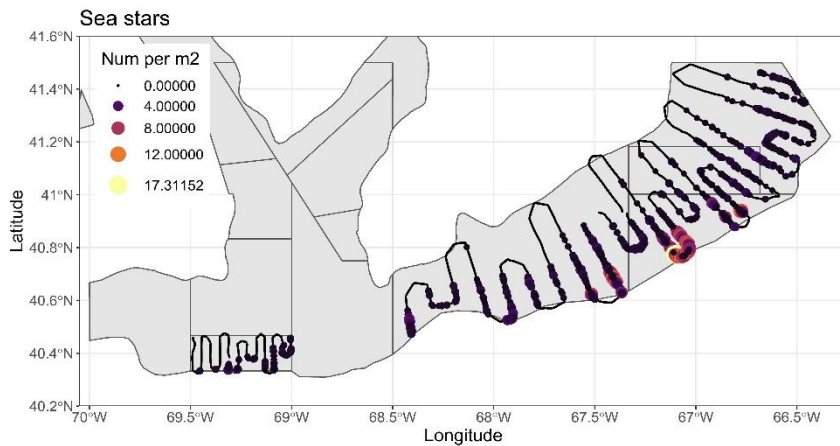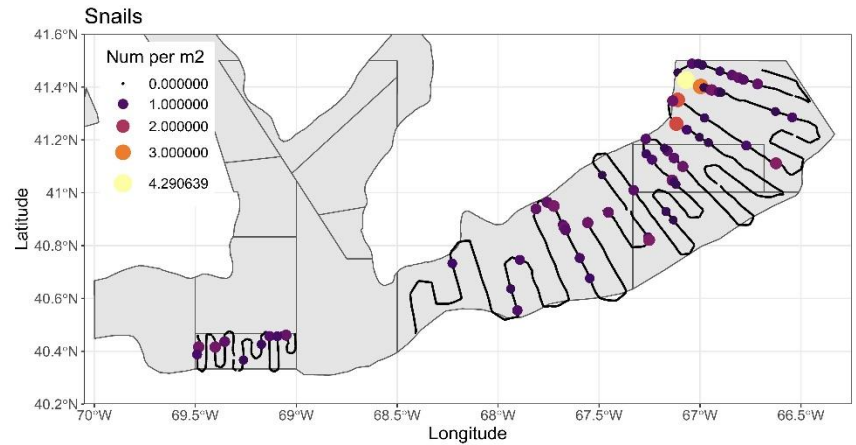- Science party

Questions?
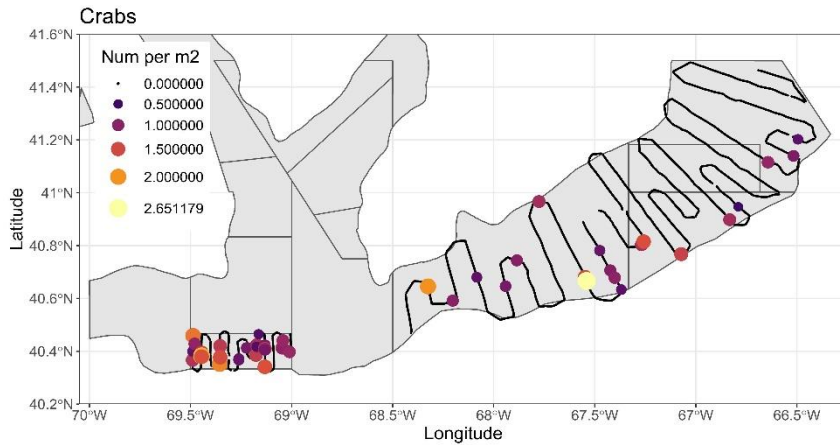
Georges Bank Bottom Temperature

Bottom temperature
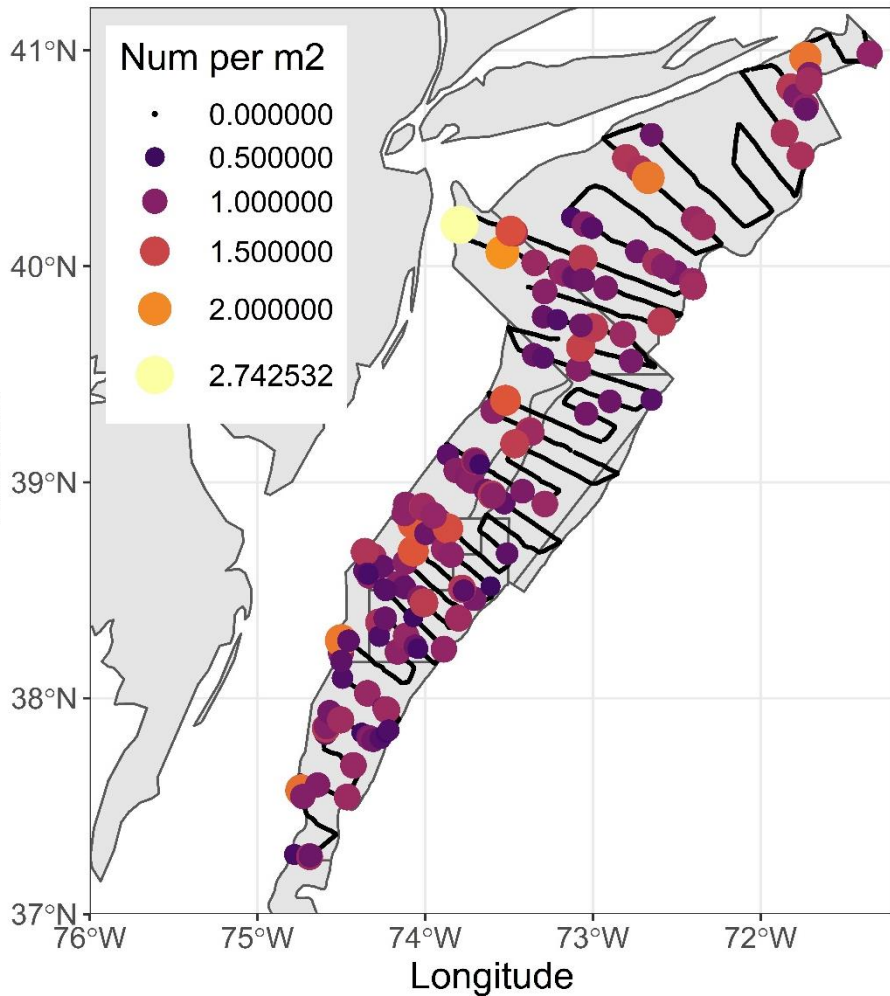
Mid-Atlantic Bottom Temperature

Bottom temperature

Georges Bank Predator Maps

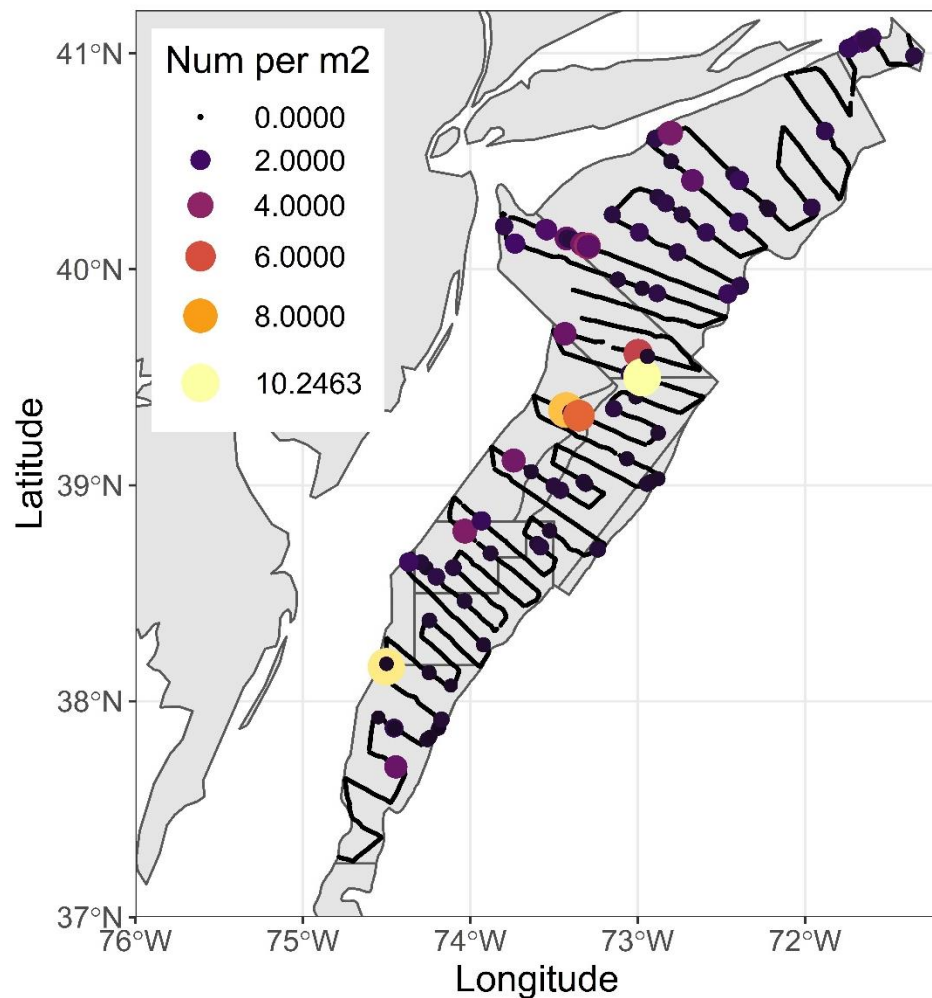# Mid-Atlantic Predator Maps

Crabs

Snails

Mid-Atlantic Predator Maps
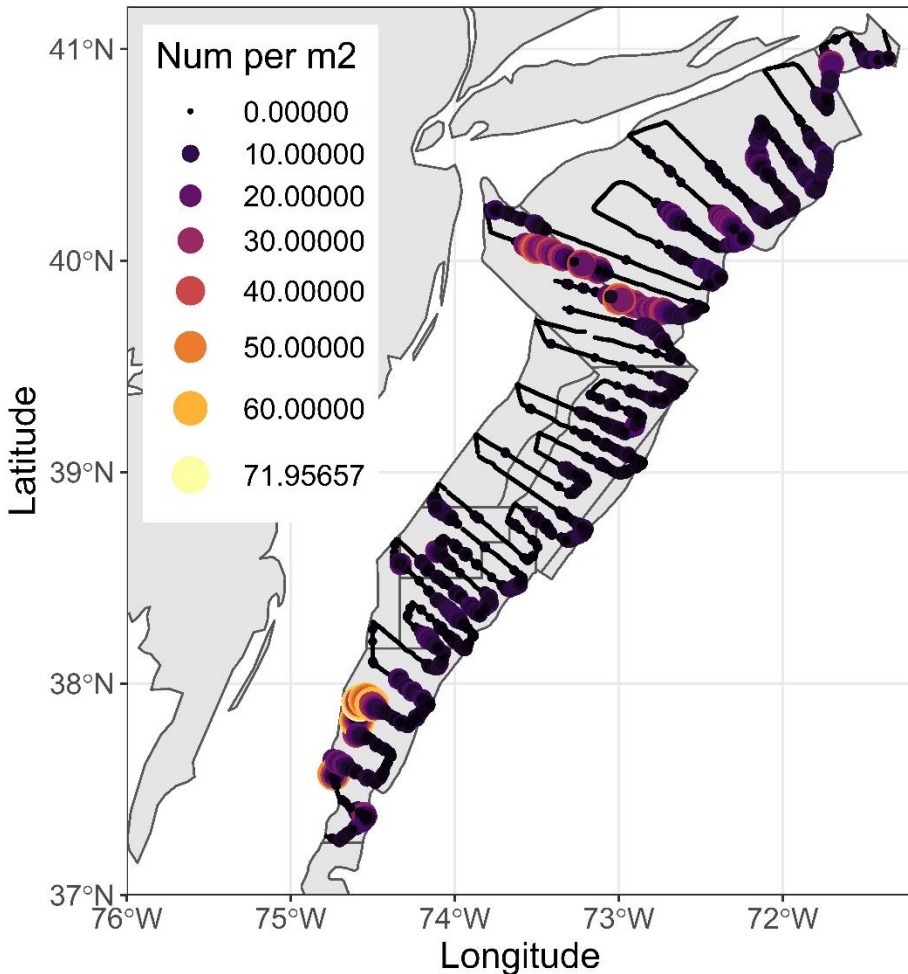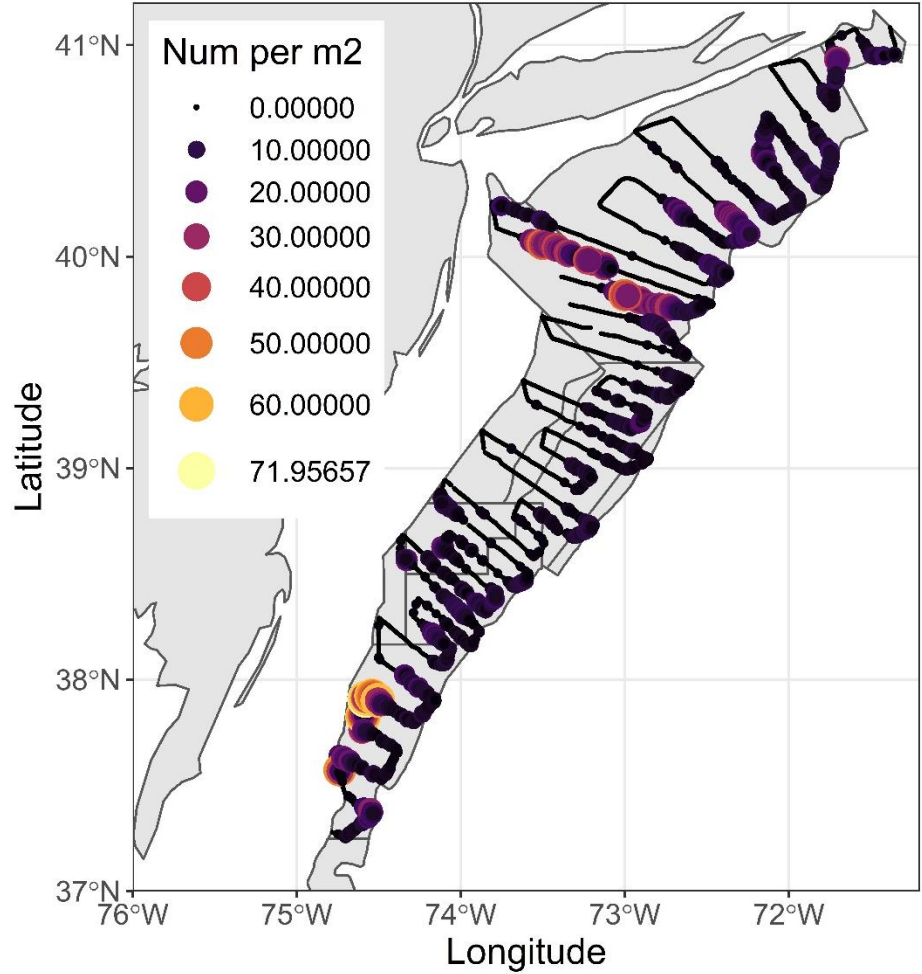
Estimated Total Biomass

SAMS	Area Km2	Average Size	Mean Weight	BmsMT	Number (millions)
CL2-Access-Southeast	2486.4	82.0	14.2	5192.6	321.6
CL2-Access-Southwest	1098.1	105.5	28.8	15313.9	526.6
CL2-Ext	1388.6	91.0	18.8	19945.0	1069.1
SF	4224.8	91.2	16.7	12084.0	703.5
NLS-South-Deep- SARC65	627.4	93.0	13.0	20347.2	1595.9
NLS-South-Deep VIMS	627.4	93.0	12.3	18848.8	1560.2
Delmarva	3867.2	83.6	12.3	211.8	17.5
ET-Open	2612.0	92.4	16.8	1243.4	69.1
ET-Flex	1793.7	103.3	21.4	632.7	30.1
MAB-Nearshore	3636.5	116.1	31.0	919.1	31.3
Hudson Canyon	3907.0	106.6	21.8	3818.3	176.9
NY Bight	5498.3	88.3	15.7	6123.8	411.6
Long Island	13132.2	99.5	21.8	14100.0	632.9
Block Island	759.2	103.8	25.1	813.6	32.9

Estimated Exploitable Biomass

SAMS	Area Km2	Average Size	Mean Weight	Exp BmsMT	Exp Number (Millions)
CL2-Access-Southeast	2486.4	82.0	14.2	3407.0	123.2
CL2-Access-Southwest	1098.1	105.5	28.8	11547.5	360.9
CL2-Ext	1388.6	91.0	18.8	11085.8	448.1
SF	4224.8	91.2	16.7	7266.3	306.2
NLS-South-Deep- SARC65	627.4	93.0	13.0	10709.3	702.2
NLS-South-Deep VIMS	627.4	93.0	12.3	9789.0	687.8
Delmarva	3867.2	83.6	12.3	91.0	4.5
ET-Open	2612.0	92.4	16.8	968.2	36.1
ET-Flex	1793.7	103.3	21.4	498.4	18.8
MAB-Nearshore	3636.5	116.1	31.0	804.2	22.0
Hudson Canyon	3907.0	106.6	21.8	3115.8	120.8
NY Bight	5498.3	88.3	15.7	3666.2	157.6
Long Island	13132.2	99.5	21.8	11190.3	373.8
Block Island	759.2	103.8	25.1	664.5	20.4

Sensitivity Analysis NLS-S

CFF 2021 HabCam Total Biomass (MT)

SAMS Area	SARC65	VIMS 2016-2020
NLS-South-Deep	20,347.2	18,848.8

Continued Covid-19 Planning

- Same on-board safety protocols as 2020
- All scientific staff and crew fully vaccinated
- Proof of vaccination prior to departure
- Pre-departure temperature checks
- Self-report any symptoms, illness
- Reduction of on-board personnel