APPENDIX III

Tracking a Large Sea Scallop Recruitment Event with High-Resolution Video Survey in the Gulf of Maine (Semi-Annual Report)

Semi-Annual Report
Period covered by Report: 06/01/2010 - 11/30/2010

Sea Scallop Research

NOAA Grant Number: NOAA/NA10NMF4540474

Award Date: 8/12/2010

Start Date: 6/1/2010

End Date: 5/31/2011

Project Title: **Tracking a large sea scallop recruitment event with high-resolution video survey in the Gulf of Maine**

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Amount: We were granted 32,700 lbs from the Delmarva Closed Area ($246,855) and 69,976 lbs from the Elephant Trunk Area ($528,318.80), totaling $775,173.80.

Work Accomplishments

a. Describe tasks scheduled for this period

Objectives (from proposal): In August 2009 we discovered large aggregations of pre-recruit (< 70 mm) juvenile scallops on Fippennies Ledge, Cashes Ledge, Platts Bank and Jeffreys Ledge with densities as high as 30 scallops·m^{-2}. We propose a high-resolution video survey to examine the abundance, spatial distribution and size composition of scallop aggregations in the Gulf of Maine and to assess rates of natural mortality, recruitment, local dissipation, and growth between 2009 and 2010.

Methodology (from proposal): In August 2010 we will conduct one 6-day video survey to examine the four large aggregations of pre-recruit scallops we sampled in our 2009 survey. We will sample 92 stations on Platts Bank, 58 stations on Cashes Ledge, 81 stations on Fippennies Ledge and 67 stations on Jeffreys Ledge based on our 2009 survey (Figure 1). The sampling procedure for these surveys will be a multistage centric systematic design with stations on a 1.0 km regular grid using a multi-view video quadrat which simultaneously samples with a 10.1 megapixel digital still camera and 3 live-feed video cameras. Counts of scallops and macrobenthos and substrate type observations will be used to estimate size-specific scallop density and map the distributions of live and dead scallops, other macrobenthos (e.g. sponges, starfish, and filamentous fauna), depth and substrates (Stokesbury 2002, Stokesbury et al. 2004, Stokesbury and Harris 2006). The 2010 survey data will be compared with our 2009 scallop data to assess natural mortality, recruitment, dissipation and to track the growth rate of the cohort.

Time Line (from proposal): The harvest trips will be collected in the 2010 fishing year as the RFP requires. We will conduct the research cruise in August 2010 and supply the data to the NEFMC and NMFS in the fall of 2010.

b. Describe tasks accomplished this period:

The awarded lbs were divided into 11 compensation trips; two 16,350 lb trips in the Delmarva Area and nine 7,775 lb trips in the Elephant Trunk Area. All trips are scheduled to be completed before the end of the 2010 fishing year (February 28, 2011).

The findings of our 2009 survey of Platts Bank, Cashes Ledge, Fippennies Ledge and Jeffreys Ledge were published in August 2010 in a manuscript titled “High densities of juvenile sea scallop (*Placopecten magellanicus*) on banks and ledges in the central Gulf of Maine” (Stokesbury et al. 2010).

We conducted one video survey in the Gulf of Maine from 9-13 August 2010. Using a multistage centric systematic sampling procedure we sampled 91 stations on Platts Bank, 65 stations on Cashes Ledge, 84 stations on Fippennies Ledge and 50 stations on Jeffreys Ledge, each separated by approximately 1 km. On Platts Bank we observed scallops in 38 stations compared to 34 in 2009. However, the mean density decreased drastically between 2009 and 2010 from 3.46 scallops·m^{-2} (SE = 1.180) to 1.67 scallops·m^{-2} (SE = 0.473). On Cashes Ledge scallops were observed in 4 stations compared to 8 in 2009. The mean densities in this area were

similar in 2009 and 2010 with a slight decrease from 1.60 scallops·m^{-2} (SE = 0.789) to 1.45 scallops·m^{-2} (SE = 0.786). Forty-six stations contained scallops on Fippennies Ledge in 2010 compared to 51 in 2009. Density actually increased in this area from 2.06 scallops·m^{-2} (SE = 0.313) in 2009 to 2.92 scallops·m^{-2} (SE = 0.496) in 2010. Lastly, scallops were observed in 26 stations on Jeffreys Ledge in 2010 compared to 33 in 2009. Mean density in this area remained constant at 1.23 scallops·m^{-2} (SE = 0.250) in 2009 and 1.25 scallops·m^{-2} (SE = 0.310) in 2010 (Figure 1, Table 1).

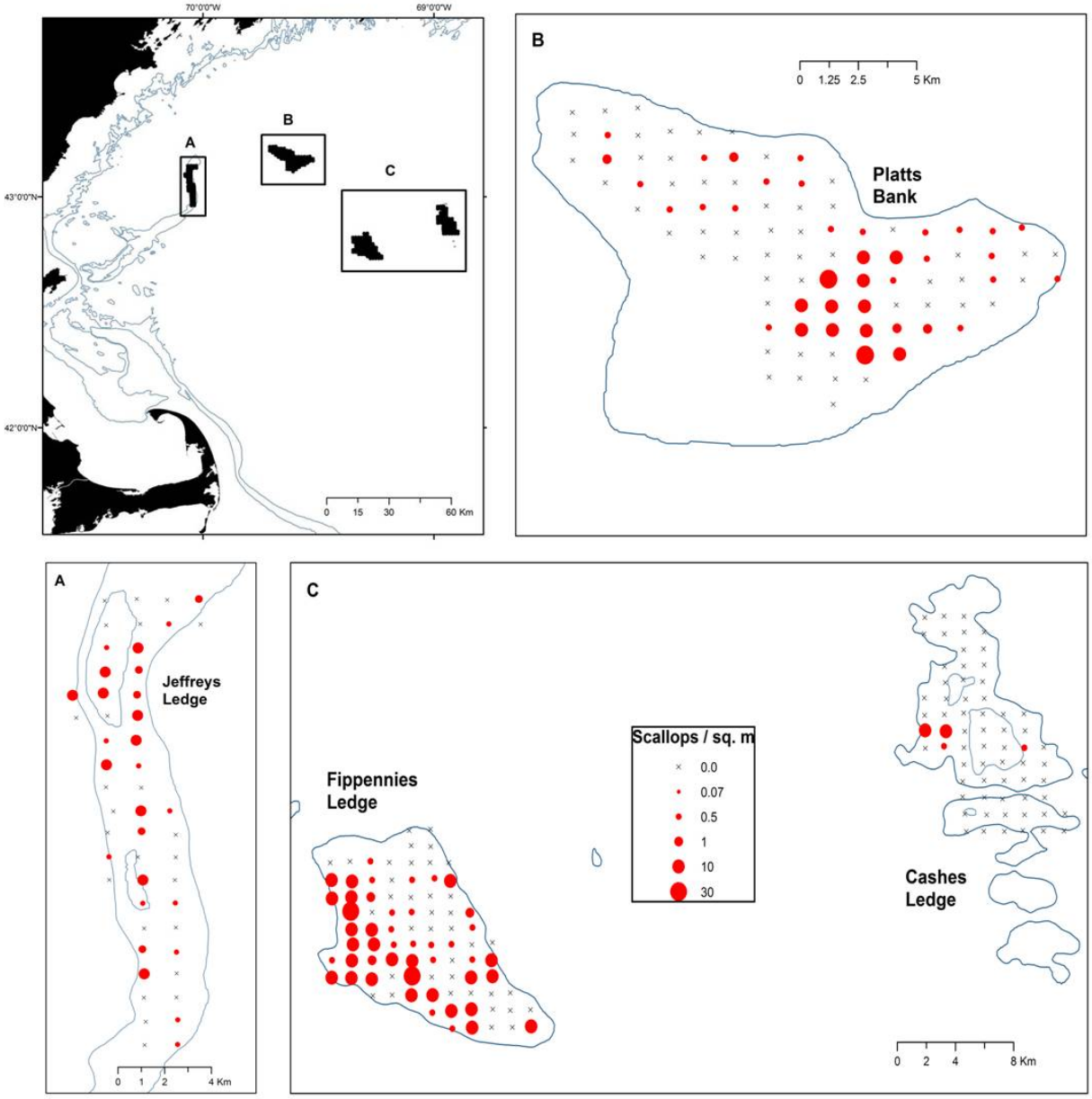

Figure 1. 2010 Gulf of Maine video survey stations and scallop densities for Platts Bank, Cashes Ledge, Fippennies Ledge and Jeffreys Ledge.

Table 1. The total number of stations, number of stations with scallops, mean number of scallops per square meter within stations with scallops, standard error, percent coefficient of variation and estimated total number of scallops for each bank and ledge studied in 2009 and 2010.

	Survey Area	St	St with Scallops	Scallops/m^2	SE	CV%	Scallops (million)
2009	Platts Bank	92	34	3.45	1.180	34.14	117.5
	Cashes Ledge	58	8	1.60	0.789	49.20	12.8
	Fippennies Ledge	81	51	2.06	0.313	15.21	105.0
	Jeffreys Ledge	67	33	1.23	0.250	20.37	40.6
	Total	298	126	2.19	0.356	16.28	275.9
2010	Platts Bank	91	38	1.67	0.473	28.38	63.3
	Cashes Ledge	65	4	1.45	0.786	54.23	5.8
	Fippennies Ledge	84	46	2.92	0.496	16.97	134.5
	Jeffreys Ledge	50	26	1.25	0.310	24.82	32.5
	Total	290	114	2.07	0.272	13.13	236.0

We measured 1,344 scallops across all four banks in 2010, compared with 2,042 in 2009. Mean shell height increased from 50.5 mm (SD = 14.7) in 2009 to 60.2 mm (SD = 15.8) in 2010. The mode of the frequency distribution increased from the 40-45 mm bin in 2009 to the 50-55 mm bin in 2010 (Figure 2). These results indicate an average growth of around 10 mm per scallop from August 2009 to August 2010.

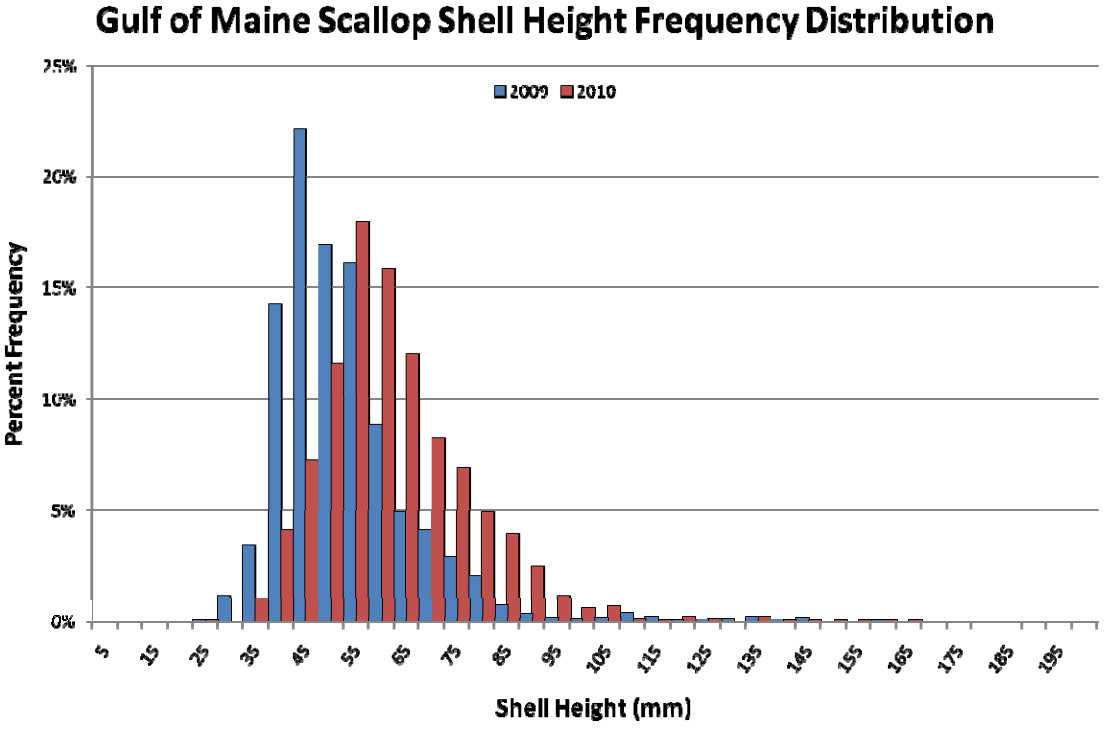

Figure 2. Shell height frequency distribution for Gulf of Maine scallops in 2009 (blue) and 2010 (red).

Analyses regarding natural mortality, recruitment, dissipation and growth are ongoing.

c. Explain special problems:

The RSA award was not made until August 12, 2010. We conducted the field work and analysis at our own expense in early August. In order for this work to be meaningful for management purposes, as proposed, we needed to complete the work prior to receiving the award. This delay in receiving the award from the funding agency could have jeopardized the completion of these important surveys.

Expenditures

The scheduled expenditures of crew, fuel, groceries were covered during this reporting period. Other expenditures will include salaries, travel and a computer for data analysis.

Literature Cited

Stokesbury K.D.E., J.D. Carey, B.P. Harris and C.E. O'Keefe. 2010. High densities of juvenile scallop (*Placopecten magellanicus*) on banks and ledges in the central Gulf of Maine. Journal of Shellfish Research 29 (2):369-372.