Project Report

Turtle-Scallop Dredge Interaction Study

2005 Field Season

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INTRODUCTION

This project was an attempt to attain behavioral information on sea turtles that interact with scallop dredges and was a continuation of work conducted in 2004. Although no turtles were observed, over 80 hours of video was taken using cameras mounted on commercial scallop dredge gear.

BACKGROUND

Loggerhead sea turtles are distributed around the globe in temperate and subtropical areas and historically there have been thousands of sightings from the mid-Atlantic shelf area in the depth range where the sea scallop fishery traditionally operates (Shoop and Kenney, 1992). Most of the scallop fishing takes place in depths deeper than 40 m (NOAA, 2003) while most of the turtle sightings were in areas with depths of 22-49 m (Shoop and Kenney, 1992). Our general knowledge of turtle biology and behavior would indicate that loggerhead turtles prefer temperatures found in the warmer surface waters, not in the colder bottom waters where the scallop dredges operate.

Presently, we do not understand the way sea turtles may be interacting with scallop dredges. Turtle chain mats have been shown to be effective in preventing turtles from entering the bag while fishing on the bottom, or during hauling and setting which is an opportune time to catch anything big in the water column. While turtle chain mats have been shown to be effective in reducing the catch of turtles, there are still unanswered questions on how or why turtles might be interacting with sea scallop dredges during a tow. It is not known if turtles are still encountering chain-equipped dredges or whether the noise of the chains is creating an avoidance behavior. Turtles have not been observed on top of chained dredges, a typical mode of encounter, which might suggest avoidance of scallop dredges equipped with chain mats.

There is very little data on the bottom foraging capabilities in temperate waters. Historical data shows that the turtles are widely distributed over a large area for a long season thus, seasonal area closures would be devastating to the local fishery. Turtles are extremely difficult to sight thus a sighting based system for closing smaller areas for shorter periods would be impractical. These factors also imply that to maintain scallop fleet/turtle separation based on observed takes would require a fast action notification system with full participation of the scallop fleet/observers. This is costly as a regulatory system and would be a least preferred approach to control bycatch.

Another unanswered question is the frequency of encounters with dredges with or without chains. Scallop fishermen reported very few encounters with turtles until recent years. The discussion of why there may be such a sudden appearance of encounters should include the possibility of a steady increase in turtle populations and likely some other operating factor. Changes in distribution due to oceanographic conditions do not seem to be the answer but can not be dismissed. One hypothesis is that it is related to the density of scallops and the act of scallop fishing. A vessel fishing on a dense bed of scallops does not move around much thus its discharge of scallop viscera remains concentrated in the relatively small area the vessel is fishing. This may attract turtles; however, this is not a new fishing practice.

METHODS

For this study we requested and received an experimental fishing permit (EFP) that allowed us to stay out to sea and not come back into port every night to offload scallops (Appendix B). We decided to focus our 2005 field season on gathering underwater video hours in areas where we confirmed the presence of turtles on the surface. We also decided to test a new dredge design in conjunction with the video work (Figure 1).

We made two trips. The first trip departed Barnegat Light, NJ on August 18, 2005, aboard the F/V Kathy Ann and returned August 26, 2005. The vessel fished two 13-foot scallop dredges, a traditional and the modified dredge. The modified dredge had four of the six bale support bars removed and the cutting bar positioned forward on the bale (Figure 1). The changes were to avoid trapping turtles under the dredge. Both dredge bags were configured similarly and the dredges were fished side by side. We outfitted both dredges with cameras looking both forward and aft, into the dredge. We collected approximately 50 usable hours of video using two cameras (See Appendix A; Camera logs) and we enumerated the catch from both dredges (Table 2).

The second trip was also aboard F/V Kathy Ann. We accomplished 13 successful paired tows and placed separate camera systems on both the control and modified dredges for all hauls. During this cruise approximately 30 hours of video footage was collected.

Two video systems were used. The first utilized a Multi Seacam® 1050 camera and a custom housing that permitted the camera to be placed in various locations on the dredge while protecting the recorder housing behind the frame of the dredge. The video was recorded on mini DV tapes with a capacity of 2 hours. External lights were not used because of the concern the lights may modify the behavior of fish encountering the gear (Wardle, 1993). The second system used a Equinox housing with a digital Panasonic PV-GS70 camcorder. All camera footage was transferred to DVD and analyzed briefly at sea and thoroughly following the cruises.

Temperature data was collected using an Onset Stowaway® tidbit temperature logger. The temperature data was recorded every 22 seconds and each recording is an average of one-second readings collected during this interval. The temperature logger has an accuracy of ±0.4°F (±0.2°C) at +70°F , a resolution of 0.29°F (0.16°C) at +70°F and a response time in water of 5 minutes to 90%.

During both cruises minor adjustments were made to the modified dredge to attain the best orientation and configuration.

RESULTS

Figures 2-7 provide the temperature profiles for all hauls where a temp logger was installed. Haul and catch data are provided in Tables 1-6. Appendix A contains all the video logs which includes placement and information on the quality of the video attained.

Turtle catch:

On the first trip, 37-paired tows were accomplished with 34 successful tows. There were no turtles seen either at the surface or in the videos during the six days on the water. Additionally, information from the fishermen in the port indicated that there had been few, if any, sightings of

turtles by the fishermen from this port this year. We were precluded from asking fishermen on the water if there were any turtles in the area as a condition of our permit.

On the second trip, we conducted 13 comparison tows were conducted and no turtles were videoed although several turtles were seen at the surface

Overall approximately 80 hours of usable video was collected and analyzed for turtle interactions.

Scallop and fish catch:

During the first trip, 34 successful tows (37 total paired tows; Table 1) were completed and the modified dredge caught 173.3 bushels of scallops while the standard dredge caught 178.6 bushels (Table 2). A paired t-test supports a determination of no difference in the scallop catch at the 95% confidence level. Most of the fish species caught were small with the exception of monkfish. We examined the monkfish catch length frequency distributions (Table 3) as one might assume it is plausible to use a large monkfish as a proxy for a sea turtle that may be on bottom. The experimental dredge caught 46 monkfish overall compared with 74 for the control. When we examine the catch of monkfish above the size of the mean juvenile turtle caught in the fishery, 56 cm, we find the experimental dredge caught 13 versus 37 for the control; about a 65% reduction in take.

During the second trip, the experimental dredge, due to its forward cutting bar design, had the cutting bar higher off the bottom. Thirteen comparison pair tows were made and the experimental dredge caught 66 bushels of scallops versus 53 bushels in the control. The experimental dredge caught more in 9 of the 13 tows, tied in tow tows, and caught less in two tows (Table 4). The experimental dredge caught more skates and monkfish and about the same amount of flatfish (Table 5). A reduction in large monkfish, was not observed (Table 6).

DISCUSSION

During this project we developed the video techniques and tools we need to visually document the interaction of sea turtles with the dredges, or at least, document a foraging behavior associated with the scallop fishery. The interactions between the fishery and sea turtles seem to be a very rare event based on observed takes. Our experience at sea made it clear that we need to do a better job of examining what is known about the loggerhead sea turtle and the scallop fishery that could shed light on understanding the interactions.

Excluder Frame:

The dredge frame modification used in this project comes out of years of experience working with scallop dredges. Frame alterations can have significant effects on catch and bycatch rates. In previous work, to reduce fish bycatch, we had altered the design of the bale so that it extended forward of the main frame eighteen inches before tapering toward the hauling point (bullring). This allowed us to test sweeps and blocking over the entire dredge width. Blocking is an approach used to prevent fish from entering the dredge from above the cutting bar and below the depressor plate. We have investigated blocking this space with rope, mesh, steel scallop rings, and 1-inch bar stock but have found these materials do not hold up to the rigors of scallop fishing.

The modified dredge design in this project is a significant departure from existing designs in that the cutting bar is moved forward of the depressor plate so that instead of confronting a vertical structure, a sea turtle encounters a sloping structure. The design extends the struts, at twelve inch spacing, between the depressor plate and the forward positioned cutting bar. Thus a sea turtle can not get trapped in this space and is guided over the dredge. The dredge frame modifications did not result in any major change in fabrication costs. The redesigned frame uses the same type of materials, has less weight of steel, and takes about the same time to construct.

The dredge frame did not require any changes to the handling and operation of the dredge as there was no alteration to the frame length or width. However, the hydrodynamics of the dredge may have changed and only additional field testing will determine the impact on catch of these changes.

A gear solution to the problem of sea turtle interactions with scallop dredges has significant beneficial economic consequences to the individuals that make up the scallop industry. The only regulatory alternatives to gear modifications are seasonal area closures. Since the sea turtle scallop fishery interaction takes place over a long season (June through October) and over a vast area (Cape Hatteras to Southern New England) the closure approach would have devastating economic consequences. Many vessels that fish in this area are too small to travel to the scallop areas on Georges Bank. The closure would force the vessels capable of fishing Georges to all focus their fishing effort on Georges Bank and thus create significant problems related to scallop management and groundfish bycatch issues. A gear solution would allow optimum utilization of the scallop resource and the associated profitability.

CONCLUSION

We have completed two years of field work and have not observed an encounter between a loggerhead sea turtle and a scallop drag. This is not surprising as the rates of encounters are very low and we were not permitted to conduct any activity that may result in an increased encounter rate. We have carefully reviewed the literature and found that virtually nothing is known about the behavior of the juvenile turtles found in the mid-Atlantic shelf area. We have examined oceanographic information and have found no correlation between oceanographic features with the known take locations. This is not unexpected as the number of observed takes on the scallop grounds is very low.

RECOMMENDATIONS

Based on our research to date, we recommend the following: capture, tag, and track sea turtles found on the scallop grounds using tags capable of measuring pressure (i.e. depth). This may be the only effective strategy for understanding the behavior of the juvenile loggerhead in the mid-Atlantic and may help to understand the nature of the captures of loggerhead sea turtles in scallop dredges and other fishing gear in this region.

ACKNOWLEDGMENTS

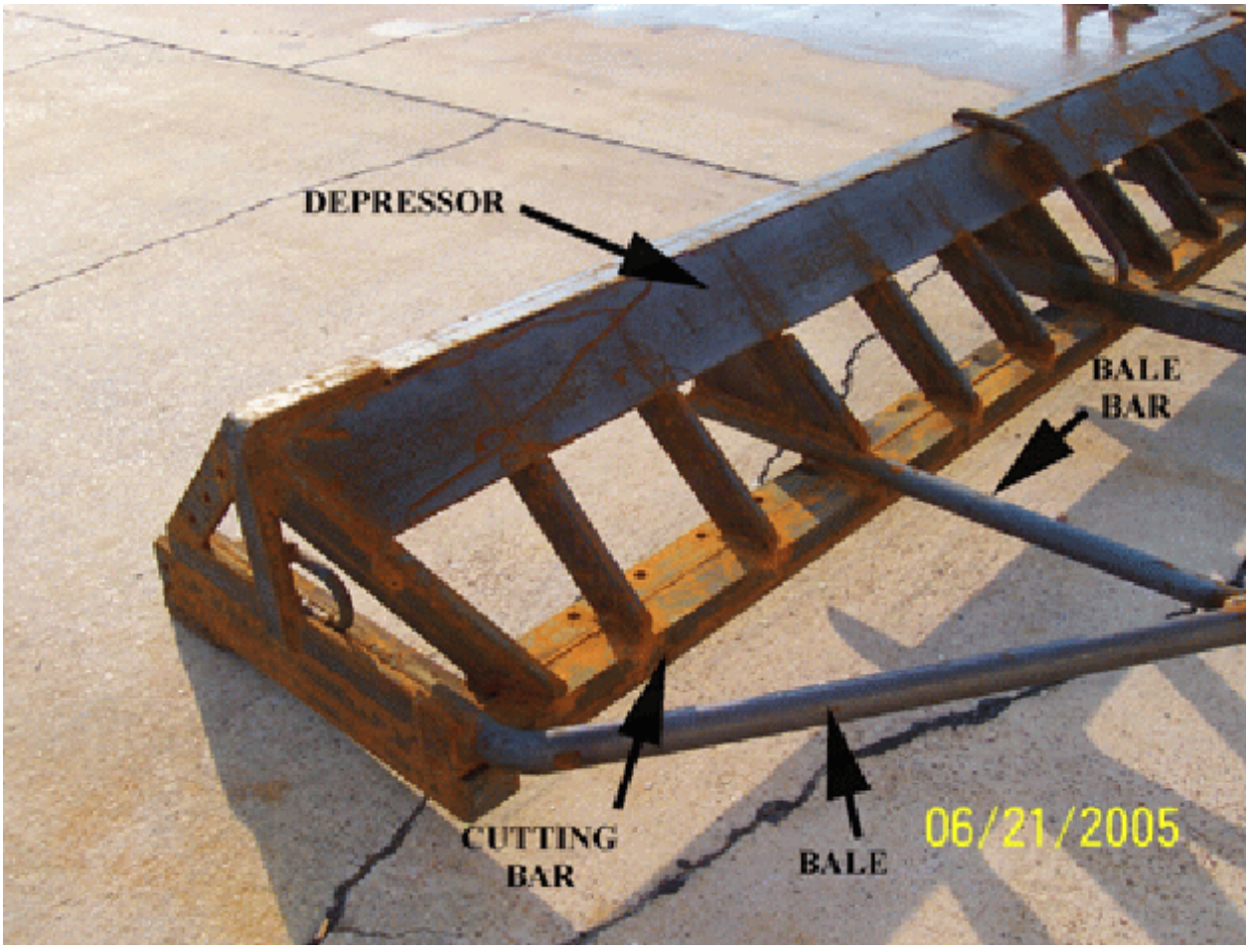
The authors would like to thank the scallop industry and their partners for the tremendous amount of support to get this project underway. Special thanks to Viking Village Fisheries in Barnegat Light, New Jersey and the owners and crews of the F/V's Kathy Ann. Thanks to Jim Manning, Henry Milliken, Sara Wetmore, and Chris Orphanides of the NEFSC for their help and guidance in accessing the necessary data sources. Big thanks to all observers, for their typically unrecognized hard work.

LITERATURE CITED

NOAA, 2003. Observer Data. National Marine Fisheries Service, Northeast Fisheries Science Center, Fisheries Sampling Branch, Observer Program, Observer Database

Shoop, Robert C. and Robert D. Kenney. 1992. Seasonal Distributions and Abundances of Loggerhead and Leatherback Sea Turtles in Waters of the Northeastern United States. Herpetological Monographs 1991 No. 6: 43-67.

Figure 1.



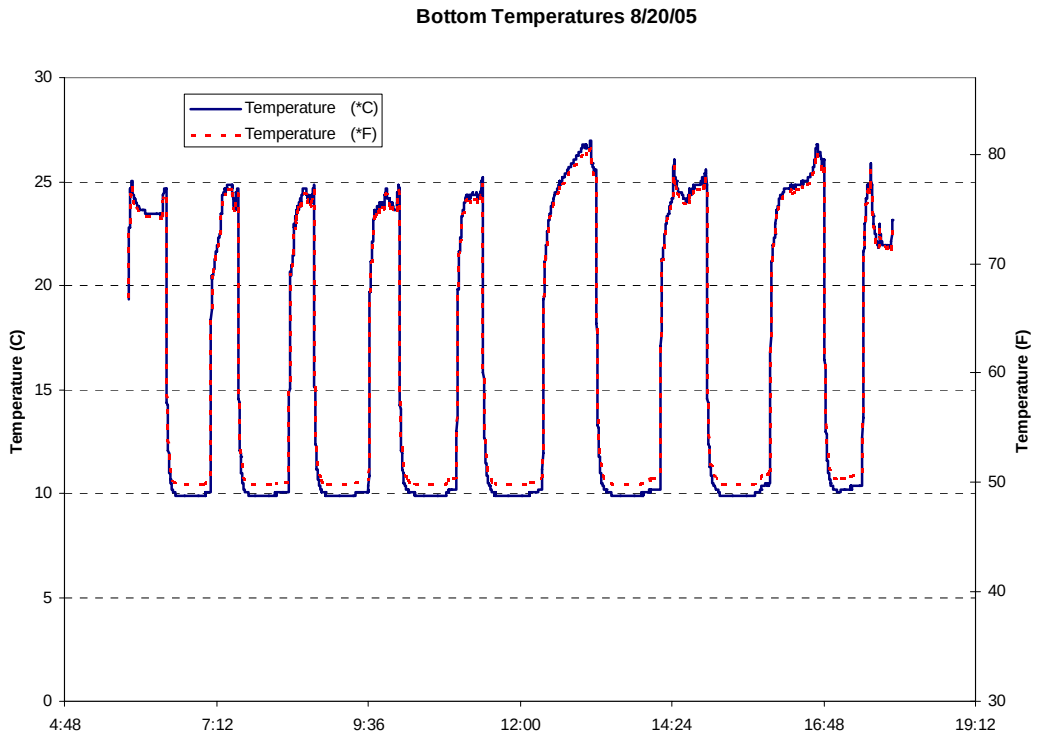


Figure (2). Temperature data collected from Onset Tidbit temperature logger attached to scallop dredge on 8/20/2005.

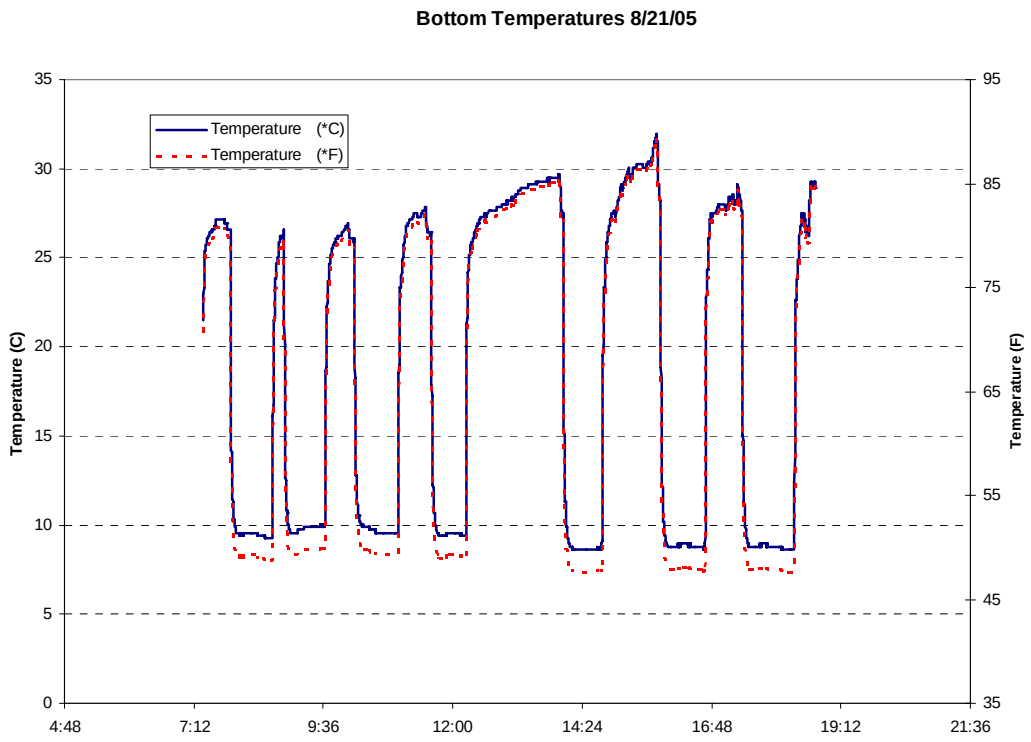


Figure (3). Temperature data collected from Onset Tidbit temperature logger attached to scallop dredge on 8/21/2005.

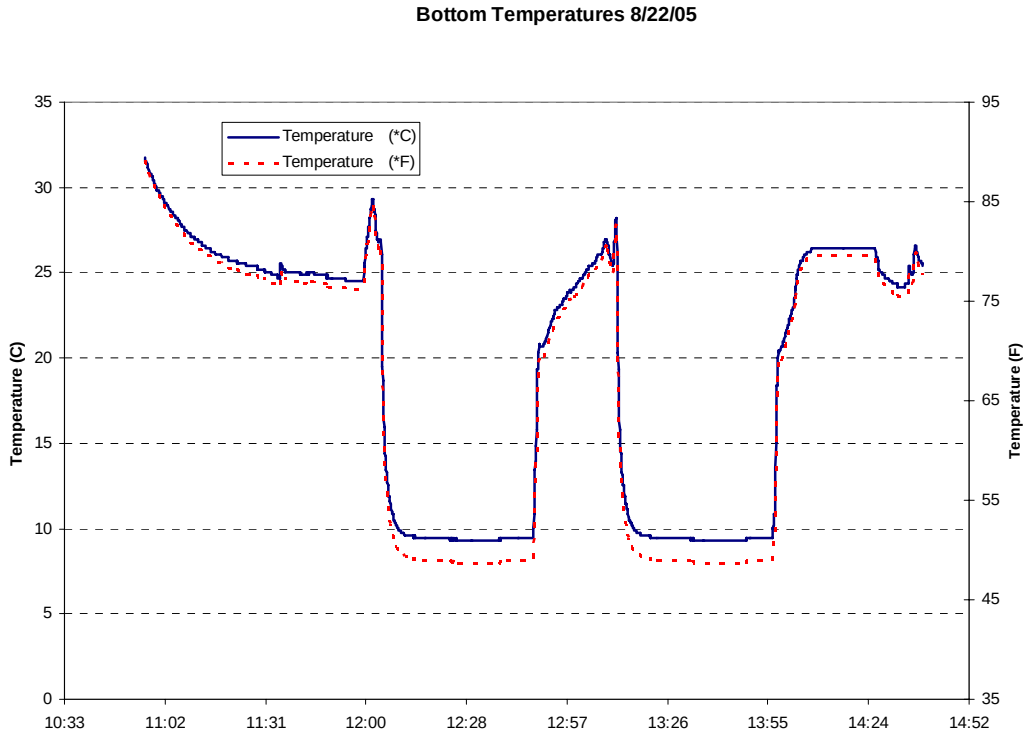


Figure (4). Temperature data collected from Onset Tidbit temperature logger attached to scallop dredge on 8/22/2005.

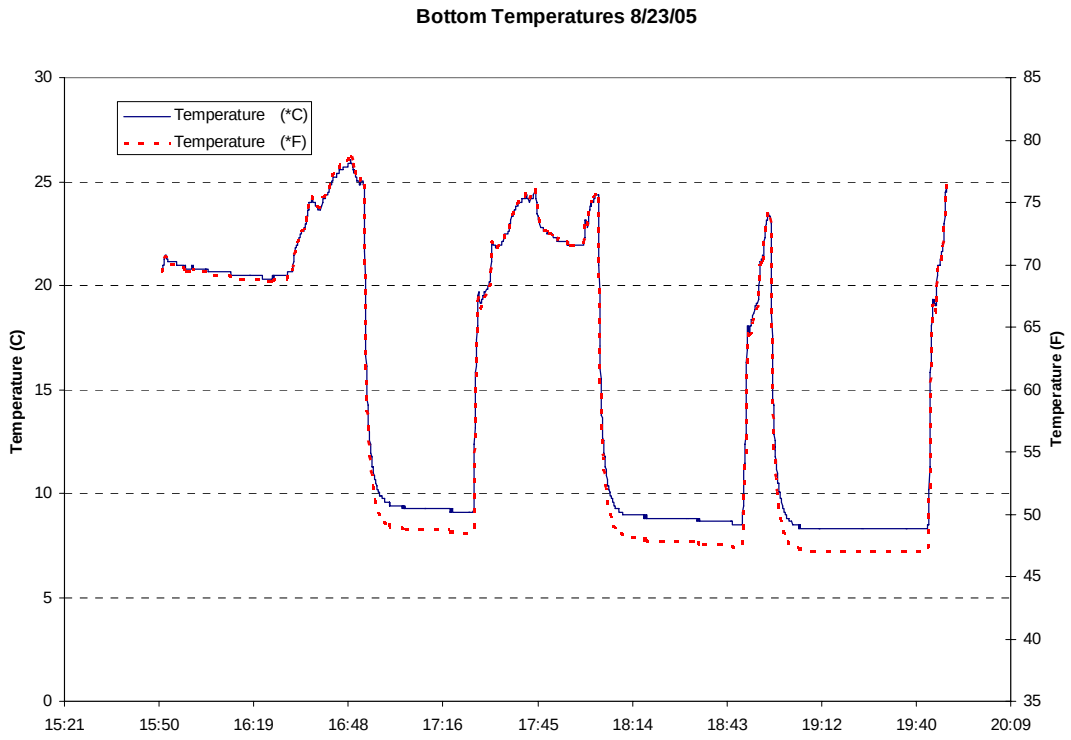


Figure (5). Temperature data collected from Onset Tidbit temperature logger attached to scallop dredge on 8/23/2005.

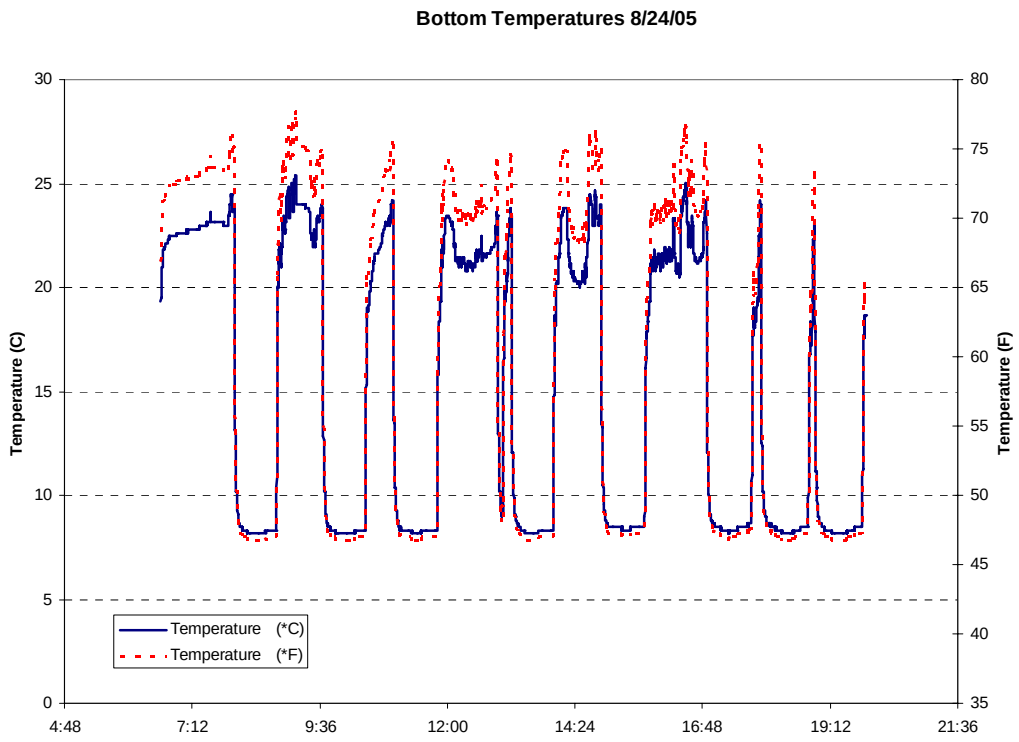


Figure (6). Temperature data collected from Onset Tidbit temperature logger attached to scallop dredge on 8/24/2005.

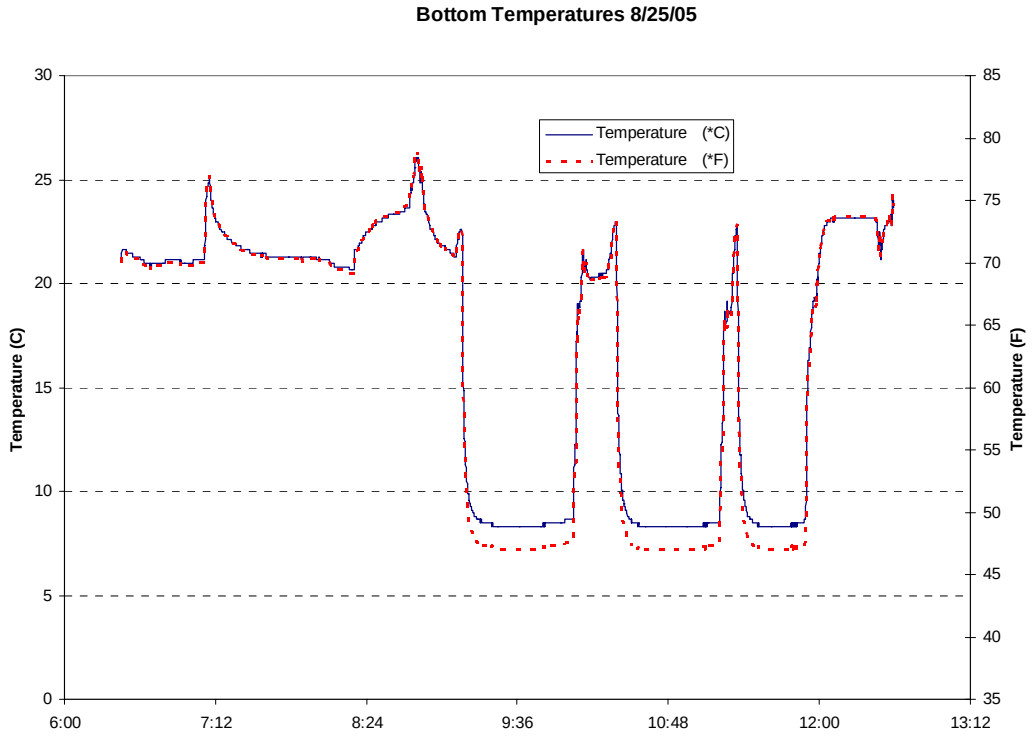


Figure (7). Temperature data collected from Onset Tidbit temperature logger attached to scallop dredge on 8/25/2005.

Table 1

FV Kathy Ann – Haul Data

Date	Tow #	Time Start	Tow Time Minutes	Start Position Latitude	Start Position Longitude	End Position Latitude	End Position Longitude	Speed Knots	Depth Fms	Wire out Fms	Vessel Heading	Catch (bu) port	Catch (bu) stbd	Comments
8/20/05	1	0625	40	39 59.9	73 42.2	40 00.0	73 30.4	4.5	19	75	040	5.5	5.5	stbd TA
8/20/05	2	0733	29	40 00.5	73 42.1	40 00.0	73 43.2	4.5	19	75	050	4.5	5	port TA
8/20/05	3	0645	35	40 00.9	73 41.7	40 00.9	73 41.7	4.5	19	75	052	5	4.5	stbd TA
8/20/05	4	1006	39	39 59.8	73 42.6	40 00.0	73 43.0	4.5	19	75	044	4	6	port TA
8/20/05	5	1125	50	39 59.7	73 42.8	39 59.9	73 42.6	4.5	19	75	047	7	7	stbd TA
8/20/05	6	1315	35	39 59.9	73 42.6	39 58.9	73 43.0	4.5	19	75	043	6	5	stbd TA
8/20/05	7	1500	50	40 00.0	73 42.9	40 00.2	73 42.9	4.5	19	75	048	8	8	port TA
8/20/05	8	1700	60	40 00.0	73 42.8	40 00.1	73 43.4	1.5	18	75	060			camera port
8/21/05	9	0755	50	38 52.2	74 10.5	38 52.2	74 12.6	4.5	18	75	261	2	2.75	straight
8/21/05	10	0855	40	38 52.2	74 15.0	38 51.7	74 19.1	5	18	75	270	0.75	0.25	straight
8/21/05	11	1011	49	38 50.4	74 20.7	38 46.4	74 20.4	4.5	16	58	185	0	0	straight
8/21/05	12	1140	50	38 44.5	74 20.9	38 41.5	74 20.6	4.7	19	75	185	1	0.5	straight
8/21/05	13	1405	35	38 28.1	74 25.0	38 25.1	74 26.1	4.8	22	85	207	4.5	4	straight
8/21/05	14	1550	45	38 25.7	74 26.6	38 25.5	74 26.5	4.8	21	80	336	7.5	7	port TA
8/21/05	15	1725	35	38 25.9	74 26.8	38 25.7	74 26.8	5	21	80	336	8	9	port TA
8/21/05	16	1830	85	38 25.1	74 26,2	38 32.2	74 26.1	5	21	80	016	4	5	straight
8/22/05	17	1110	30	38 11.0	73 53.7	39 11.1	73 53.4	4.5	20	80	044	3.5	3	port TA
8/22/05	18	1205	40	39 11.4	73 53.1	39 11.5	73 53.2	5	20	80	057	8	5	stbd TA
8/22/05	19	1310	55	39 11.6	73 52.8	39 11.5	73 52.7	5	20	80	055	7	7	stbd TA
8/23/05	20	1545	30	39 47.5	73 33.2	39 47.5	73 30.2	4.5	18	75	090	2.5	2.5	straight
8/23/05	21	1653	30	39 47.4	73 29.5	39 47.3	73 26.5	4.5	18	75	090	2	1.5	straight
8/23/05	22	1805	40	39 47.3	73 26.0	39 45,6	73 22.5	4.7	19	80	090	2.25	3.5	stbd TA
8/23/05	23	1657	45	39 45.6	73 22.5	39 45.5	73 22.8	4.7	20	80	055	7.5	8	stbd TA
8/23/05	24	1952	45	39 45.5	73 22.8	39 45.2	73 21.9	4.7	20	60	055	7	8	stbd TA
8/24/05	25	0800	45	39 45.3	73 21.6	39 45.3	73 21.9	4.7	20	80	030	7	7.5	port TA
8/24/05	26	0940	45	39 45.6	73 21.7	39 45.5	73 22.0	4.7	20	80	040	BJ	6	port TA
8/24/05	27	1100	45	39 45.2	73 21.9	39 45.2	73 22.6	4.7	20	80	040	6	7	port TA
8/24/05	28	1312	45	39 45.8	73 22.2	39 44.9	73 21.6	4.7	20	80	040	6.5	6.5	stbd TA
8/24/05	29	1454	45	39 45.1	73 21.9	39 44.9	73.21.8	4.7	20	85	110	6	6	stbd TA
8/24/05	30	1655	45	39 45.2	73 21.9	39 45.4	73 22.3	4.7	20	85	040	4.5	6	port TA
8/24/05	31	1755	45	39 45.4	73 22.3	39 45.6	73 21.8	4.7	20	85	058	6	5	port TA
8/24/05	32	1855	50	39 45.6	73 21.7	39 45.7	73 22.0	4.7	20	85	040	4	6	port TA
8/25/05	33	0608	55	39 45.3	73 22.8	39 44.9	73 22.1	4.7	20	85	050	7	5.5	stbd TA
8/25/05	34	0747	55	39 44.6	73 22.4	39 44.9	73 22.2	4.5	20	85	040	4	6.5	port TA
8/25/05	35	0910	50	39 45.2	73 22.0	39 45.0	73 21.8	4.5	20	85	045	4.5	7	port TA
8/25/05	36	1025	45	39 45.2	73 21.6	39 45.3	73 21.6	4	20	85	040	4.5	5	port TA
8/25/05	37	1122	30	39 45.3	73 21.5	39 45.5	73 21.5	4.5	20	85	040	3	3	port TA

Table 2.

F/V Kathy Ann
Catch Data

August 2005
2005-1

Port	Experimental						Control					
Tow #	scallops	skates	windowpane	fourspot	blackback	monk	scallops	skates	windowpane	fourspot	blackback	monk
	(bu)						(bu)					
1	5.5	316	5	4	3	0	5.5	242	9	3	1	1
2	4.5	323	8	3	3	0	5	283	11	9	1	1
3	5.25	312	14	4	3	1	4.5	250	9	14	2	0
4	4.25	278	11	2	2	1	5.75	298	18	9	3	2
5	7	427	19	6	0	1	7	345	14	7	6	2
6	5	379	17	8	4	0	6	460	13	14	2	2
7	8						8					
9	2	51	0	0	0	0	2.75	48	1	0	0	0
10	0.75	76	3	0	0	0	0.25	60	2	1	0	0
12	1	26	4	0	0	0	0.5	13	2	0	0	0
13	4.5	20	2	0	0	2	4	16	1	0	0	3
14	7.25	13	1	1	0	0	7	21	1	0	0	3
15	8	12	0	0	0	0	9	18	1	0	0	0
16	4						5					
17	3.5	92	7	0	0	0	3	72	4	0	0	0
18	6.5	110	7	6	0	1	8	111	5	2	0	0
19	7	142	7	2	0	1	6.5	104	5	1	0	1
20	2.5	72	8	3	0	0	2.5	86	5	5	0	0
21	2.3	152	8	4	0	1	1.3	208	10	5	0	0
22	3.5					0	2.25					2
23	7.5						8					
24	7						8					
25	7	175	9	1	2	1	7.5	220	6	4	1	5
27	6	134	4	1	0	3	7	223	8	2	2	7
28	6.5	159	8	1	0	4	6.5	222	6	3	0	3
29	6	183	6	5	0	2	6	275	6	4	0	8
30	6	80	2	1	0	0	4.5	207	7	3	1	6
31	6	115	5	2	0	3	5.5	222	7	3	1	3
32	6	164	6	3	0	6	4.5	162	2	1	0	9
33	7	137	5	8	1	5	5.75	197	6	2	0	6
34	4	92	6	2	0	2	6.5	177	2	4	0	2
35	4.5	87	3	0	0	4	7	133	2	1	0	5
36	4.5	81	2	1	0	3	5	78	2	1	0	3
37	3	58	2	2	1	5	3	36	4	0	0	1
Totals												
All Tows	173.3	4266	179	70	19	46	178.55	4787	169	98	20	75
Tows 20-37	89.3	1689	74	34	4	39	90.8	2446	73	38	5	60
Tows 34-37	16	318	13	5	1	14	21.5	424	10	6	0	11
Tows 1-19	84	2577	105	36	15	7	87.75	2341	96	60	15	15

Table 3.

F/V Kathy Ann
Monkfish Catch Data

August 2005
2005-1

Length		Experimental																								
(cm)	Tow #	1	2	3	4	5	6	13	14	18	19	21	22	25	27	28	29	30	31	32	33	34	35	36	37	Totals
16-20																										0
21-25																						1				1
26-30														1		2	1			3	1		1	1	2	12
31-35						1		2			1	1							3		2		1		3	14
36-40															1											1
41-45																										0
46-50																	1							1		2
51-55					1										1	1										3
56-60				1						1						1										3
61-65															1					2	1		1			5
66-70																								1		1
71-75																						1	1			2
>76-80																				1	1					2
																								Total		46
																								>46 cm		18
																								>56 cm		13
		Control																								
	Tow #	1	2	3	4	5	6	13	14	18	19	21	22	25	27	28	29	30	31	32	33	34	35	36	37	
																										0
16-20															1	1										2
21-25																		1				1				2
26-30														1			1	1	1	2						6
31-35								1						1	2		3		1	1	1	1		1		12
36-40									1											1	1					3
41-45																										0
																				1			1	1		3
51-55						2								1			1	1	1	1	1		1			9
56-60		1					2		1							1	2				2		1			10
61-65			1		2				1						3								1		1	9
66-70								1					1	1			1	2					1			7
71-75								1					1	1						1	1					5
>76-80															1	1		1		2				1		6
																								Total		74
																								>46 cm		49
																								>56 cm		37

Table 4.

Table 4.

F/V Kathy Ann
Tow Data

September 2005
2005-1

		Time	Tow Time	Start Position		End Position		Speed	Depth	Wire out	Vessel	Catch (bu)		
Date	Tow #	Start	Minutes	Latitude	Longitude	Latitude	Longitude	Knots	Fms	Fms	Heading	port	stbd	Comments
9/13/05	1	0920	40	39 27.7	73 14.3	39 27.9	73 14.1	4.5	20	75	215	7	4	stbd TA
9/13/05	2	1040	40	39 27.8	73 14.2	39 27.8	73 14.1	4.6	20	75	225	7	4	port tA
9/13/05	3	1200	35	39 27.8	73 14.2	39 25.9	73 16.4	4.5	20	75	218	5	5	straight tow
9/13/05	4	1310	30	39 25.8	73 15.8	39 26.2	73 16.0	4.5	20	75	044	3.5	3	straight tow
9/13/05	5	1430	30	39 26.5	73 15.6	39 28.2	73 13.7	4.5	20	75	039	4	3.5	straight tow
9/13/05	6	1535	35	39 28.0	73 14.0	39 27.9	73 14.1	4.6	20	75	214	7	5.5	stbd TA
9/13/05	7	1600	35	39 27.9	73 14.1	39 27.8	73 14.2	4.6	20	75	223	6	4	port tA
9/13/05	8	1710	30	39 27.8	73 14.3	39 27.8	73 14.1	4.6	20	75	223	5	3	stbd TA
9/14/05	9	0730	35	39 27.7	73 14.1	39 27.8	73 14.2	4.5	20	75	188	4.5	5.75	stbd TA
9/14/05	10	0830	35	39 27.9	73 14.3	39 28.0	73 14.2	4.5	20	75	218	3	4.5	straight tow
9/14/05	11	0945	45	39 28.0	73 14.2	39 27.1	73 19.9	4.5	20	75	256	2	1.5	straight tow
9/14/05	12	1105	35	39 27.1	73 25.7	39 29.4	73 25.2	4.7	18	75	298	5	4	straight tow
9/14/05	13	1215	45	39 28.4	73 25.8	39 32.0	73 25.3	4.7	18	75	011	6	6	straight tow

Coonamessett Farm

Table 5.

F/V Kathy Ann
Catch Data

September 2005
2005-2

Port	Experimental						Control					
Tow #	scallops	skates	windowpane	fourspot	Yellowtail	monk	scallops	skates	windowpane	fourspot	Yellowtail	monk
	(bu)						(bu)					
1	7	91	7	2	2	2	4	76	8	2	1	0
2	7	82	5	2	0	6	4	68	7	5	0	1
3	5.5	89	3	1	0	0	4.5	69	1	2	0	2
4	3.5	71	1	2	0	2	3	61	4	0	0	2
5	4	101	1	7	2	4	3.5	52	4	5	1	1
6	7	124	2	1	0	8	5.25	57	6	4	3	3
7	6.5	91	3	4	1	0	4	52	4	2	0	2
8	5	50	5	3	4	6	3	42	0	3	0	0
9	4.5	58	3	0	0	1	5.25	54	1	3	0	3
10	3	53	3	2	0	6	4.5	53	4	2	0	2
11	2	152	7	2	0	6	2	154	7	1	0	5
12	5	149	3	1	0	5	4	121	6	1	0	4
13	6	144	9	3	0	1	6	86	6	0	0	0
Totals	66	1255	52	30	9	47	53	945	58	30	5	25

Table 6.

F/V Kathy Ann
Monkfish Catch Data

September 2005
2005-2

Length		Experimental													
(cm)	Tow #	1	2	3	4	5	6	7	8	9	10	11	12	13	Totals
16-20															0
21-25			2		1	2			1		1			1	8
26-30			1						1						2
31-35		1				1	4		1	1	1	3	2		14
36-40							2				1				3
41-45			1			1			1						3
46-50					1				1		2	1	1		6
51-55													2		2
56-60			1									1			2
61-65		1	1				1					1			4
66-70									1		1				2
71-75							1								1
>76-80															0
													Total		47
													>46 cm		17
													>56 cm		9
		Control													
	Tow #	1	2	3	4	5	6	7	8	9	10	11	12	13	
16-20					1										1
21-25				1	1	1					1				4
26-30			1	1			1			1		1	1		6
31-35							1			1		2	1		5
36-40													1		1
41-45															0
46-50							1			1		1			3
51-55								1							1
56-60								1				1			2
61-65													1		1
66-70															0
71-75															0
>76-80											1				1
													Total		25
													>46 cm		8
													>56 cm		4

Appendix A: Camera logs

Tow: 2005-Trip 1, tow 3
Camera: PV-GS150
View Angle: Camera mounted on bale; viewing forward
Video quality: poor visibility

0905 on bottom

Tow: 2005-Trip 1, tow 4
Camera: PV-GS150
View Angle: Camera mounted on bale; viewing forward
Video quality: poor visibility

Tow: 2005-Trip 1, tow 5
Camera: PV-GS150
View Angle: Camera mounted on bale; viewing forward
Video quality: poor visibility

Tow: 2005-Trip 1, tow 6
Camera: PV-GS150
View Angle: Camera mounted on bale; viewing forward
Video quality: poor visibility

Tow: 2005-Trip 1, tow 7
Camera: DSPL In-situ
View Angle: Mounted on depressor plate viewing towards tow point
Video quality: Clear video but turbid water

1146 On bottom; dredge with two bale bars
1236 wheels turning
1520 skate
1853 skate
1921 dead skate?
1948 skate
2242 entered very turbid water
2541 water clears
2632 skate
2912 skate
5999 tape ends still on bottom

Tow: 2005-Trip 1, tow 8
Camera: DSPL In-situ
View Angle: Mounted on depressor plate viewing towards tow point
Video quality: very dark

1035 on bottom
2033 scallop swims into dredge
2248 dredge slows skate in front
3025 very large skate out swims dredge
3330 trail of shucked scallop shells
3700 dredge going very slow
4550 leaving bottom
4750 On surface

Tow: 2005-Trip 1, tow 11
Camera: DSPL In-situ
View Angle: Mounted on depressor plate viewing towards tow point
Video quality: clear

1247 On bottom
1425 good view of rollers riding on bottom
2959 dredge stops
3204 skate
3241 scallop goes in over cutting bar
3321 skate goes in
3756 shell windrows
5444 skate
5748 skate
5959 leaving bottom
1:02 On surface

Tow: 2005-Trip 1, tow 12
Camera: DSPL In-situ
View Angle: Mounted on depressor plate viewing towards tow point
Video quality: clear

1132 On bottom
1528 skate
1715 skate
1823 fish and skate
1837 something drops in
2550 skate
4820 gear lifting off bottom
5200 alongside vessel

Tow: 2005-Trip 1, tow 13
Camera: DSPL In-situ
View Angle: Mounted on bale viewing cutting bar
Video quality: clear

0853 dredge on way down; view of turtle chains
0913 on bottom
0942 good view of cutting bar and turtle chains
1035 good shot of sand flow over cutting bar
2616 scallop hits cutting bar and goes over
2801 scallops caught on frame
3634 scallop goes in
3705 scallop goes in
3735 scallop flies in; all small scallops
4237 large object (rock?) gets wedged under bale bar
4517 object clearly looks like a rock
4550 object gone
4950 gear coming off bottom
5116 view into bag
5201 on surface

Tow: 2005-Trip 1, tow 13
Camera: PV-GS70; wide angle lens, manual focus, 16 bit
View Angle: Camera mounted on bale; viewing forward
Video quality: clear but camera on auto focus blurring images

0123 on bottom
0458 sand bottom with weed
1319 dredge slows to a stop; wire out?
1908 scallop swimming up
2109 scallops swimming
2240 scallops swimming
2300 uneven bottom
2655 scallop swims up
3033 scallop swims up
3148 scallop swims up
3423 rocks
3900 scallops swimming over next few minutes
4137 leaving bottom
4426 on surface

Tow: 2005-Trip 1, tow 14
Camera: DSPL In-situ
View Angle: Mounted on bale viewing cutting bar
Video quality: clear

1215 On bottom
3619 scallops going in over cutting bar
3646 fish swims out
3827 scallops going in
4029 small scallop on depressor plate
4947 scallop hung up on strut
5910 gear leaving bottom
10150 on surface

Tow: 2005-Trip 1, tow 14
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear

0509 on bottom
0537 hit rock
0800 irregular bottom
1435 scallop swims up to camera
1623 small shark swims out of path
1700 scallop swimming
2320 scallop swimming out of the way ahead of gear
2831 scallop swimming
3020 scallops still swimming
4100 still many swimming scallops
5200 gear leaving bottom
5400 on surface

Tow: 2005-Trip 1, tow 15
Camera: DSPL In-situ
View Angle: Mounted on bale viewing cutting bar
Video quality: clear but dark

1009 gear on bottom
1252 large skate going in upside down?
1500 cutting sand waves
2237 scallop hung up on strut for a few seconds
3104 lost image in plume; something hung up under bale?
5028 regained image camera back inside dredge; hauling back
5257 on surface

Tow: 2005-Trip 1, tow 15
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear

0503 on bottom
0824 scallop swimming up
1718 sand lumps
1809 scallop swimming
2042 scallop swimming
2235 group of scallops moving
2306 scallops swimming
2438 skate fleeing
3824 scallop swims up into camera
3848 scallop swims up
4051 two scallops swim together
10050 gear leaves bottom
10230 on surface

Tow: 2005-Trip 1, tow 16
Camera: DSPL on cable
View Angle: Drift
Video quality: variable

0802 drifting; bottom barely visible
0900 bottom visible
1018 on bottom
1115 close to bottom
1439 bottom views; small sand waves
1530 good video
1840 good video close up
2310 hits bottom then remains close to bottom
3110 bottom in view; different area
3346 close then hits
3957 good view of bottom
4100 scallop
4200 close ups
4930 sulphur sponge
5206 scallop
5414 scallop
5900 end of tape

Tow: 2005-Trip 1, tow 17
Camera: DSPL In-situ
View Angle: Mounted on bale viewing cutting bar
Video quality: clear

0720 on bottom; no wheel plume
0843 flat bottom; no cutting bar contact
0900 unknown source of turbulence in front of cutting bar
2500 wheels sending up plume
4223 lifting off bottom
4454 on surface

Tow: 2005-Trip 1, tow 18
Camera: DSPL In-situ
View Angle: Mounted on bale viewing cutting bar
Video quality: clear

0744 on bottom
1414 turbulence patterns similar to previous tow
2959 turbulence stops
4930 leaving bottom
5205 on surface

Tow: 2005-Trip 1, tow 19
Camera: DSPL In-situ
View Angle: Mounted on bale viewing forward
Video quality: clear but camera 90 degrees out

0639 on bottom
1623 fish flees
2327 jelly fish in water column
3056 lost picture

Tow: 2005-Trip 1, tow 20
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear

0759 On bottom
0920 flat sand bottom with shell
1041 sulphur sponge
1920 rocks scattered on bottom
2948 scallop swimming
3044 skate
3530 sponge
3934 large skate swimming away

4020 leaving bottom
4228 on surface

Tow: 2005-Trip 1, tow 20
Camera: DSPL In-situ
View Angle: Mounted on bale viewing back into dredge bag
Video quality: very clear

1125 dredge flared out; view of turtle chains and bag
1230 on way down
1258 on bottom
1330 good view of chains working and twine top
1430 small scallops caught by chains
2235 sponges going into bag
2810 skate swimming in bag
3024 chains kick up small skate
3738 skate swims forward
3901 skate swimming across
3930 skate swims up
4500 gear leaving bottom
4550 view into bag washing out
4735 on surface
4828 bag set down on deck

Tow: 2005-Trip 1, Deck shots
Camera: PV-GS150
View Angle: Various
Video quality: Clear

0004 view of turtle chains hanging in air
0013 camera placed in dredge
0050 catch on deck
0154 measuring scallops
0214 picking pile
0254 measuring monk fish
0331 monitoring computer
0348 dumping bag
0400 setting gear
0506 bringing bag aboard
0600 view of experimental dredge frame
0713 launching towed camera
0850 bringing in a dredge
1006 view of DSPL camera housing on dredge
1102 dumping bag

1213 view of experimental dredge frame
1300 turtle chain rigging
1425 modifying dredge frame by removing bale bars
1613 view of side of new dredge

Tow: 2005-Trip 1, tow 21
Camera: DSPL In-situ
View Angle: Mounted on bale viewing back into dredge bag
Video quality: clear

0947 on bottom
1025 view closer to side piece than previous tow
2247 more chain visible; turning?
2418 skate goes into bag
2930 skates entering
3247 lots of starfish entering
4200 leaving bottom
4404 on surface

Tow: 2005-Trip 1, tow 21
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear

0628 on bottom
1625 good view of sponges
1825 skate moving slowly across
1924 another skate as before
2002 skates all over bottom
2115 still many skates
2322 school of skates
3828 leaving bottom
4020 on surface

Tow: 2005-Trip 1, tow 22
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear

0812 on bottom
1131 scallop swimming up to camera
1314 crab moving across
1957 scallop jumps up
2120 skate flies across
2437 skate fleeing

4400 something hung up on bale creating plume
4722 view is dark; can not make out what is happening
5055 hauling back
5228 on surface

Tow: 2005-Trip 1, tow 25
Camera: DSPL In-situ
View Angle: Mounted in dredge bag viewing turtle chains and back of cutting bar
Video quality: clear but light limited

1028 on bottom
1140 view of turtle chains riding off bottom
4320 small scallops
5600 leaving bottom
5816 on surface

Tow: 2005-Trip 1, tow 25
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: dark and not clear

0619 on bottom
1000 bottom barely visible
2000 poor visibility
3000 camera seems out of focus
5230 leaving bottom
5500 on surface; camera not in focus

Tow: 2005-Trip 1, tow 26
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: dark and not clear

0043 on bottom

Tow: 2005-Trip 1, tow 27
Camera: DSPL In-situ
View Angle: Mounted in dredge bag viewing turtle chains and back of shoe
Video quality: very clear

1110 dredge flared behind vessel; rudder visible
1350 dredge on the way down; good view
1404 on bottom
1530 view of sponge and scallops going through chains
10100 leaving bottom
10235 tape ends

Tow: 2005-Trip 1, tow 28
Camera: DSPL In-situ
View Angle: Mounted on depressor plate viewing towards wheels
Video quality: camera fouled first set; clear on 2nd set

0919 on bottom but view uncertain
1530 on surface
2439 on bottom
2510 wheels riding off bottom
2850 skate fleeing ahead
2923 skate
3000 skate by wheel
3136 skate
3310 old wire on bottom
3312 large flat rock
3435 skate flees into bottom
3504 more skates
3823 scallop swims over dredge
3954 skate moving slowly
4138 scallops swimming up
4220 rock
4426 start of skate school
5158 rock
5314 scallop goes over
5452 skate
10235 tape ends gear on bottom

Tow: 2005-Trip 1, tow 28
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: clear

0604 on bottom
0625 runs into second dredge
0643 two dredges being towed one on top of the other
0657 second dredge upside down
0828 dredges separate
0909 dredge warps still fouled together
1101 back on surface
2122 back on bottom
2356 skate
2847 small fish rises off bottom and swims away
2854 rock
2859 a small unidentified object with piece of rope attached? small fish around
3234 cobbles
3251 large skate
3312 cobbles

3448 scallop swimming
3558 big rock
3835 skate fleeing
5000 scallops swimming 10236 end of tape

Tow: 2005-Trip 1, tow 29
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: clear

0609 on bottom
0618 small fish swim by
0645 sponges in the water column; thrown overboard?
0822 scallop swimming
0856 skates
1110 scallop hits camera
1145 rock
1340 scallops swimming
1604 skate
2406 cobble bottom with swimming scallops
2610 cobbles; scallops
2743 rock
2954 skate school
5235 discarded skate?
5330 leaving bottom
5600 on surface

Tow: 2005-Trip 1, tow 29
Camera: DSPL In-situ
View Angle: Mounted on dredge frame strut viewing towards wheels
Video quality: clear

0930 on bottom
1022 scallop swimming up
1151 scallop swimming
1326 skate school
2509 skates
2729 scallop
2853 cobble bottom; scallops and skates
3146 scallop swimming
3218 pair of scallops
3240 skate and scallops
3303 rock
5613 leaving bottom
5952 on surface

Tow: 2005-Trip 1, tow 30
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: clear

0628 on bottom
1203 skate
1920 cobble bottom
2056 skates scallops cobble
2600 still cobble bottom with scallops swimming
2930 skate
3115 scallops swimming
3342 flatfish moving across path
3511 skate
3710 scallops swimming
3856 focus blurred then comes back
5020 hard bottom knocked focus out again but it comes back
5500 leaving bottom
5813 on surface

Tow: 2005-Trip 1, tow 30
Camera: DSPL In-situ
View Angle: Mounted on dredge bale viewing towards dredge frame
Video quality: clear

1141 on bottom
1200 view of cutting bar off bottom and first set of chains
1637 scallop passes up and in
1847 scallop goes in over cutting bar
2529 scallops going in over cutting bar
2914 goes over rock
4025 scallops flowing in
4230 scallop in then out through twine top
4451 big bump
5658 dredge leaving the bottom
5700 good view then tape ends

Tow: 2005-Trip 1, tow 35
Camera: DSPL In-situ
View Angle: Mounted on dredge strut viewing inside bag
Video quality: clear but sediment cloud obstructs view

1026 on bottom
1530 twine top visible
3600 view has been consistent; sediment plume and twine top visible

5200 lost most visibility
10000 leaving bottom
10230 tape ends with view into a full bag

Tow: 2005-Trip 2, tow 01
Camera: DSPL In-situ
View Angle: Camera mounted on bale; viewing cutting bar
Video quality: Very clear

0920 on bottom; good view of tickler inside
1132 skate
1323 skate
1423 scallop
1523 skate under
2004 skate goes under
2251 skate caught on cutting bar
3000 skate still on cutting bar
3140 skate swims under
3311 skate goes under
4501 skate swims under
4900 dredge heading up
5216 on surface

Tow: 2005-Trip 2, tow 02
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear

0454 on bottom; clear
1129 skate fleeing ahead
1628 skate fleeing ahead
2735 skate stirs in bottom
3205 skate swimming across
4420 on way up
4600 on surface

Tow: 2005-Trip 2, tow 02
Camera: DSPL In-situ
View Angle: Camera mounted on bale; viewing cutting bar
Video quality: Very clear

0937 on bottom
1243 skate hits cutting edge goes under
1919 skate fleeing goes under

3514 lots of stuff on cutting bar
3614 scallop goes over cutting bar
4919 lifting off bottom
5145 on surface

Tow: 2005-Trip 2, tow 03
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear

0526 dredge on bottom; lots of shell
0856 clear shot of skate swimming in front
1130 starfish on bottom
1206 crab in front
1814 skate swimming
1853 skate
2515 skate moving across 2533 another skate
3824 haul back
4013 on surface

Tow: 2005-Trip 2, tow 03
Camera: DSPL In-situ
View Angle: Camera mounted on bale; viewing cutting bar
Video quality: Very clear

0931 on bottom
1108 cutting the bottom slightly
1114 skate caught on cutting edge
1259 large scallop hung up on cutting edge
4246 coming off bottom
4501 on surface

Tow: 2005-Trip 2, tow 04
Camera: DSPL In-situ
View Angle: Camera mounted on frame strut; viewing into dredge bag
Video quality: Dark

1115 on bottom; picture is dark; can see tickler
1534 can see tickler
4100 turbulence caused by cutting bar
4911 on way up
5130 on surface

Tow: 2005-Trip 2, tow 04

Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Focus problem; useable

0736 on bottom; focus seems bad
1606 not too bad
2315 back in focus
3018 skate
4500 on way up
4700 on surface

Tow: 2005-Trip 2, tow 05
Camera: DSPL In-situ
View Angle: Camera mounted on depressor plate viewing towards wheel
Video quality: Clear

0951 On bottom
2356 skate swimming across path
2447 skate swimming
2507 skate swimming
2605 skates
3810 wheel lifting off bottom
3916 dredge off bottom
4020 dredge alongside

Tow: 2005-Trip 2, tow 05
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear

0650 On bottom; a little dark
1110 clear shot of bottom with shell
1210 lots of starfish
1611 starfish eating clams
3500 leaving bottom
3714 On surface

Tow: 2005-Trip 2, tow 06
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Dark in the very beginning but then becomes clear

0509 on bottom
0702 lightens up
1748 skate fleeing

2141 skate fleeing
2334 skate fleeing
4415 out of focus
5400 leaving bottom
5631 On surface

Tow: 2005-Trip 2, tow 06
Camera: DSPL In-situ
View Angle: Camera mounted on depressor plate viewing towards wheel
Video quality: Dark

0900 on bottom
1800 viewing stbd dredge in background
2427 the plume seems to be the other dredge
5600 picture goes dark
5700 off bottom
5900 on surface

Tow: 2005-Trip 2, tow 09
Camera: DSPL In-situ
View Angle: Camera mounted on bale viewing cutting edge
Video quality: Dark

0745 on bottom going 4.8 kn
1405 skate on cutting edge
1845 skate hangs up then goes in; speed 4.3 kn
2838 skate hits and goes in
3315 lots of sand dollars hung up on cutting bar
4234 skate on cutting bar
4256 second skate hits and goes in
4520 coming off bottom
4657 On surface

Tow: 2005-Trip 2, tow 10
Camera: DSPL In-situ
View Angle: Camera mounted on bale viewing cutting edge
Video quality: Clear

0640 on bottom
0837 starfish on cutting bar
0908 skate hit
0950 skate goes under
1244 skate swimming in front hits cutting edge and flips up onto depressor plate
2049 skate hit and hang
2214 lots of stuff on cutting bar
2200 scallop hits and hangs on cutting edge; gets cut

2330 skate swimming and in
3614 cutting bar loaded up with stuff
4140 cutting edge cutting bottom
4212 Object going over dredge?
4423 skate scooped up
4636 skate goes under
4700 dredge lifting off bottom
4940 On surface

Tow: 2005-Trip 2, tow 11
Camera: DSPL In-situ
View Angle: Camera attached to twine top inside bag
Video quality: Camera pointed too high; view NG

Tow: 2005-Trip 2, tow 11
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear
0516 gear on bottom
1545 skate comes out of bottom
2151 skate fleeing
3630 skate fleeing
3642 skate fleeing
3714 skate overtaken
3818 skates fleeing to 3822
4012 skate fleeing
4415 skate fleeing
4519 skate fleeing
5037 seaweed or small school passes over bale
5237 skate fleeing
5315 skate fleeing
5327-40 three skates fleeing
5600 leaving bottom
5759 On surface

Tow: 2005-Trip 2, tow 12
Camera: DSPL In-situ
View Angle: Camera attached to twine top inside bag
Video quality: sediment cloud dominates picture

0740 on bottom
4430 leaving bottom
4436 view of tickler
4700 On surface

Tow: 2005-Trip 2, tow 12

Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Washed out; camera out of focus?

0402 on bottom
1600 video so far is very washed out; poor lighting?
1903 slow moving skate
4045 leaving bottom
4303 On surface

Tow: 2005-Trip 2, tow 13
Camera: PV-GS70
View Angle: Camera mounted on bale; viewing forward
Video quality: Clear
0549 On bottom
0700 skate swimming
4824 leaving bottom
5012 On surface

Tow: 2005-Trip 2, tow 13
Camera: DSPL In-situ
View Angle: Mounted on depressor plate viewing towards tow point
Video quality: Clear

0900 On bottom; bale without wheels
1244 skate moving
1300 skate swimming into dredge path
1329 monkfish laying on bottom?
1336 skate moving
1416 skate moving
1542 skate swimming
1921 skate moving
2005 skate moving
2226 skate swimming into dredge path
2440 skate moving
2728 skate hits dredge; flips in
2858 skate swimming
4011 skate fleeing
4239 skate coming across
4314 skate going in
4518 skate swimming across
4532 same thing
4750 skate swimming
4804 same
5140 coming off bottom
5348 on surface

Tow: 2005-Trip 2, tow Deck shots
Camera: PV-GS150
View Angle: Various
Video quality: Clear

0000 new dredge on deck with cutting edge mounted
0036 viewing cutting edge
0300 view of camera mounted on bale
0350 view of crows nest used for turtle sighting
0456 view of the crows nest

Appendix B: EFP Permit

March 17, 2005

Re: Sea Turtle Research Project

Dear Pat,

Coonamessett Farm, VIMS, and the NEFSC plan to conduct research this summer to collect information on turtle interactions with sea scallop dredges. Previous work by VIMS and Coonamessett Farm has shown that the installation of chain mats greatly reduces the incidental take of turtles in scallop dredges. It is the intent of this project to investigate the behavior of sea turtles around scallop dredges and in areas where scalloping has recently occurred. This investigation requires the use of underwater cameras to visually identify sea turtle behaviors in and around scallop gear.

The modification, a chain mat that physically excludes turtles, did not catch a turtles in over 2400 hauls, while the standard dredge caught seven loggerhead sea turtles. An issue was raised after the study about how the turtles interact with the scallop dredge. After the prior study, several proposed the theory that turtles are attracted scallop viscera and lay close to the bottom, while others speculated that the turtles are captured while the dredge is being retrieved. In a meeting between the contractors and NMFS, there was a stated importance of viewing the scallop gear using video with the hope of seeing a turtle(s) interacting with the scallop dredge. It was discussed that with video, NMFS will be better equipped to assess the effectiveness of this gear modification in not only reducing the bycatch of turtles, but also in assessing the type of interactions that may be occurring. As an example, we do not know if the noise of the chains is causing the turtles to flee from he path of the dredge, if the turtles are getting run-over by the gear, or if the interactions are occurring predominantly during the retrieval of the gear. Again, the questions that this study hopes to answer will help NMFS better assess the effectiveness of this gear modification and understand the behaviour of loggerhead sea turtles in relation to scallop dredges.

We began the first phase of the project in September 2004 and utilized two commercial vessels fishing off their limited access DAS under the general category provisions of 400 lb daily maximum catch in an area that had reported turtle takes and dense scallop concentrations. A minimum of two scientific observers were onboard and complete catch records were kept. A draft report has been submitted to the NEFSC. The vessels were compensated by a payment of $1000/day plus they landed their catch daily. The fact that they were fishing under general category provisions required the vessels to return to port daily to prevent exceeding the daily limit of 400 lbs. The catch was a significant part of paying for the vessel costs.

We plan to continue the project this year starting in June and going through to the fall. It would significantly improve the project's efficiency if we did not have to return to port everyday to land the catch. We would like to be able to stay on the fishing grounds for up to four days at a time without having to land the catch. We request that the NMFS issue a Letter of Authorization (LOA) to allow vessels participating in this project to be exempt from the 400 lb per day possession limit and instead, be allowed to land up to 400 pounds per day at sea. In other words, if the vessel spends three DAS it would be able to land up to1200 pounds. This will not result in any additional fishing mortality than if they were operating under the 400 pound daily possession limit. There will be no enforcement concerns as the vessels have observers onboard and complete catch records are being kept.

Thank you for your consideration of this request.

Sincerely,
Ronald Smolowitz

May 7, 2005

EFP APPLICATION

Project: Sea Turtle/Scallop Dredge Interaction Study

Submitted by: Ronald Smolowitz

Purpose: The purpose of this EFP request is to collect further information on turtle interactions with sea scallop dredges. Previous work by VIMS and Coonamessett Farm has shown that the installation of chain mats greatly reduces the incidental take of turtles in scallop dredges. Similar video work was conducted in 2004 and was successful in devising a methodology to video in front of scallop dredges but was unsuccessful in viewing any turtle behavior due to a late start, bad weather, and poor concentrations of sea turtles. This project plans to utilize the methodology and information gained during the last project contract with NMFS, and make more and longer trips on scallop vessels which should increase the likelihood of success.

Presently it is not understood what interaction, if any, occurs when turtles encounter chain-equipped dredges or whether the noise of the chains is creating an avoidance behavior. A vessel fishing on a dense bed of scallops may discard scallop viscera remains concentrated in the relatively small area the vessel is fishing which may attract turtles. In short, there are many unanswered questions regarding sea turtle interactions with scallop dredges equipped with chain mats. It is the intent of this project, conducted under contract with the NMFS NEFSC, to investigate the behavior of sea turtles around scallop dredges and in areas where scalloping has recently occurred. This investigation requires the use of underwater cameras to visually identify sea turtle behaviors in and around scallop gear.

Requested Exemption: In order to remain on the grounds for more than a 24-hour cycle, as well as to steam to distant locations where turtle interactions are reported to be occurring, we are requesting to be exempt from the 400-lb possession limit. The exemption would allow vessels participating in the project to land scallops based on a 400-lb per day allowance, rather than to land daily.

Background:

<u>Past chain mat work</u>
In response to increasing numbers of sea turtle interactions observed by the sea scallop industry and subsequently corroborated by NMFS observers, a series of 15 experimental cruises were carried out during the summer and early fall of 2003 on the continental shelf waters of the mid-Atlantic Bight. These cruises demonstrated that a simple modification to the standard sea scallop dredge can be effective in eliminating the incidence of sea turtle bycatch without substantial associated reductions in the capture of the target species.

The modification, a chain mat that physically excludes turtles, did not catch a turtles in over 2400 hauls, while the standard dredge caught seven loggerhead sea turtles. An issue was raised after the study about how the turtles interact with the scallop dredge. After the prior study, several proposed the theory that turtles are attracted scallop viscera and lay close to the bottom, while others speculated that the turtles are captured while the dredge is being retrieved. In a meeting between the contractors and NMFS, there was a stated importance of viewing the scallop gear using video with the hope of seeing a turtle(s) interacting with the scallop dredge. It was discussed that with video, NMFS will be better equipped to assess the effectiveness of this gear modification in not only reducing the bycatch of turtles, but also in assessing the type of interactions that may be occurring. As an example, we do not know if the noise of the chains is causing the turtles to flee from he path of the dredge, if the turtles are getting run-over by the gear, or if the interactions are occurring predominantly during the retrieval of the gear.

Again, the questions that this study hopes to answer will help NMFS better assess the effectiveness of this gear modification and understand the behaviour of loggerhead sea turtles in relation to scallop dredges.

Past video work

In 2004 Coonamessett Farms conducted three days of video operations on the F/V Kathy Ann monitoring 16 paired scallop tows with tow times ranging from 15-49 minutes in duration at speeds of about 4 knots. The vessel fished approximately 30 miles offshore on a bed of scallops that averaged catch rates of 5 bushels per dredge per tow. Two dredges were being fished but video cameras only monitored the port dredge. The vessel kept the tow path short by using turn around tows. and discarding. Scallop viscera was discarded within the tow path in a manner typical of commercial operations. No turtles were sighted during the entire trip though other vessels reported sightings in the vicinity. The project took over seven hours of dredge mounted video.

Additionally the project monitored the bycatch in the port dredge over the three days to see if there was an increase in bottom feeders such as crabs. The bycatch of benthos typically consisted of one half bushel of sulphur sponge (Cliona celata) and 5-10 bushels of sand dollars per tow. There were only a few starfish and crabs in the catch during the whole experimental period. In three full days of covering the bottom with scallop viscera there was no increase in rock crabs or hermit crabs.

The trip was terminated after three days to wait for reports of turtle sightings by the scallop fleet. On October 1, 2004 a vessel reported that she had three turtles takes in an area southeast of Cape May, New Jersey. The project staff heard through the sea sampling program that another vessel had multiple takes in the same general area and we made arrangements to sail on the F/V Karen L out of Cape May. Unfortunately, as we were sailing out of Cape May on October 3rd, the scallop fleet was heading back home due to a very bad weather forecast. We continued to the fishing area, and did set the dredge, but the

weather was getting increasingly bad. We terminated the operation. Weather remained bad for over a week and by the time weather cleared the turtles were presumed to be south of the scallop operating area.

Goals and Objectives: There is limited information on how interactions occur between sea turtles and the dredge gear used in the sea scallop fishery. This project seeks to conduct research that will employ video to view turtle behavior and the actions of the scallop dredge equipped with a scallop chain mat. The goals will be similar to the 2004 study and will be to determine if discarding of scallop viscera, consistent with normal scallop fishing operations, has an effect of attracting sea turtles to fishing vessels.
Need for exemption: The project will utilize one or more commercial vessels fishing off their limited access DAS under the general category provisions of 400 lb trip limit in an area that has reported turtle takes and dense scallop concentrations. The period of performance shall be 15 June 2005 through 31 October 2005. The project requests an exemption from the 400-lb possession limit to eliminate returning to port every day. For the project to succeed, the vessels need the capability to stay at sea when concentrations of turtles are located. Turtles may also be located at distances beyond daily trip ranges. If these vessels were not participating in the project, they would be landing their full 400-lb possession limit daily as part of their commercial operation. They should not be penalized by participating in the project.

The vessels must be sufficient in size to safely accommodate the gear and the researchers for this study. The project will fish one 13-foot scallop dredge outfitted with two self-contained video cameras; one dredge mounted looking forward and one mounted on the towing warp looking back at the dredge. The fishing activity should concentrate on one short turn-around dredge path. All viscera will be maintained onboard and dumped in the center of the dredge path before each tow. Video cameras will be lowered to examine the dredge path and dumping location. Complete catch records will be kept and a minimum of six tows per day shall be completed when possible. The Scientific Data Collectors will be trained in data collection procedures. This training shall include species identification, sub-sampling techniques, proper methodology for recording catch, ship and gear data. The data shall be recorded on NMFS approved data sheets.

Catch and bycatch: The vessel will fish for a maximum of twenty days. The total anticipated scallop catch will be 8000 lbs of sea scallops which will be landed and sold. This catch will probably be taken in less than 150 tows. The fishing will in all likelihood take place off the coast of New Jersey and Delmarva. Based on last years work we do not expect a significant bycatch of fish and the benthos will also be in very limited quantities as stated above. The fish bycatch may consist of 5000 lbs of little skate, less than 50 lbs of monkfish, and about 300 lbs of flatfish. All the incidental catch will be returned to the sea.

Sea Turtle Handling: Any Sea Turtles brought aboard that are comatose

or inactive turtles shall be handled in accordance with Sea Turtle Resuscitation Regulations at 50 CFR 223.206(d)(1). Sea turtles that are actively moving shall be released by the crew of the vessel over the stern of the boat when gear is not deployed and engine gears are in neutral position, in areas where they are unlikely to be recaptured or injured by vessels. When possible live injured turtles will be transferred to a cooperating U.S. Coast Guard Vessel and delivered to an authorized rehabilitation facility. Loggerhead turtles injured within 36 hours of anticipated return will be brought in to the dock, unless arrangements can be made for a U.S. Coast Guard vessel to pick up the animal.

Data disposition: A final report shall be submitted to NEFSC by 31 November 2005. The final reports shall be delivered electronically in journal format to Henry Milliken the COTR at the Protected Species Branch, NEFSC, 166 Water Street, Woods Hole, MA 02543. All submitted products will be reviewed by the COTR for completeness within 30 days of receipt by NMFS NEFSC.

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Ronald Smolowitz, President, CF, Inc

EXEMPTED FISHING PERMIT

Project Coordinator
Ronald Smolowitz, Coonamessett Farm, Inc.

Vessel Owner/Operator	Vessel Name	Hull Number	Permit Number
Kathy Ann, Inc	KATHY ANN	946982	410505

Date Issued: July 26, 2005 **Participation Period:** July 26–Dec. 31 2005

This exempted fishing permit (EFP) is issued in accordance with Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) provisions (16 U.S.C. 1801 et seq.), 50 CFR 600.745 and 50 CFR 648.12 (subpart F). The above-named vessels are exempt from the following regulations while conducting experimental fishing activities in accordance with the conditions and requirements specified below. The objective of the proposed exempted experimental fishing activity is to collect further information on turtle interactions with sea scallop dredge gear equipped with a chain mat. The project will investigate sea turtle behavior around scallop dredges and areas where scalloping has recently occurred. The vessel will fish one 13-ft (4 m) scallop dredge outfitted with self-contained video cameras; one camera mounted in a forward-looking position, while the other is mounted on the towing warp to look back at the dredge. Tows will be concentrated in one area doing short turnaround tows. **This EFP exempts the vessel named above from the scallop possession and landing limits(50 CFR 648.53(a)).** The participating vessel will be authorized to make tows off the coast of New Jersey and the Delmarva Peninsula, where sea turtle interactions are likely. The vessel named above may conduct experimental fishing activities under the exemptions listed above provided said vessel complies with the following conditions and requirements:

1. This EFP **must** be carried on board the vessel and accompany a valid Federal Atlantic Sea Scallop permit if the landing of scallops is authorized under this EFP.
2. The vessel **must** comply with all other applicable requirements and restrictions specified at 50 CFR part 648, unless specifically exempted in this EFP. This EFP does **not** exempt the vessel from any requirement imposed by any state.
3. The owner of this vessel **must** submit Federal logbook reports to the National Marine Fisheries Service (NMFS) according to current regulations at 50 CFR 648.7.
4. A copy of the final report **must** be provided to NMFS within 6 months of the expiration of the EFP.
5. The EFP authorizing this activity may be terminated by the Regional Administrator at any time, at her discretion, for reasons including, but not limited to, a finding that the vessel violated the conditions of the permit, i.e., exceeding the limits set forth in item #9 of this permit.

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7. The vessels are authorized to fish a maximum of 20 days. Total scallop catch may not exceed 8,000 lb. under theis EFP and vessels must fish in the areas where sea turtle interactions are likely.
8. The vessel operator **must** comply with all protocols listed in the EFP proposal, including but not limited to: length of trip, dredge construction and configuration, towing wire specifications, towing scope, speed, and towing time/distance. A copy of the EFP proposal and protocols must be available on board the vessel for inspection. Vessels may not fish in the Elephant Trunk Closed Area defined as a box with the coordinates 38°50' N Lat. 74°20' W. Long., 38°10' N Lat. 74°20' W Long., 38°10' N Lat. 73°10' W. Long., 38°50' N Lat. 73°30' W. Long.
9. The vessel is authorized to possess and land scallops and the possession limits for multispecies, monkfish, and other species allowed under Federal regulations. In order to retain catch other than scallops, the vessel must have a valid Federal fishery permit for multispecies, monkfish, and other Federally managed species.

10. The vessel **must** have a fully operational Vessel Monitoring System on board (50 C.F.R. 648.9), and comply with all DAS notification requirements in 648.10 and 648.58.

11. The vessel must conduct the research described in the EFP proposal as its primary mission. Retention of scallop and other catch must be secondary to experimental fishing and research activities conducted on board the vessel. Trips may not be terminated prior to acquiring the proposed level of experimental data for reasons other than the health and safety of the crew, or other emergencies.
12. The Exempted Fishing Permit authorizing the proposed experimental fishing activity may be terminated by the Regional Administrator at any time, at her discretion, including, but not limited to a finding that the vessel violated the conditions of this permit.
13. The vessel owner and operator fishing under this Letter of Authorization remain subject to 50 C.F.R. 648.4(b). This Letter of Authorization does not exempt the vessel owner or operator from any requirement imposed by any state.

Failure to comply with any of the above provisions, or any of the provisions of the Magnuson-Stevens Act and its regulations, automatically and immediately renders this authorization null and void as of the date of the violation and subjects the violator to fines and/or permit sanctions.

Activities that do not comply with the provisions of the Magnuson-Stevens Act, or that are conducted outside the scope of the EFP and/or the cruise instructions, automatically render this EFP null and void as of the date of the violation and may subject the violator to fines and/or permit sanctions.

Authorization on reverse side of this permit

I agree to comply with the conditions of this permit. **Authorized by:**