

Appendix 1. Daily Activity Summaries and Observations

Operations were conducted from June 18-22, 2006 in the Gulf of Mexico, 1/4 mile offshore of Shell Island, Panama City Florida in 20-30 ft. of water. The *F/V Captain Wick*, a 70-ft fish/shrimp trawler, was used as the research platform.

Sunday 6/18/06

- Attached A-frame and necessary stays on vessel
- Loaded dredge on vessel
- Setup of RF camera system on dredge
- Conducted one tow to observe dredge attitude with different scope and speed combinations.

Tow #1 Dredge attitude observations with different scope and speed combinations

Scope: Varied

Cable: Varied

Depth: 28-29 ft

Speed: Varied

Comments: RF camera installed on starboard side of center bar in dredge bale facing aft, providing a view of the starboard side of cutting bar. The amount of cutting bar bottom contact was observed as an indicator of dredge attitude. It was assumed that the more contact the cutting bar made the lower the angle of the bale relative to the bottom.

1.8:1 scope @ 2.1 knots – Occasional bottom contact

1.8:1 scope @ 3.2 knots – Infrequent bottom contact

1.8:1 scope @ 4.0 knots – No bottom contact

2.6:1 scope @ 4.0 knots – Infrequent bottom contact

3.5:1 scope @ 1.5 knots – Constant bottom contact

3.5:1 scope @ 2.0 knots – Frequent bottom contact

3.5:1 scope @ 3.0 knots – Frequent bottom contact

4.3:1 scope @ 3.0 knots – Frequent bottom contact

4.3:1 scope @ 4.0 knots – Frequent bottom contact

5.1:1 scope @ 3.0 knots – Nearly constant bottom contact

5.1:1 scope @ 4.0 knots – Nearly constant bottom contact

5.1:1 scope @ 5.2 knots – Frequent bottom contact

Monday 6/19/06

- Conducted one tow with divers to observe dredge attitude, collect measurements, and handheld video.
- Conducted two tows with turtle carcasses deployed ahead of the dredge.

Tow #2 Dredge attitude observations and video collection with 5.1:1 ratio at 3.0 kts

Scope: 5.1:1

Cable: 150 ft

Depth: 29 ft

Speed: 3.0 kts

Comments: The cutting bar was making nearly constant contact with the bottom. The bale of the dredge was nearly parallel with the bottom with less than 6-inches of clearance. Lots of sand was being pushed by the cutting bar due to the low angle of attack and the bag was nearly covered with sand at the end of the tow. No more than a few of inches of clearance was observed between the cutting bar and the bottom.

Tow #3 Turtle carcass #1 deployed ahead of the dredge

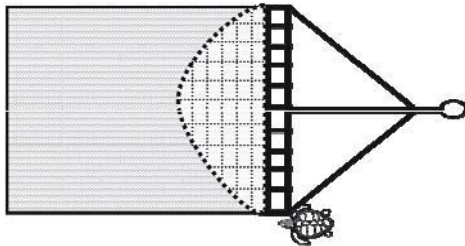
Scope: 5.1:1

Cable: 150 ft

Depth: 28 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was placed in front of the starboard edge of the dredge and did not go under the bale. The carcass deflected off the starboard shoe away from the dredge. Divers deploying the carcass had trouble locating the oncoming dredge due to the length of cable deployed. Also, the captain had trouble making adjustments due to the amount of cable deployed.

Tow #4 Turtle carcass #1 deployed ahead of the dredge

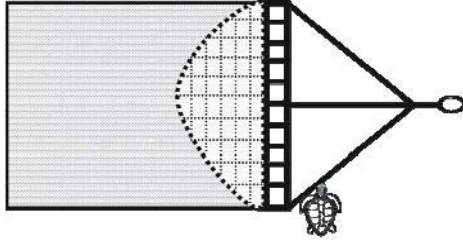
Scope: 5:1

Cable: 125 ft

Depth: 25 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: Cable length was shortened to 125 ft to provide the captain with better maneuverability and allowed divers to adjust to dredge more effectively. The carcass was placed in front of the starboard edge of the dredge and did not go under the bale. The carcass was held on the outer edge of the bale for approximately 30 seconds before it came off and went up and over the dredge. The amount of clearance between the bale and the bottom at this scope did not allow the turtle carcass to pass under the bale. Because of difficulties experienced with the 5:1 ratio, it was agreed that subsequent tows should match the 2005 testing scenario with a 3:1 ratio at 3.0 knots. In 2005, scallop dredge fishermen and industry representatives that attended testing determined that this ratio speed combination provided a dredge attitude that best matched that observed on commercial dredges during normal fishing conditions. The 3:1 ratio also provided better maneuverability, diver response time, and enough clearance to place carcasses under the bale, which was a more conservative testing approach.

Tuesday 6/20/06

- Conducted four tows with turtle carcasses deployed ahead of the dredge

Tow #5 Turtle carcass #2 deployed ahead of the dredge

Scope: 3:1

Cable: 90 ft

Depth: 30 ft

Speed: 3.0 kts

Carcass Placement and Orientation: Missed

Comments: The apex of the dredge bale was 14-20-inches off the bottom and the cutting bar was making occasional contact with 3-4-inches of clearance observed and very little sand observed going over the cutting bar. No interaction was recorded; the dredge missed the carcass deployment dive team.

Tow #6 Turtle carcass #2 deployed ahead of the dredge

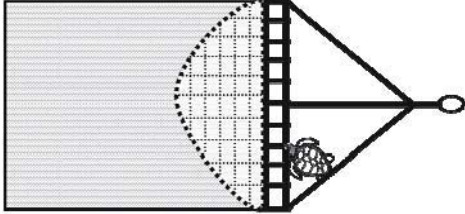
Scope: 3:1

Cable: 90 ft

Depth: 30 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was placed under the starboard side of the dredge bale and made contact with the cutting bar in the center of the starboard side of the dredge approximately 3 feet from the edge (Figure 2A). The carcass was facing the dredge and turned slightly to the right, with the left front flipper trapped under the cutting bar by water pressure and the posterior edge of the shell held down by the bale (Figure 2B). The carcass was held in this position for approximately 4 minutes before divers removed it. The front flipper was trapped under the cutting bar and against a vertical piece of round stock that was added to the front edge of the cutting bar and pressure plate (Figure 2C and D).

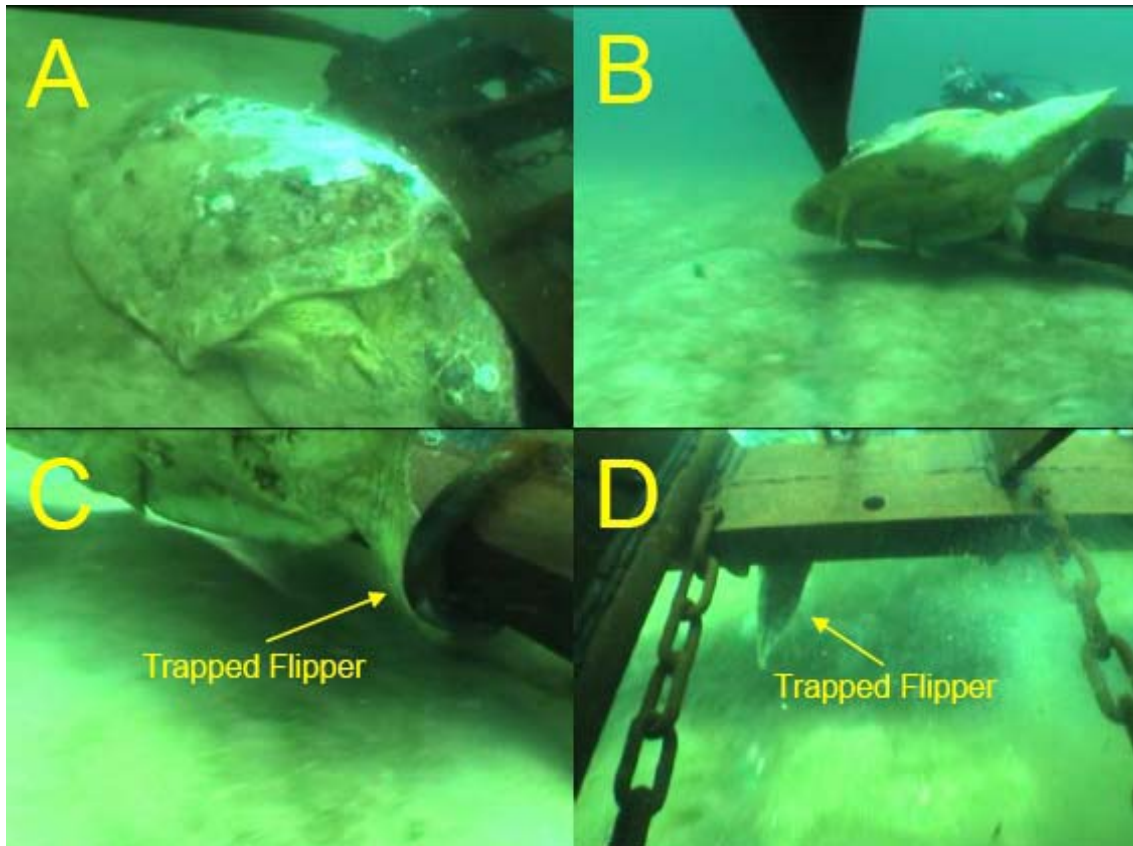


Figure 2. Photos taken from video collected during tow #6 of modified scallop dredge testing June 20, 2006. (A) Initial impact with the dredge; (B) carcass caught under bale; (C) flipper under cutting bar and against round stock modification; (D) rear view of flipper.

Tow #7 Turtle carcass #2 deployed ahead of the dredge

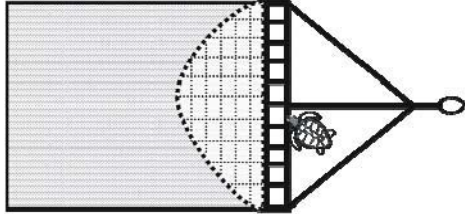
Scope: 3:1

Cable: 90 ft

Depth: 28 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was placed under the starboard side of the dredge bale and made contact with the cutting bar just to the starboard side of the center bar approximately 6 feet from the edge of the frame (Figure 3A). The carcass was facing the dredge and turned slightly to the right with the front left flipper and head making initial contact. The carcass then flipped up onto the front of the dredge (Figure 3B and C). The right front flipper was momentarily trapped under the cutting bar before releasing and allowing the carcass to flip up and over the dredge (Figure 3C and D).

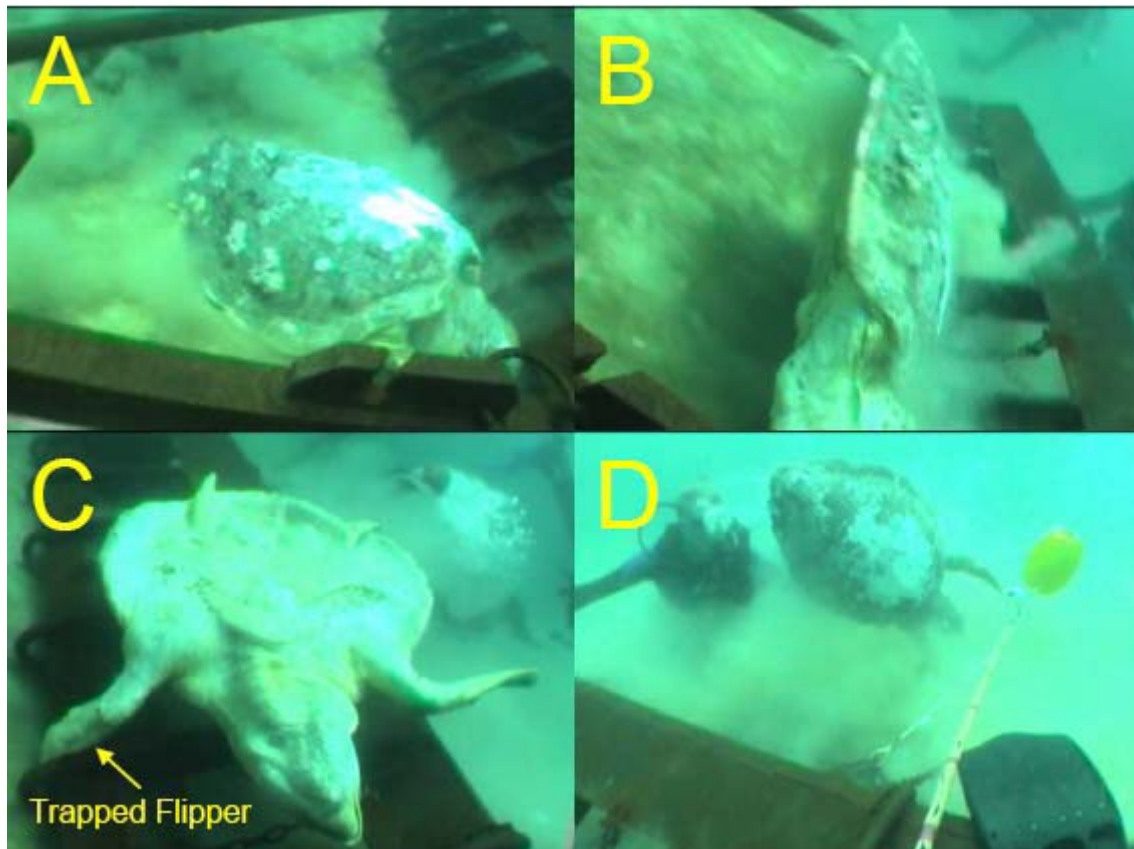


Figure 3. Photos taken from video collected during tow #7 of modified scallop dredge testing June 20, 2006. (A) Initial impact with the dredge; (B) carcass beginning to flip up; (C) carcass flipping onto dredge with flipper momentarily trapped; (D) carcass going over dredge.

Tow #8 Turtle carcass #3 deployed ahead of the dredge

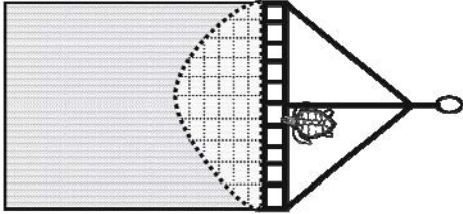
Scope: 3:1

Cable: 90 ft

Depth: 27 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was placed under the starboard side of the dredge bale and made contact with the cutting bar just to the starboard side of the center bar approximately 6 feet from the edge of the frame (Figure 4A). The carcass was facing the dredge and made contact head first. The carcasses stayed in position for a few seconds and proceeded to flip up and over the pressure plate where it was recovered by divers (Figure 4B).

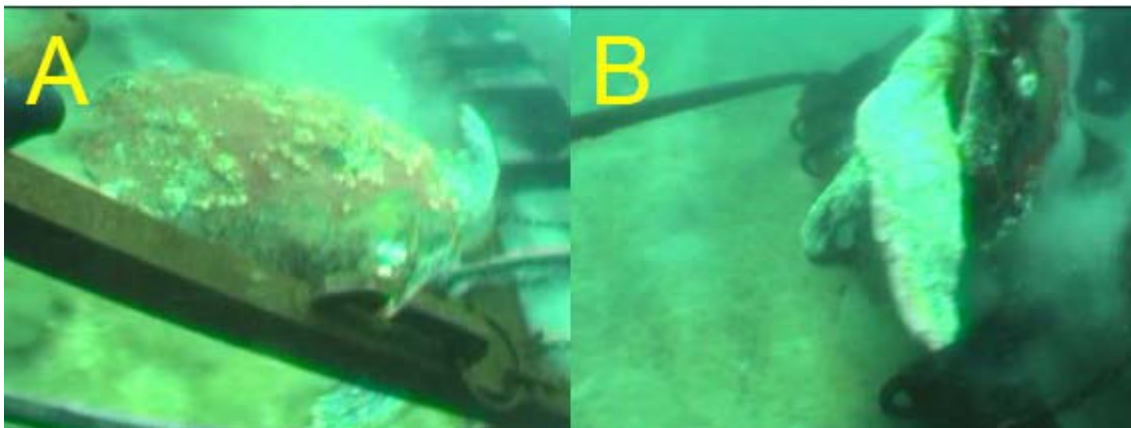


Figure 4. Photos taken from video collected during tow #8 of modified scallop dredge testing June 20, 2006. (A) Initial impact with the dredge; (B) carcass flipping up and over the dredge.

Wednesday 6/21/06

- Conducted five tows with turtle carcasses deployed ahead of the dredge

Tow #9 Turtle carcass #4 deployed ahead of the dredge

Scope: 3:1

Cable: 90 ft

Depth: 31 ft

Speed: 3.0 kts

Carcass Placement and Orientation: Missed

Tow #10 Turtle carcass #4 deployed ahead of the dredge

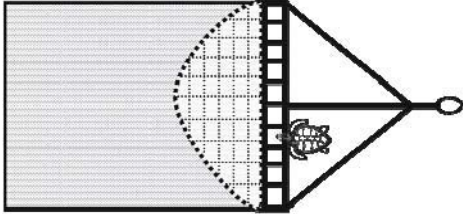
Scope: 3:1

Cable: 90 ft

Depth: 34 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was placed under the starboard side of the dredge bale and made contact with the cutting bar near the middle of the starboard side of the dredge approximately 4 feet from the edge of the frame (Figure 5A). The carcass was facing the dredge and made contact head first. The carcass slid up the face of the dredge immediately after impact and proceeded to go over the pressure plate (Figure 5B).

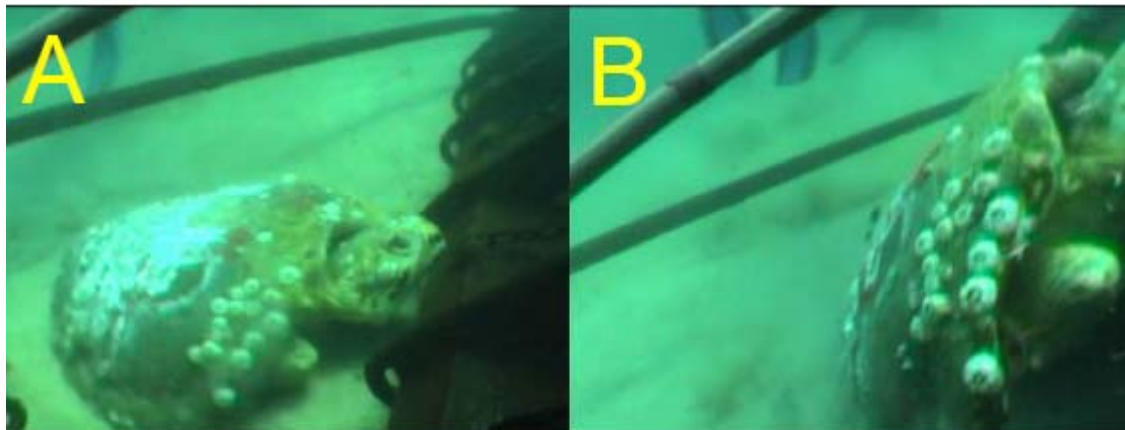


Figure 5. Photos taken from video collected during tow #10 of modified scallop dredge testing June 21, 2006. (A) Initial impact with the dredge; (B) carcass sliding up and over the dredge.

Tow #11 Turtle carcass #3 deployed ahead of the dredge

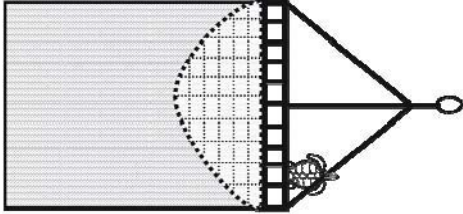
Scope: 3:1

Cable: 90 ft

Depth: 30 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was placed under the starboard side of the dredge bale and made contact with the cutting bar near the edge of the starboard side of the dredge approximately 3 feet from the edge of the frame (Figure 6A). The carcass encountered the dredge tail first. The posterior edge of the carapace was caught under the cutting bar while the anterior portion of the carapace was held down by the dredge bale, which prevented the carcass from flipping up and over the dredge frame (Figure 6B).

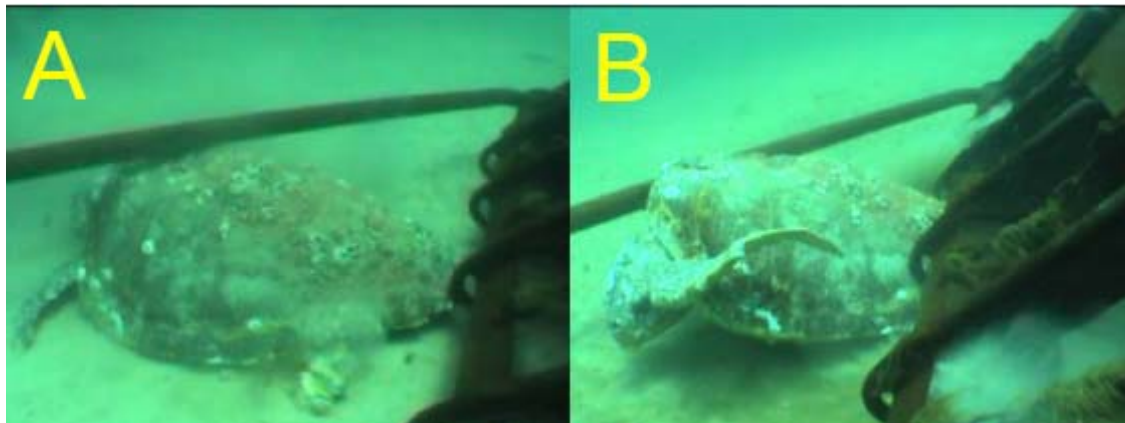


Figure 6. Photos taken from video collected during tow #11 of modified scallop dredge testing June 21, 2006. (A) Initial impact with the dredge; (B) carcass caught under bale and cutting bar.

Tow #12 Turtle carcass #4 deployed ahead of the dredge

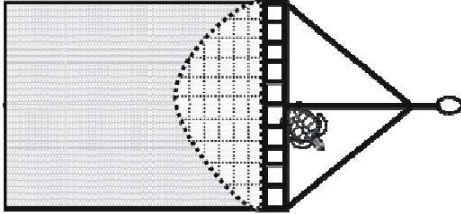
Scope: 3:1

Cable: 90 ft

Depth: 29 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was placed under the starboard side of the dredge bale and made contact with the cutting bar near the center of the dredge just on the starboard side of the center brace bar approximately 6 feet from the edge of the frame (Figure 7A). The carcass encountered the dredge tail first and was angled to the right. Upon impact the carcass slid up the face of the dredge and stalled on the pressure plate (Figure 7B and C). The carcass's front left flipper was trapped under the cutting bar and against a vertical piece of round stock (Figure 7D). The carcass was held in this position for approximately one minute before it moved the rest of the way over the dredge.

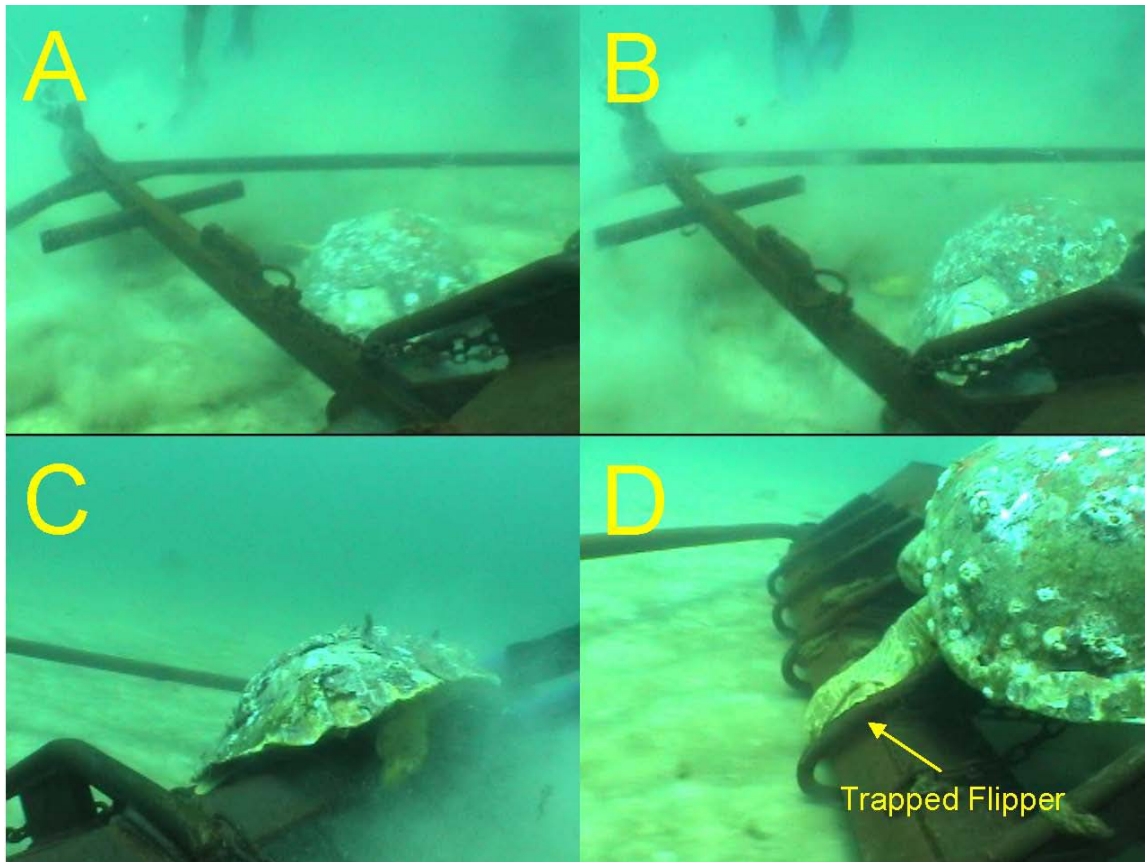


Figure 7. Photos taken from video collected during tow #12 of modified scallop dredge testing June 21, 2006. (A) Initial impact with the dredge; (B) carcass sliding up face of the dredge; (C) carcass stopping on the pressure plate; (D) flipper which may have temporarily held carcass in place.

Tow #13 Turtle carcass #4 deployed ahead of the dredge

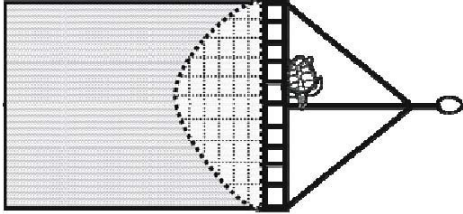
Scope: 3:1

Cable: 90 ft

Depth: 30 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was placed under the port side of the dredge bale and made contact with the cutting bar near the center of the dredge just on the port side of the center brace bar approximately 5 feet from the edge of the frame (Figure 8A). The carcass was facing to the right and encountered the dredge along its entire right side. Upon impact the carcass flipped up and over the dredge (Figure 8B).

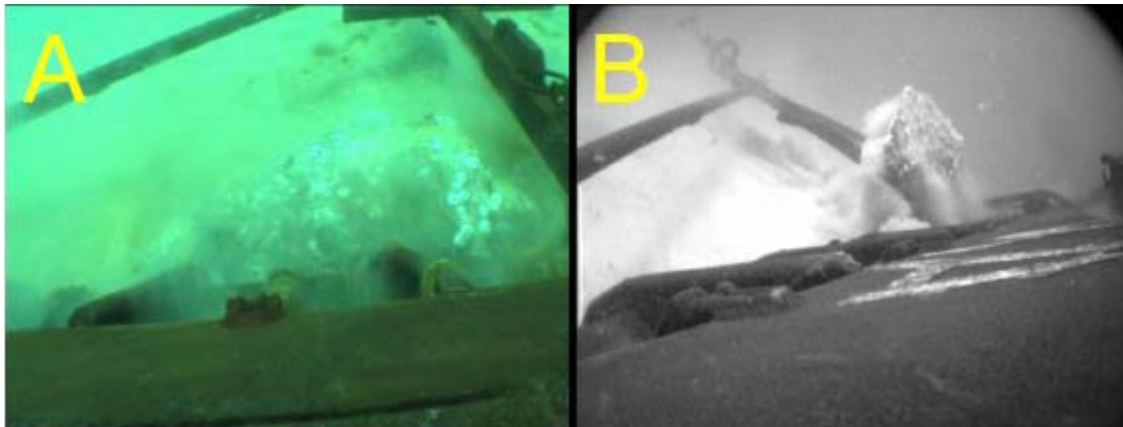


Figure 8. Photos taken from video collected during tow #13 of modified scallop dredge testing June 21, 2006. (A) Initial impact with the dredge; (B) carcass flipping up and over the dredge.

Thursday 6/22/06

- Conducted four tows with turtle carcasses deployed ahead of the dredge
- Unloaded modified dredge
- Completed rigging change for trawl work

Tow #14 Turtle carcass #5 deployed ahead of the dredge

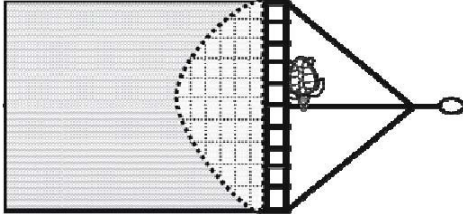
Scope: 3:1

Cable: 90 ft

Depth: 30 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was large and bloated and required the addition of thirty pounds of weight to sink. The carcass was placed under the port side of the dredge bale and made contact with the cutting bar just to the port side of the center brace bar approximately 5 feet from the edge of the frame (Figure 9A). The carcass was facing to the right and encountered the dredge along its entire right side. Upon impact the carcass slid up the face of the dredge and stopped (Figure 9B). The attached weights may have hung on the face of the dredge preventing it from sliding completely over the dredge. In addition, both front flippers were under the cutting bar which may have also prevented the carcass from sliding any further up the face of the dredge (Figure 9B).

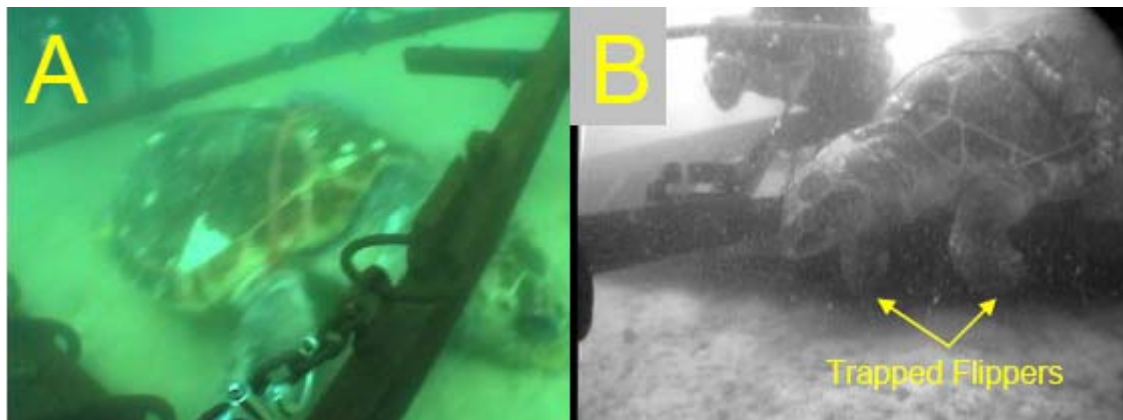


Figure 9. Photos taken from video collected during tow #14 of modified scallop dredge testing June 22, 2006. (A) Initial impact with the dredge; (B) carcass sliding up the face of the dredge.

Tow #15 Turtle carcass #5 deployed ahead of the dredge

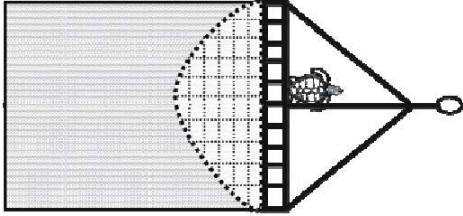
Scope: 3:1

Cable: 90 ft

Depth: 32 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: This was the same carcass used on the previous tow and required the addition of weights to sink. The carcass was placed under the port side of the dredge bale and made contact with the cutting bar on the port side of the center brace bar about 5 feet from the edge of the frame (Figure 10A). The carcass encountered the dredge tail first. Upon impact the carcass flipped up and over the face of the dredge (Figure 10B).

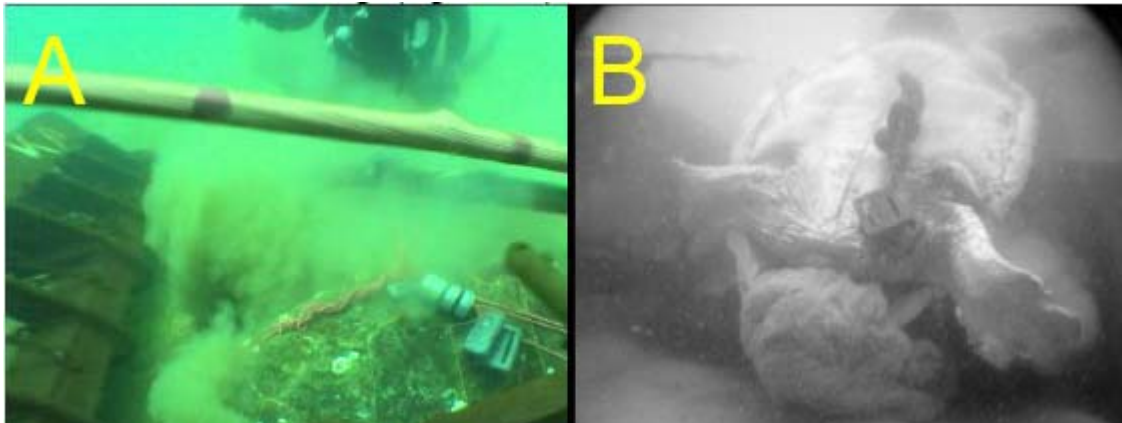


Figure 10. Photos taken from video collected during tow #15 of modified scallop dredge testing June 22, 2006. (A) Initial impact with the dredge; (B) carcass flipping up and over the dredge.

Tow #16 Turtle carcass #2 deployed ahead of the dredge

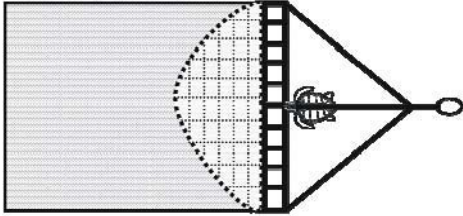
Scope: 3:1

Cable: 90 ft

Depth: 31 ft

Speed: 3.0 kts

Carcass Placement and Orientation:



Comments: The carcass was placed directly under the center brace bar (Figure 11A). The carcass encountered the dredge head first and was held under the center brace bar until divers removed it (Figure 11B).

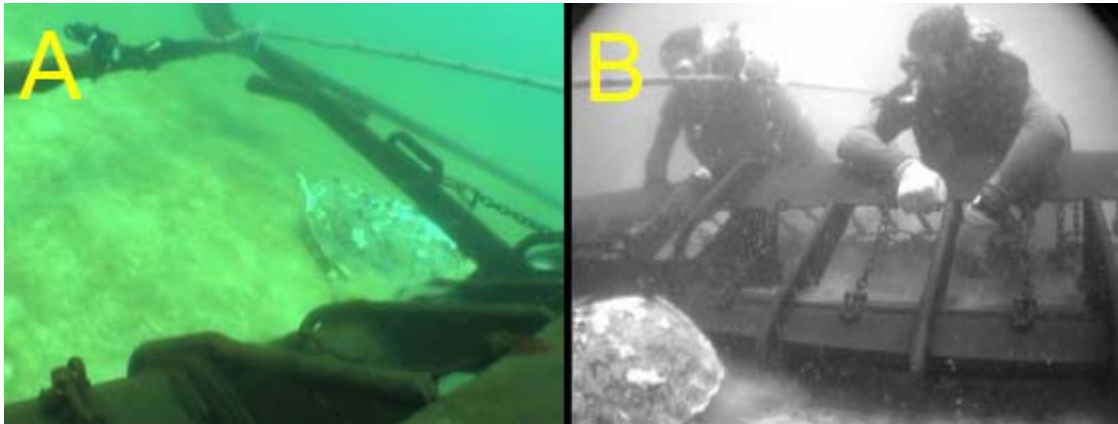


Figure 11. Photos taken from video collected during tow #16 of modified scallop dredge testing June 22, 2006. (A) Initial impact with the dredge; (B) divers preparing to remove carcass from under the center brace bar.

Tow #17 Fiberglass Turtle Model #1 deployed ahead of the dredge

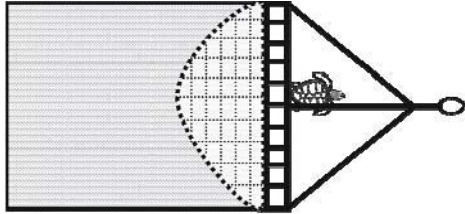
Scope: 3:1

Cable: 90 ft

Depth: 30 ft

Speed: 3.0 kts

Plastic Turtle Placement and Orientation:



Comments: The model was placed under the port side of the dredge bale and made contact with the cutting bar near the center of the dredge just on the port side of the center brace bar 5 feet from the edge of the frame (Figure 12A and B). The model encountered the dredge tail first. Upon impact the model started to flip up but the head caught under a cross bar where wheels had been previously mounted on the center bar. This prevented the model from flipping up and over the dredge (Figure 12C). In addition, the right rear flipper was trapped under the cutting bar (Figure 12D).

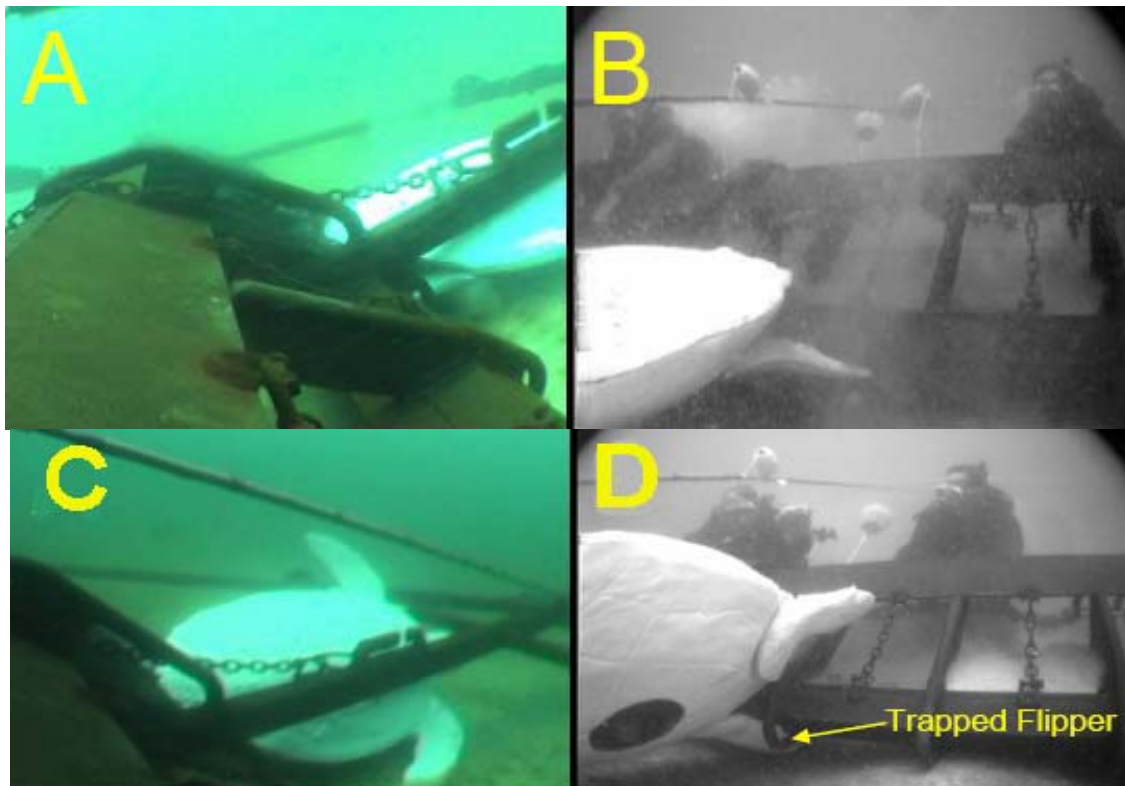


Figure 12. Photos taken from video collected during tow #17 of modified scallop dredge testing June 22, 2006. (A) Initial impact with the dredge; (B) initial impact with the dredge; (C) turtle model caught with head under crossbar (D) rear flipper of model shown under cutting bar.