

Risk Assessment and Risk Management Plan

Brazos Island Harbor (BIH) Brownsville Entrance Channel November 5, 2008

This risk assessment is prepared to address circumstances which may have contributed to the incidental sea turtle take that was recently experienced during performance of hopper dredging of this navigation project.

Risk Assessment

The subject dredging contract was issued to perform dredging in a 6,600-foot reach of the Entrance Channel of the Brazos Island Harbor Project. This channel segment extends from Station -6+400 to -13+000. The sediments being dredged are characterized as having a large percentage of sand.

Hopper dredge operations commenced on August 30, 2008, by the contract hopper dredge *B.E. Lindholm*. Contract specifications required dredging for an estimated 10 days with the objective of removing approximately 350,000 CY of shoal material. Dredging progressed until September 5, when the dredge experienced a breakdown and was not able to continue. Dredging operations resumed on October 31, and will continue until about November 12. This dredge is equipped with two dragheads. Both dragarms convey dredged material into a common pipe leading to a central inflow lander. For this reason, it is generally not possible to discern which draghead entrained the turtles unless there is evidence on the draghead itself. During the course of this dredging one Kemp's ridley turtle was taken.

This work is being conducted under a rental contract rather than a production contract. The dredge is expected to leave before the complete channel template is cleared; so cleanup dredging does not appear to be a factor.

A review of the TES Observer reports indicates that the draghead deflector and screening were in good condition. A review was also made of the Dredge QC Daily Reports. One item of note is that the cable on the starboard dragarm repeatedly broke. The Construction Rep reported that the draghead was constantly bouncing up and down during operations. A review of pre-dredging channel surveys indicated a highly irregular bottom, which is not surprising given the sandy character of the sediments in the region. These factors could account for the bouncing. Sea state does not appear to be a significant factor, because wave heights were about 2.0 feet during the

time of the take. Paint tests were conducted and indicate that the draghead penetration was satisfactory.

Biological bycatch aboard the dredge and relocation trawlers yielded only a few crabs. Although this is a preferred food for the Kemp's ridley turtles, there did not seem to be a sufficient abundance that would attract and retain this species to this particular area.

A dredge inspection was performed according to the Sea Turtle Compliance Checklist by the Construction Rep on 30 August, 2008 at the onset of operations, and again on 31 October 2008. Paint tests also were conducted at those times. Following this inspection, the conclusion was that the dredge was being operated in a satisfactory manner, and that no corrective actions were required. A follow-up inspection and paint test were also conducted in response to the take. No obvious factors that might have been responsible for the takes were revealed.

Dredging is being not performed within the Dredging Window recommended in the GRBO. The underlying assumption behind this Dredging Window is that during this period, water temperature would be low enough to discourage turtle presence. This condition does not prevail in South Texas. Regardless of this window, there seems to be a year-round abundance of turtles in the South Texas region. Dredging is being conducted at this time because of the need to relieve shoaling that is restricting navigation. But, based on previous turtle history in the project, and because of a lack of experience with hopper dredges during this time of year, two relocation trawlers were employed, each on a 24-hour basis to clear the channel of any turtles that may be present.

Relocation trawling commenced on August 29, a day before dredging began. In a total of 740 tows, only 5 turtles were captured, three loggerheads, one Kemp's ridley and one green. During the period since resumption of dredging on October 31, two turtles were captured in 329 tows, a loggerhead and the green.

Kemp's Ridley Take

This take occurred on November 3 in Load No. 283. The water temperature was about 24.4°C. Winds were out of the southeast at an estimated 9.0 knots; seas were relatively calm with wave heights of about 2.0 ft. The take was reported to have occurred between 00:43 and 02:36. The dredge was working along the entire length of channel outside the jetties, with emphasis on the northern half of the channel but not along the side slopes. Before-dredging channel surveys show a lot of variability in depth, possibly indicating the presence of depressions and humps. So, channel topography may be a factor in this take; the draghead was constantly being buffeted and the turtle may have been in close proximity when this occurred, or it could have been lurking

in a depression or a prior dredge track when the draghead passed over. There is no way to determine if this was the case, nor is there a way to avoid this situation.

Generally, it appears that the dredge was operated satisfactorily. Figures 1 and 2 are plots of some of the operating parameters extracted from Silent Inspector (SI) data. These plots indicate that the pumps were operated properly with regard to draghead depth. The draghead depths displayed a lot of variation reflective of the irregular bottom contours. Pump rpm remained constant during dredging, but there was variability in the slurry density. However, there is no evidence in the SI plots to suggest that any corrective action would be appropriate. It is possible that as the dragheads bounced along the channel bottom, they lost contact with the sediment. These events are transient and uncontrollable; it is impossible to detect whether the turtle was entrained during such an event.

Risk Management Plan

A review of available data indicates that sea turtle abundance in the immediate project vicinity is not very large. Generally there does not seem to be any obvious feature of the dredge or its operation that would have contributed to the documented turtle take; and there appear to be no reasonable corrective measures that can be undertaken by the Contractor to prevent future takes.

Dredge B. E. Lindholm

Contract W912P8-08-C-0072

Stbd Drag Depth Stbd Density Stbd Velocity Stbd RPM

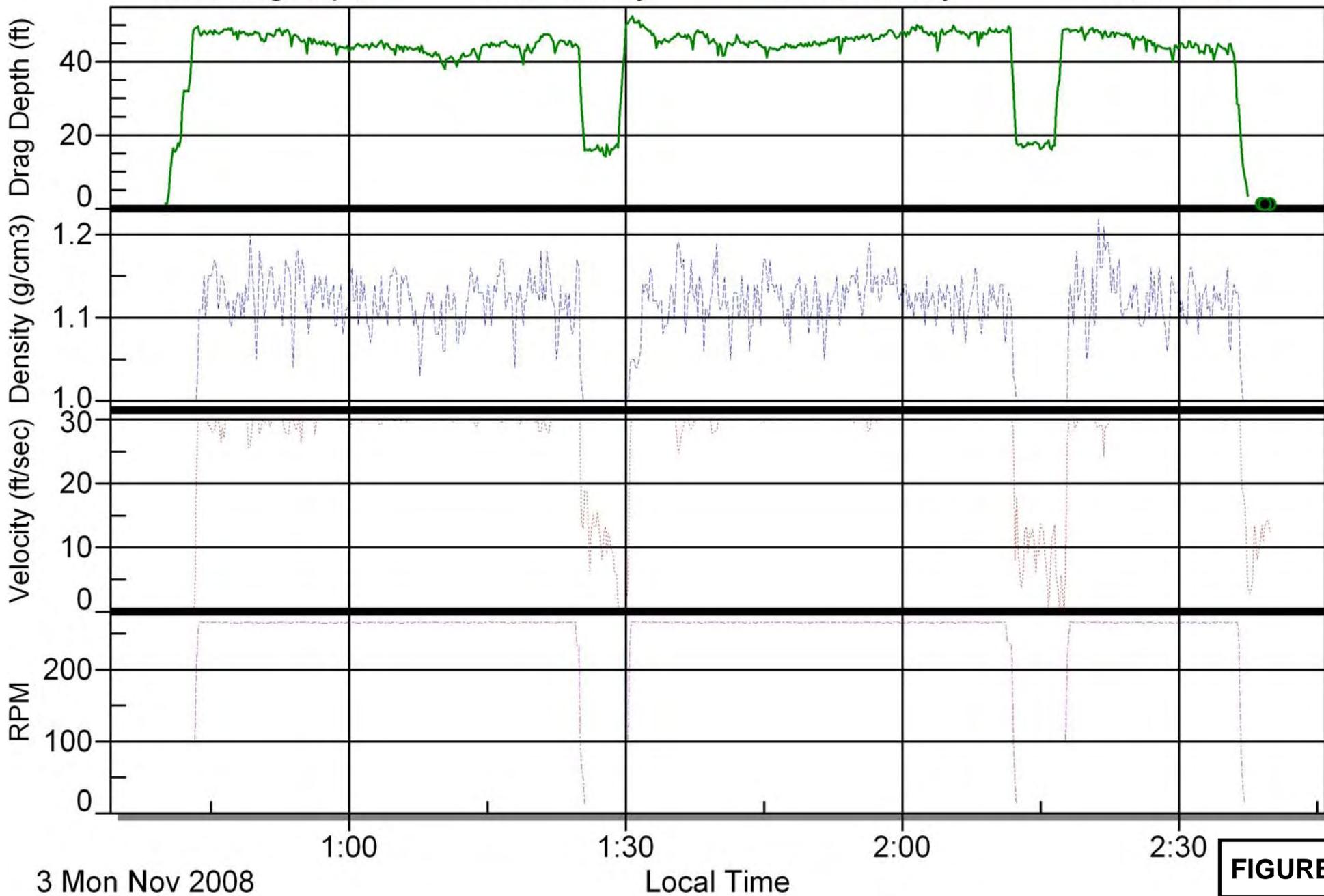


FIGURE 1

Dredge B. E. Lindholm

Contract W912P8-08-C-0072

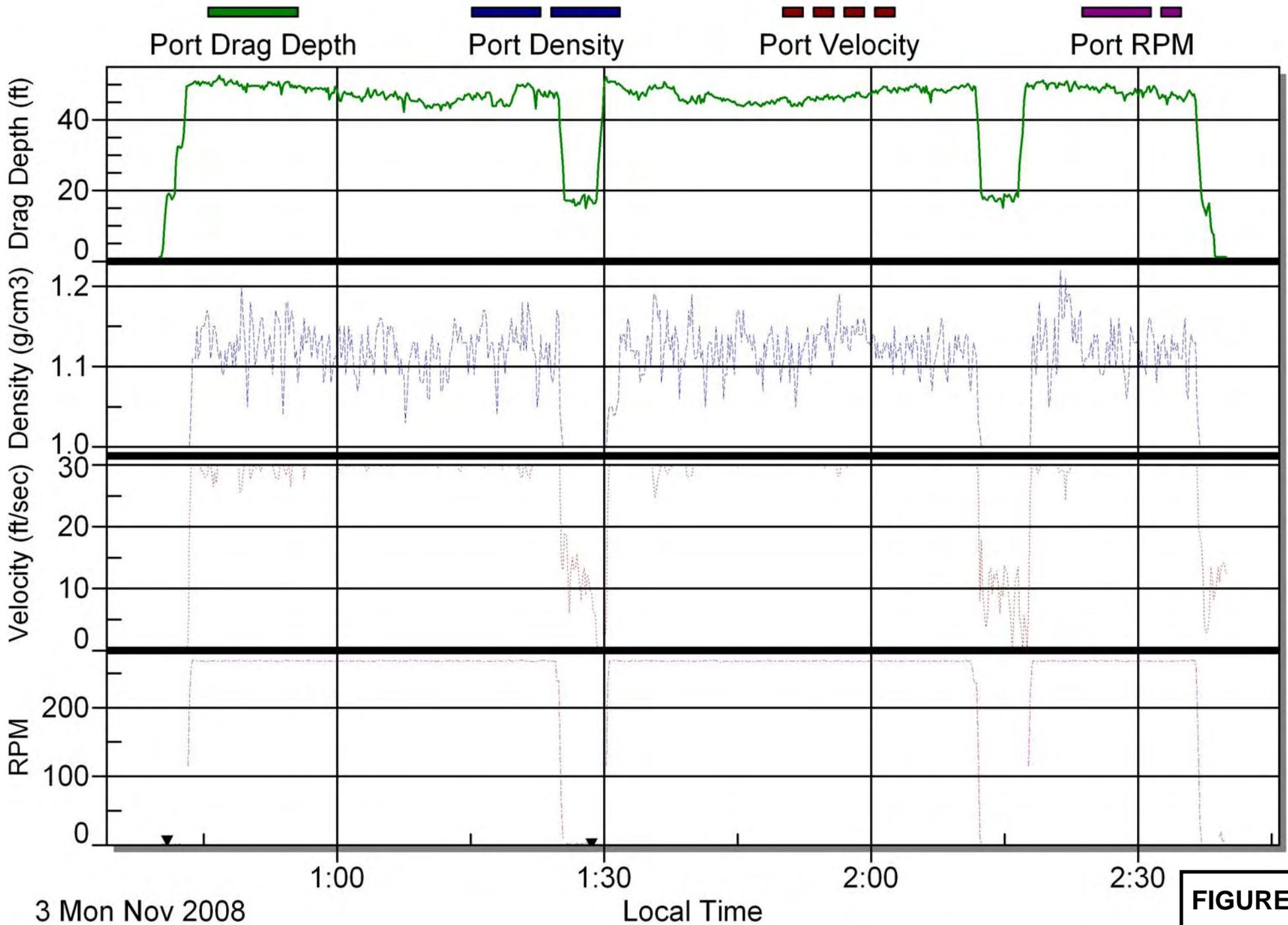


FIGURE 2

Addendum
Risk Assessment and Risk Management Plan

Brazos Island Harbor (BIH)
Brownsville Entrance Channel
November 13, 2008

This addendum to the risk assessment, dated November 5, 2008, is prepared to address circumstances which may have contributed to the incidental take Nos. 2, 3 and 4 experienced during performance of hopper dredging of this navigation project.

Risk Assessment

At the time of the second take, the dredging was estimated to be completed on about 12 November, but because of weather delays and mechanical difficulties, the completion date is now projected to be the morning of 16 November. After the third take, the project engineer stated that the dredging had almost achieved the authorized project depth and that operations were more of a cleanup action. There remain, however, some high spots that are of concern. The contractor was instructed to concentrate on those areas.

A review of the TES Observer reports indicate that the draghead deflectors and screening were in good condition. These reports do not suggest anything unusual that may have contributed to these takes. Wave height does not appear to be a significant factor. Paint tests and reviews of the Sea Turtle Compliance Checklist were conducted after each take. These did not reveal any obvious factors that might have been responsible for the takes. Therefore, no corrective actions were identified.

Take No. 2

This take was a loggerhead that occurred on 8 November in Load No. 326 via the port draghead. The water temperature was about 25.6°C. Winds were estimated to be about 11.0 knots resulting in wave heights of about 3 to 4 feet. This take was reported to have occurred between 14:32 and 17:12. The dredge was working along the entire length of channel outside the jetties, with emphasis on the northern half of the channel. Some of the tracks appear to be along the northern slope, as well.

Generally, it appears that the dredge was operated satisfactorily. Figure 1 shows plots of some of the operating parameters extracted from Silent Inspector (SI) data. These plots indicate that the

pumps were operated properly with regard to draghead depth. The draghead depths displayed a lot of variation reflective of the irregular bottom contours. Pump rpm remained constant during dredging, but there was variability in the slurry density. However, there is no evidence in the SI plots to suggest that any corrective action would be appropriate. The bouncing of dragheads previously reported could account for the variations. These events are transient and uncontrollable; it is impossible to detect whether the turtle was entrained during such an event.

Take No. 3

This take was another loggerhead that occurred on 11 November in Load No. 337 via the port draghead. There is some uncertainty as to what the load number actually was due to mis-numbering of loads. The water temperature was about 26.1°C. Winds were estimated to be about 12.0 knots resulting in wave heights of about 3 to 5 feet. There is also some discrepancy in the actual timing; on the observer reports, this take was reported to have occurred between 16:04 and 17:54. But a different report puts the time between 18:00 and 21:00. The dredge was working along the entire length of channel outside the jetties, with emphasis on the southern half of the channel. Some of the tracks appear to be along the southern slope, as well.

It appears that the dredge was operated satisfactorily. Figure 2 shows plots of some of the operating parameters extracted from SI data. Because of the confusion related to timing, plots of the two loads between 16:04 and 21:26 were obtained. These plots indicate that the pumps were operated properly with regard to draghead depth. There was one occurrence shortly after 6:00 PM, when the draghead was not at the channel bottom while the pump appeared to be engaged, probably to clear the line. The draghead was, however at or near the water surface, so it is unlikely that this is when the take occurred. The draghead depths displayed a lot of variation reflective of the irregular bottom contours. There were two events when the draghead seemed to abruptly raised off of the bottom. These occurred shortly after 7:30 PM and again just before 9:00 PM. These events were of relatively short duration and may be instances when the draghead rode up the side slope. Pump rpm remained constant during dredging, but there was variability in the slurry density. However, there is no evidence in the SI plots to suggest that any corrective action would be appropriate. The bouncing of dragheads previously reported, together with the fact that the dredge was essentially conducting some cleanup operation could account for the variations. Recent surveys indicate the presence of trenches and other depressions that resulted from previous dredging activities. It is possible that this turtle may have been in a low spot and was thus vulnerable to a draghead passing overhead. This take may be attributable to this circumstance, but it is impossible to determine whether the turtle was entrained during such an event.

Take No. 4

This take was a green that occurred on 12 November in Load No. 343 through the starboard draghead. Even though this was the first dredge entrainment of a green turtle during this task, they are known to be abundant in the region because of the lush seagrass pastures in the adjacent Laguna Madre. Mechanical problems have rendered the port draghead useless, so only starboard will be used for the duration of this dredging. The water temperature was about 26.1°C. Winds were estimated to be about 11.0 knots resulting in wave heights of about 1 to 2 feet. The dredge was working along the entire length of channel outside the jetties, the prime emphasis seemed to be along the northern half of the channel, but significant activity was also undertaken along the southern half. Some of the tracks are not straight suggesting an effort to hit selected areas, some dredging appears to be along the side slopes, as well.

Generally, it appears that the dredge was operated satisfactorily. Figure 3 shows plots of some of the operating parameters extracted from SI data. These plots indicate that the pumps were operated properly with regard to draghead depth. The draghead depths displayed a lot of variation reflective of the irregular bottom contours. There were two events when the draghead seemed to abruptly raised off of the bottom. These occurred shortly before and after 6:00 PM and again just before 9:00 PM. These events were of very short duration and may be instances when the draghead rode up the side slope. Pump rpm remained constant during dredging. The plot of the slurry density displayed only two spikes, suggesting some difficulty with the sensor. This may be an artifact of using only one draghead. However, there is no evidence in the SI plots to suggest that any corrective action would be appropriate. The bouncing of dragheads together with cleanup operation could account for the variability in draghead depth, and could have contributed to this take. But, it is impossible to determine a definitive cause.

Risk Management Plan

There are currently two relocation trawlers operating on a 24-hr basis in conjunction with this dredging. The number of turtles captured and relocated indicate that sea turtle abundance in the immediate project vicinity may not be very large at this time. However, trawling operations will continue for the duration of dredging.

There does not appear to be any obvious deficiencies in the dredge or its operation that would have contributed to the documented turtle takes; therefore there appear to be no reasonable corrective measures that can be undertaken by the Contractor to prevent future takes. Dredging continues to be performed and the contractor was instructed to concentrate on the most significant remaining shoals.

Dredge B. E. Lindholm

Contract W912P8-08-C-0072

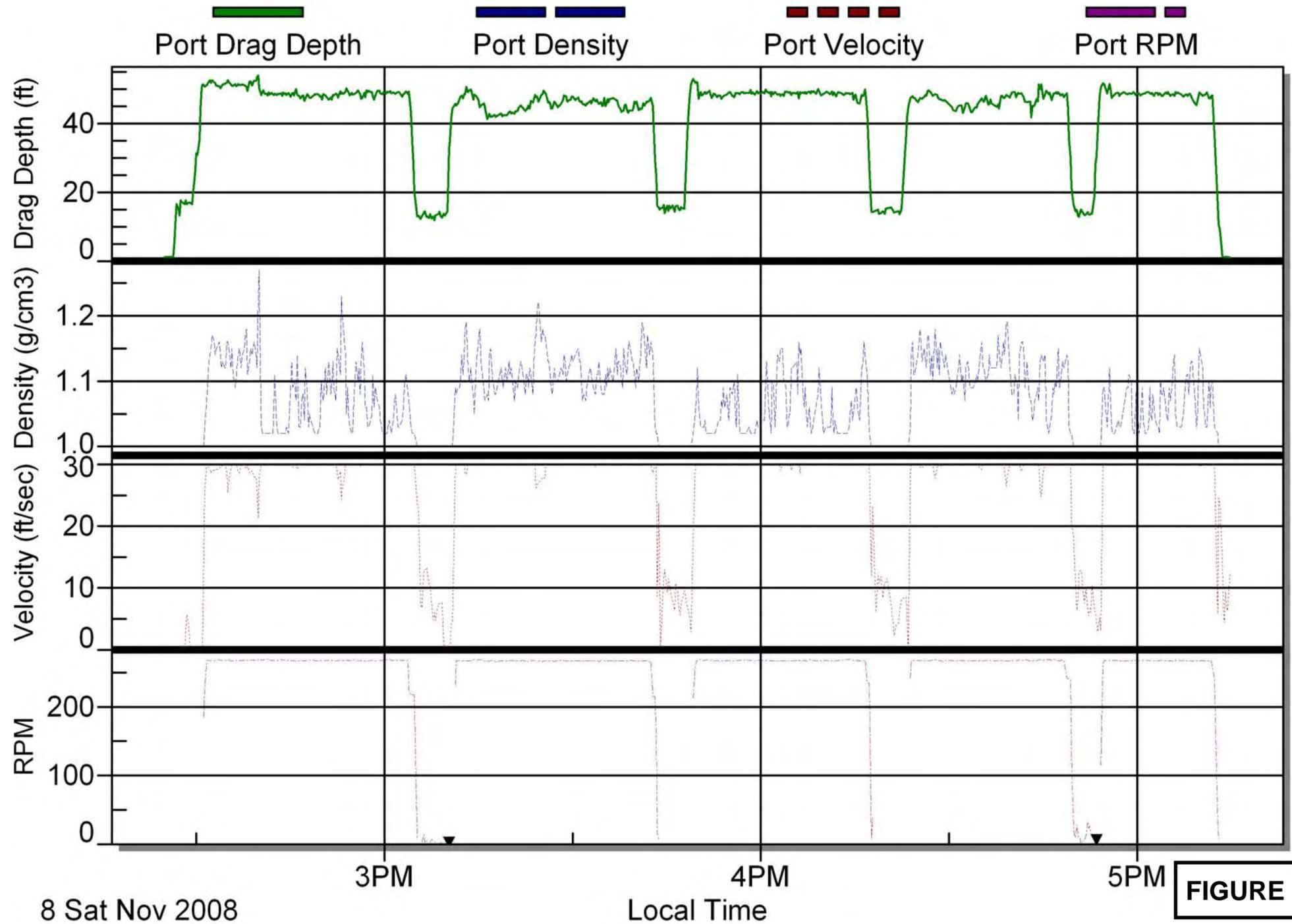


FIGURE 1

Dredge B. E. Lindholm

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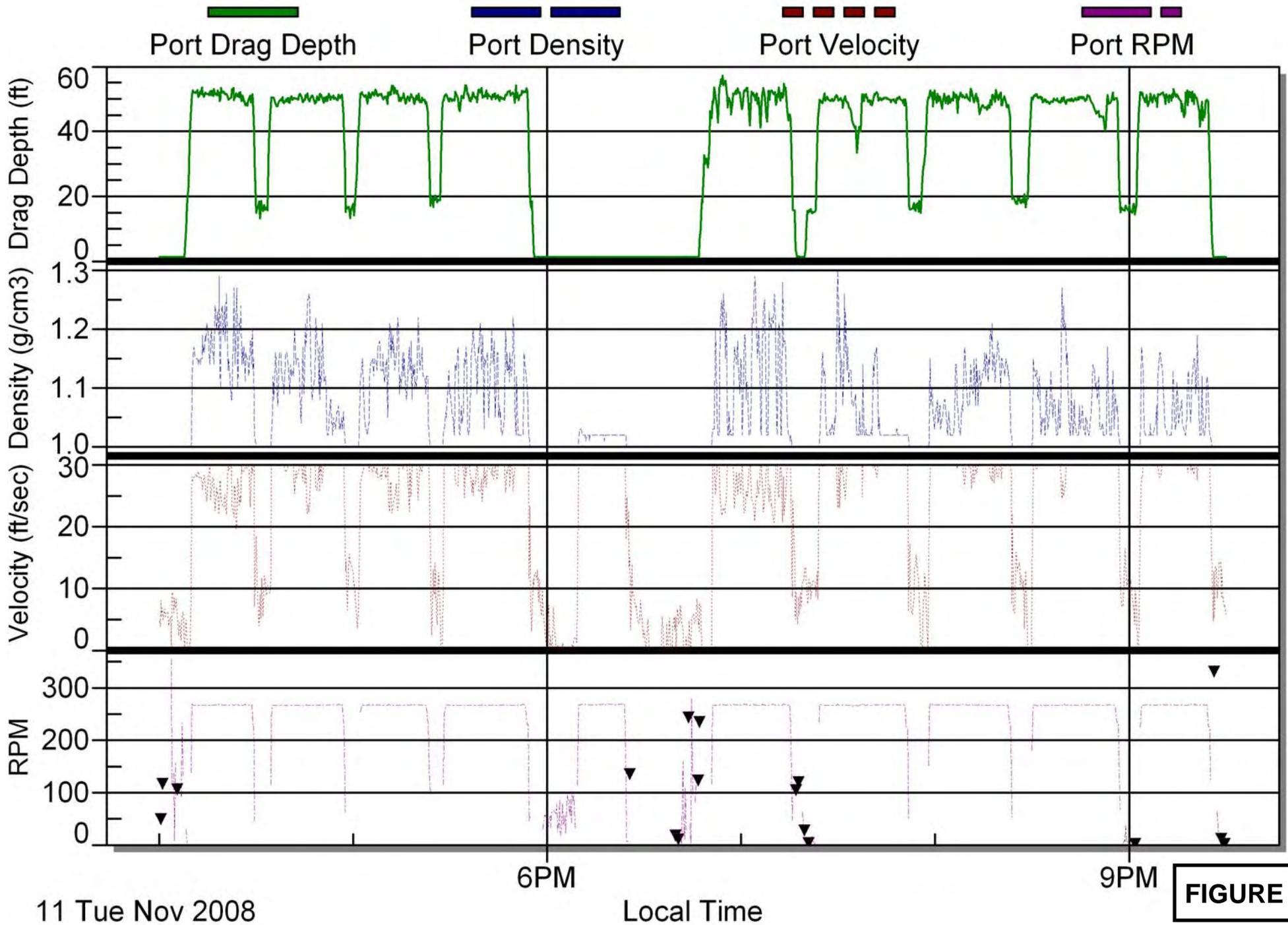


FIGURE 2

Dredge B. E. Lindholm

Contract W912P8-08-C-0072

