

Final Tidal Zoning for OPR-J977-TE-08

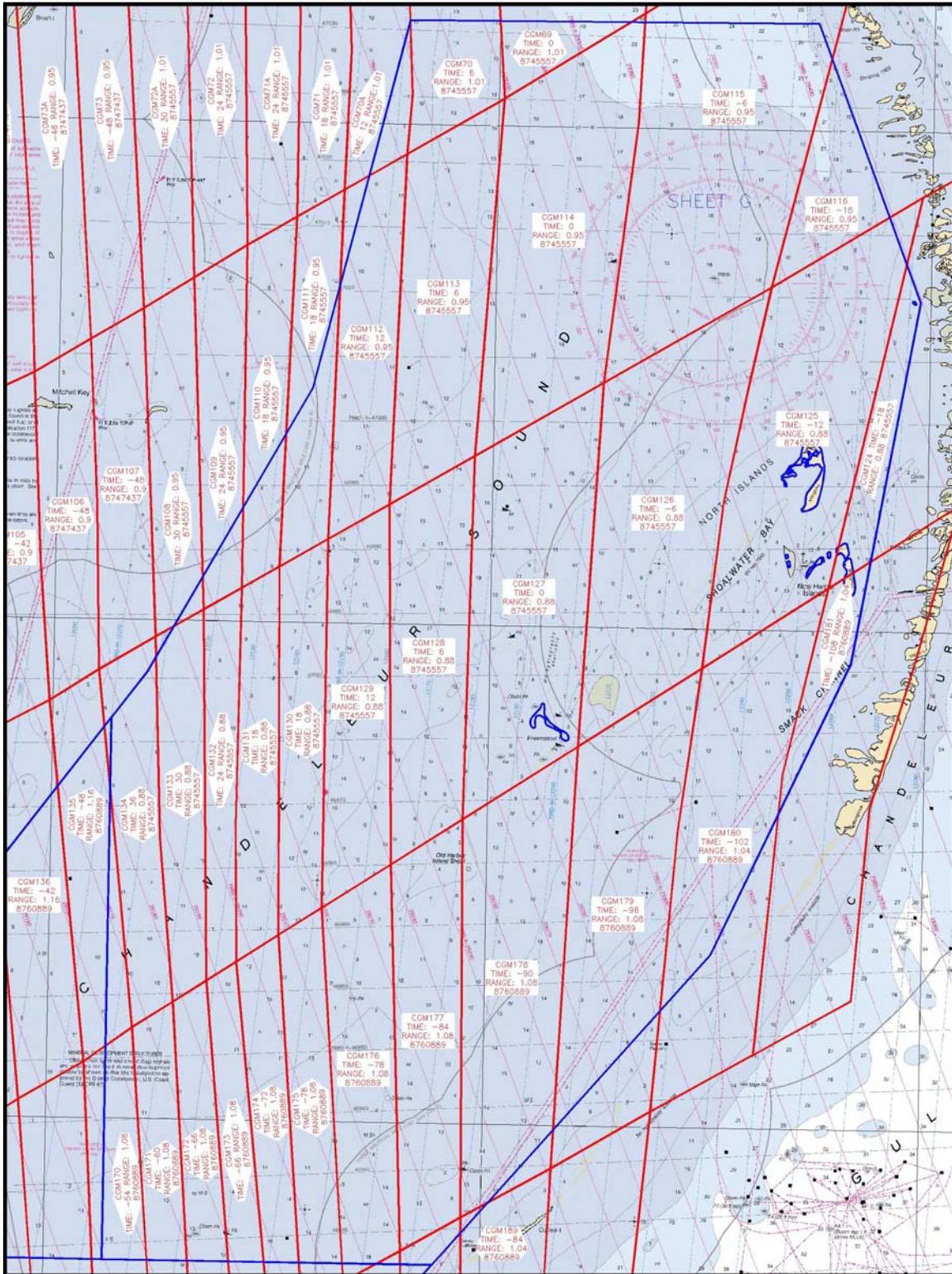


Figure 1 - Final Tidal Zoning Chart for OPR-J977-TE-08, Sheet D00140 with Chart 11363, 41st Edition, June 2007. Soundings in feet.



Descriptive Report for Tidal Zoning

OCS Project: S-J977-KR-TERRA-2008
Client: Terrasond, Ltd.
JOA Work Order: 115
Primary Tide Stations for Project: 8760922 Pilot Station East, LA (*datum control only*)
8747437 Bay Waveland Yacht Club, MS (*not used in final zoning*)
8745557 Gulfport Harbor, MS

Tertiary Tide Stations for Project: 8760417 Devon Energy Facility, LA
8760889 Olga Compressor Station, LA

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Preliminary Zoning

The preliminary zoning from CO-OPS generally shows the tide range increasing from about 0.3m to 0.5m from south to north, while the tide generally progresses from east to west taking nearly 3 hours to move through the survey area.

Preliminary tidal zoning from CO-OPS was based on the following NWLON stations:

- 8745557 Gulfport Harbor, MS
- 8747437 Bay Waveland, MS
- 9760922 Pilot Station East, LA

Final Zoning

The preliminary zoning was edited to make the zoning factors relative to the following tide stations:

- 8745557 Gulfport Harbor, MS (NWLON)
- 8760889 Olga Compressor Station (tertiary)
- 8760417 Devon Energy Facility (tertiary)

A comparison of the GT at the three tide stations showed that the preliminary zoning essentially had the range ratios modeled correctly. Looking at the difference in time of the tides between these three stations also showed that the time offsets were nearly correct as well.

GT for the 3 zones where the tide stations are located

	Gulfport Harbor	Olga Compressor	Devon Energy
Preliminary Zoning	0.53	0.39	0.36
Actual	0.53	0.40	0.37
Final Zoning	0.53	0.40	0.37

Time change in minutes between the tide stations

	Gulfport Harbor to Olga	Devon Energy to Olga Compressor
Preliminary Zoning	84	114
Actual	50 (1 sigma = 88min)	112 (1 sigma = 88min)
Final Zoning	84	114

The final zoning was not edited to reflect the measured time change between Olga and Gulfport Harbor (determined by comparing times of high and low tides) because the standard deviation of the measured time difference was so large. During the development of the final zoning, the measured time change between Gulfport and Olga was used to modify the time offsets as a test, and it did not improve the discrete shift at the zoning boundary between these two tide stations. Therefore, the preliminary zoning scheme was generally maintained, and the zoning factors were simply edited to reference these stations. The geometry of the zoning was not changed, with the exception of 15 zones that were deleted because they were not required for the survey area.

The deleted zones are listed below:

CGM151	CGM152	CGM99	CGM100	CGM101	CGM102
CGM103	CGM104	CGM105	CGM106	CGM107	CGM108
CGM74	CGM73A	CGM73			

The Bay Waveland NWLON was removed from the zoning because the tide station did not have verified data on several occasions during survey operations. Gulfport Harbor and Olga Compressor station were used to cover the zones that had been assigned to Bay Waveland.

Changed these zones to reference Gulfport instead of Bay Waveland:

CGM124	CGM125	CGM126	CGM127	CGM128	CGM129
CGM130	CGM131	CGM132	CGM133	CGM134	

Changed these zones to reference Olga instead of Bay Waveland:

CGM135	CGM136	CGM137	CGM138	CGM139	CGM140
CGM141	CGM142	CGM143	CGM159	CGM160	

Zoned tides covering the entire time period of the survey were compared at the boundary between Olga Compressor and Devon Energy at CGM260, and at the boundary of Olga Compressor and Gulfport Harbor at CGM134. The zoned tides from Devon and Olga compare passably. The average of the differenced zoned tides (excluding the 2 hurricanes) is about 1cm, with a standard deviation of 8cm.

The comparison of zoned tides between Olga and Gulfport at CGM134 do not match nearly as well. The water seems to behave much differently at Gulfport and Bay Waveland then it does at Olga or Devon. The average of the difference between the two zoned tides (excluding the 2 hurricanes) is 6cm. Starting in September, the Olga MLLW tide data seems to be consistently higher than the Gulfport MLLW data, possibly indicating a seasonal difference between these two areas, or a difference in the datum epoch. The standard deviation of the difference is 13cm.

Recommendations

For future hydrographic survey projects, COOPS should include the time and range contours, as well as any boundary conditions that are used to develop the preliminary zoning, with the SOW. This would make zoning revision much more straight forward. Currently, the time and range contours have to be recomputed from the preliminary zoning factors, and some guesswork is involved.

In addition, COOPS should include the historic station summary files they use to create the preliminary zoning. It can be difficult to understand, much less perform meaningful revision to the preliminary tidal zoning without the justifying data that went into creating it.

For future surveys in this area, it may be beneficial to install a tide station at the NE boundary of the project, near the Chandeleur Islands, to help bridge the difference between the water levels in the south (Olga and Devon) and north (Bay Waveland and Gulfport).

While the tide range is rather small, and fairly slow to change across the project area, the time of the tide changes much more, and is much more erratic depending on local weather conditions. Instead of discrete tide zones, averages of water levels from two or more tide stations, weighted for importance, may produce better results, and smoother transitions between zone boundaries.