

List of Figures

Figure 1. Florida, its coastal geomorphologic provinces (Davis et al., 1992), and bathymetry on the central West Florida Shelf.	2
Figure 2. Flow diagram illustrating the idealized elements and linkages in a coastal morphodynamic system.	17
Figure 3. Location of the IRB and MS study areas in relation to the Pinellas County, FL coast.	32
Figure 4. Harrison 1995-1996 study area in relation to Indian Rocks Beach (IRB) 1996-1998 study area.	33
Figure 5. Interpretation of boundary movement using GIS overlays.	45
Figure 6. Locations of Midshelf (Figure 3) sub-study areas used in GIS analysis of 1996 to 1998 side-scan data.	47
Figure 7. Locations of Indian Rocks Beach (Figure 3) sub-study areas used in GIS analysis of 1996 to 1998 side-scan data.	48
Figure 8. IRB98N1 side-scan mosaic showing sub-study areas (A-D) for GIS analysis.	49
Figure 9. Sediment sampling locations, box core locations, and current meter locations, midshelf area.	51
Figure 10. Sediment sampling locations, box core locations, and current meter locations, Indian Rocks Beach area.	53
Figure 11. Diagram (not to scale) of Klován-style, diver deployed, box coring unit.	61
Figure 12. InterOcean S4® current meter deployed in both the MS and IRB study areas.	64
Figure 13. 100 kHz side-scan sonar mosaic from MS96M survey.	69
Figure 14. 500 kHz side-scan sonar mosaic from MS98JL survey.	71
Figure 15. MS sub-area A (Figure 6) GIS analysis.	72
Figure 16. MS sub-areas B, C, and D (Figure 6) GIS analysis.	75
Figure 17. MS sub-area E (Figure 6) GIS analysis.	77

Figure 18. MS sub-area F (Figure 6) GIS analysis.	80
Figure 19. MS sub-area G (Figure 6) GIS analysis.	82
Figure 20. 500 kHz side-scan sonar mosaic from IRB96M (May 1996) survey.	85
Figure 21. Southwest corner (sampling area) from IRB96M 500 kHz survey (Figure 20).	86
Figure 22. IRB October 1997 500 kHz side-scan sonar mosaic.	87
Figure 23. IRB November 1997 500 kHz side-scan sonar mosaic.	88
Figure 24. IRB97N sampling area (southwest sub-study area -- Figure 23)	89
Figure 25. IRB July 1998 500 kHz side-scan sonar mosaic.	91
Figure 26. IRB98JL sampling area (southwest sub-study area -- Figure 25).	92
Figure 27. IRB sub-area A (Figure 7) GIS analysis.	93
Figure 28. IRB sub-area B (Figure 7) GIS analysis.	96
Figure 29. IRB sub-area C (Figure 7) GIS analysis.	99
Figure 30. IRB sub-area D (Figure 7) GIS analysis.	102
Figure 31. IRB sub-area E (Figure 7) GIS analysis.	104
Figure 32. IRB sub-area F (Figure 7) GIS analysis.	106
Figure 33. IRB sub-area G (Figure 7) GIS analysis.	108
Figure 34. IRB98N1 sub-study area.	111
Figure 35. IRB98N2 sub-study area.	112
Figure 36. IRB November 1998 sub-area A (Figure 8) GIS analysis.	114
Figure 37. IRB November 1998 sub-area B (Figure 8) GIS analysis.	116
Figure 38. IRB November 1998 sub-area C (Figure 8) GIS analysis.	119
Figure 39. IRB November 1998 sub-area D (Figure 8) GIS analysis.	121
Figure 40. Embedded box core peels from site MS01 (see Figure 14 for location).	123
Figure 41. Embedded box core peels from site MS02 (see Figure 14 for location).	125
Figure 42. Embedded box core peels from site MS03 (see Figure 14 for location).	127

Figure 43. Embedded box core peels from site IRB01 (see Figure 26 for location).	129
Figure 44. Embedded box core peels (July 1998) from site IRB02 (see Figure 26 for location).	131
Figure 45. Embedded box core peels (November 1998) from site IRB02 (see Figure 34 for location).	132
Figure 46. Mean grain size versus depth in cores IRB02-C and IRB02-D, taken in November 1998.	133
Figure 47. Embedded box core peels from site IRB03 (see Figure 26 for location).	135
Figure 48. Embedded box core peels from site IRB04 (see Figure 26 for location).	137
Figure 49. Cumulative frequency grain size distribution, MS96M sediment samples.	140
Figure 50. Comparison of sedimentary properties for MS96M samples.	141
Figure 51. Cumulative frequency grain size distribution, MS98JL sediment samples.	146
Figure 52. Comparison of sedimentary properties, MS98JL.	147
Figure 53. Cumulative frequency grain size distribution, IRB97N.	151
Figure 54. Comparison of sedimentary properties for IRB97N samples, taken from SW (-01) to NE (-11) along three transects (T1, T2, and T3) (Figure 24).	154
Figure 55. Cumulative frequency grain size distribution, IRB98JL.	160
Figure 56. Comparison of sedimentary properties for IRB98JL samples, taken from SW (-01) to NE (-11) along three transects (T1, T2, and T3) (Figure 26).	164
Figure 57. Cumulative frequency grain size distribution, IRB98N1.	169
Figure 58. Comparison of sedimentary properties for IRB98N1 samples, taken from SW (-01) to NE (-11) along three transects (T1, T2, and T3) (Figure 34).	173
Figure 59. Cumulative frequency grain size distribution, IRB98N2.	179
Figure 60. Comparison of sedimentary properties for IRB98N2 samples, taken from SW (-01) to NE (-11) along three transects (T1, T2, and T3) (Figure 35).	182
Figure 61. Plot of mean grain size vs. sorting for IRB98JL and MS98JL sediment samples.	189
Figure 62. Mean grain size plotted against mean gray scale value for sediment samples with DGPS locations from all data sets.	193
Figure 63. Grain sorting plotted against mean gray scale value for sediment samples with DGPS locations from all data sets.	195

Figure 64. Carbonate content plotted against mean gray scale value for sediment samples with DGPS locations from all data sets.	196
Figure 65. Percent fine material plotted against mean gray scale value for sediment samples with DGPS locations from all data sets.	197
Figure 66. Sorting (standard deviation) of gray scale values plotted against mean gray scale value for sediment samples with DGPS locations from all data sets.	199
Figure 67. Sorting (σ_G) of gray scale values plotted against grain size sorting (σ_ϕ) for sediment samples with DGPS locations from all data sets.	200
Figure 68. MS98JL current meter data for the period April 27, 1998 through May 4, 1998.	204
Figure 69. Current ellipse for MS98S4 data.	205
Figure 70. IRB98S4A hourly average u , v , and h data.	207
Figure 71. Current ellipse for IRB98S4A data.	210
Figure 72. Comparison of the distribution of mean velocities, MS98S4 vs. IRB98S4A current meter data.	211
Figure 73. IRB98S4B (November 1998) current meter data.	213
Figure 74. IRB98S4B (November 1998) current meter data.	214
Figure 75. IRB98S4B (November 1998) current meter data.	215
Figure 76. Shields β vs. the boundary Reynolds number for MS area, based on the range of mean current velocities from MS98S4 data and mean grain sizes from MS98JL data (Table 12).	219
Figure 77. Shields β vs. the boundary Reynolds number for IRB area, based on the range of mean current velocities from IRB98S4A data and mean grain sizes from IRB98JL data (Table 16).	220
Figure 78. Summary multiple regression statistics.	305
Figure 79. Actual and predicted mean gray scale values for all 500 kHz side-scan/sediment sampling sites.	315
Figure 80. Calculation of τ_0 and Shields β for MS98S4 and MS98JL data.	317
Figure 81. Calculation of Re (boundary Reynolds #) for MS98S4 and MS98JL data.	318
Figure 82. Calculation of τ_0 and Shields β for IRB98S4A and IRB98JL data.	319

Figure 83. Calculation of Re (boundary Reynolds #) for IRB98S4A and IRB98JL data.	320
Figure 84. Meteorological data from Tampa International Airport station for the month of November, 1998.	322
Figure 85. Seismic reflection profile from the MS sub-study area (Figure 13), collected May 1996.	324
Figure 86. Swath bathymetry, Indian Rocks Beach area.	326