

APPENDIX B
ENGINEERING REPORT

SUB-APPENDIX B

SUB-APPENDIX B

DELFT3D MODEL RESULTS

TABLE B-1

ALTERNATIVES SIMULATED

Alternative	Project
2	Abandon/Retreat (Without-Project)
3	Rich Inlet Management and Beach Fill
4	Beach Fill without Management of Rich Inlet (same beach fill as Alternative 3)
4a	Beach Fill without Management of Rich Inlet (same beach fill as Alternative 5a)
5a-1	Terminal Groin (700 ft) with Beach Fill from Nixon Channel
5a-2	Terminal Groin (1,200 ft) with Beach Fill from Nixon Channel
5a-3 (700ft)	Terminal Groin (700 ft) without Oceanfront Beach Fill
5a-3 (1,200ft)	Terminal Groin (1,200 ft) without Oceanfront Beach Fill
5a-2-10°	Alt. 5a-2 with 10° oblique terminal groin (1,200 ft)
5a-2-20°	Alt. 5a-2 with 20° oblique terminal groin (1,200 ft)
5a-2-30°	Alt. 5a-2 with 30° oblique terminal groin (1,200 ft)

NOTE: The length of each groin above is the length relative to the April 2007 shoreline position, and does not include the landward segment of the structure.

This document provides the following figures:

- 1) Bathymetry maps (year 0, 2 and 5) for each alternative.
- 2) Erosion/sedimentation maps (year 2 and 5) for each alternative. Erosion is indicated by the red or negative tones, and deposition is indicated by the green or positive tones.
- 3) Maps of differences between the bathymetry of each alternative at year 0, 2 and 5 and the initial bathymetry of Alternative 2. Along the fill areas, these maps indicate the amount of fill remaining.
- 4) Maps of differences between the bathymetry of each alternative at year 0, 2 and 5 and the bathymetry of Alternative 2 at year 0, 2 and 5, respectively. These maps indicate the impacts and benefits of each alternative. Along the oceanfront beaches and the southeastern shoreline of Nixon Channel, red or negative tones indicate impacts, and green or positive tones indicate benefits.

All elevations are shown in feet NGVD.

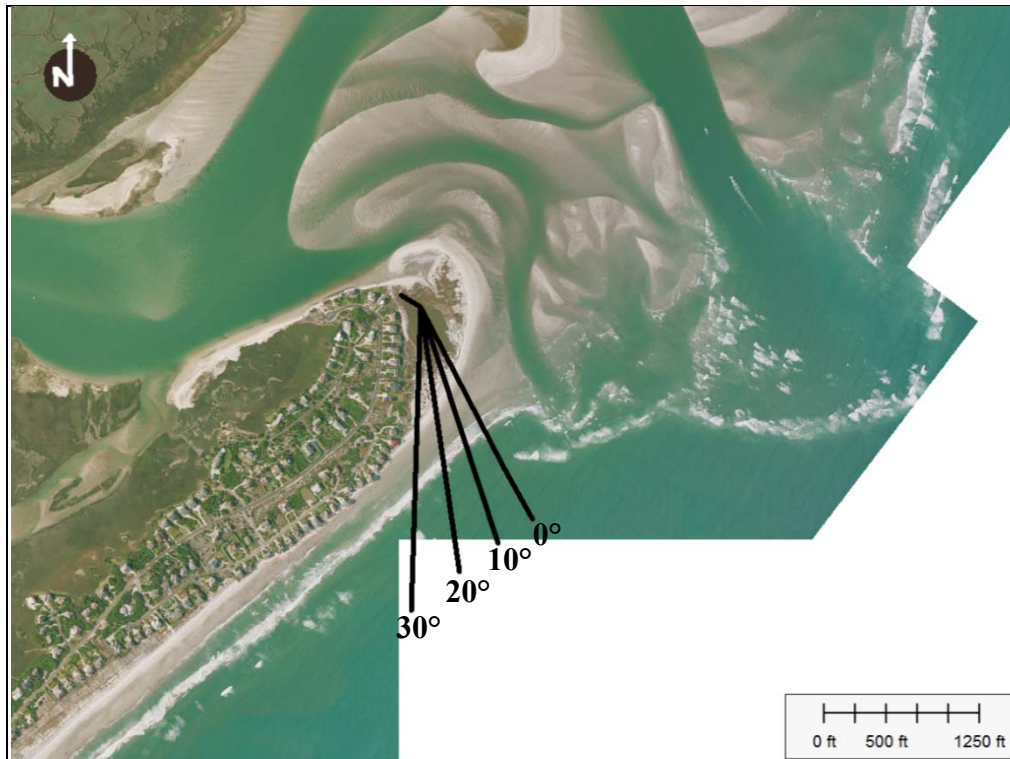


Figure 1: 10, 20 and 30 degrees angled groins in relation to the predefined groin position.

Alternative 2 - Abandon/Retreat (Without-Project)

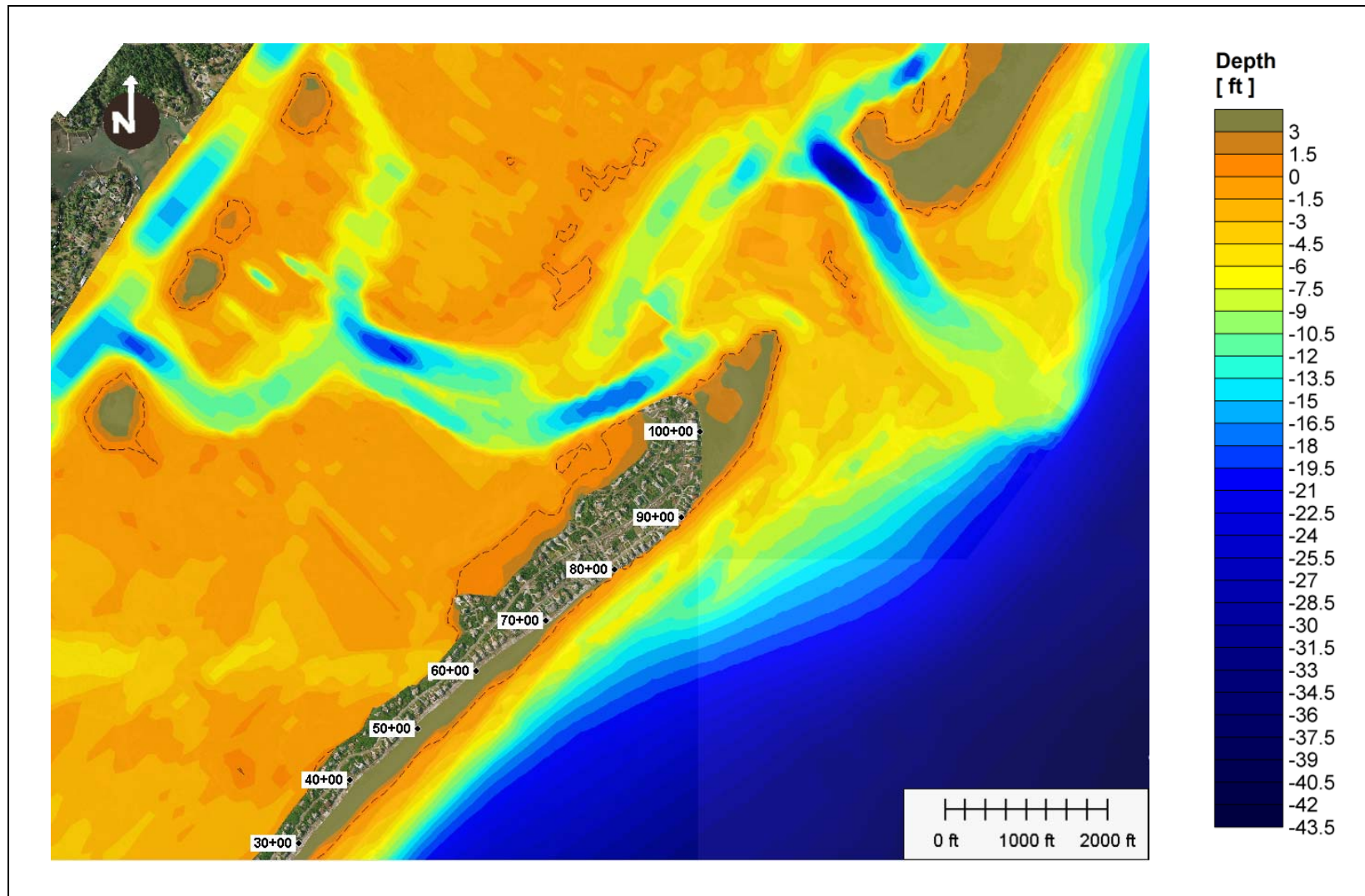


Figure 2: Alternative 2, initial bathymetry.

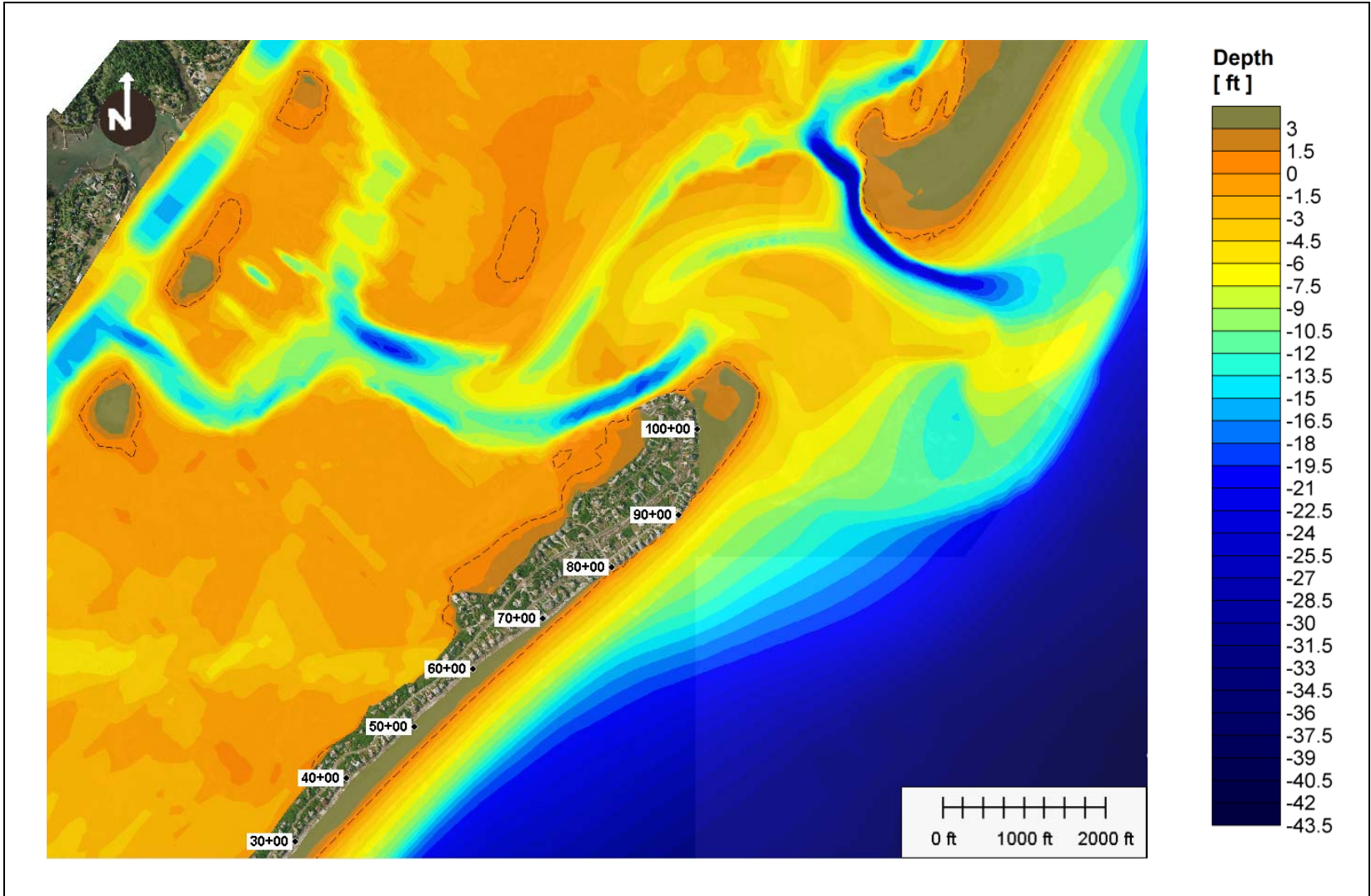


Figure 3: Alternative 2, bathymetry after 2 years simulation.

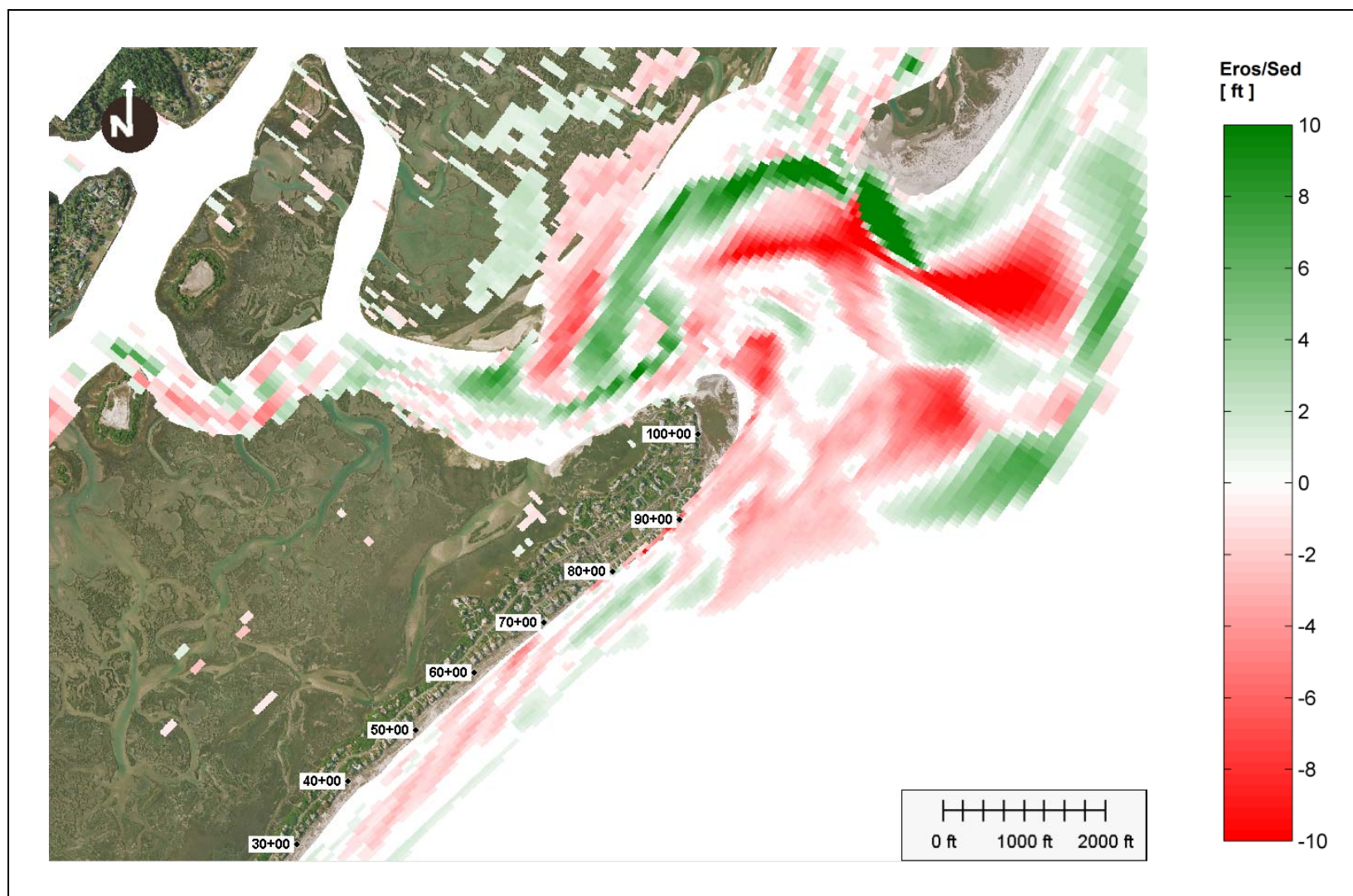


Figure 4: Alternative 2, erosion/sedimentation after 2 years simulation.

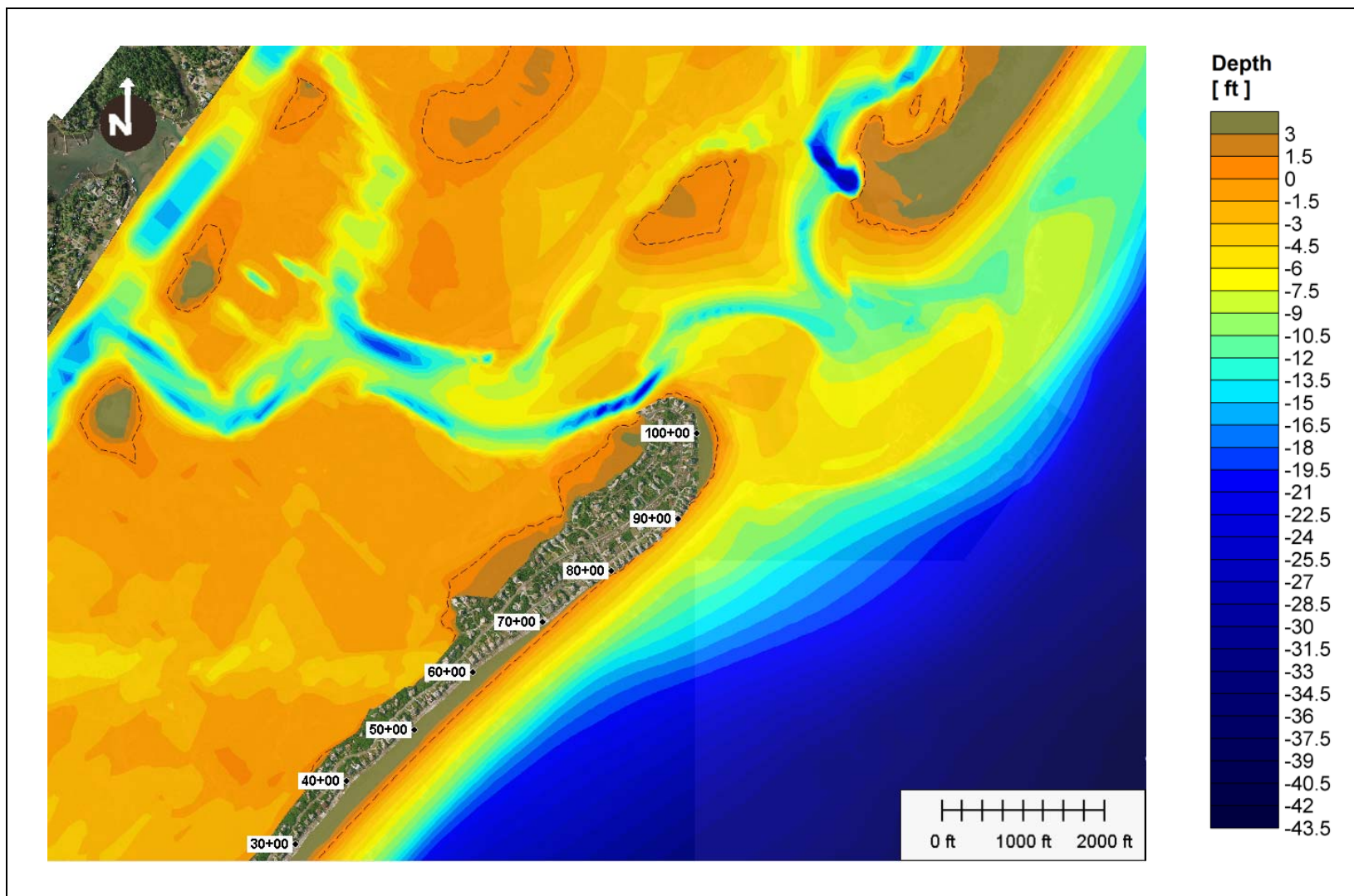


Figure 5: Alternative 2, bathymetry after 5 years simulation.

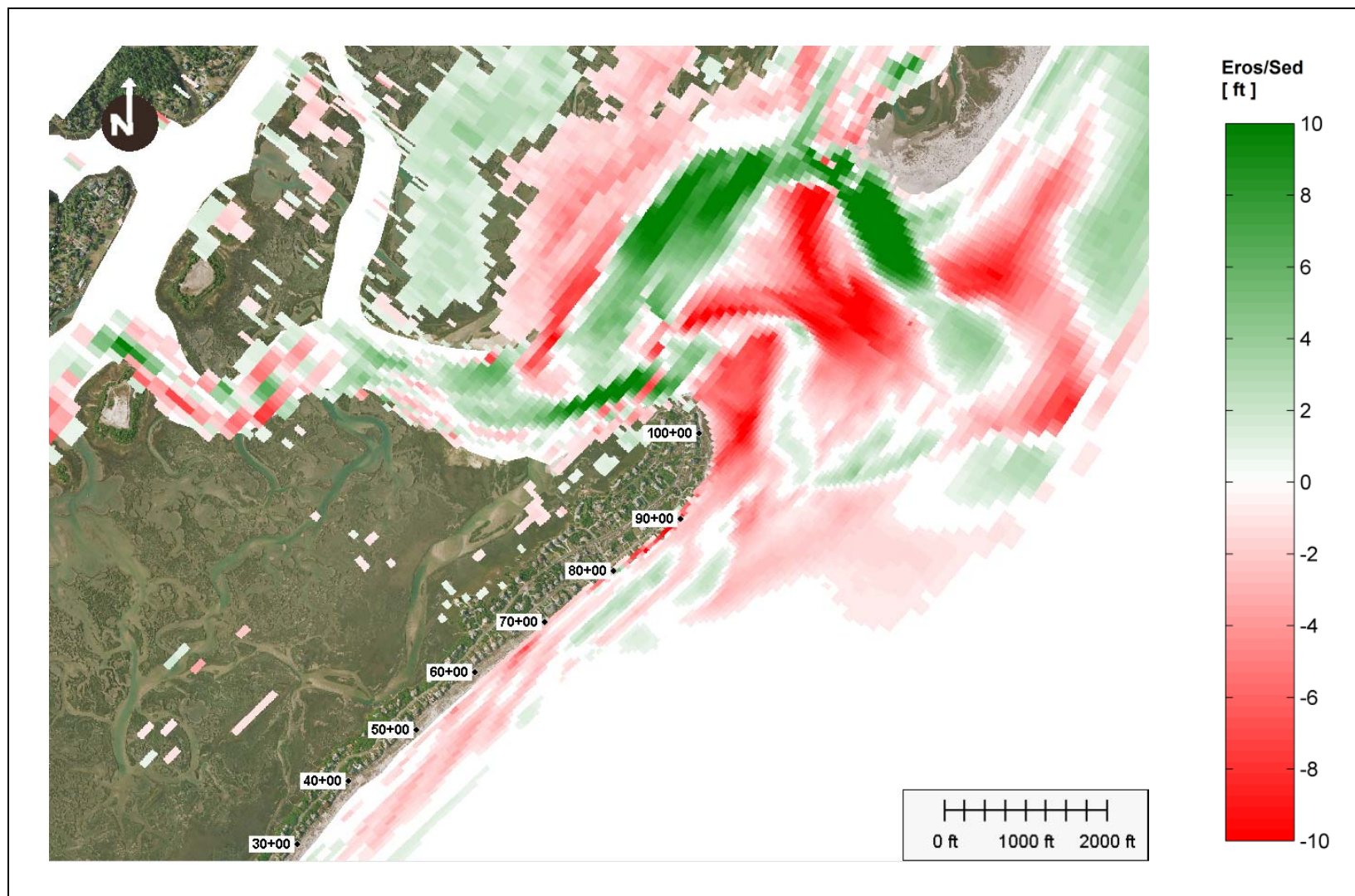


Figure 6: Alternative 2, erosion/sedimentation after 5 year simulation.

Alternative 3 - Rich Inlet Management and Beach Fill

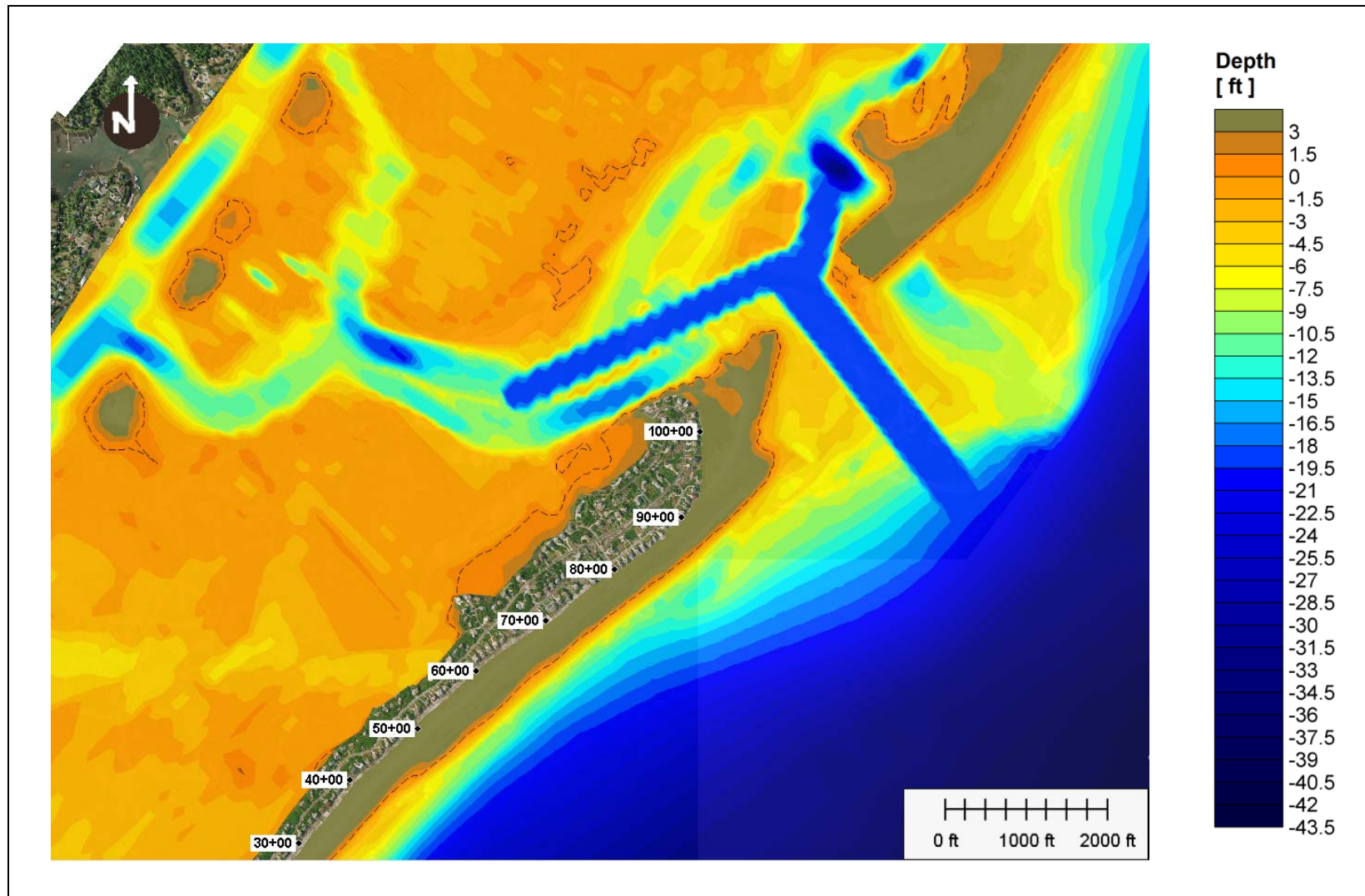


Figure 7: Alternative 3, initial bathymetry.

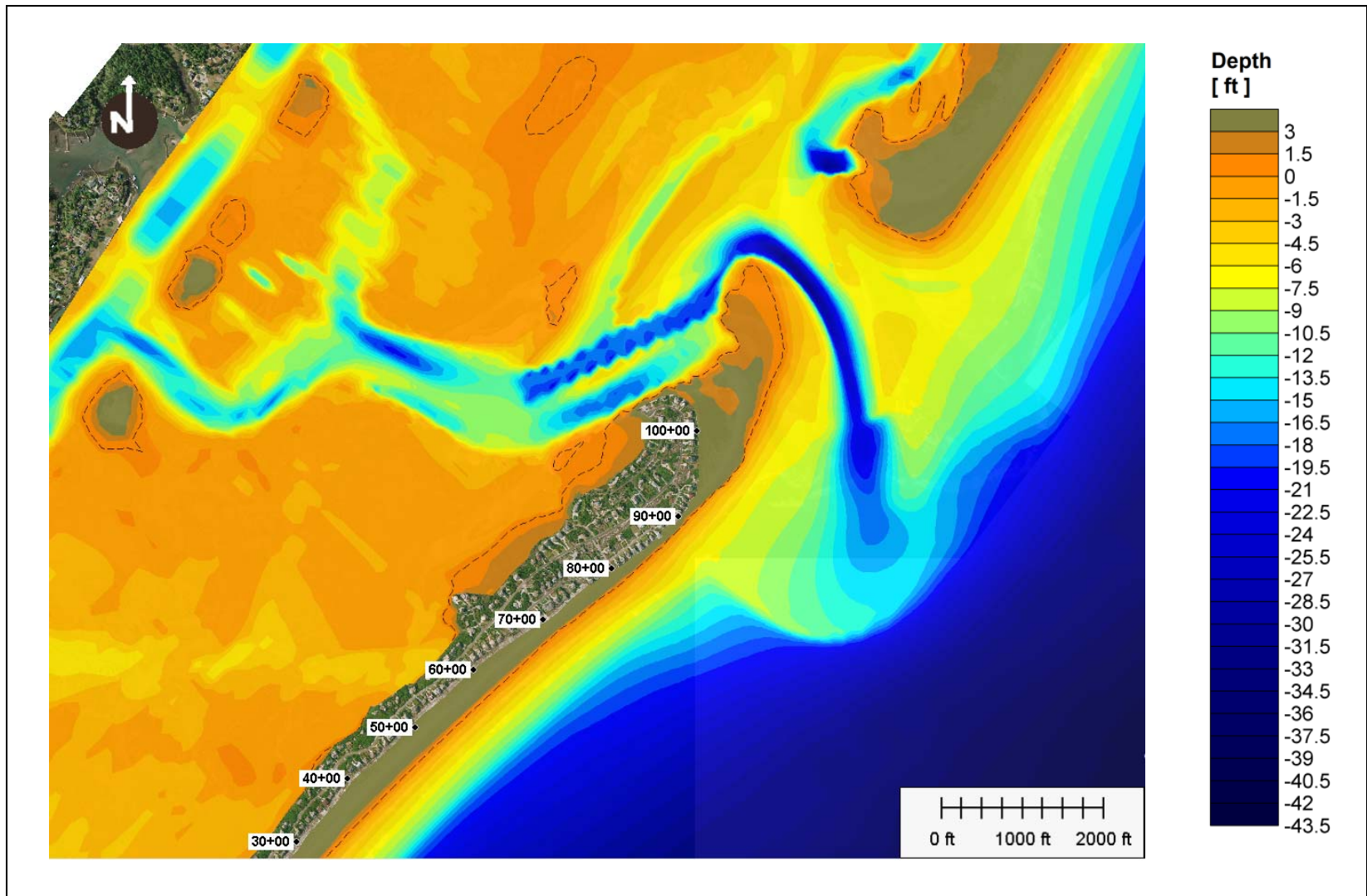


Figure 8: Alternative 3, bathymetry after 2 years simulation.

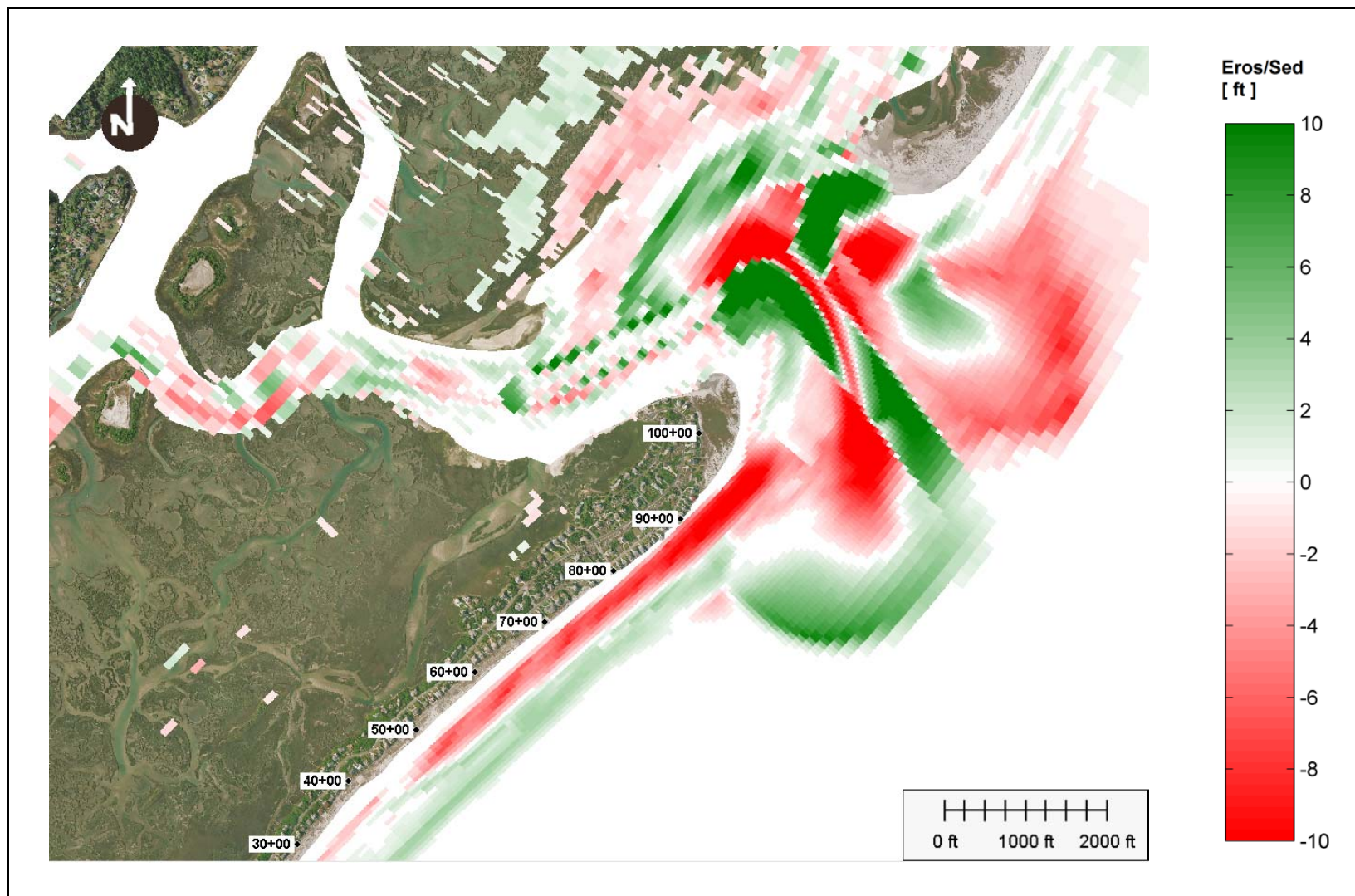


Figure 9: Alternative 3, erosion/sedimentation after 2 years simulation.

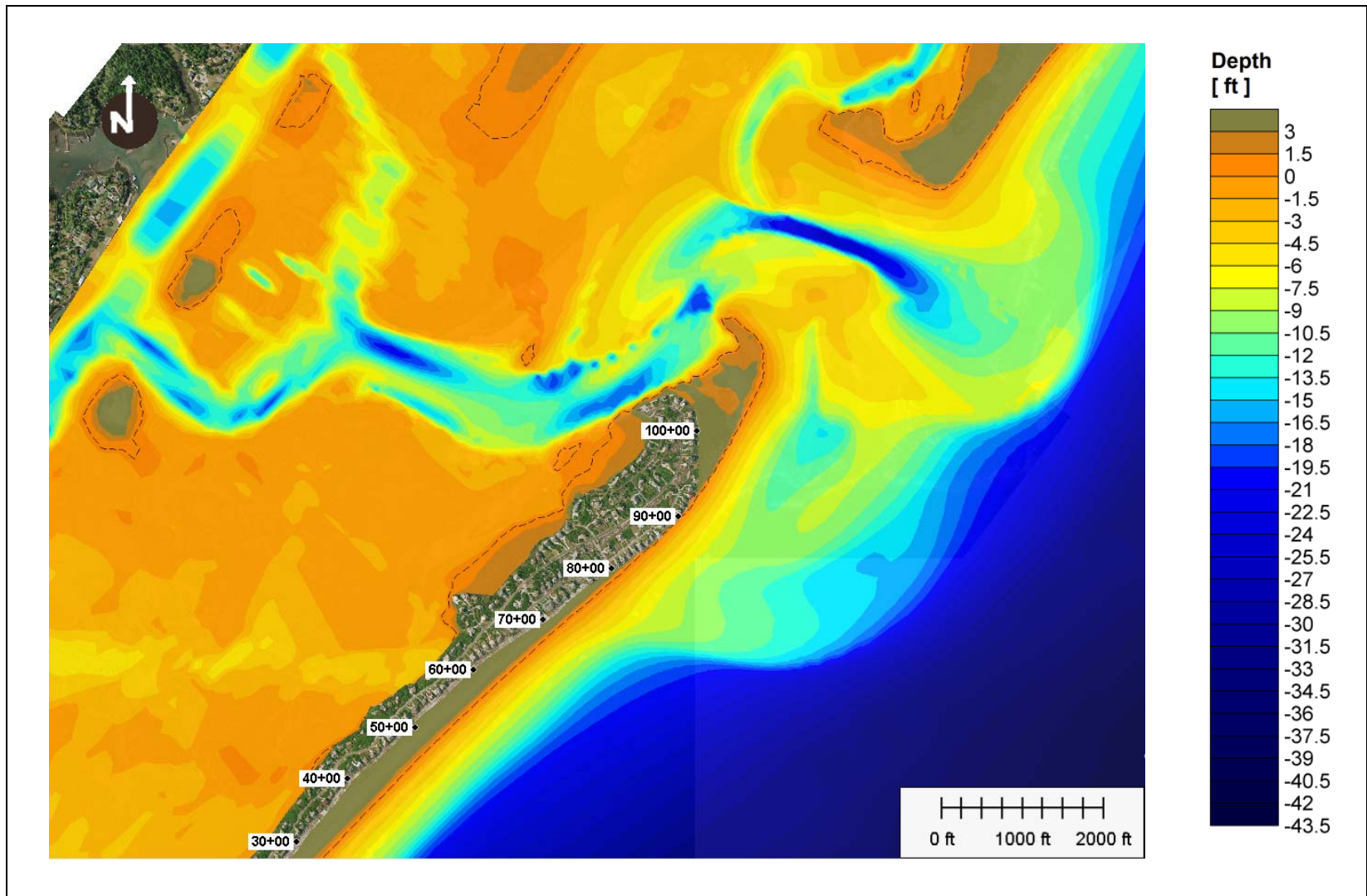


Figure 10: Alternative 3, bathymetry after 5 years simulation.

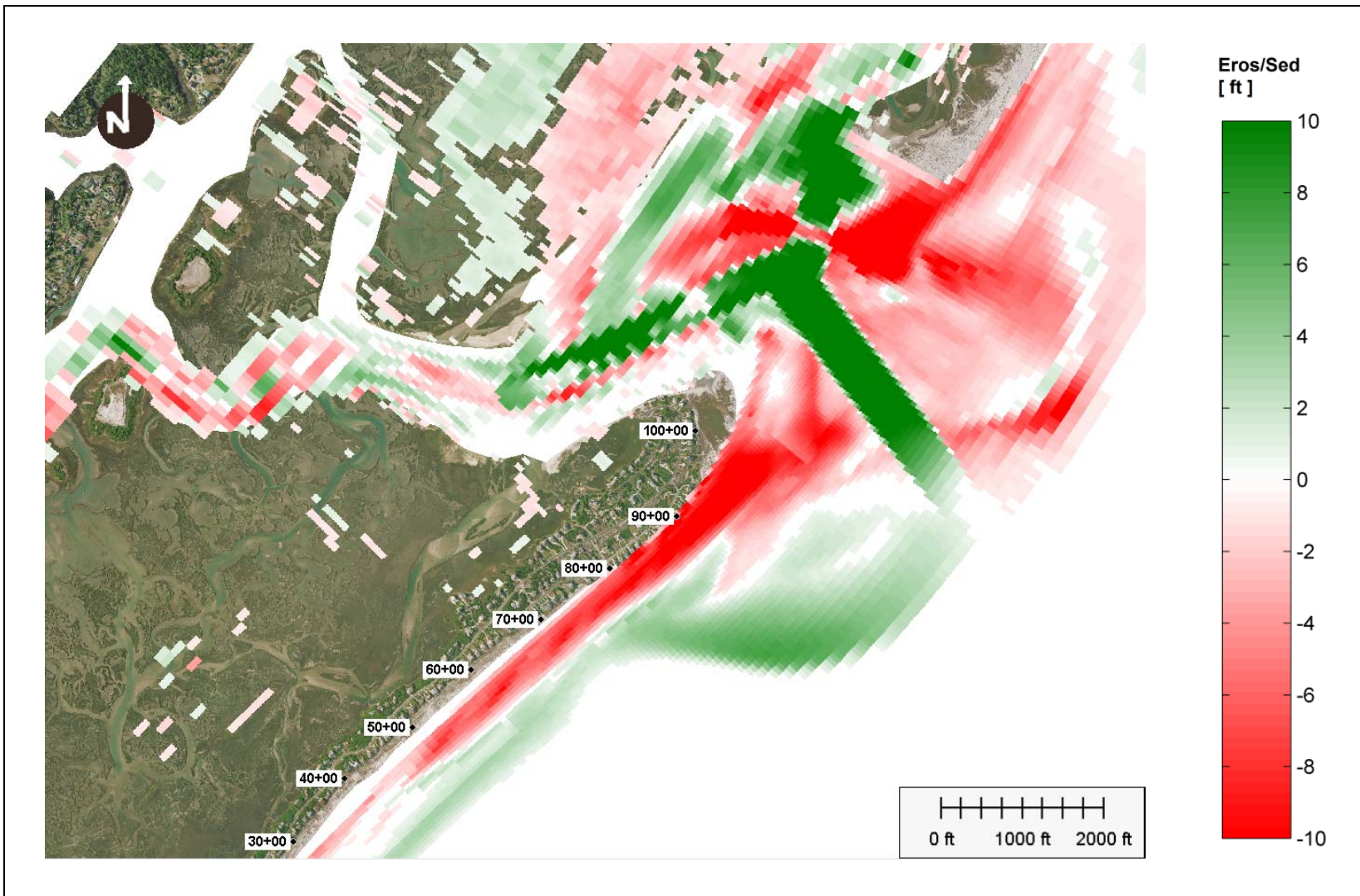


Figure 11: Alternative 3, erosion/sedimentation after 5 year simulation.

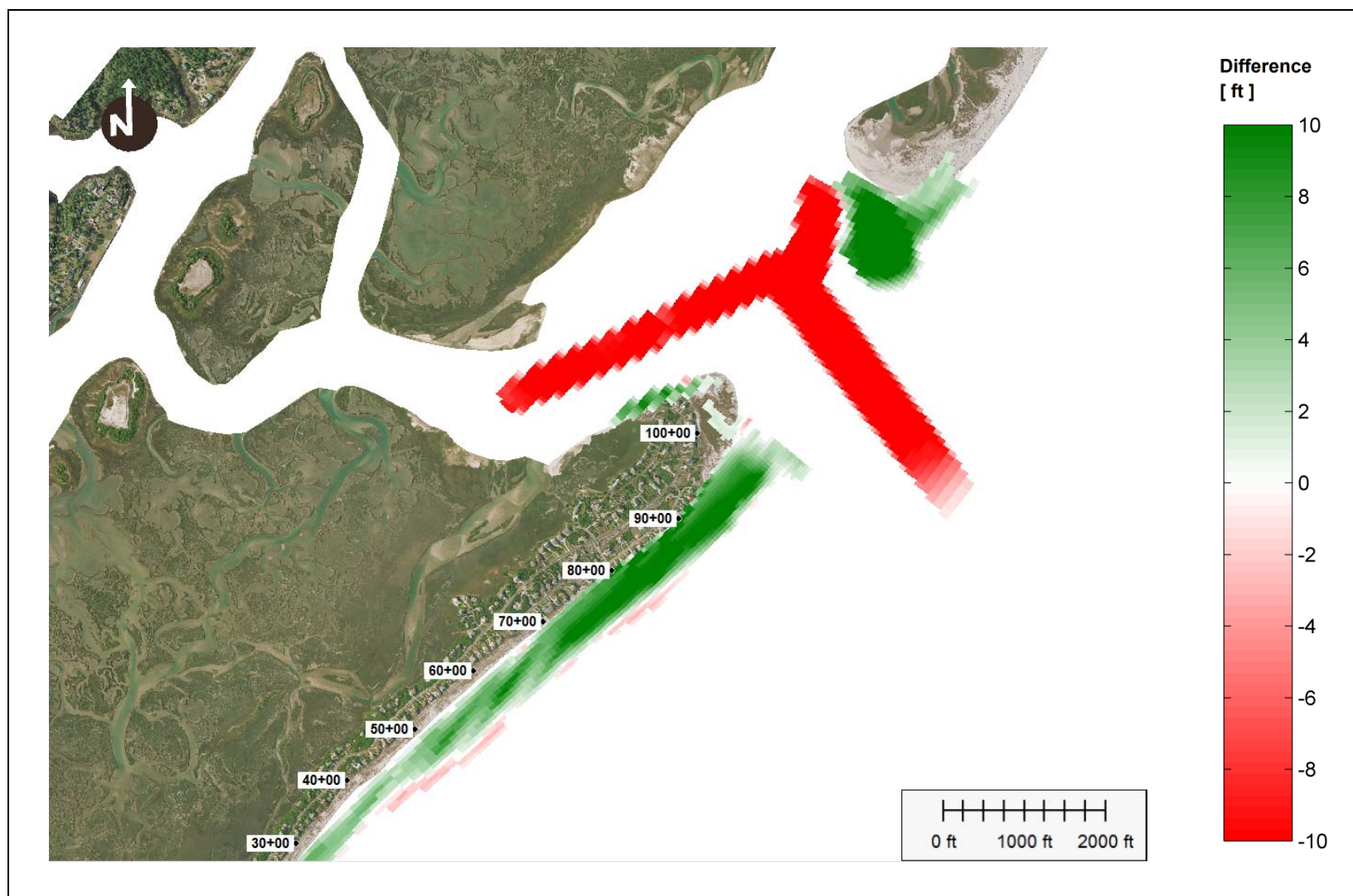


Figure 12: difference between initial bathymetries of Alternative 3 and Alternative 2.

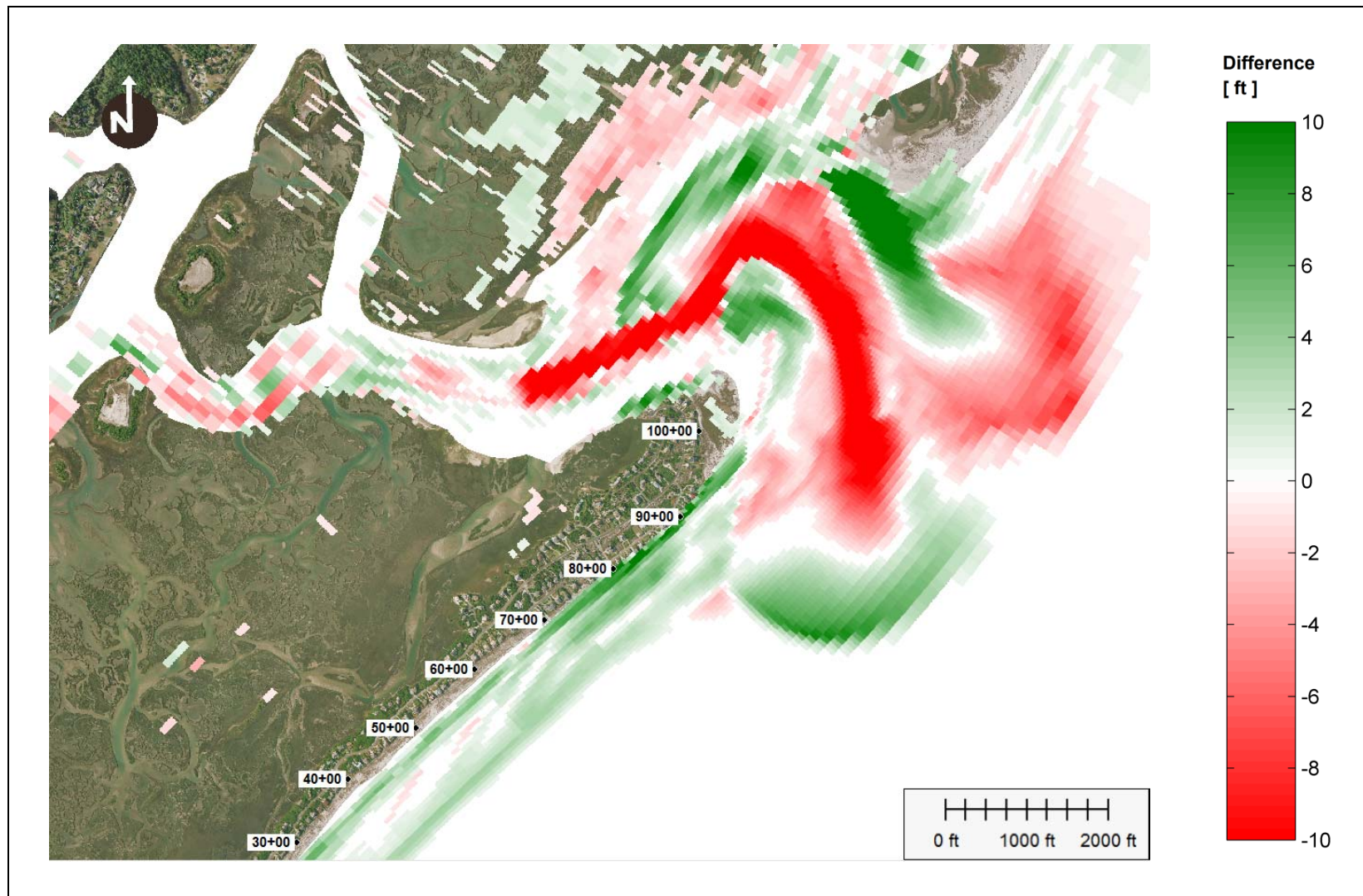


Figure 13: difference between bathymetry of Alternative 3 after 2 years simulation and initial bathymetry of Alternative 2.

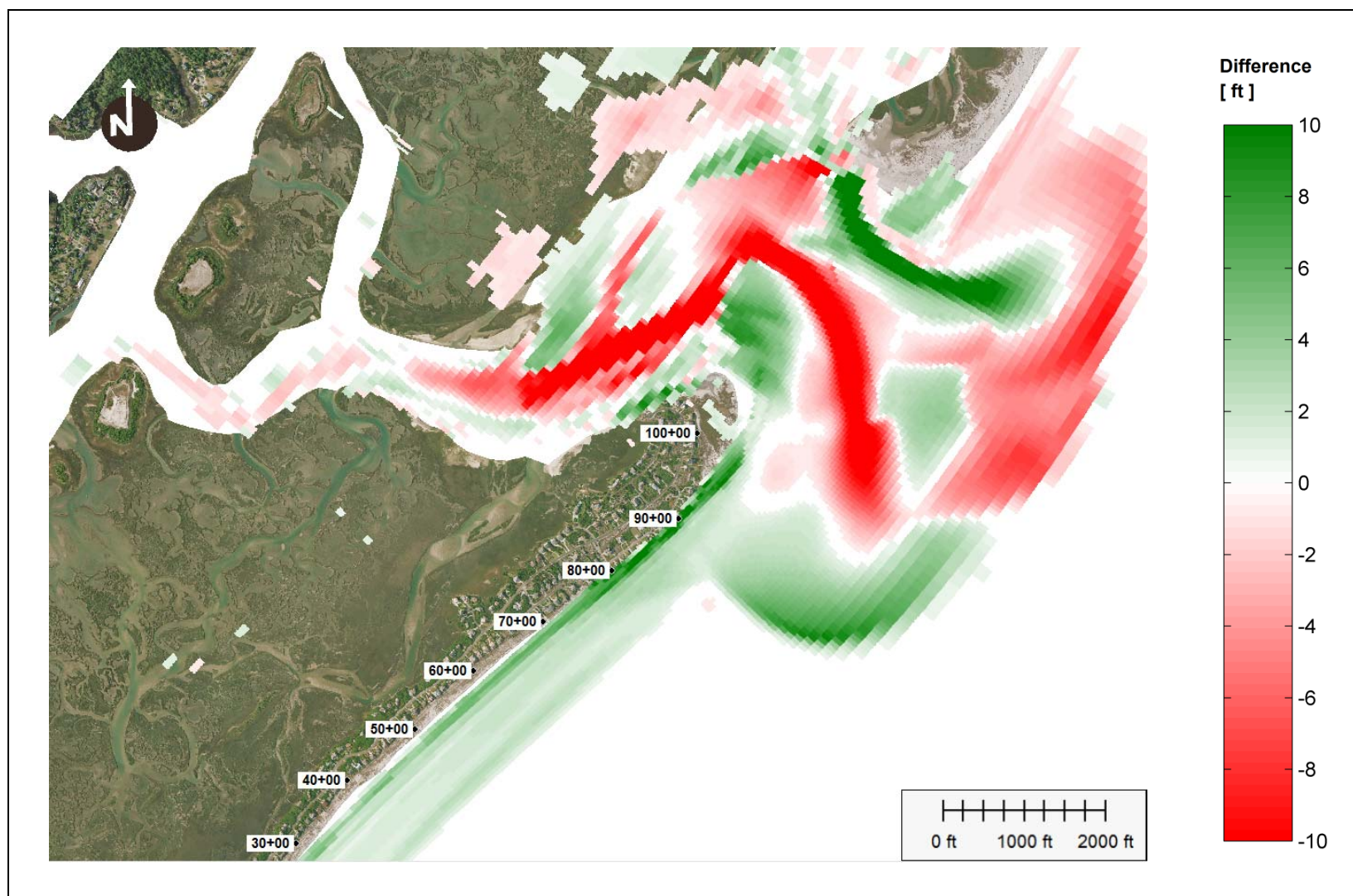


Figure 14: difference between bathymetries of Alternative 3 and Alternative 2 after 2 years simulation.

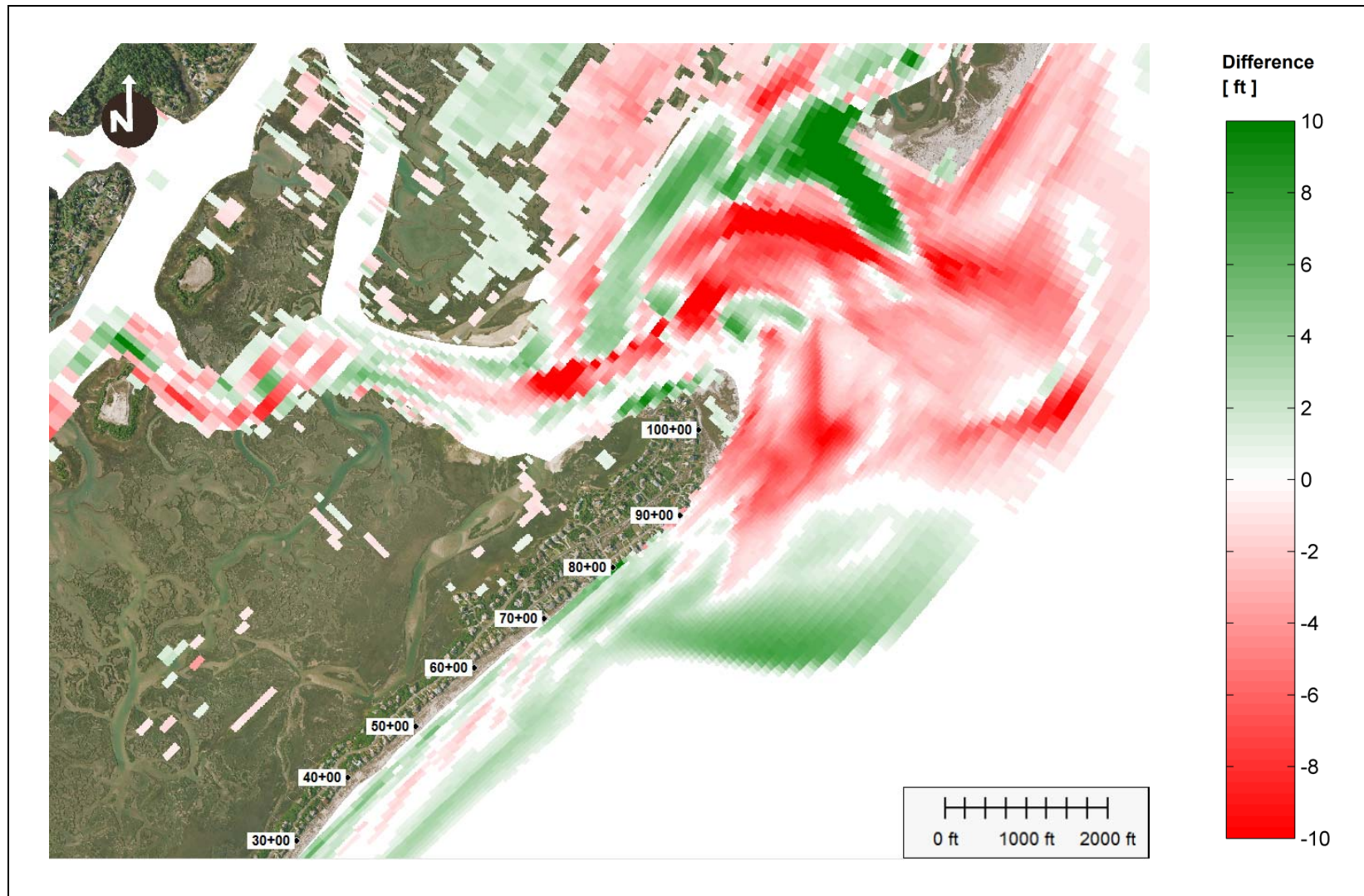


Figure 15: difference between bathymetry of Alternative 3 after 5 years simulation and initial bathymetry of Alternative 2.

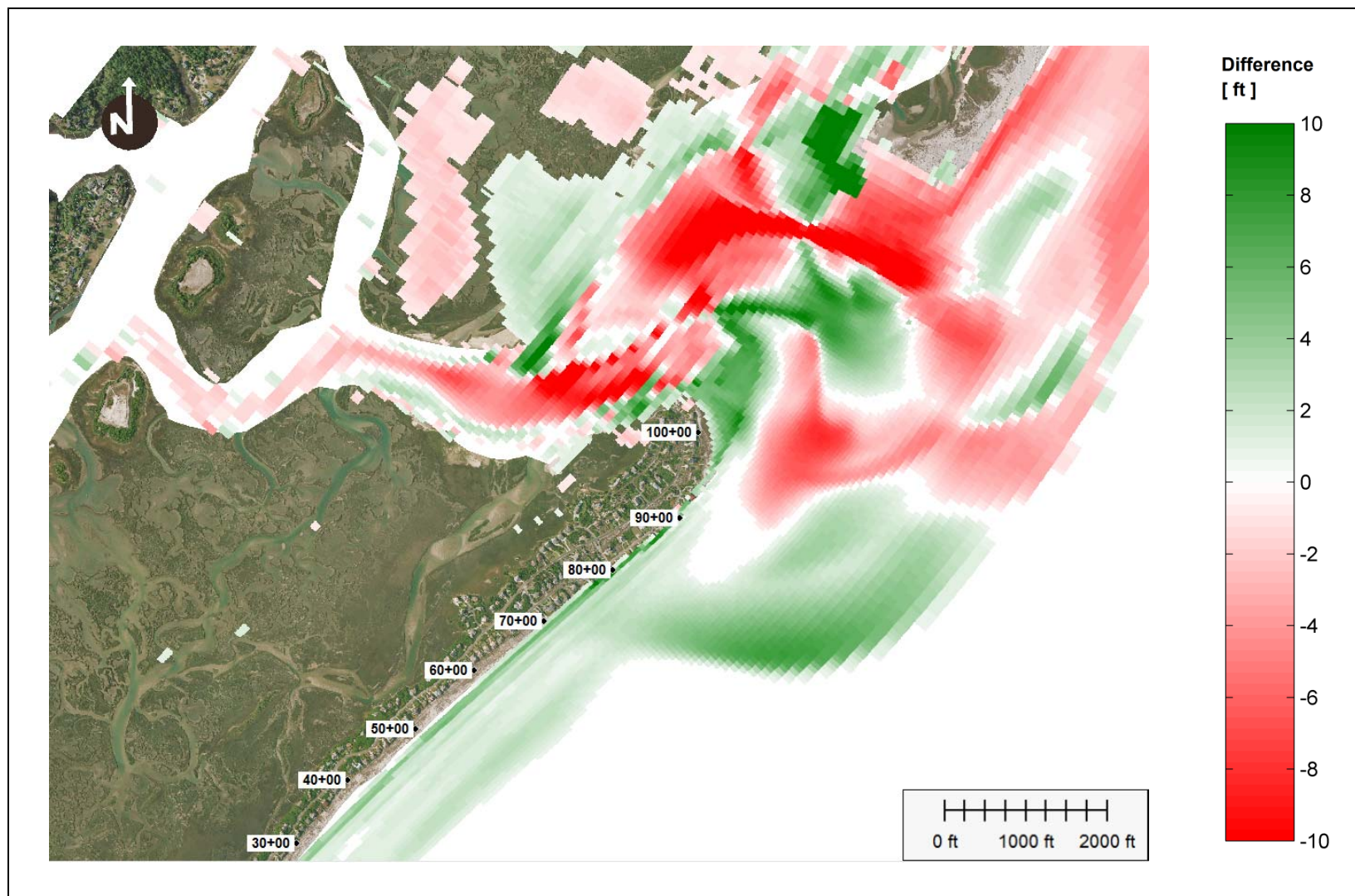


Figure 16: difference between bathymetries of Alternative 3 and Alternative 2 after 5 years simulation.

Alternative 4 - Beach Fill without Management of Rich Inlet (same beach fill layout as Alternative 3)

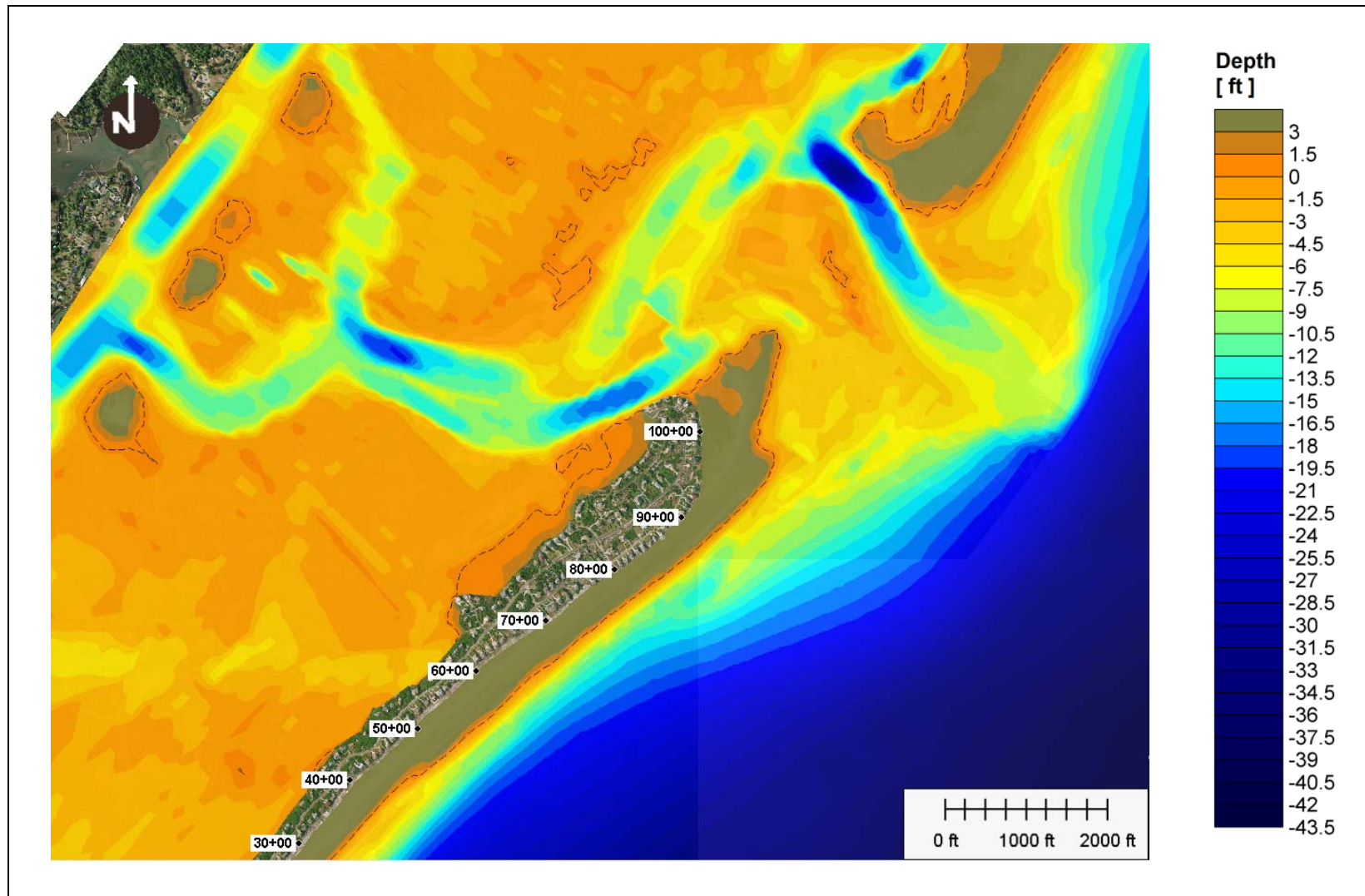


Figure 17: Alternative 4, initial bathymetry.

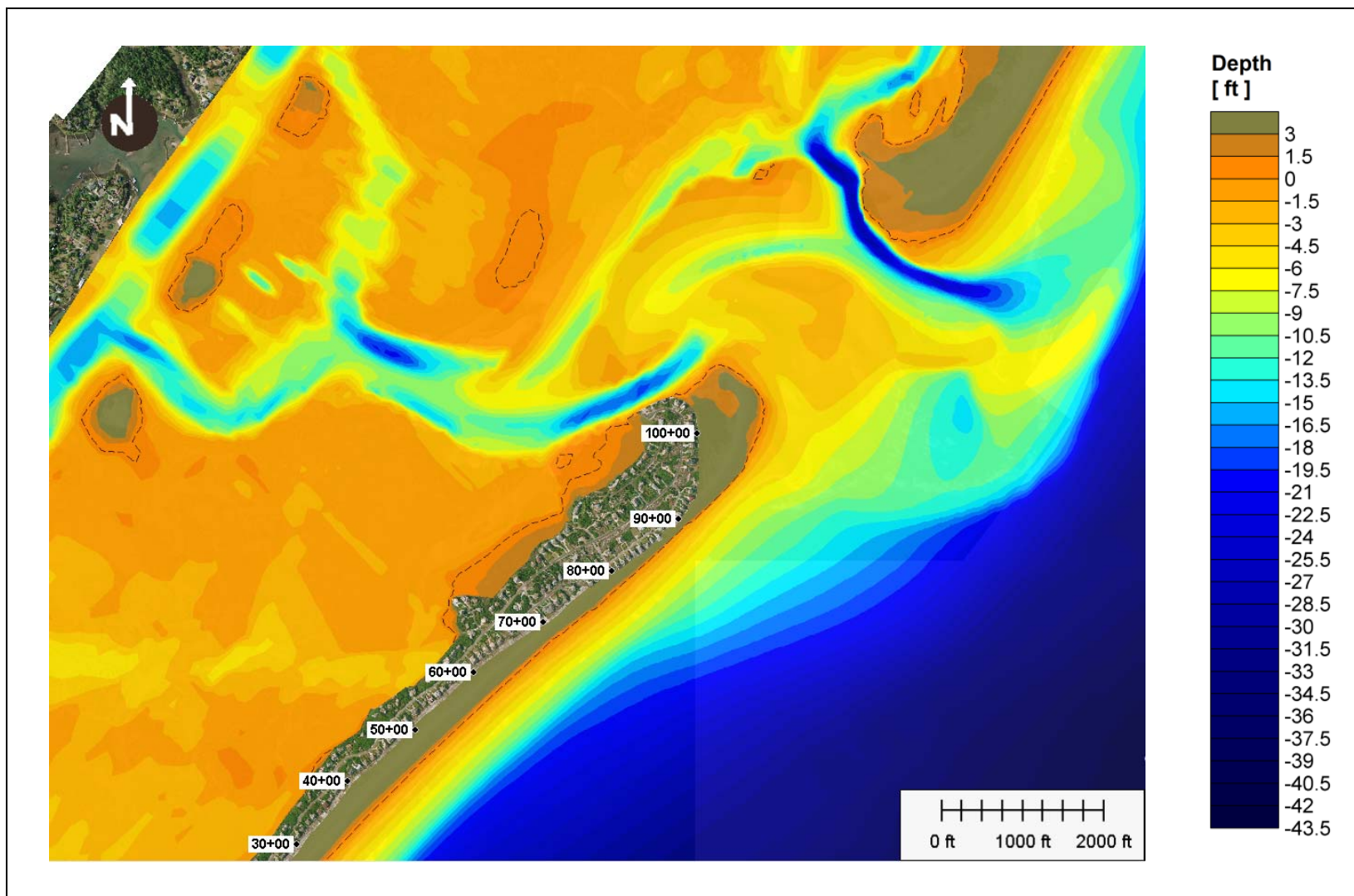


Figure 18: Alternative 4, bathymetry after 2 years simulation.

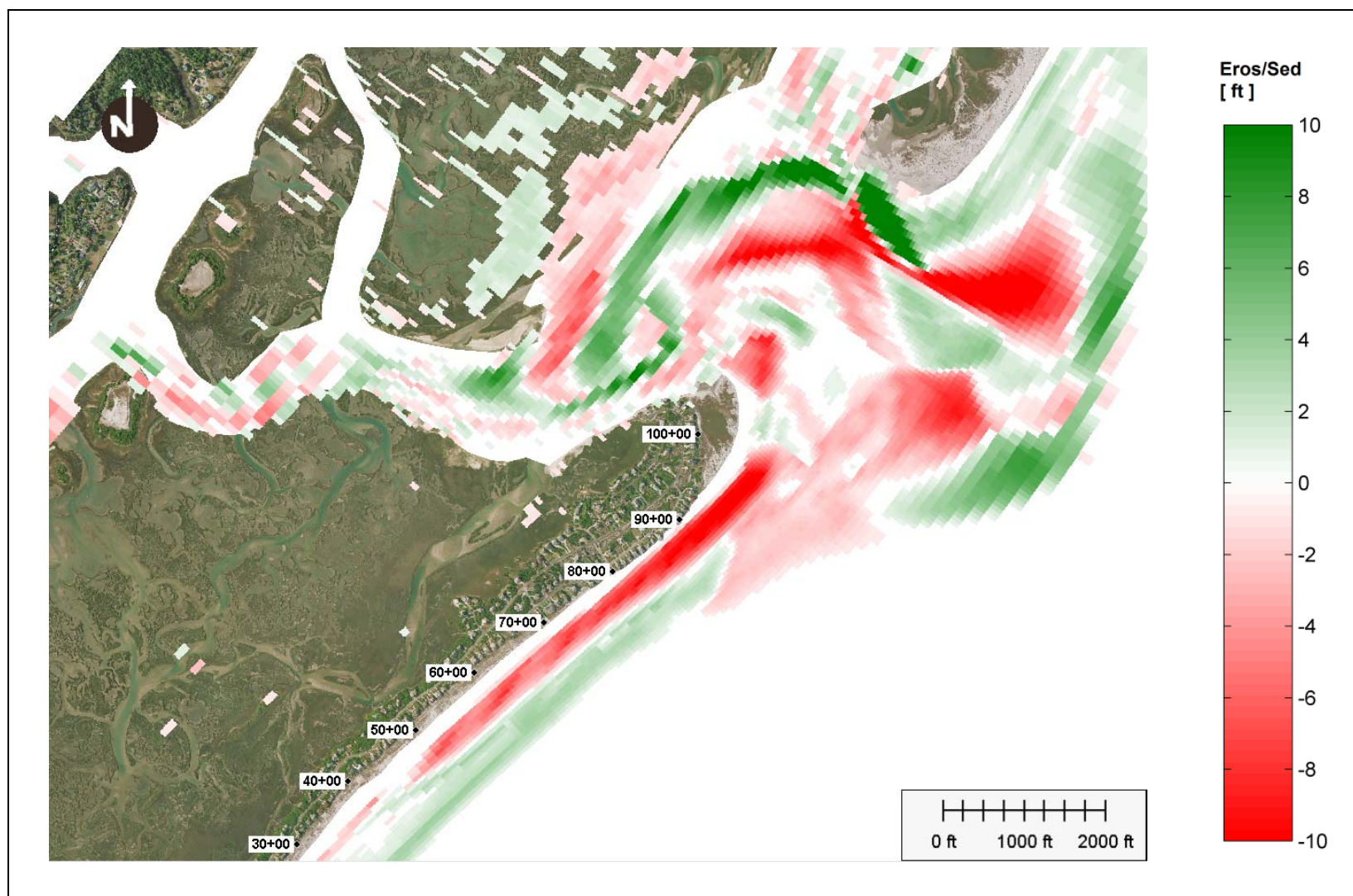


Figure 19: Alternative 4, erosion/sedimentation after 2 years simulation.

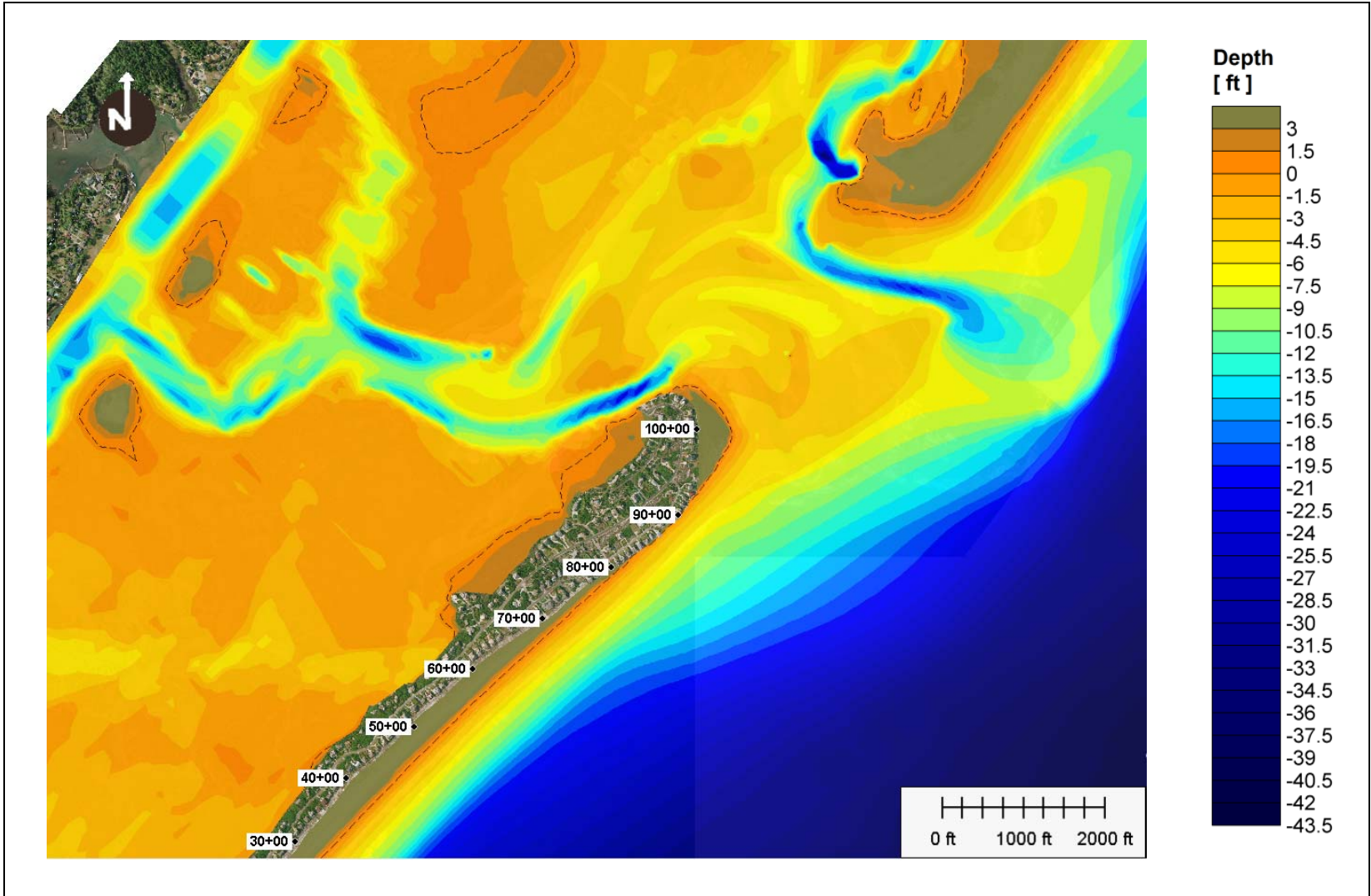


Figure 20: Alternative 4, bathymetry after 5 years simulation.

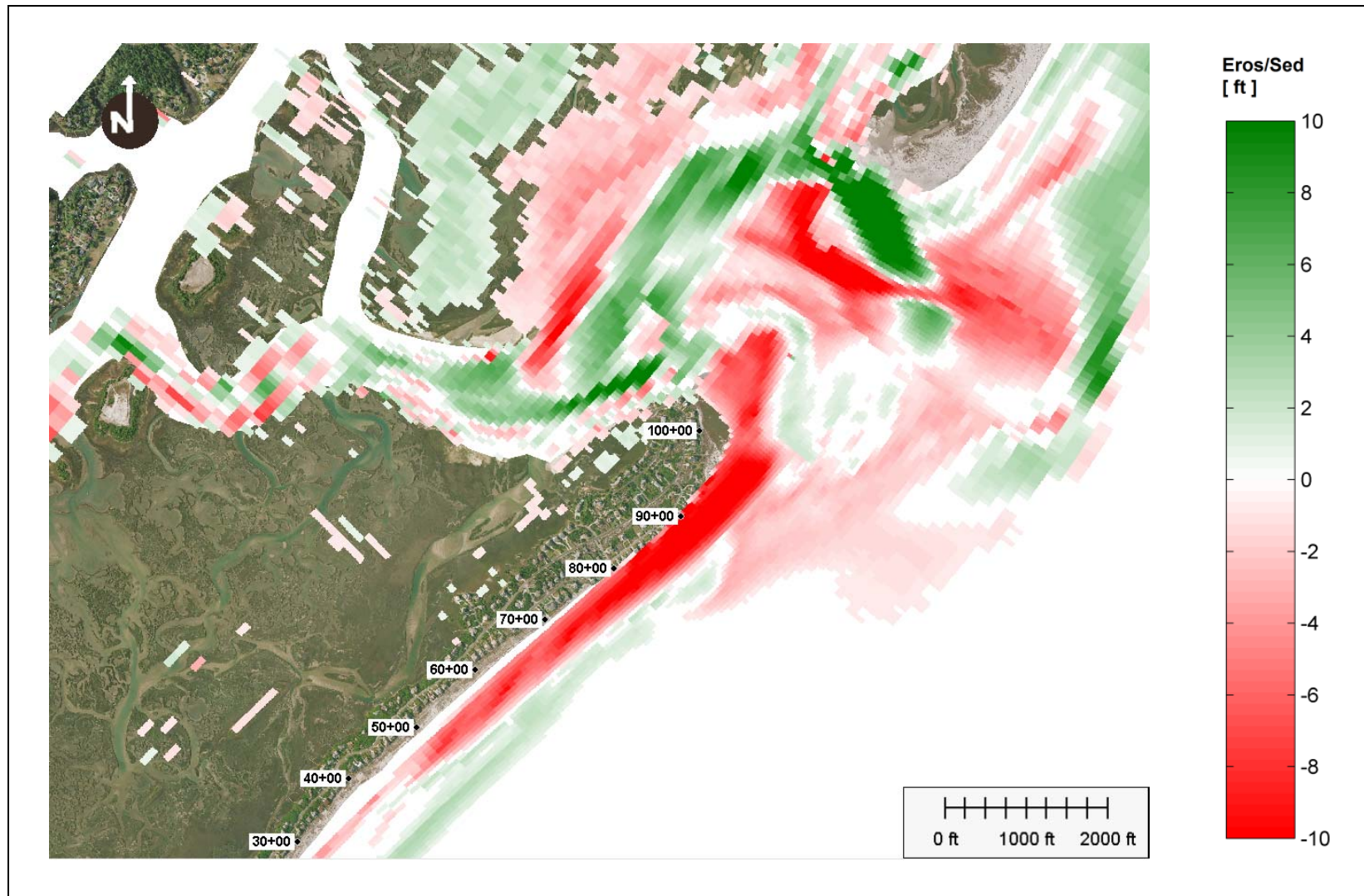


Figure 21: Alternative 4, erosion/sedimentation after 5 year simulation.

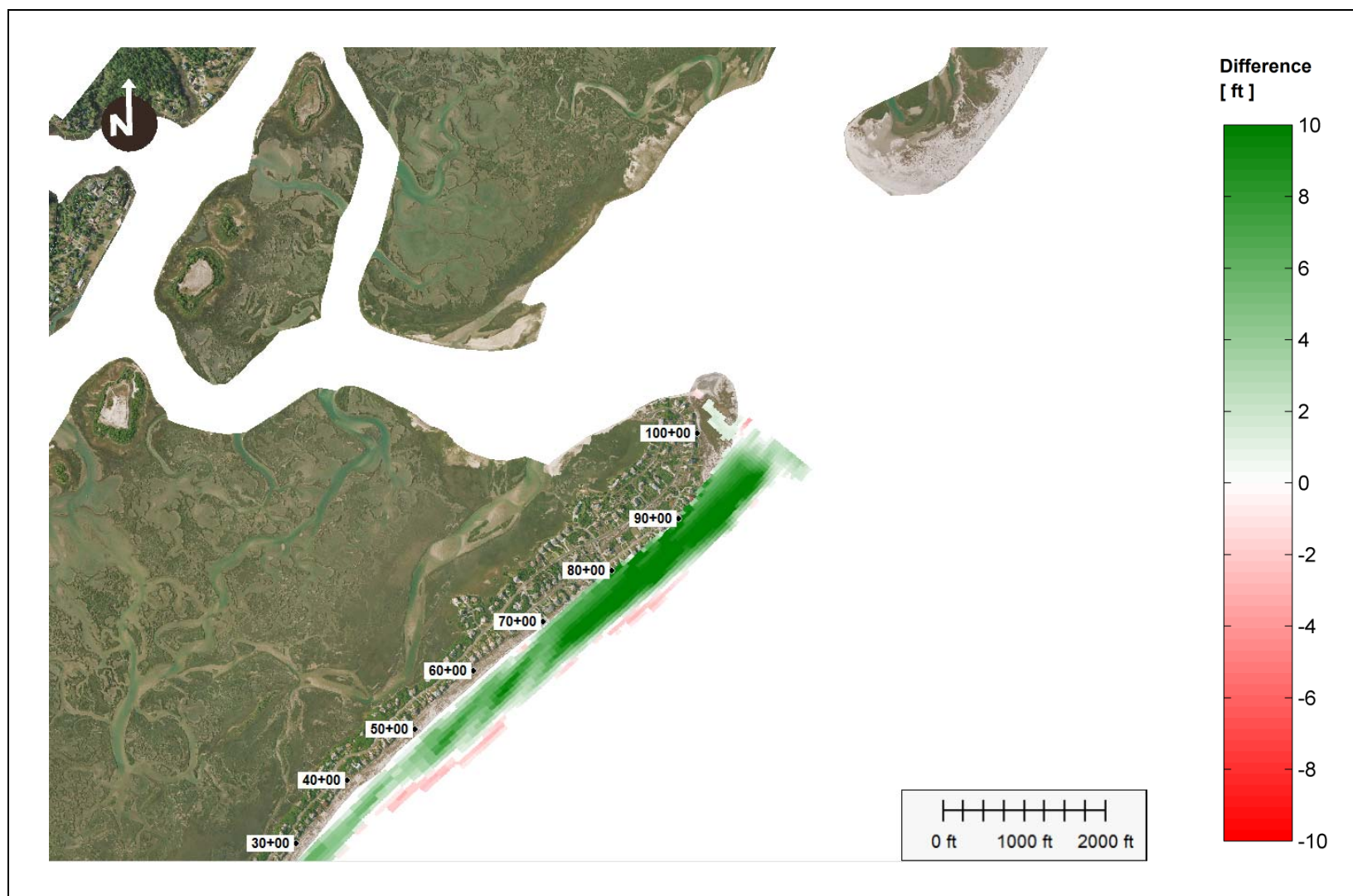


Figure 22: difference between initial bathymetries of Alternative 4 and Alternative 2.

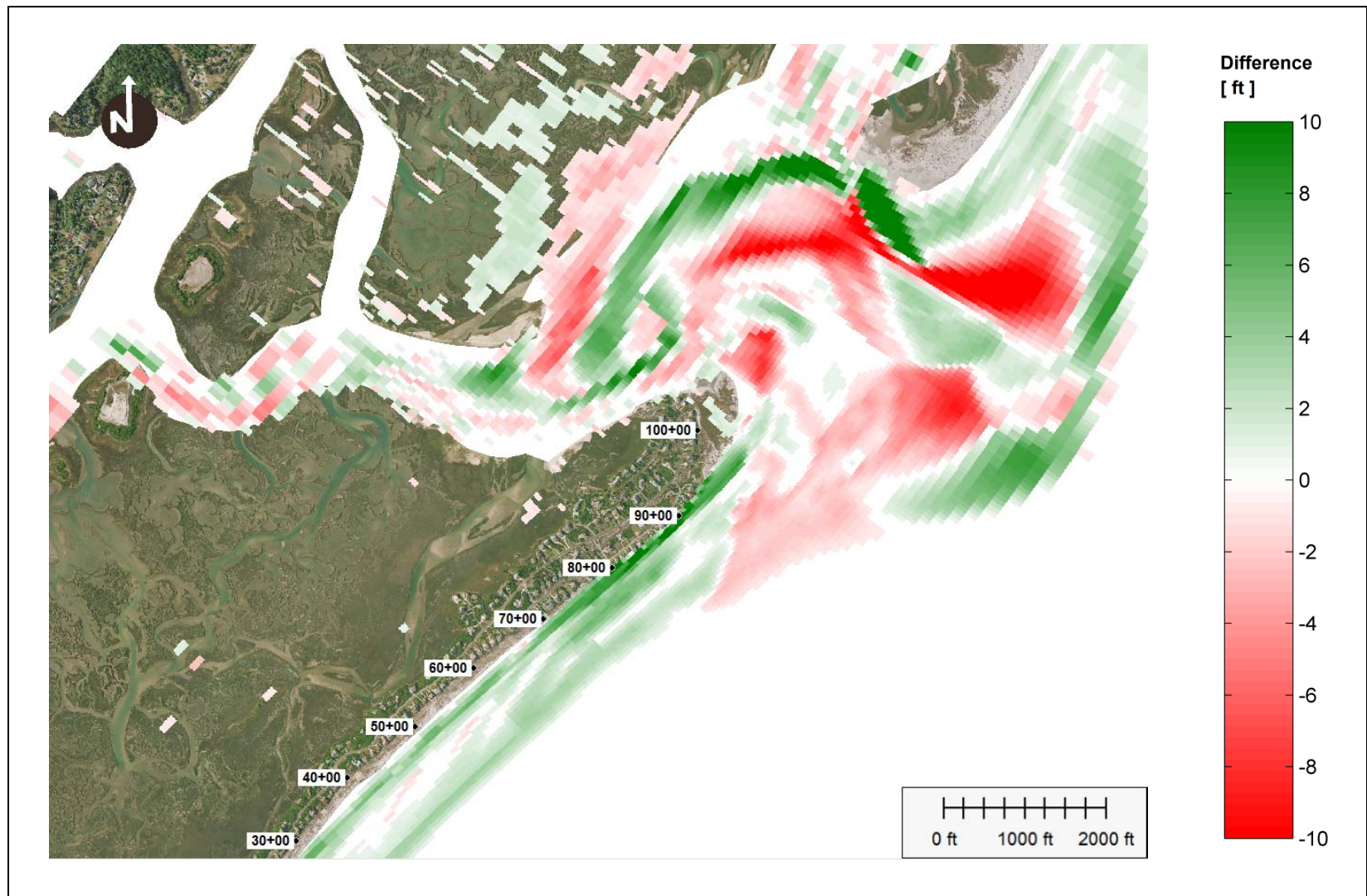


Figure 23: difference between bathymetry of Alternative 4 after 2 years simulation and initial bathymetry of Alternative 2.

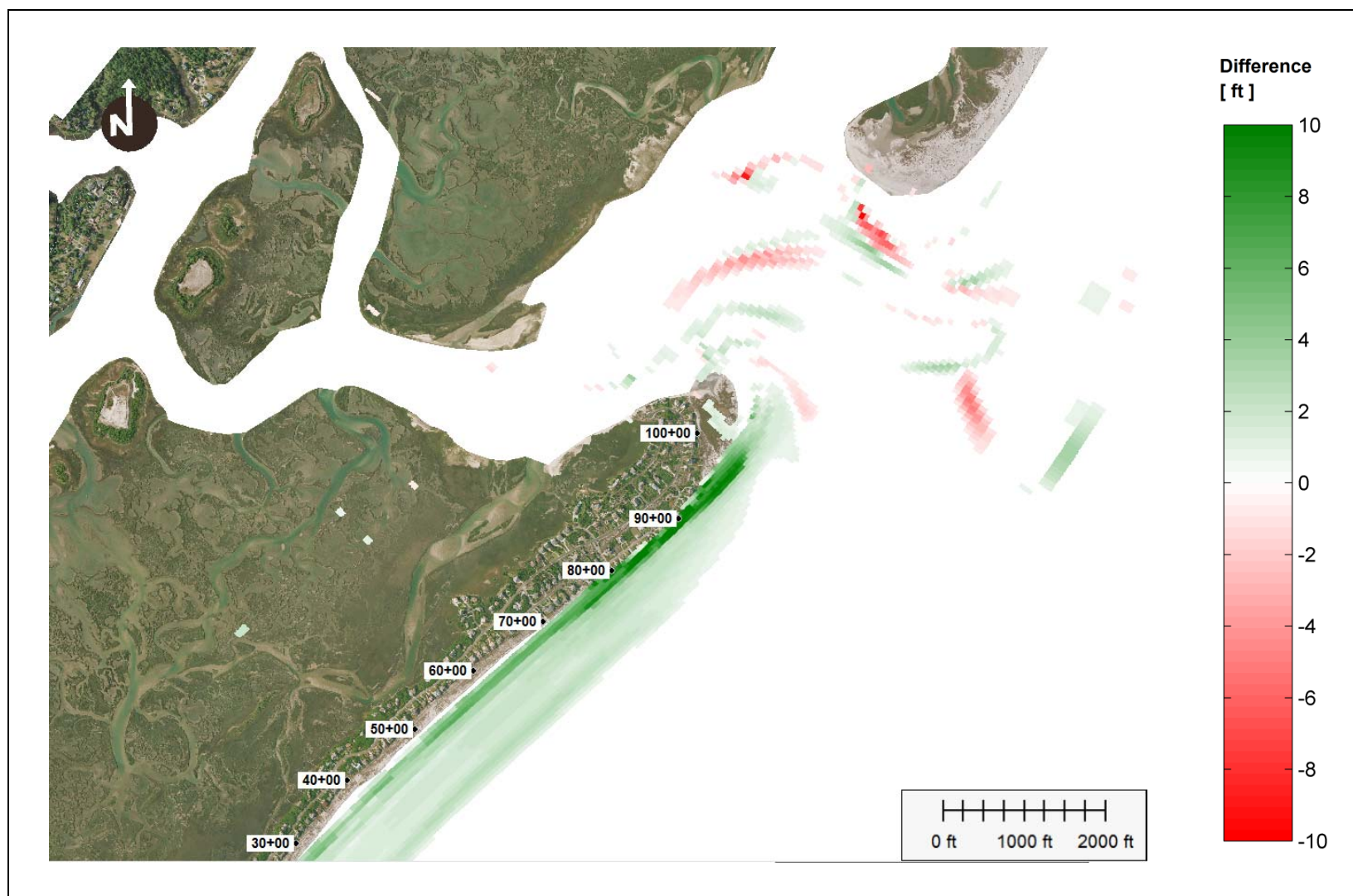


Figure 24: difference between bathymetries of Alternative 4 and Alternative 2 after 2 years simulation.

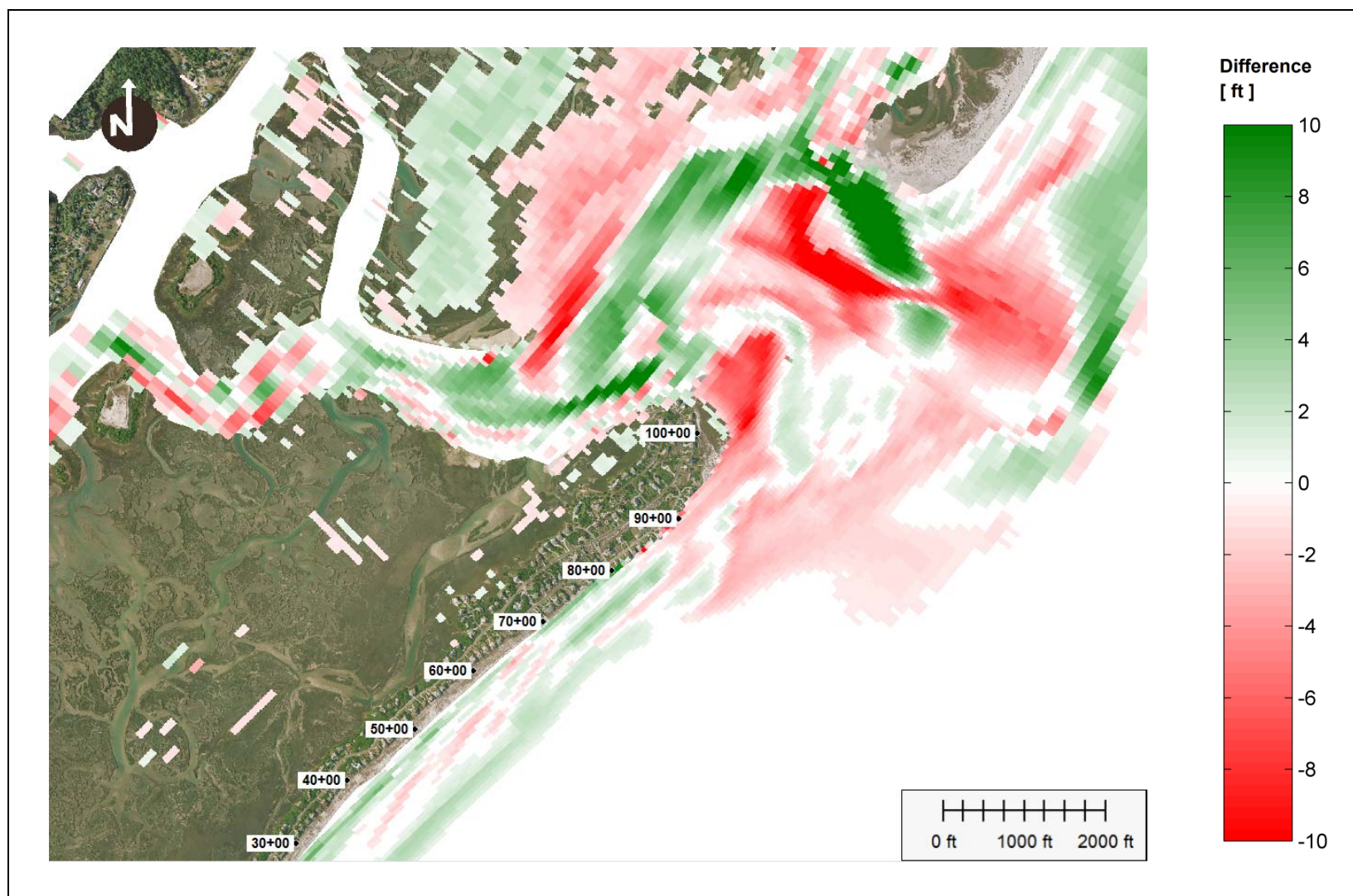


Figure 25: difference between bathymetry of Alternative 4 after 5 years simulation and initial bathymetry of Alternative 2.

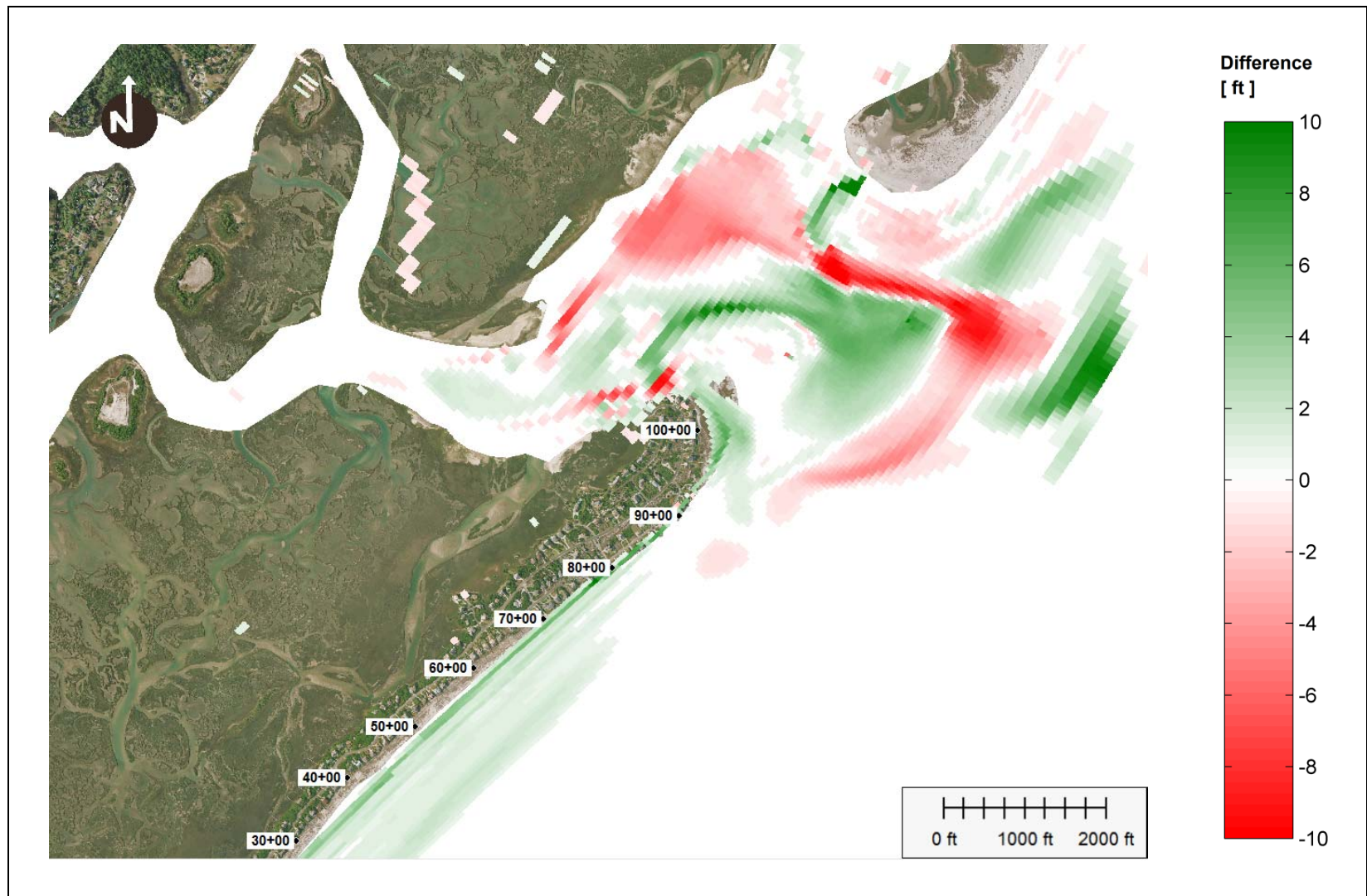


Figure 26: difference between bathymetries of Alternative 4 and Alternative 2 after 5 years simulation.

Alternative 4a - Beach Fill without Management of Rich Inlet (same beach fill as Alternative 5a)

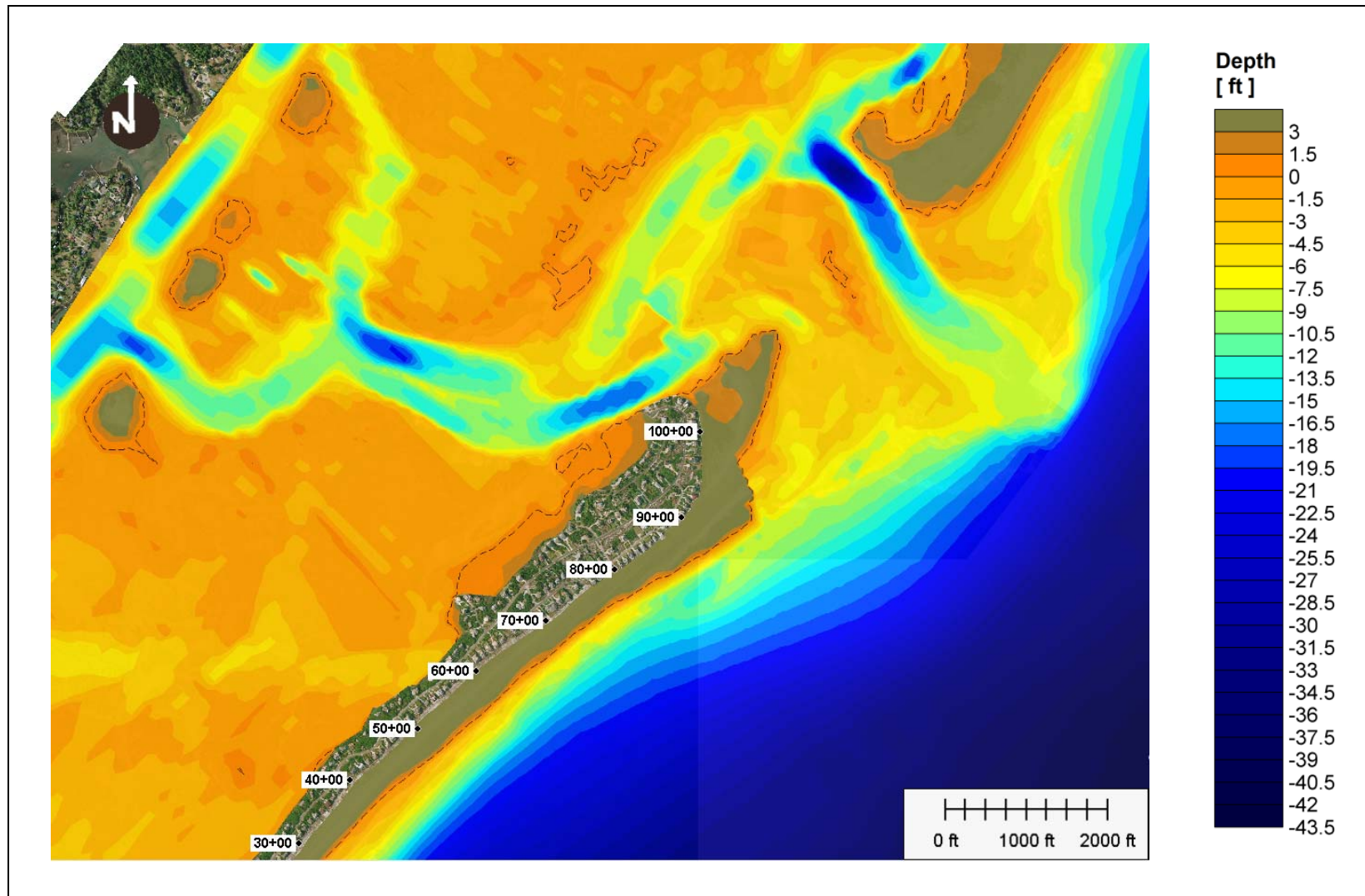


Figure 27: Alternative 4a, initial bathymetry.

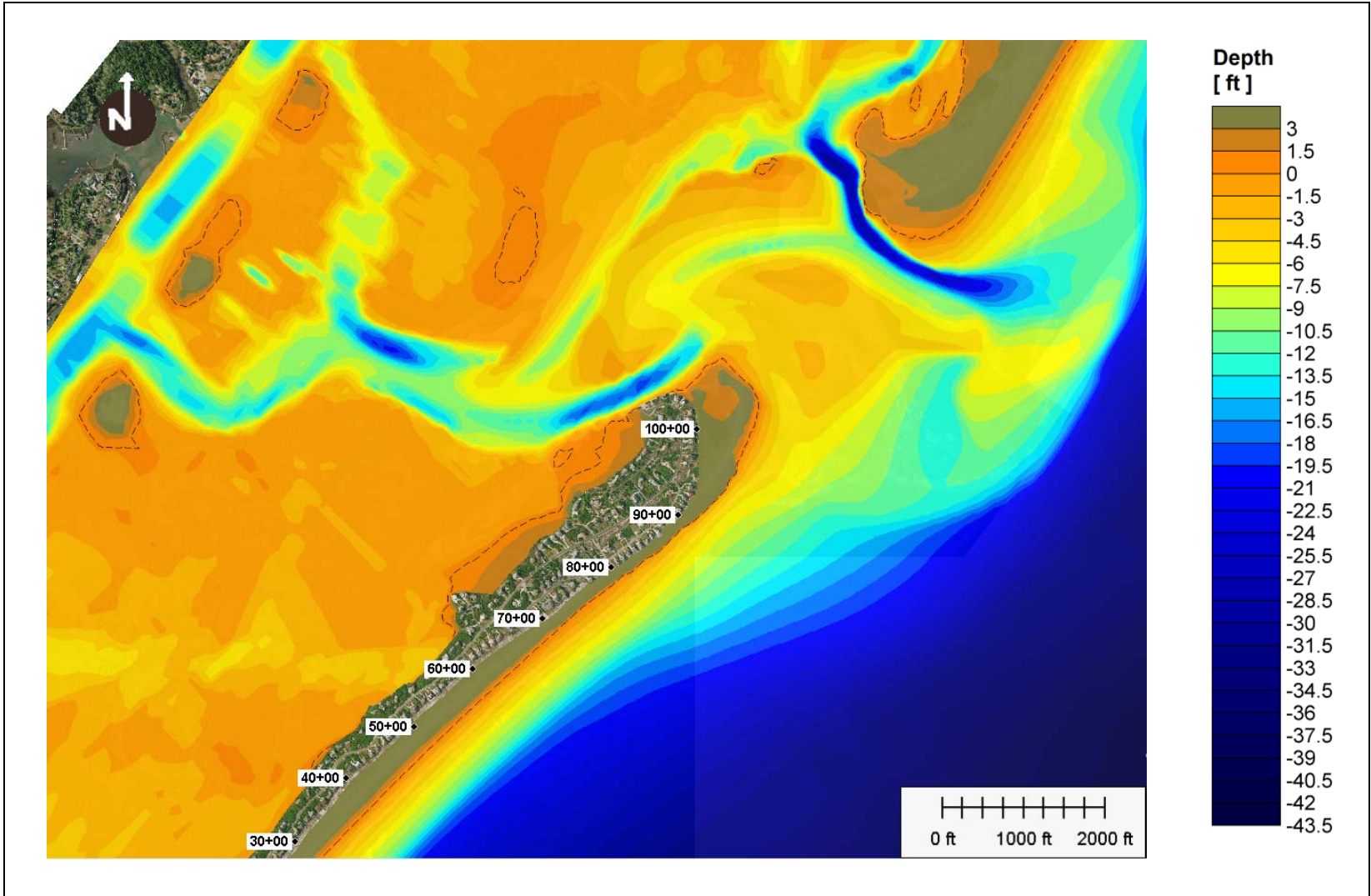


Figure 28: Alternative 4a, bathymetry after 2 years simulation.

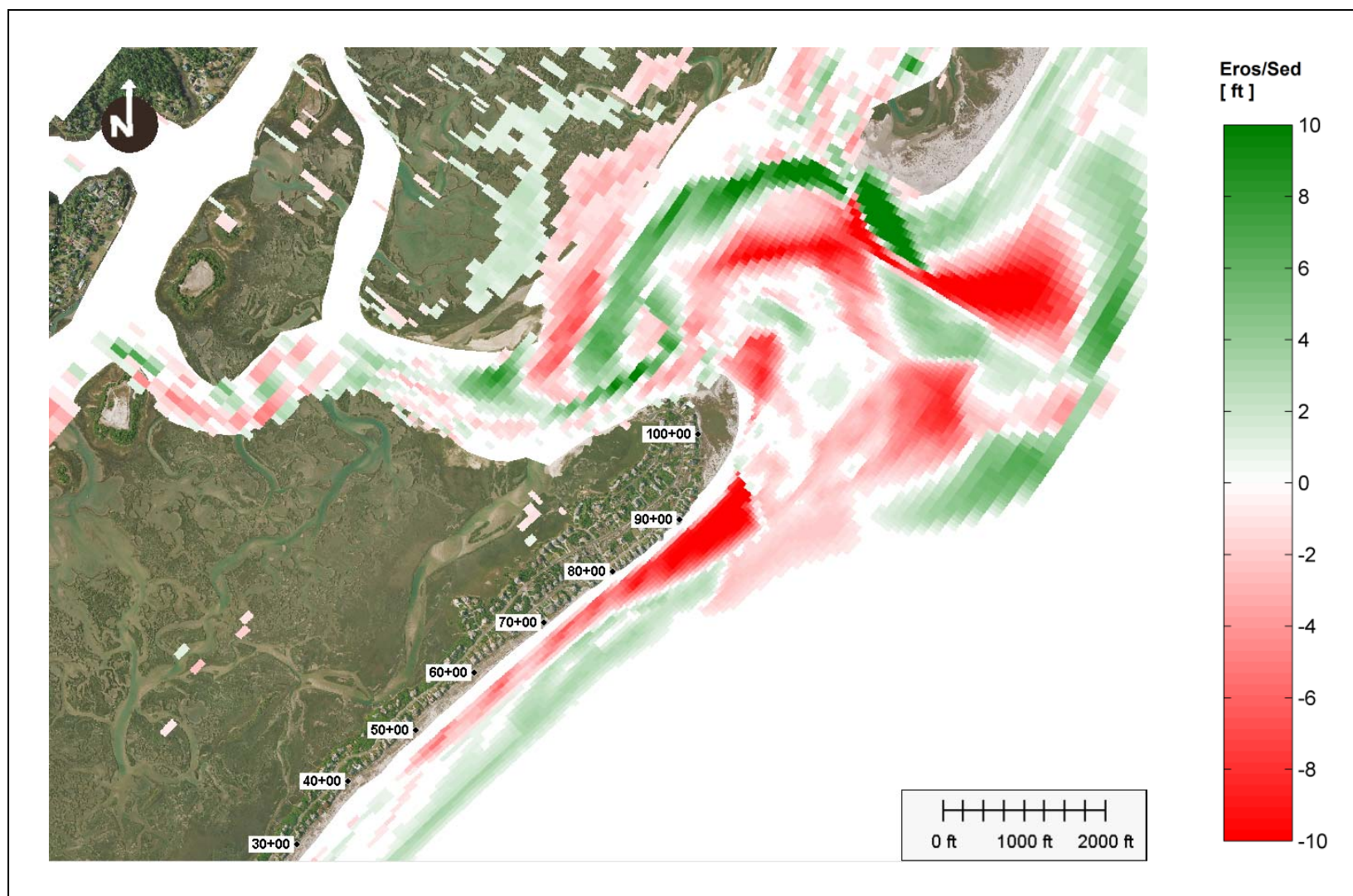


Figure 29: Alternative 4a, erosion/sedimentation after 2 years simulation.

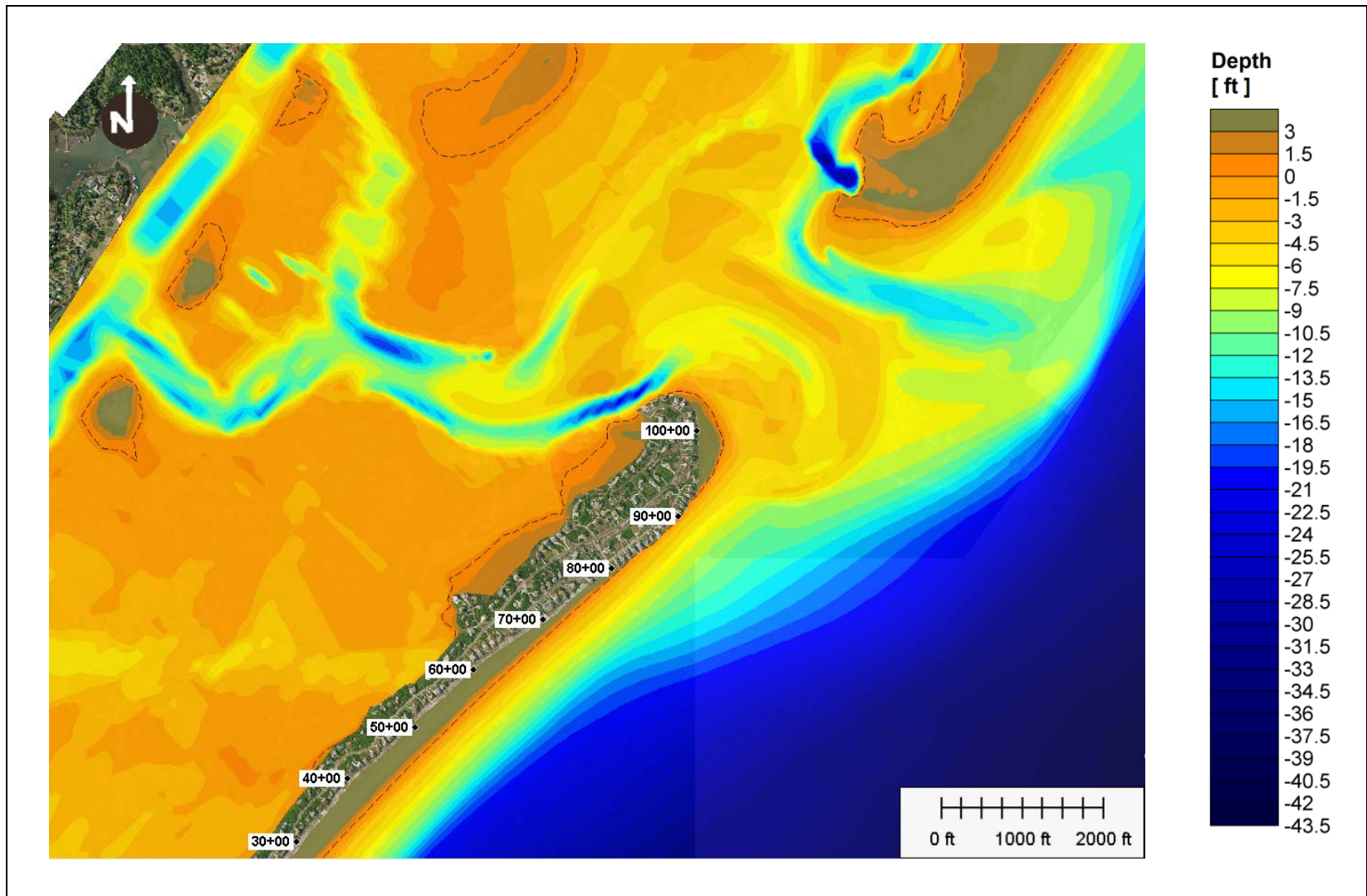


Figure 30: Alternative 4a, bathymetry after 5 years simulation.

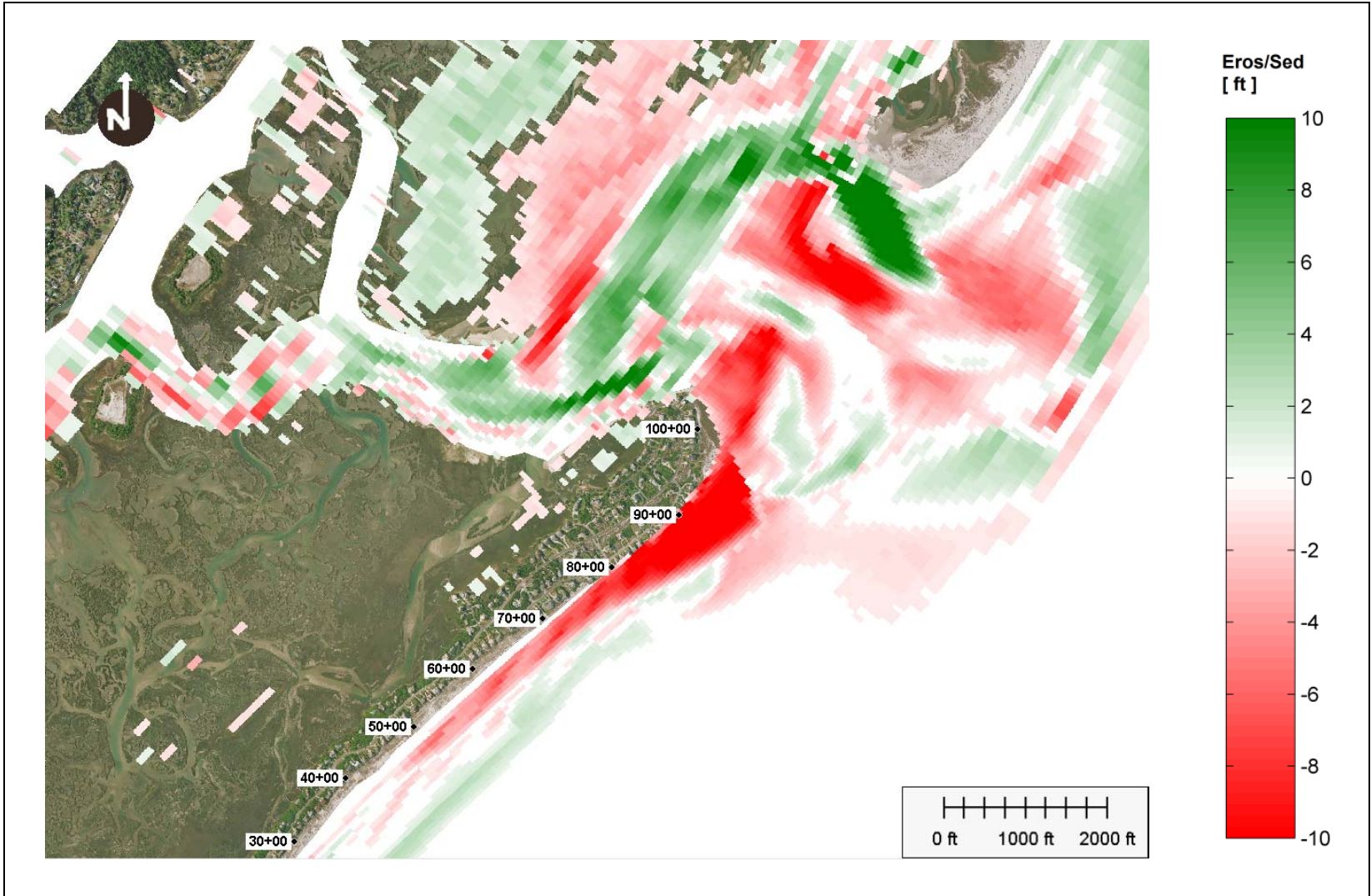


Figure 31: Alternative 4a, erosion/sedimentation after 5 year simulation.

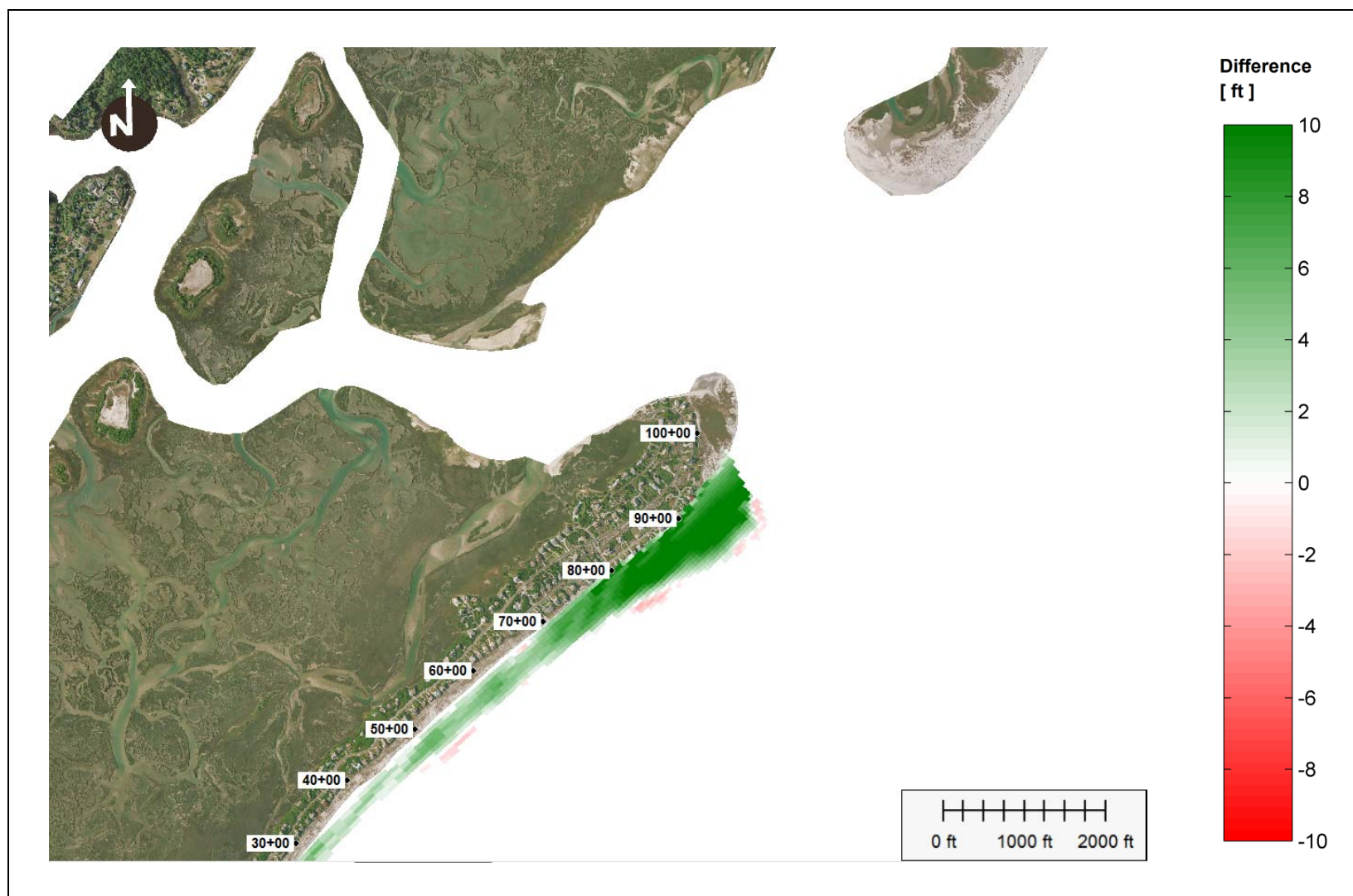


Figure 32: difference between initial bathymetries of Alternative 4a and Alternative 2.

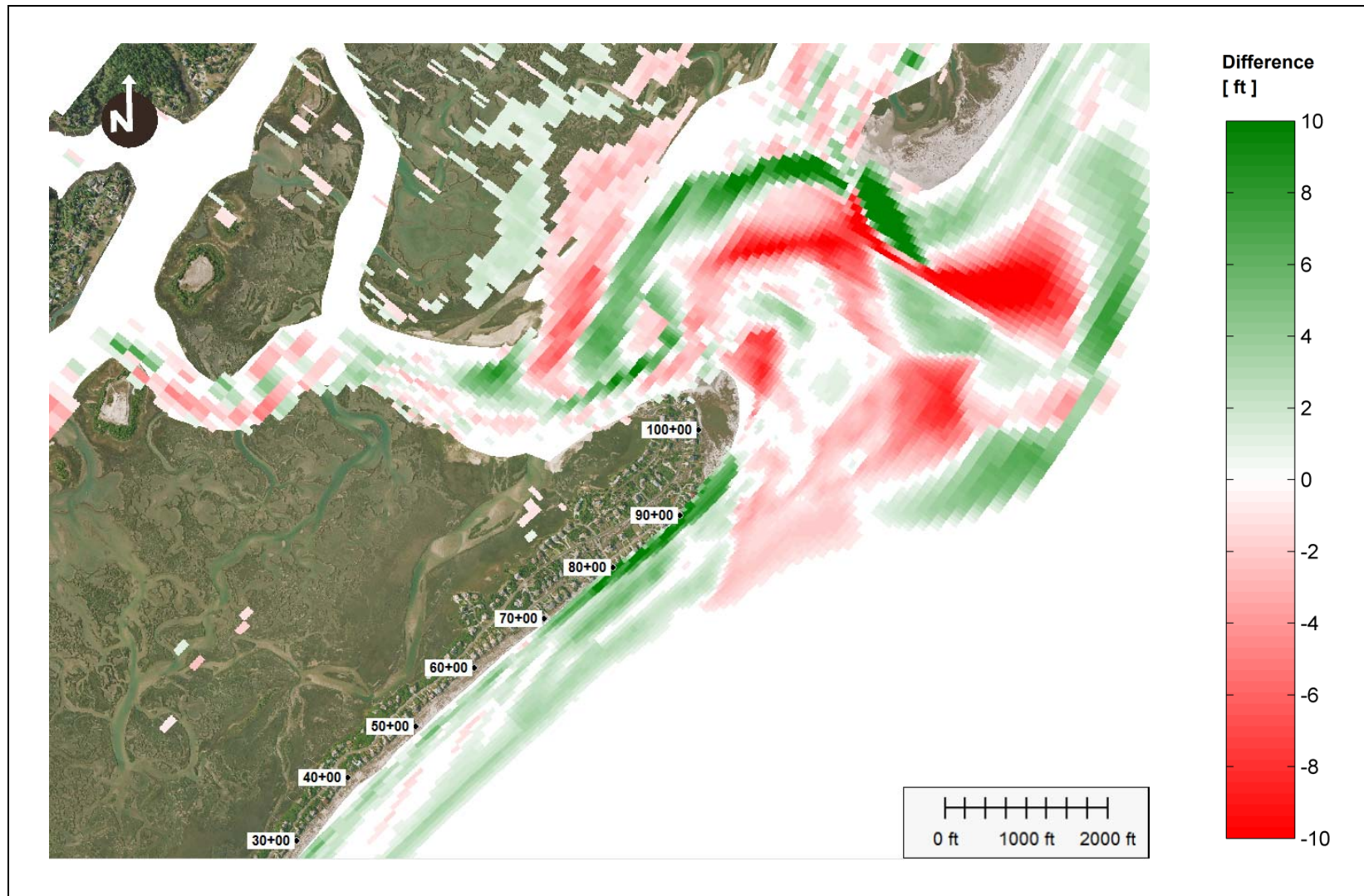


Figure 33: difference between bathymetry of Alternative 4a after 2 years simulation and initial bathymetry of Alternative 2.

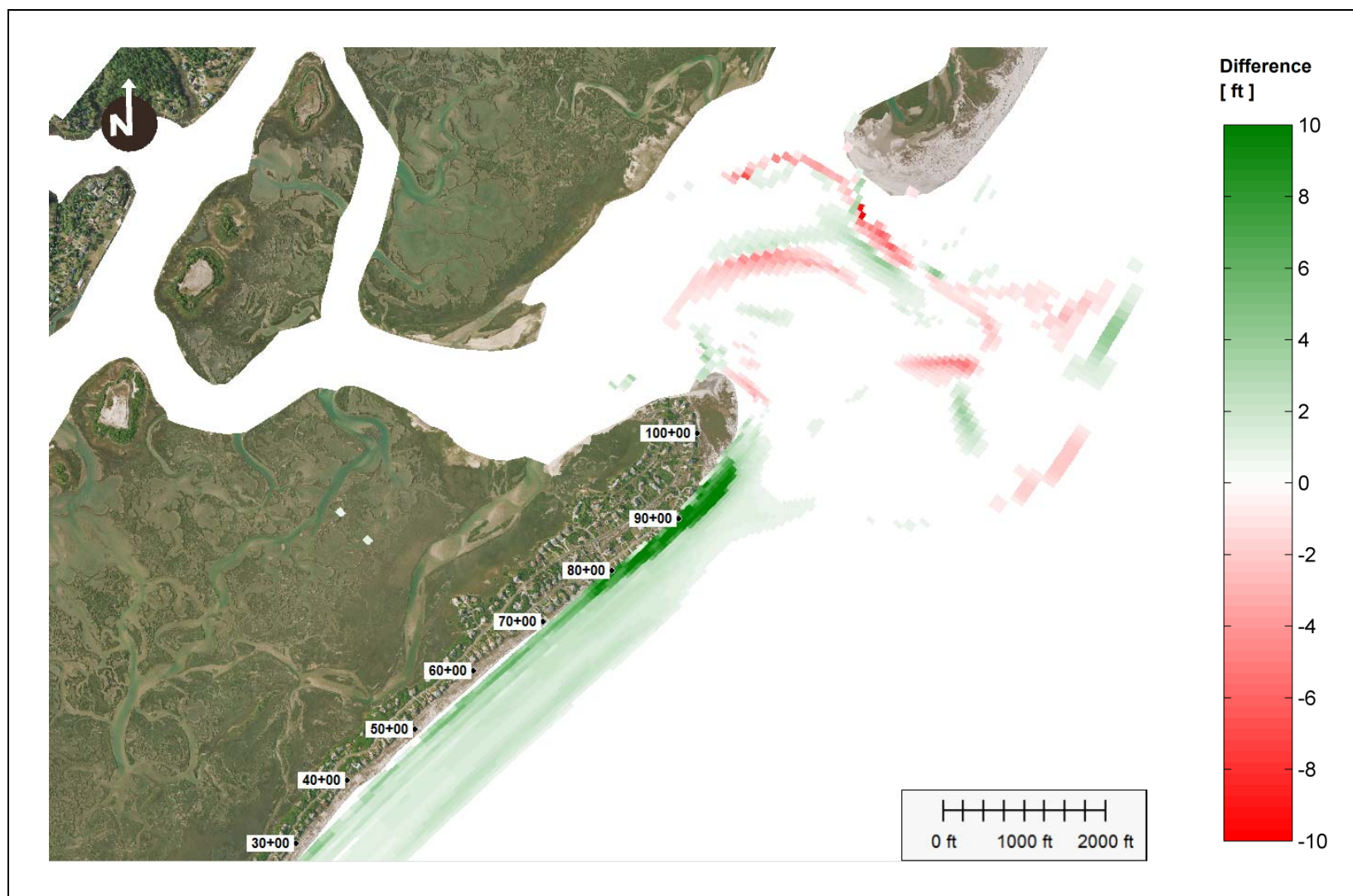


Figure 34: difference between bathymetries of Alternative 4a and Alternative 2 after 2 years simulation.

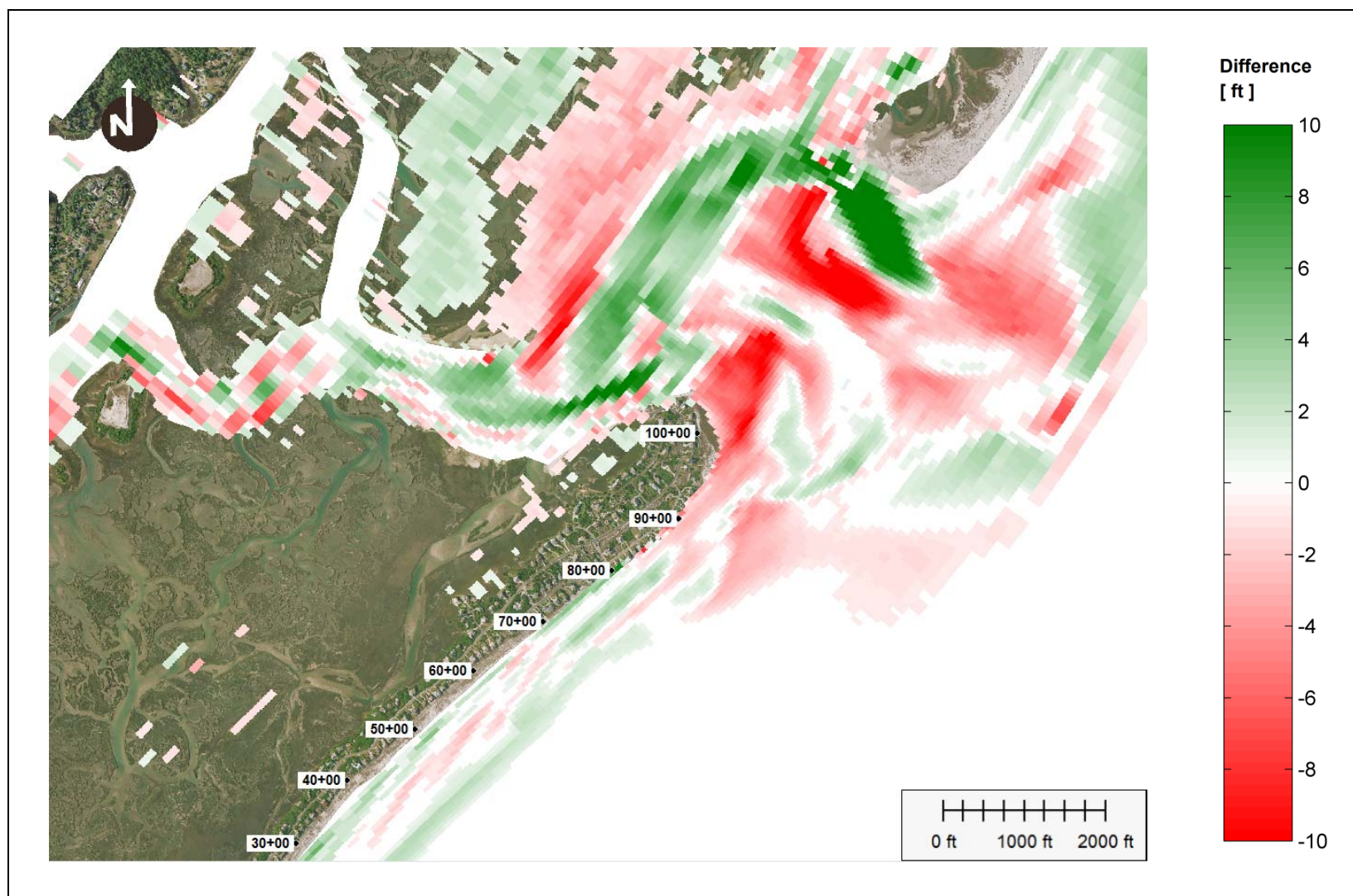


Figure 35: difference between bathymetry of Alternative 4a after 5 years simulation and initial bathymetry of Alternative 2.

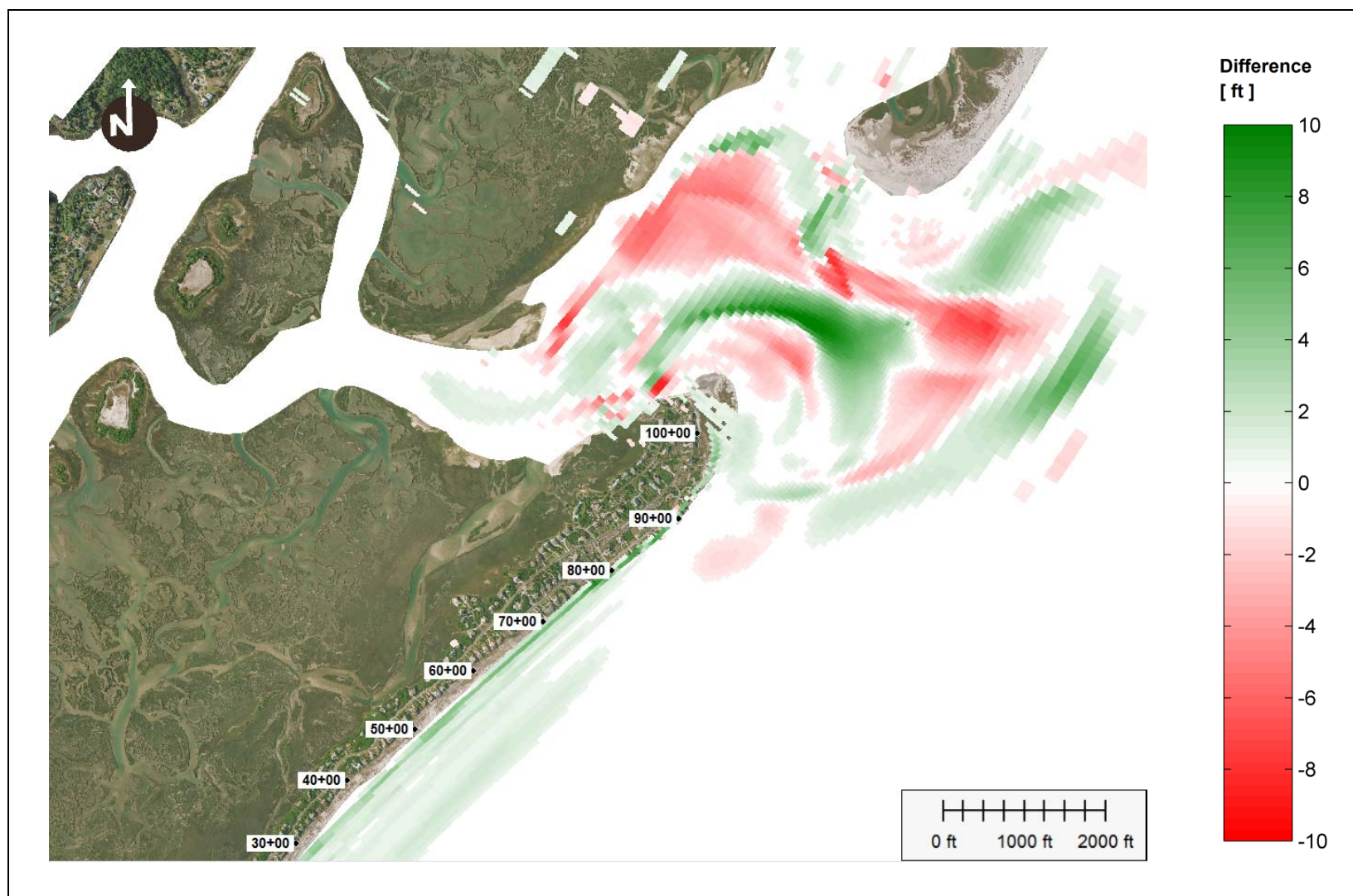


Figure 36: difference between bathymetries of Alternative 4a and Alternative 2 after 5 years simulation.



Alternative 5a-1 - Terminal Groin (700 ft) with Beach Fill from Nixon Channel

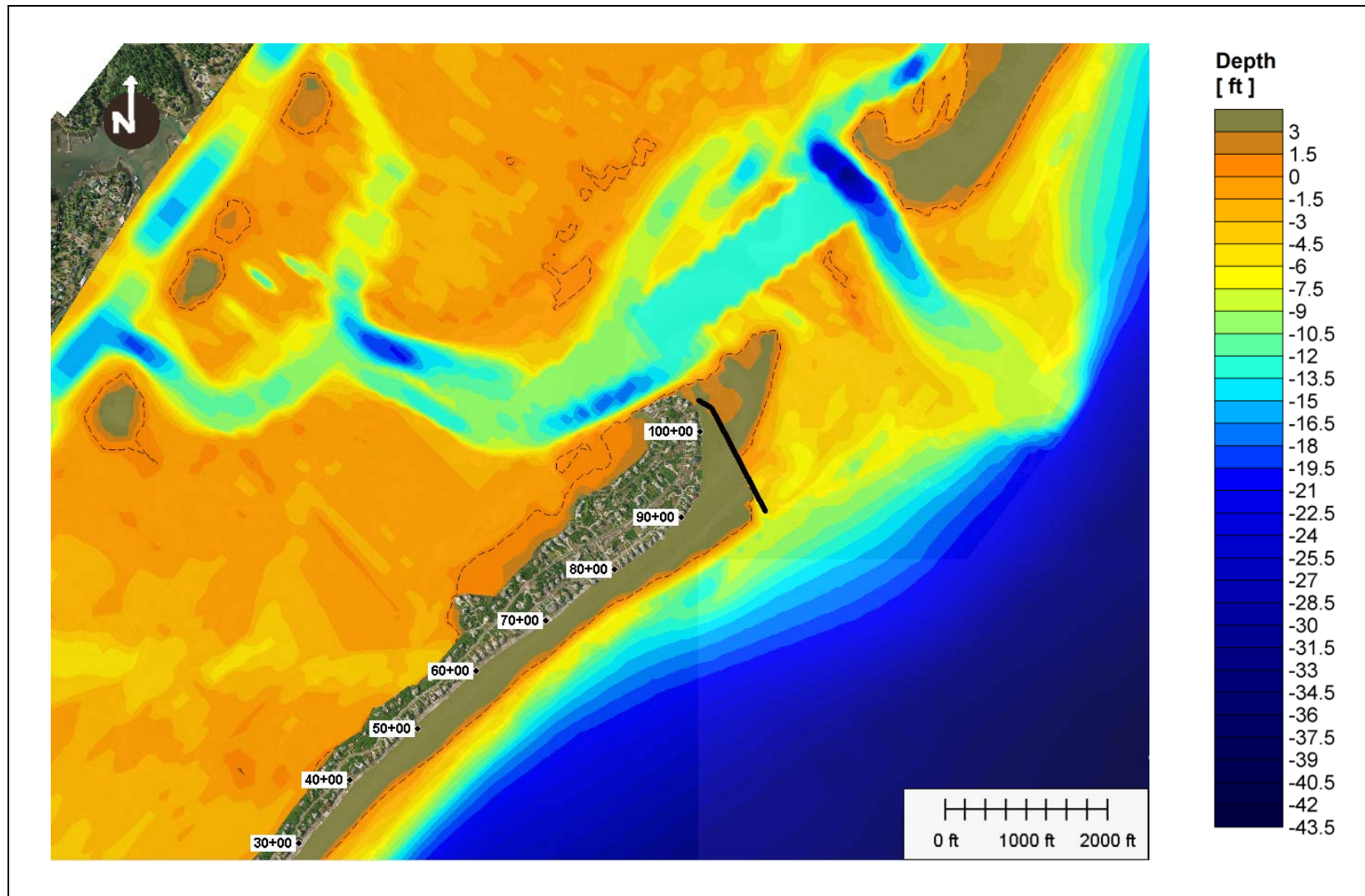


Figure 37: Alternative 5a-1, initial bathymetry.

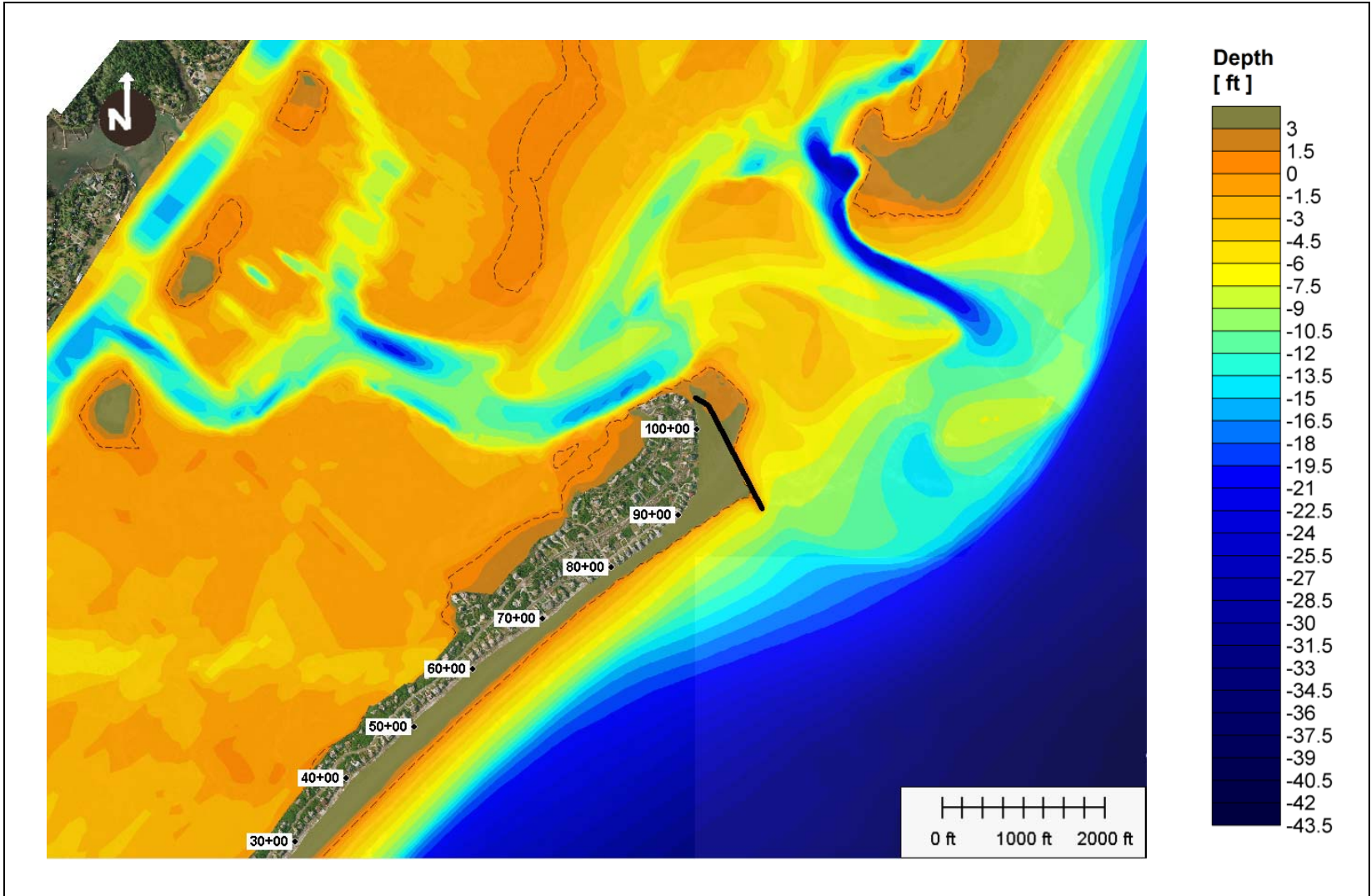


Figure 38: Alternative 5a-1, bathymetry after 2 years simulation.

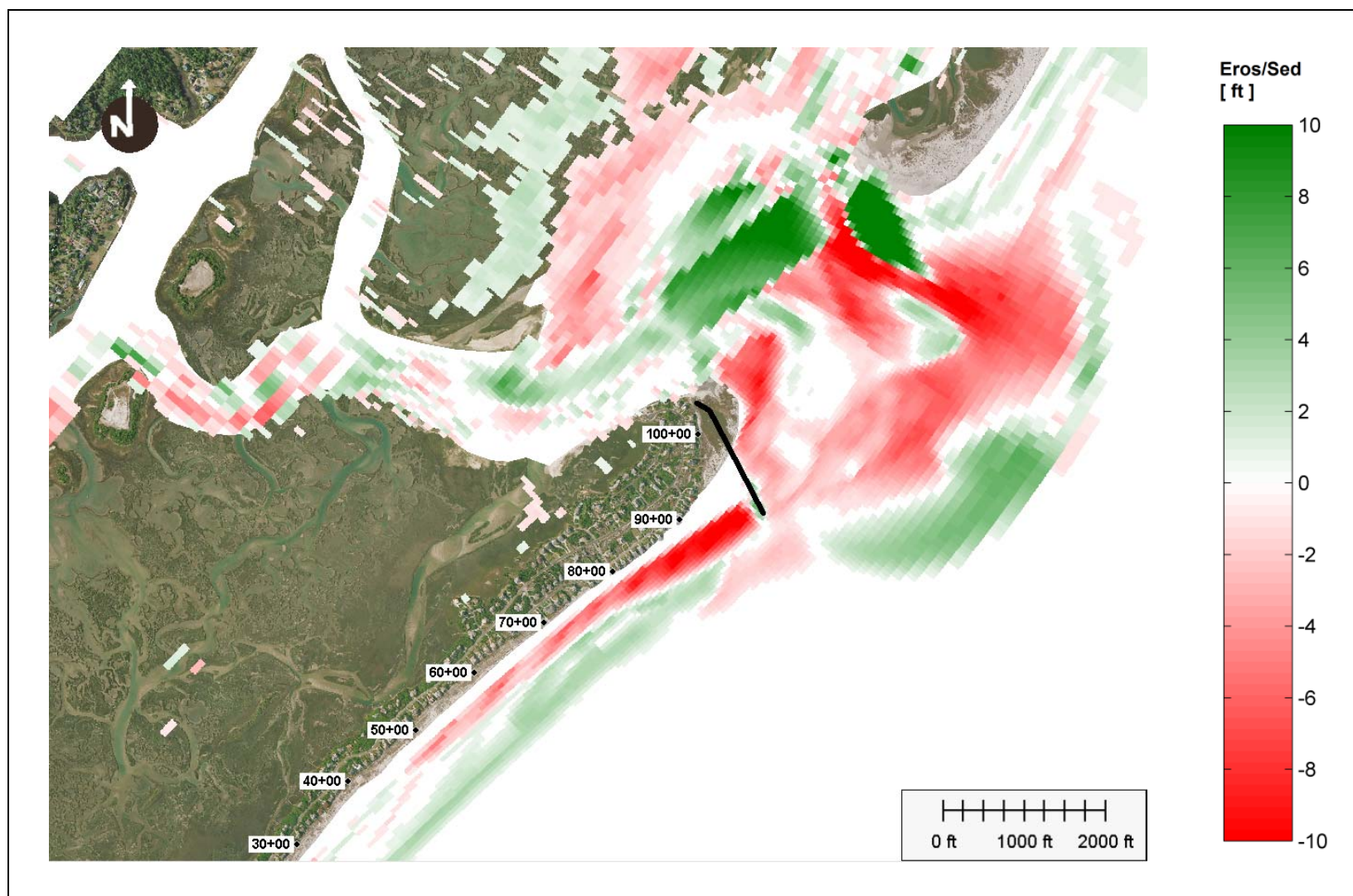


Figure 39: Alternative 5a-1, erosion/sedimentation after 2 years simulation.

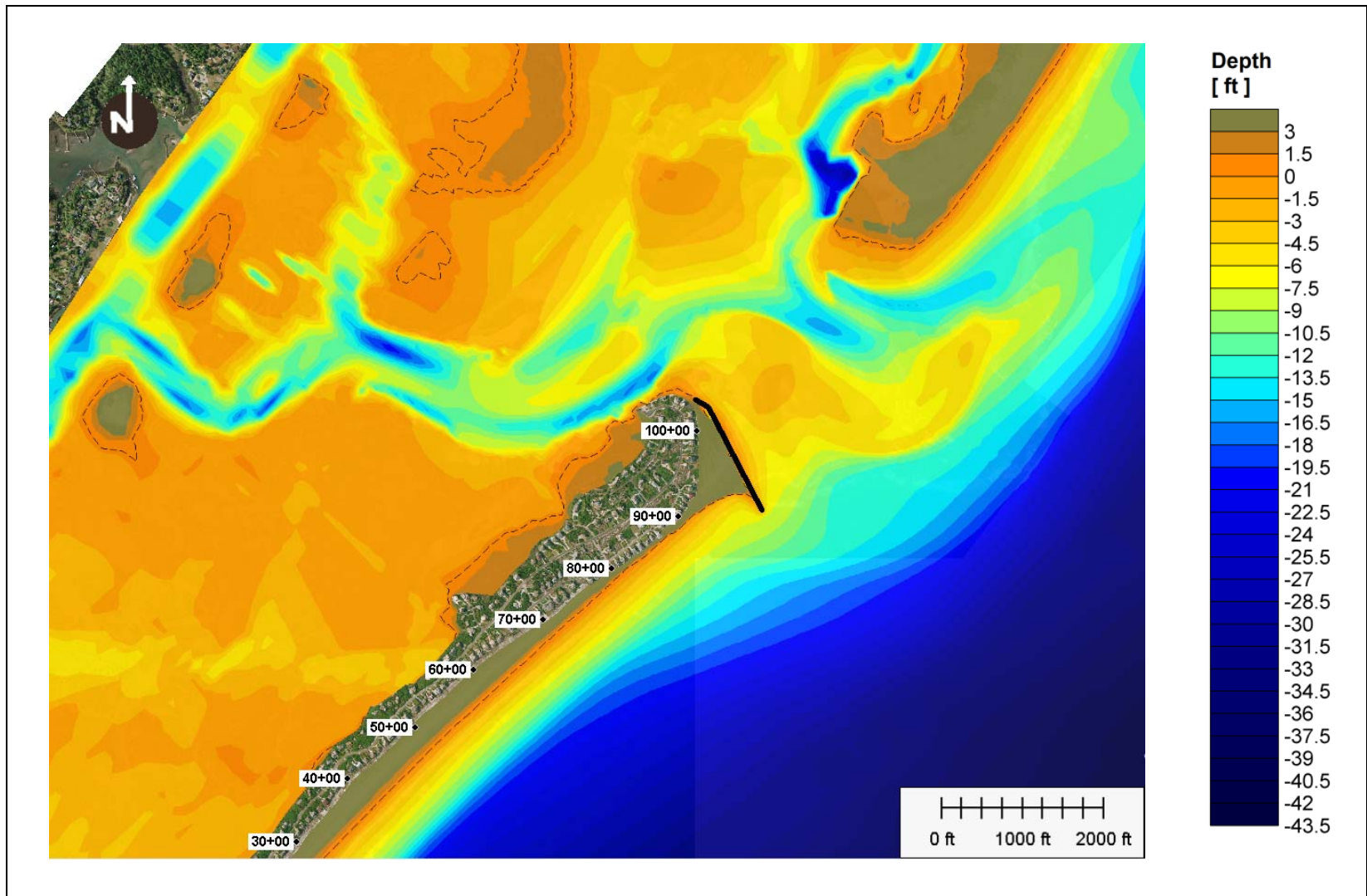


Figure 40: Alternative 5a-1, bathymetry after 5 years simulation.

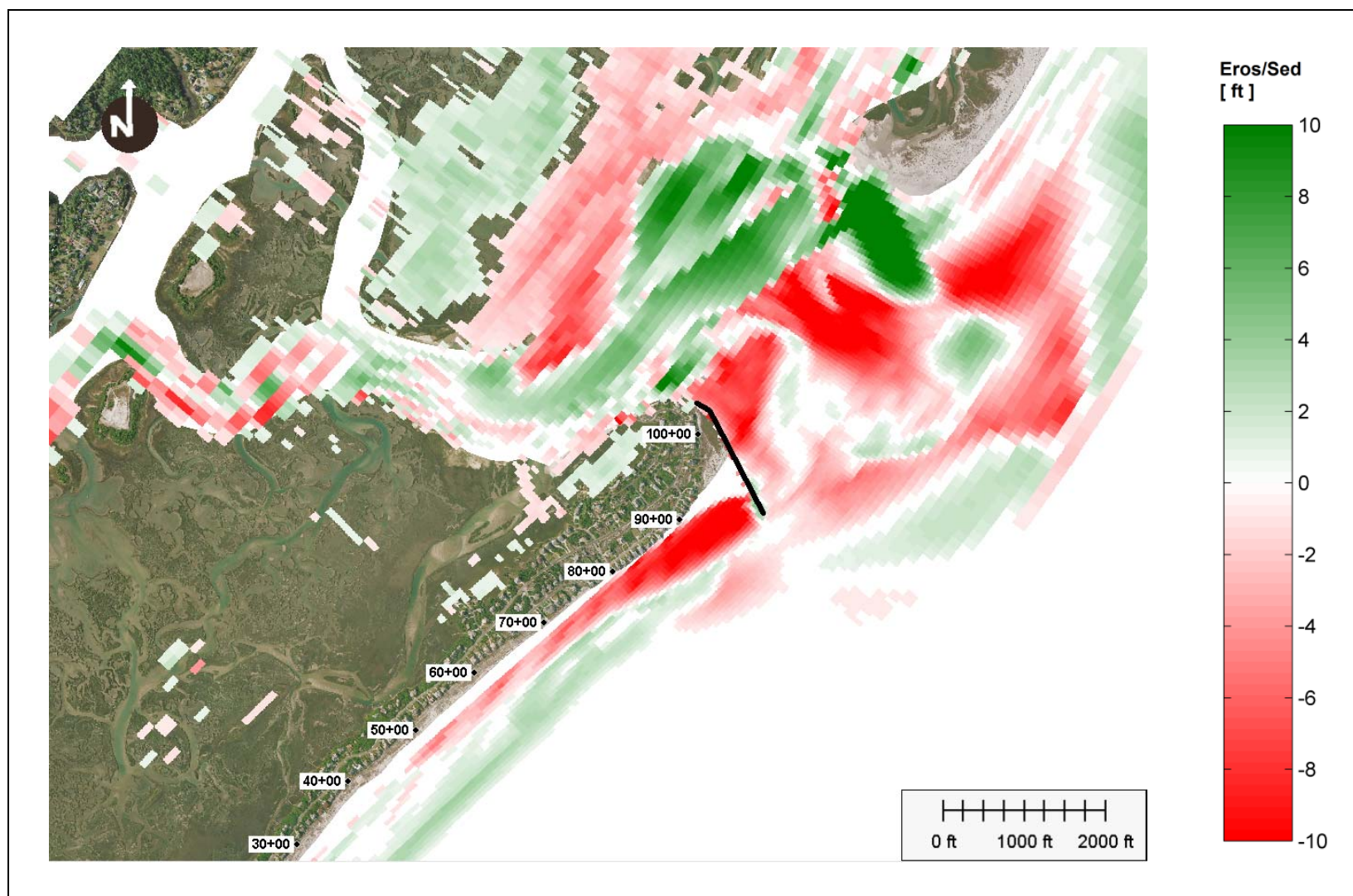


Figure 41: Alternative 5a-1, erosion/sedimentation after 5 year simulation.

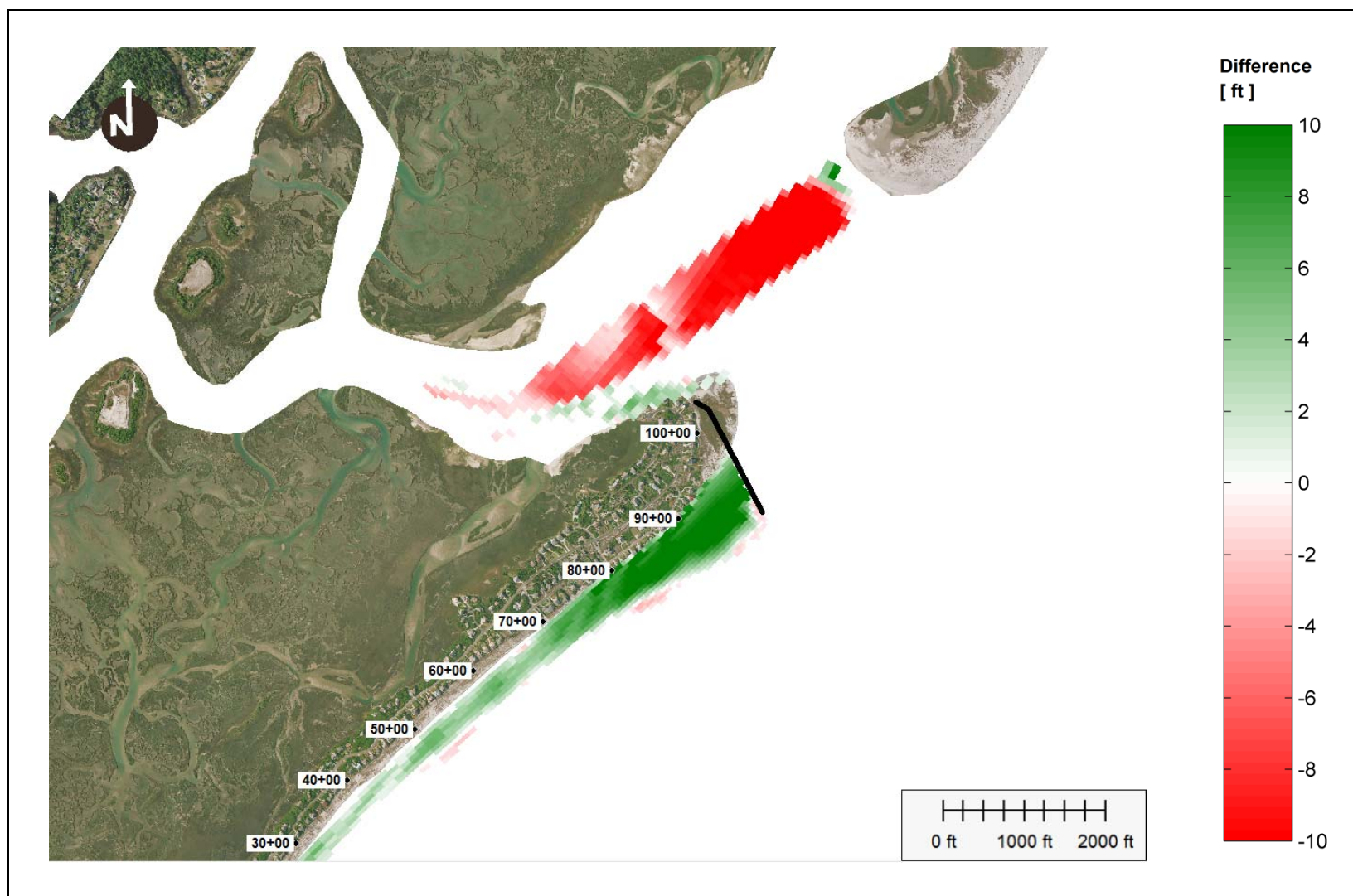


Figure 42: difference between initial bathymetries of Alternative 5a-1 and Alternative 2.

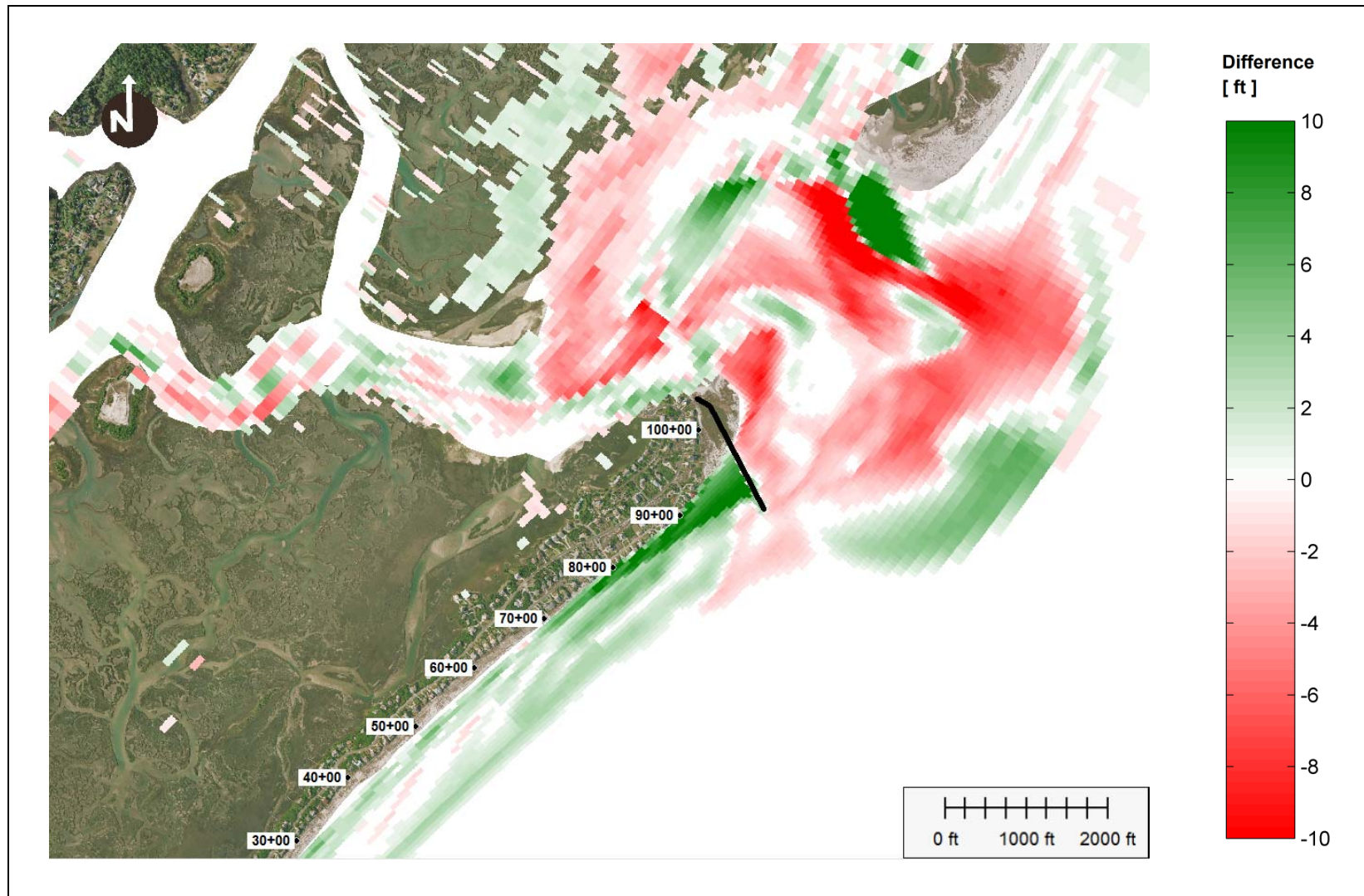


Figure 43: difference between bathymetry of Alternative 5a-1 after 2 years simulation and initial bathymetry of Alternative 2.

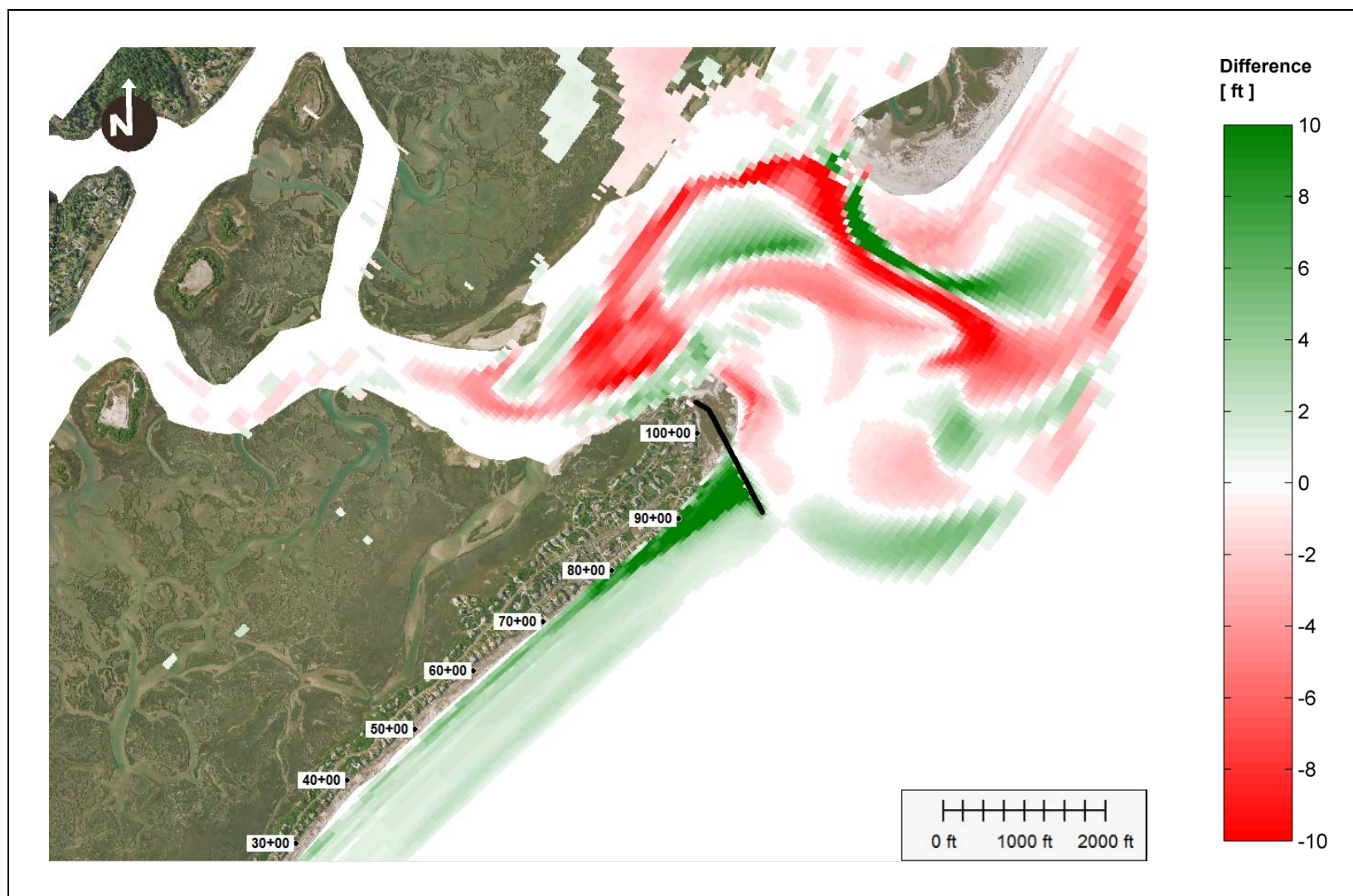


Figure 44: difference between bathymetries of Alternative 5a-1 and Alternative 2 after 2 years simulation.

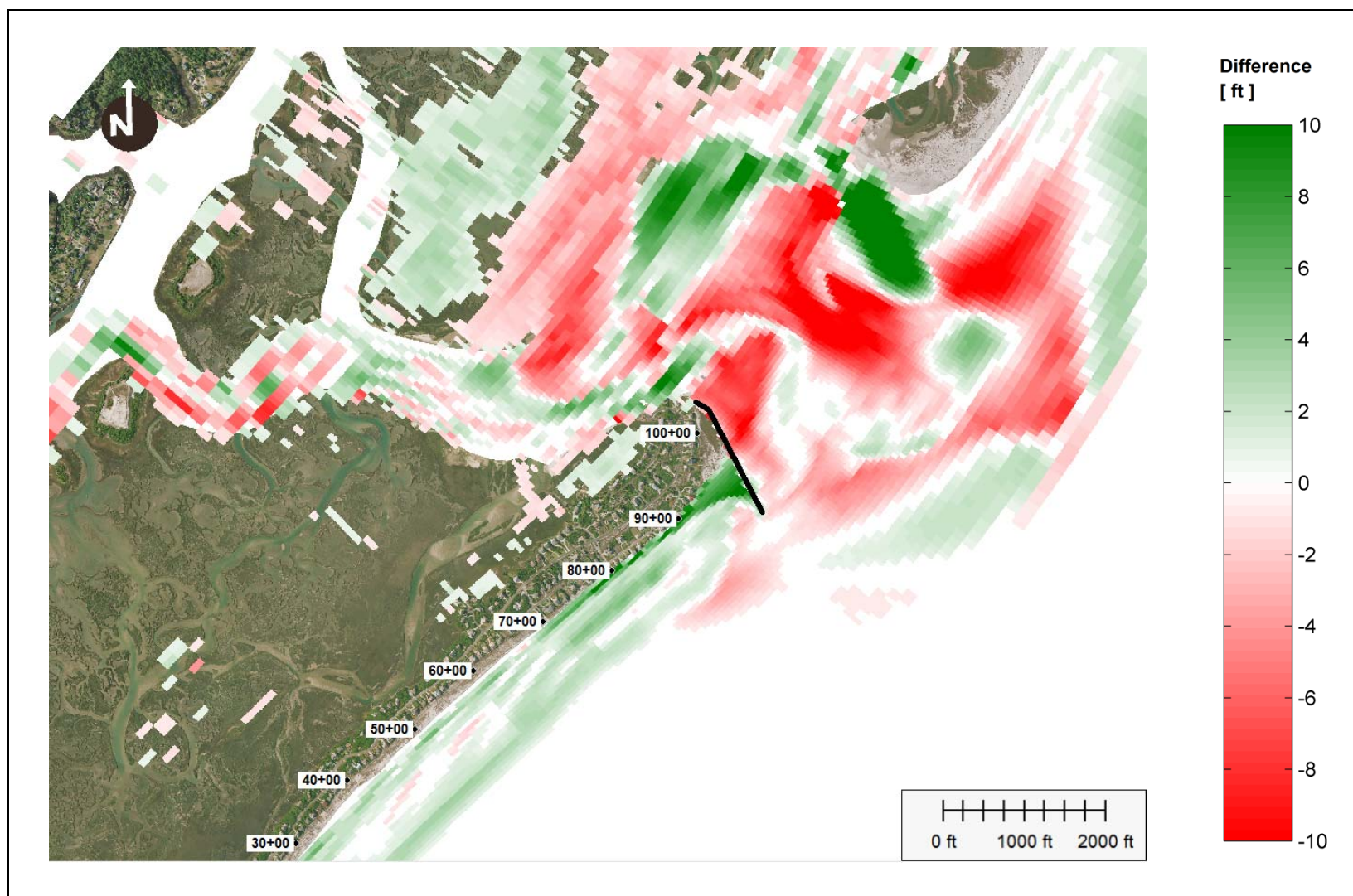


Figure 45: difference between bathymetry of Alternative 5a-1 after 5 years simulation and initial bathymetry of Alternative 2.

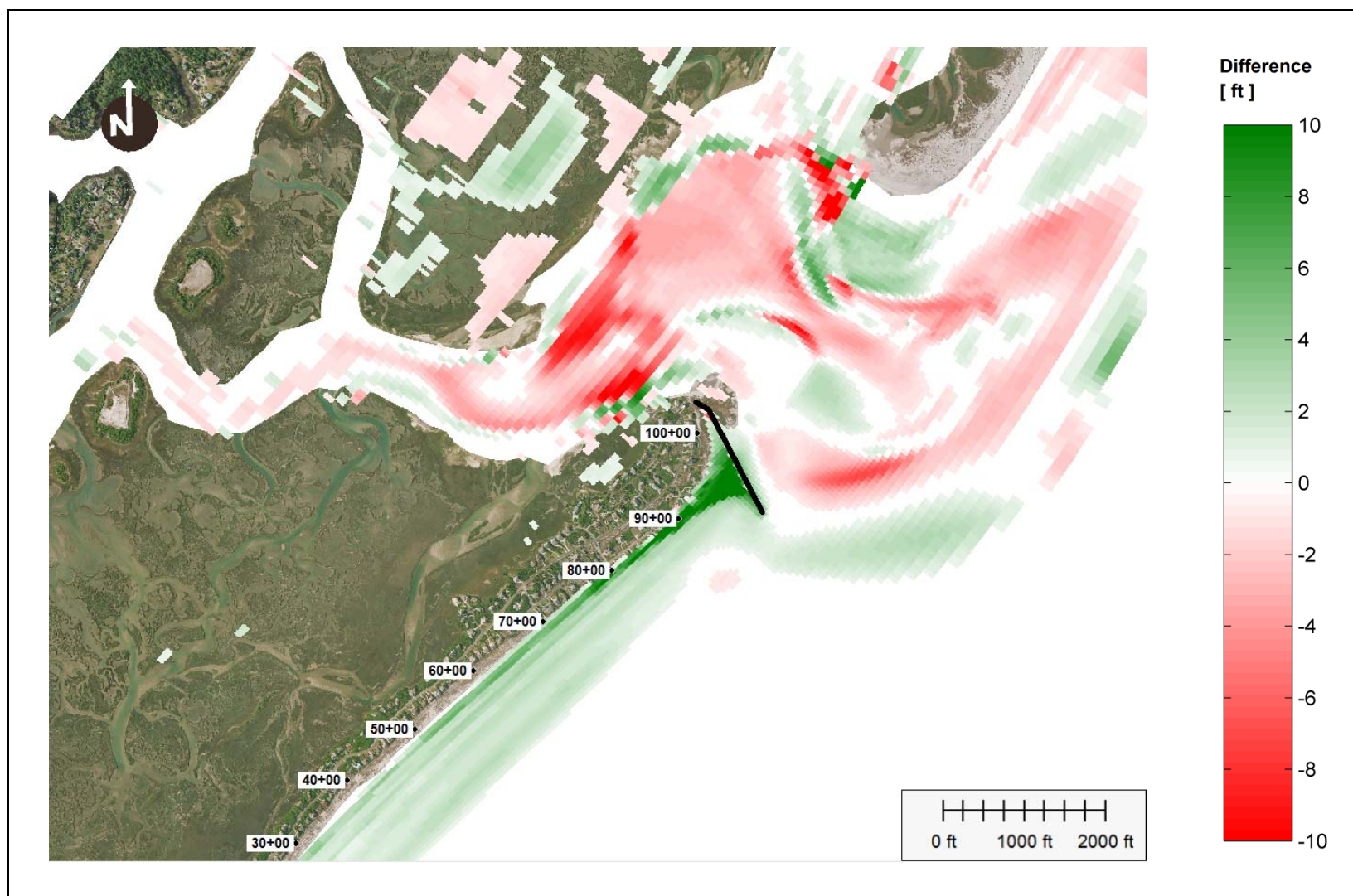


Figure 46: difference between bathymetries of Alternative 5a-1 and Alternative 2 after 5 years simulation.

Alternative 5a-2 - Terminal Groin (1,200 ft) with Beach Fill from Nixon Channel

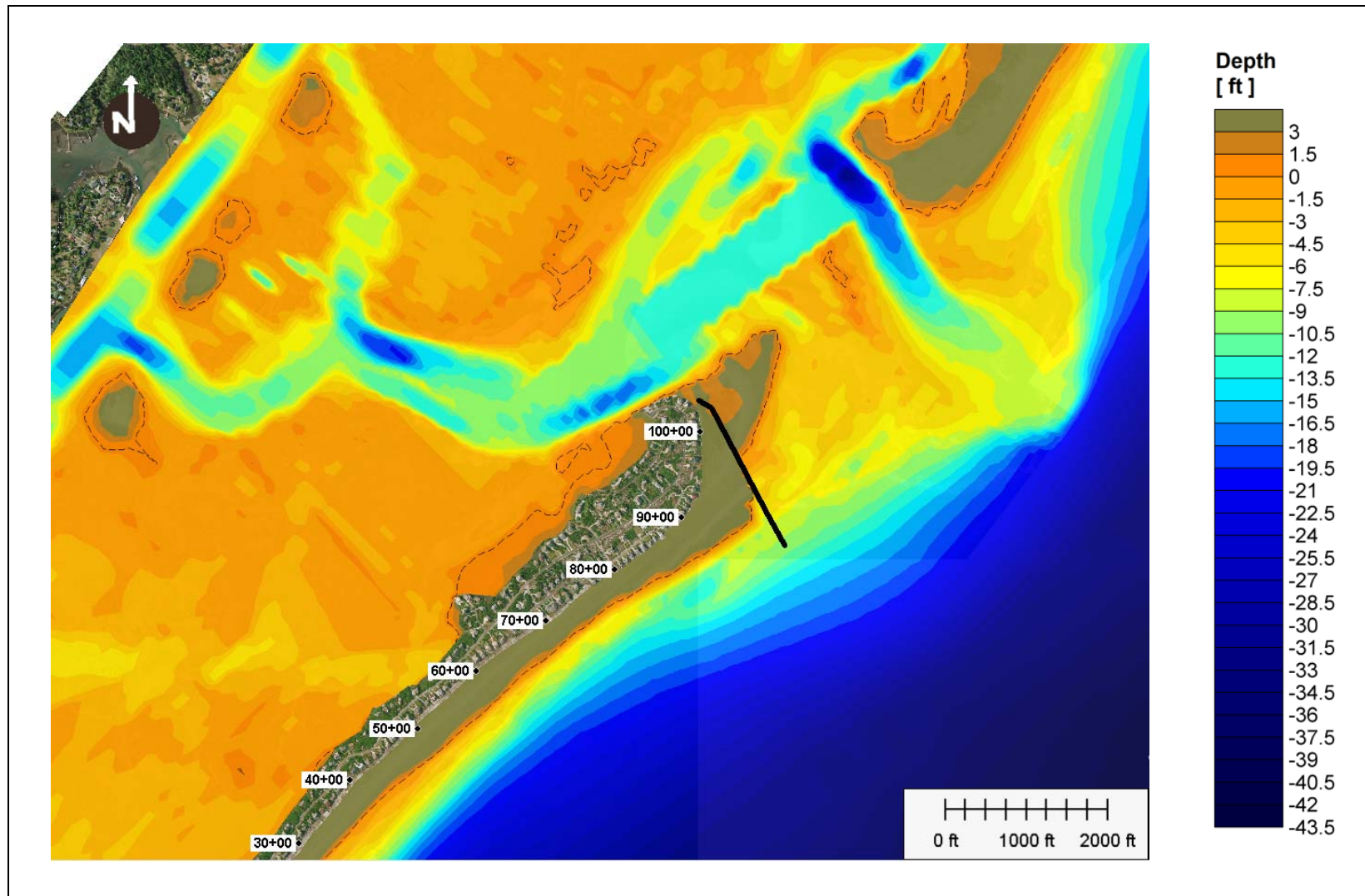


Figure 47: Alternative 5a-2, initial bathymetry.

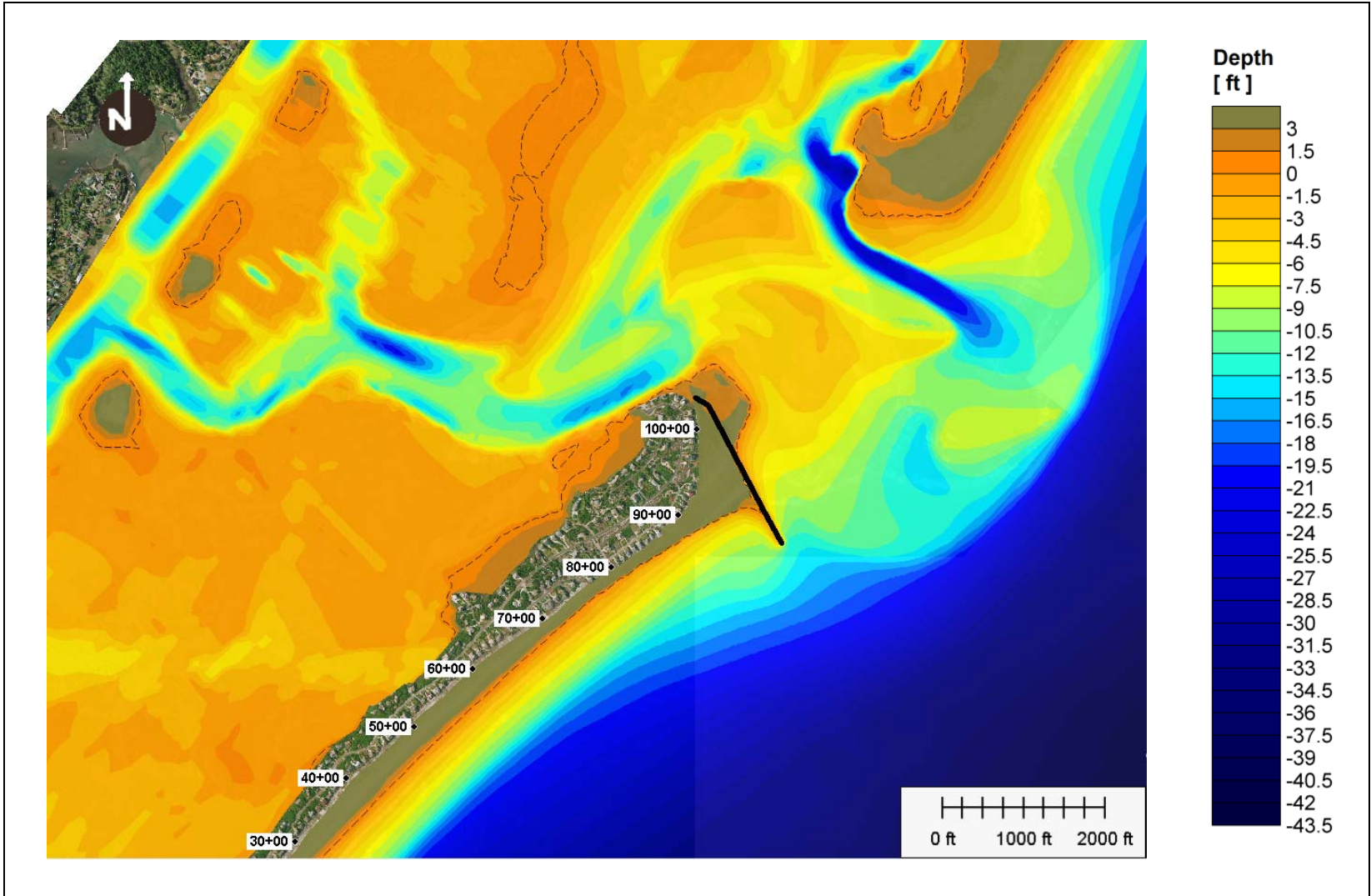


Figure 48: Alternative 5a-2, bathymetry after 2 years simulation.

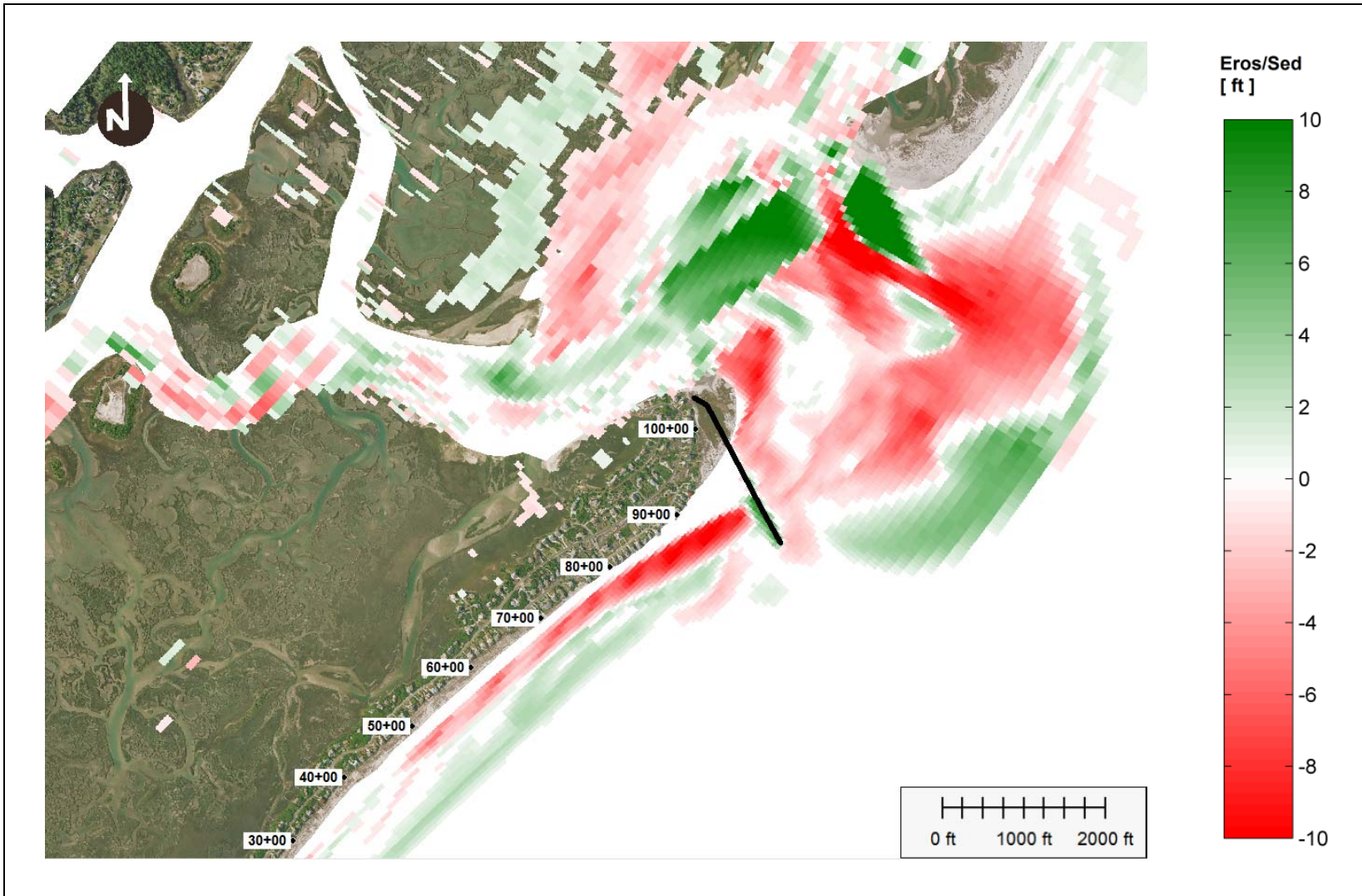


Figure 49: Alternative 5a-2, erosion/sedimentation after 2 years simulation.

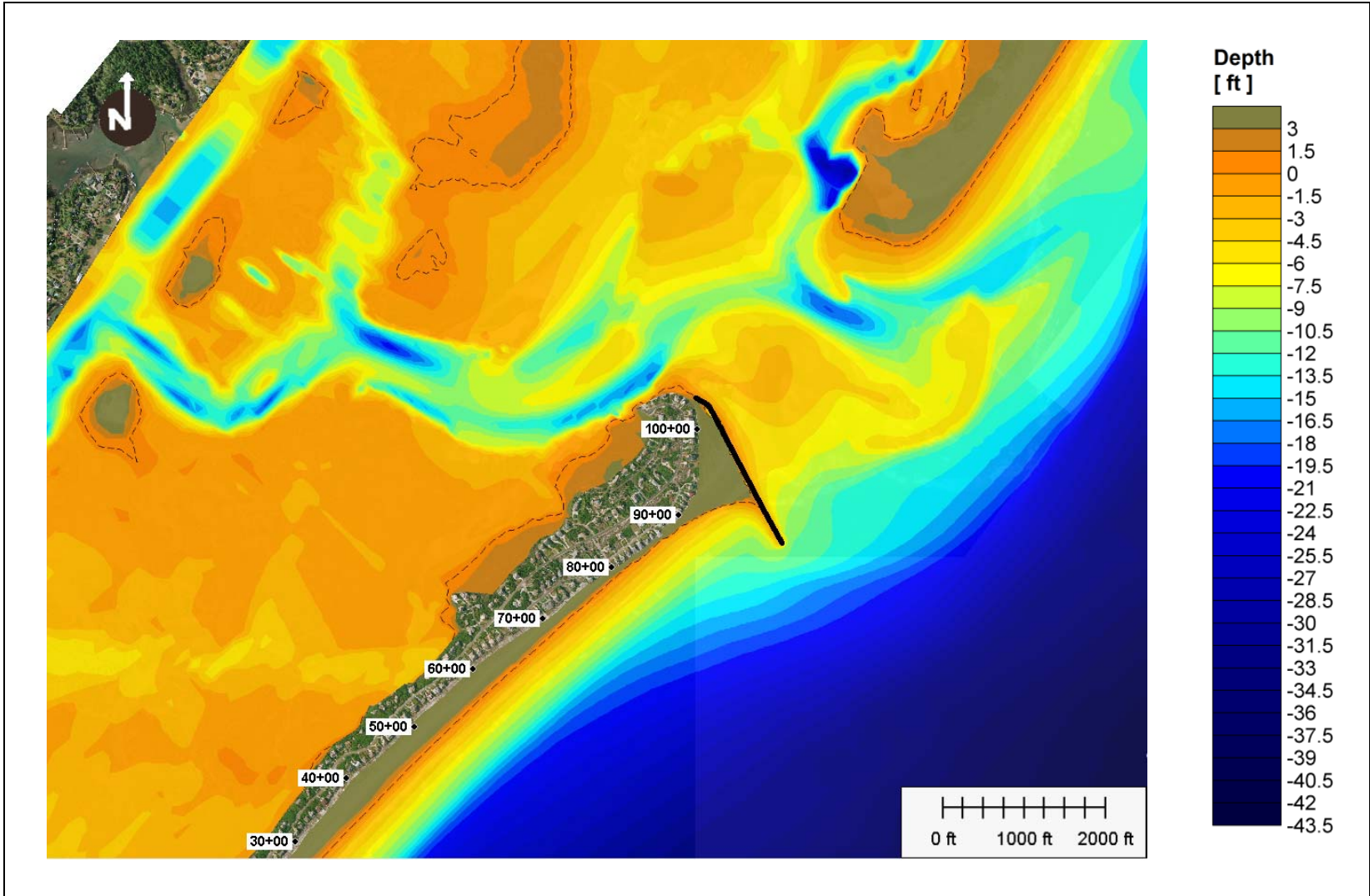


Figure 50: Alternative 5a-2, bathymetry after 5 years simulation.

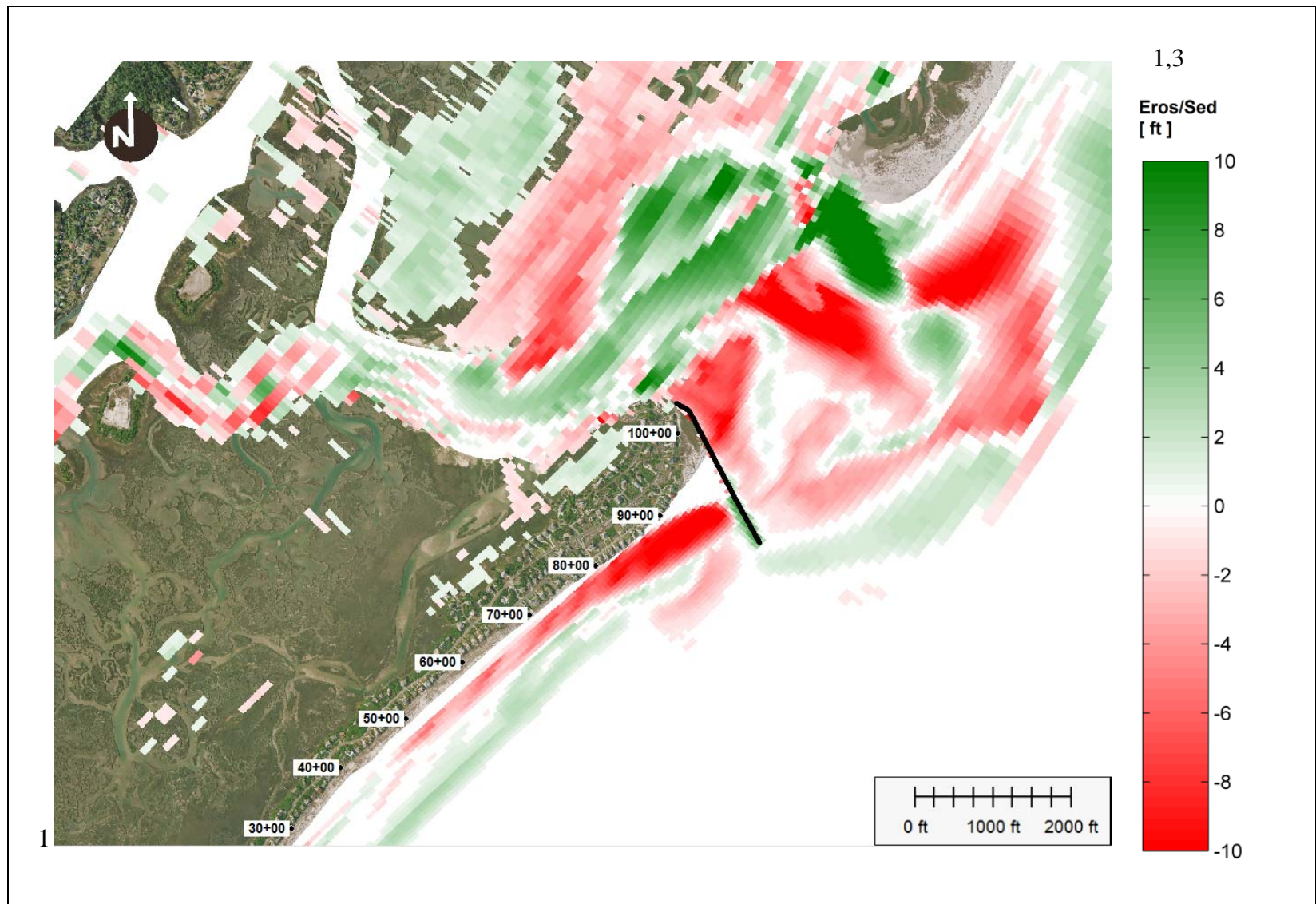


Figure 51: Alternative 5a-2, erosion/sedimentation after 5 year simulation.

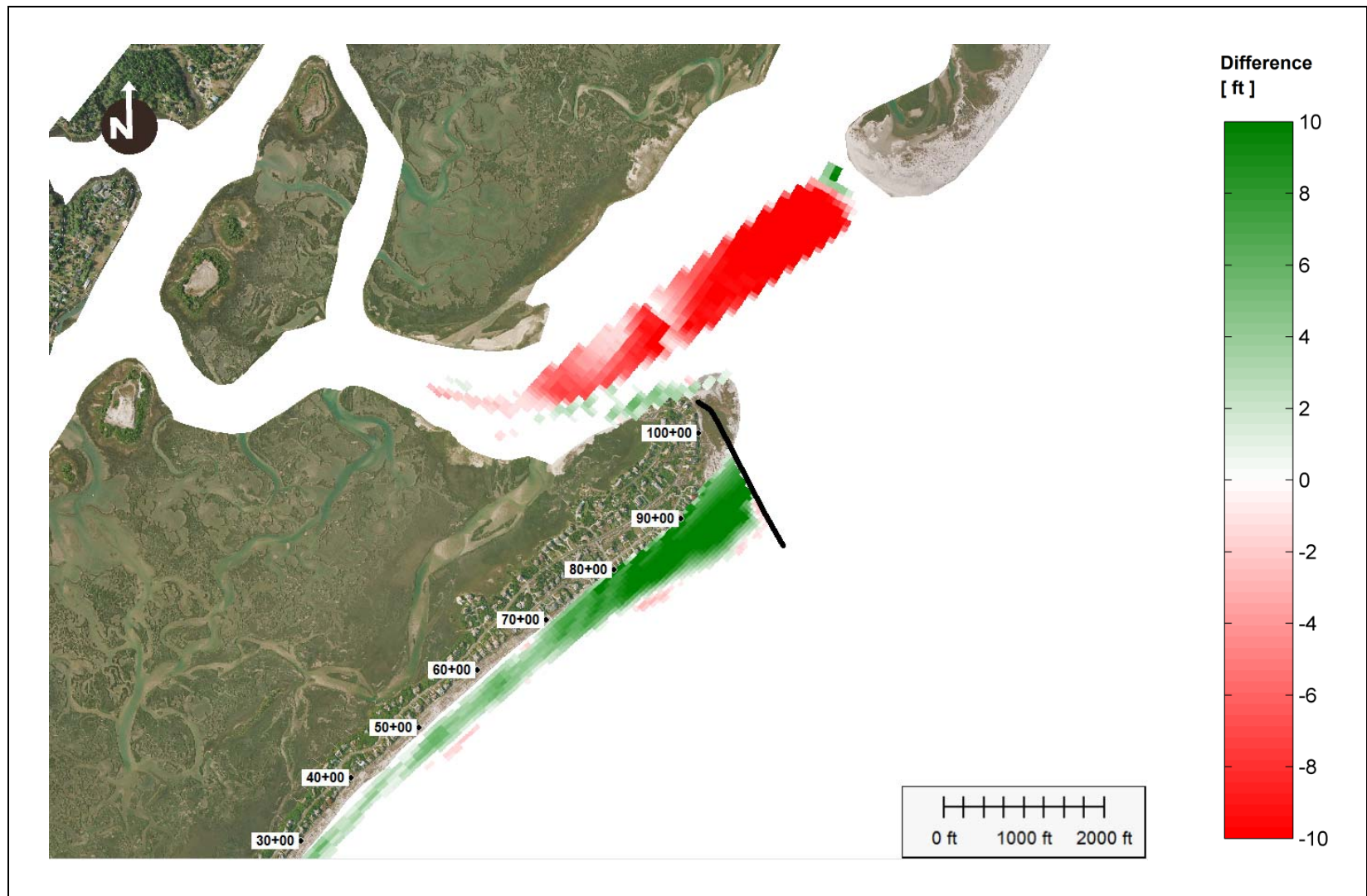


Figure 52: difference between initial bathymetries of Alternative 5a-2 and Alternative 2.

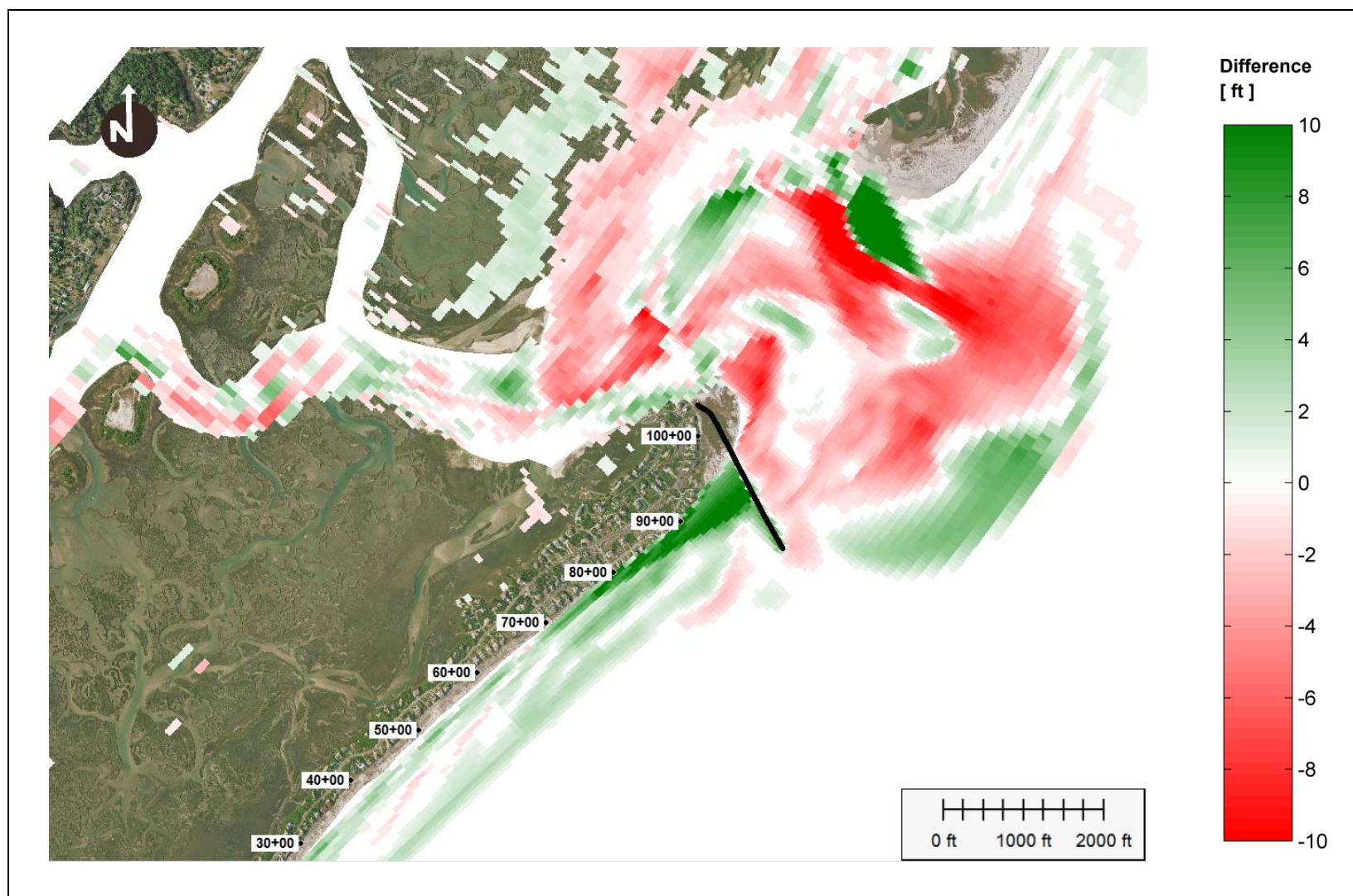


Figure 53: difference between bathymetry of Alternative 5a-2 after 2 years simulation and initial bathymetry of Alternative 2.

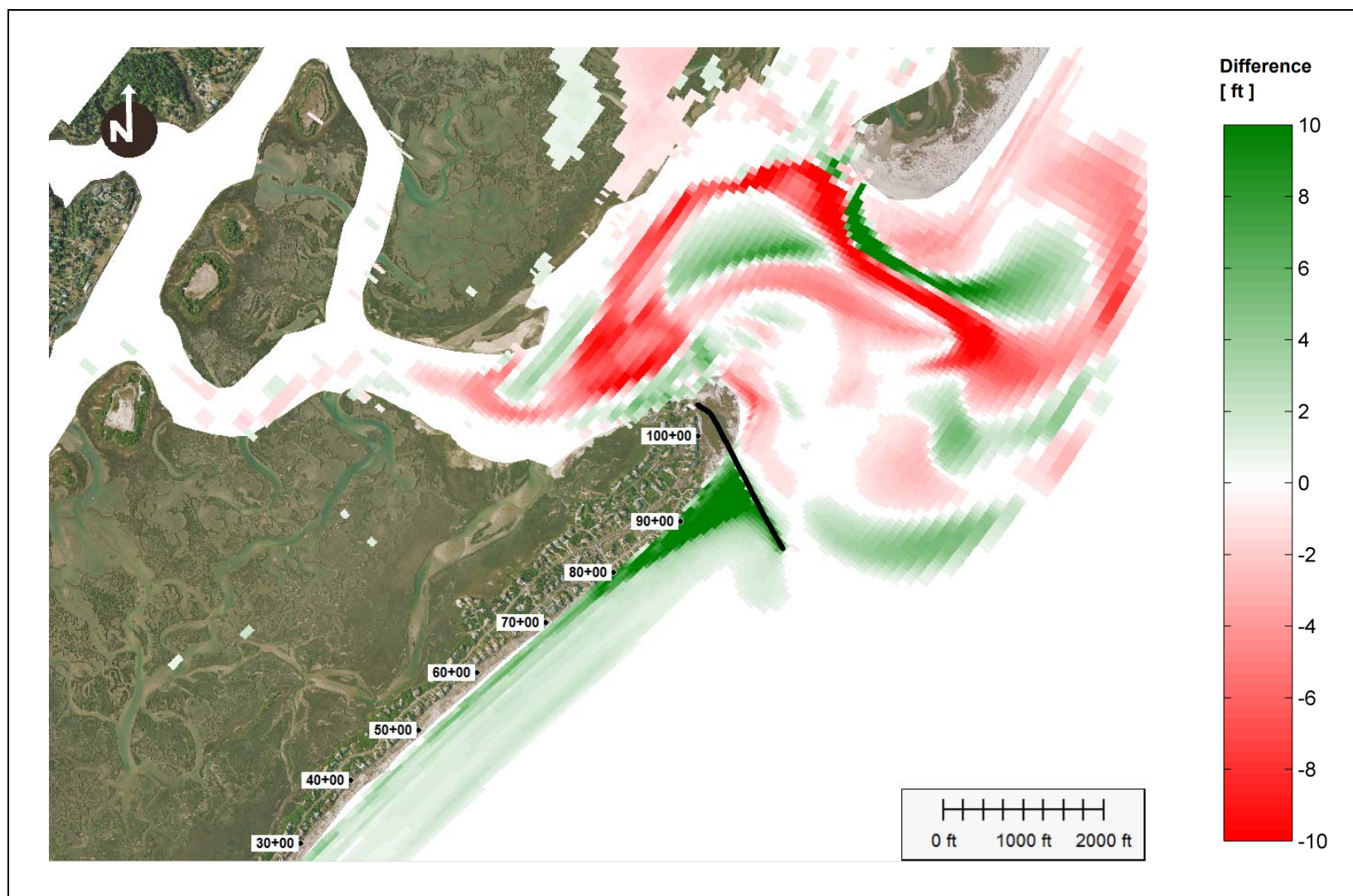


Figure 54: difference between bathymetries of Alternative 5a-2 and Alternative 2 after 2 years simulation.

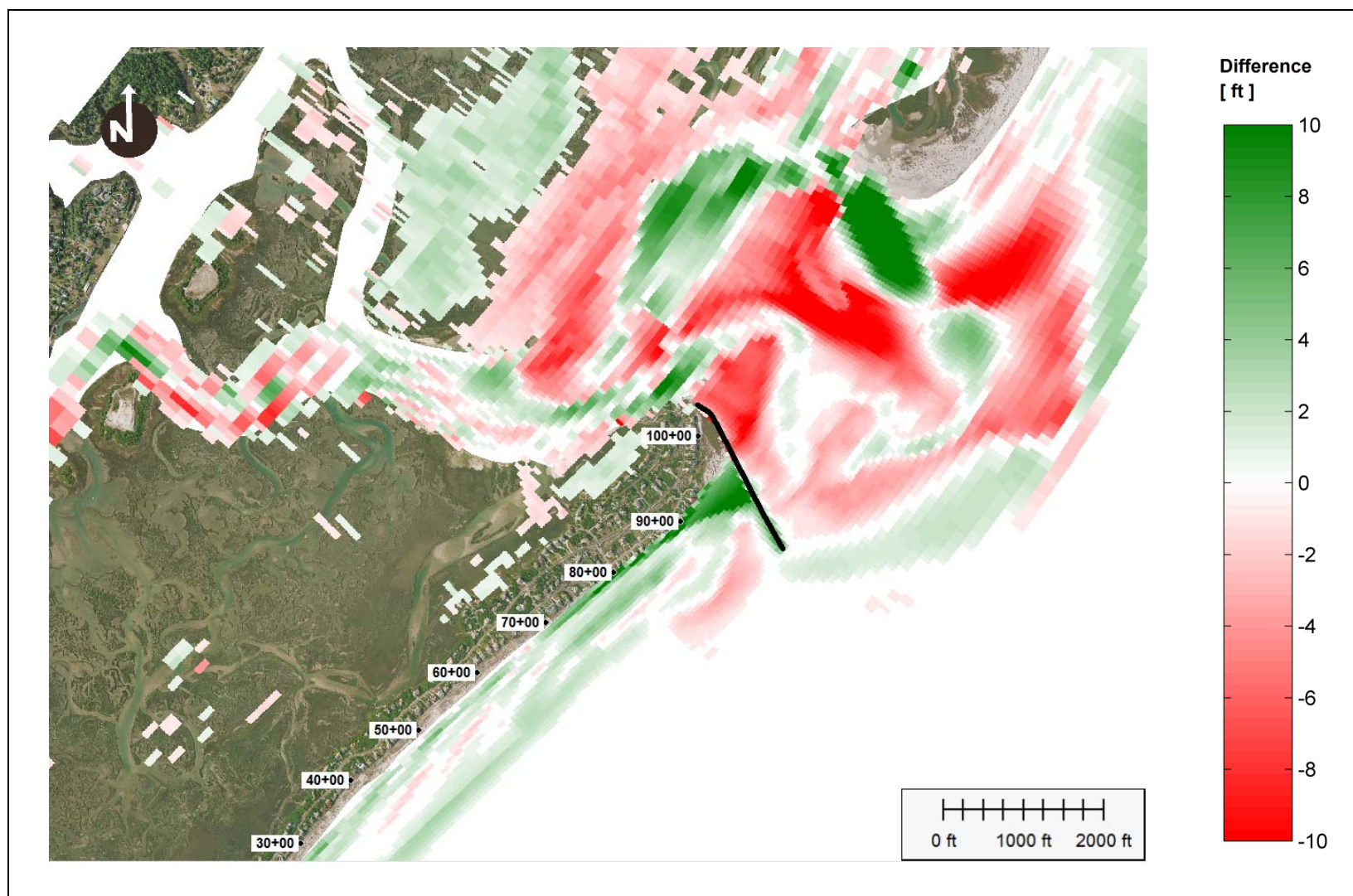


Figure 55: difference between bathymetry of Alternative 5a-2 after 5 years simulation and initial bathymetry of Alternative 2.

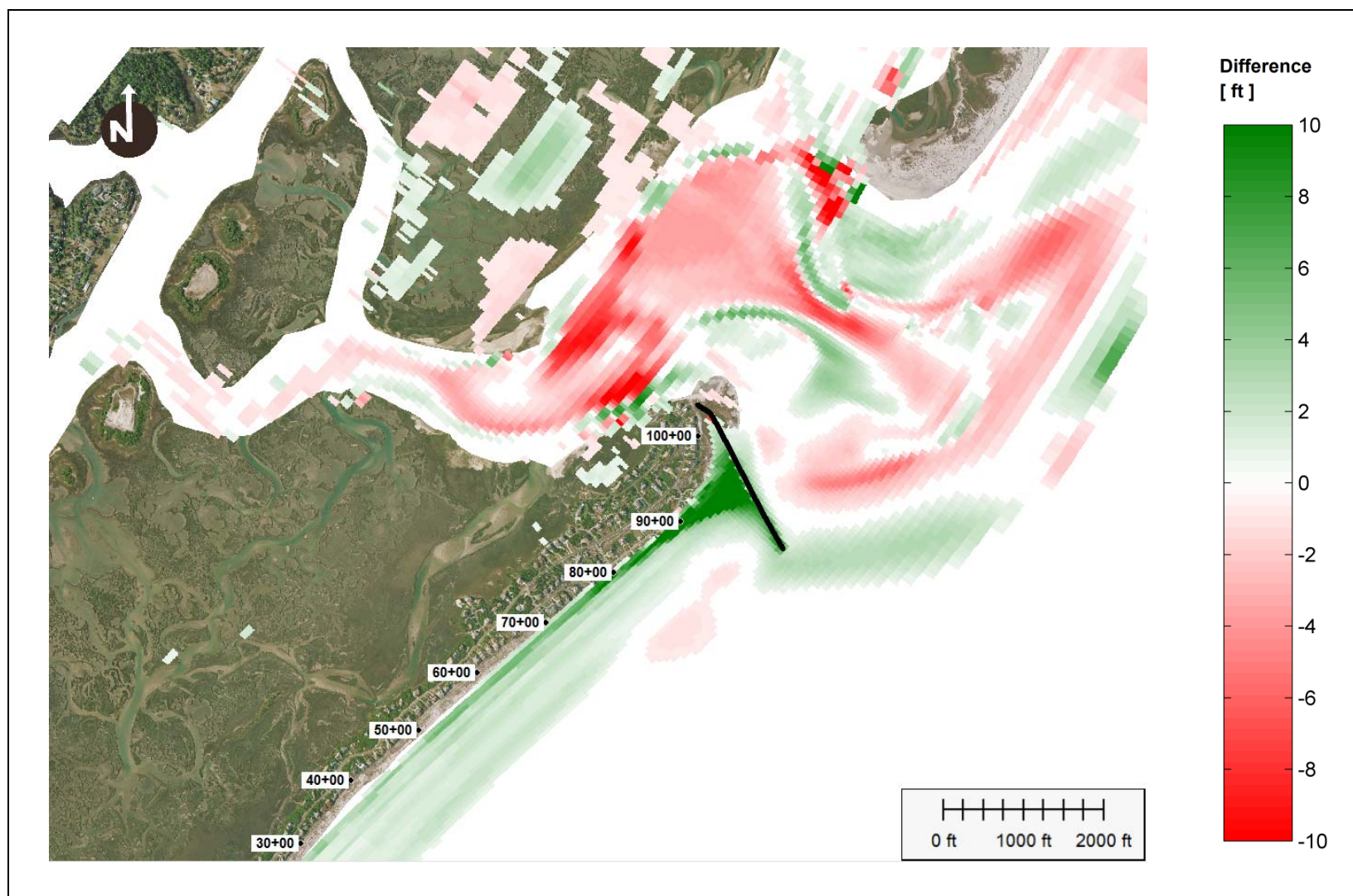


Figure 56: difference between bathymetries of Alternative 5a-2 and Alternative 2 after 5 years simulation.

Alternative 5a-3 - Terminal Groin (700 ft) without Oceanfront Beach Fill

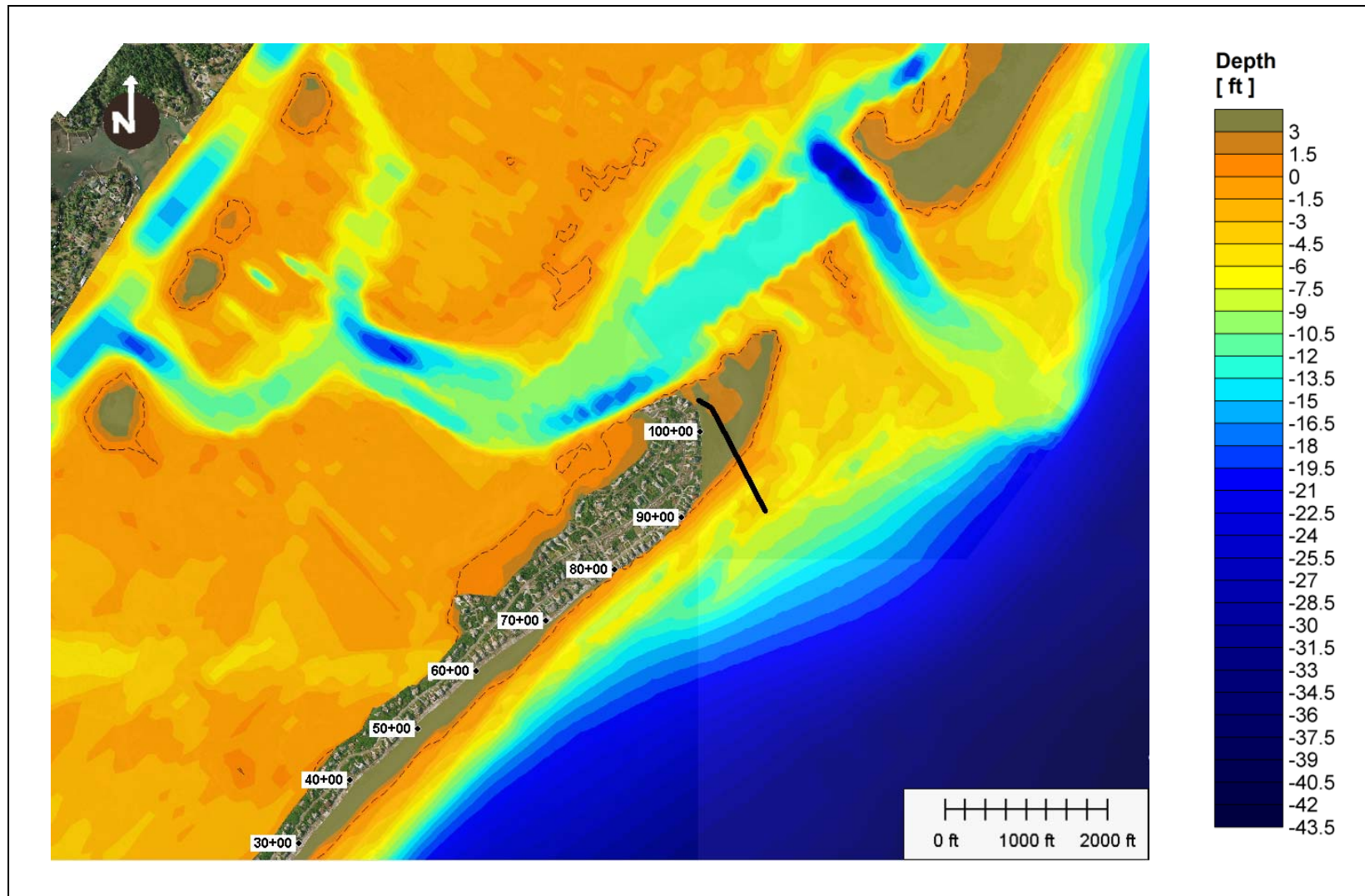


Figure 57: Alternative 5a-3 (700 ft groin), initial bathymetry.

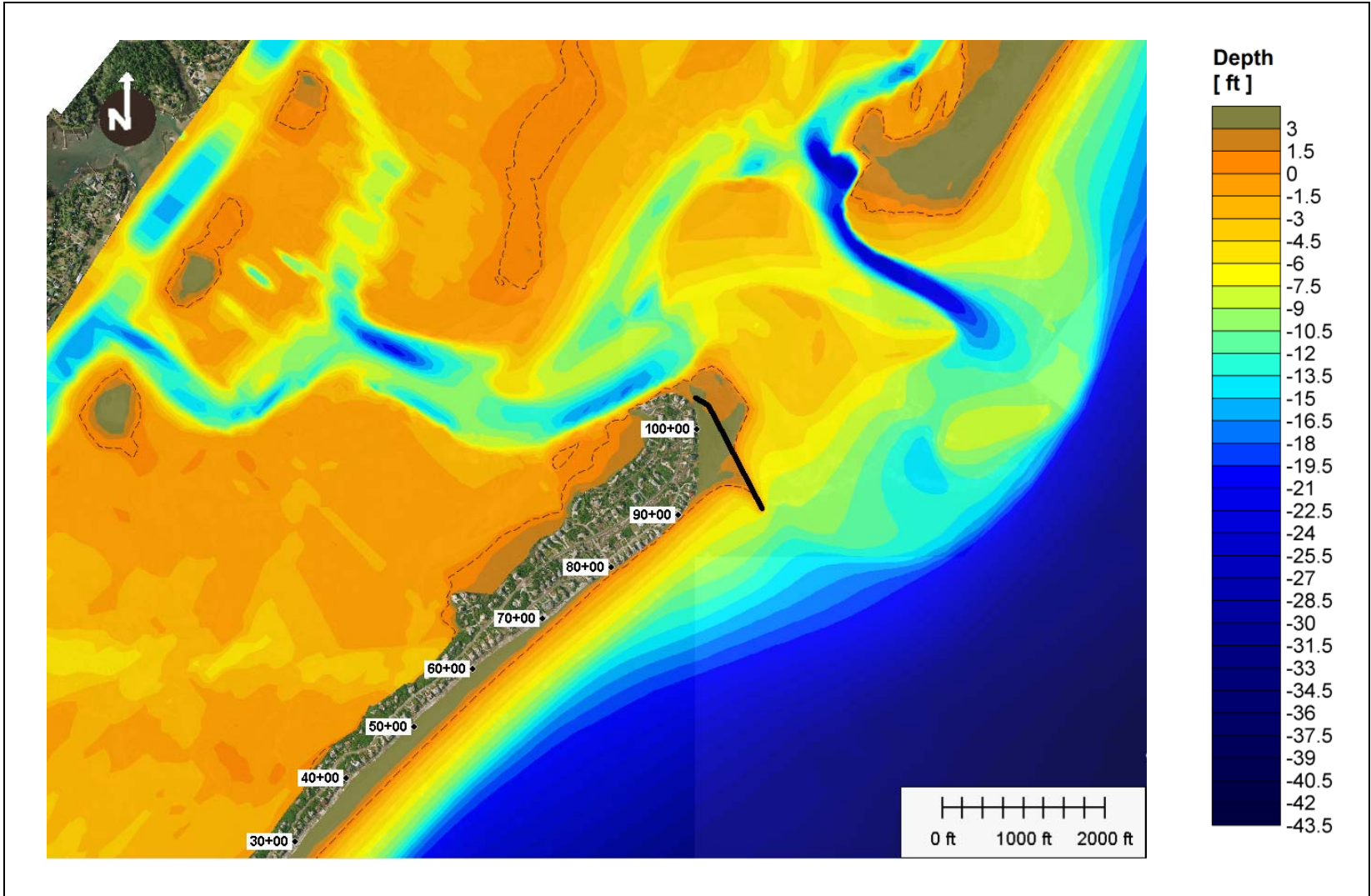
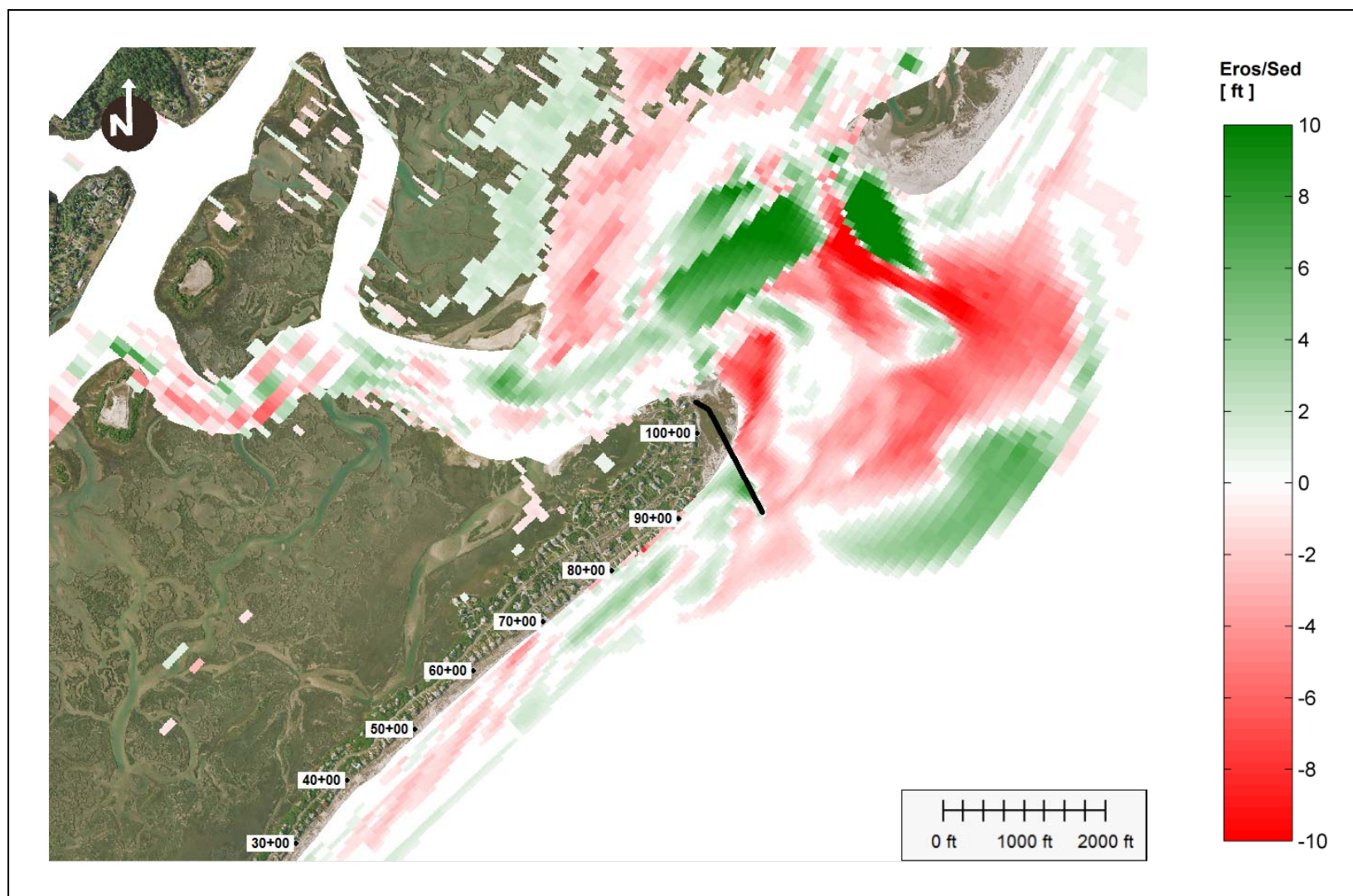


Figure 58: Alternative 5a-3 (700 ft groin), bathymetry after 2 years simulation.



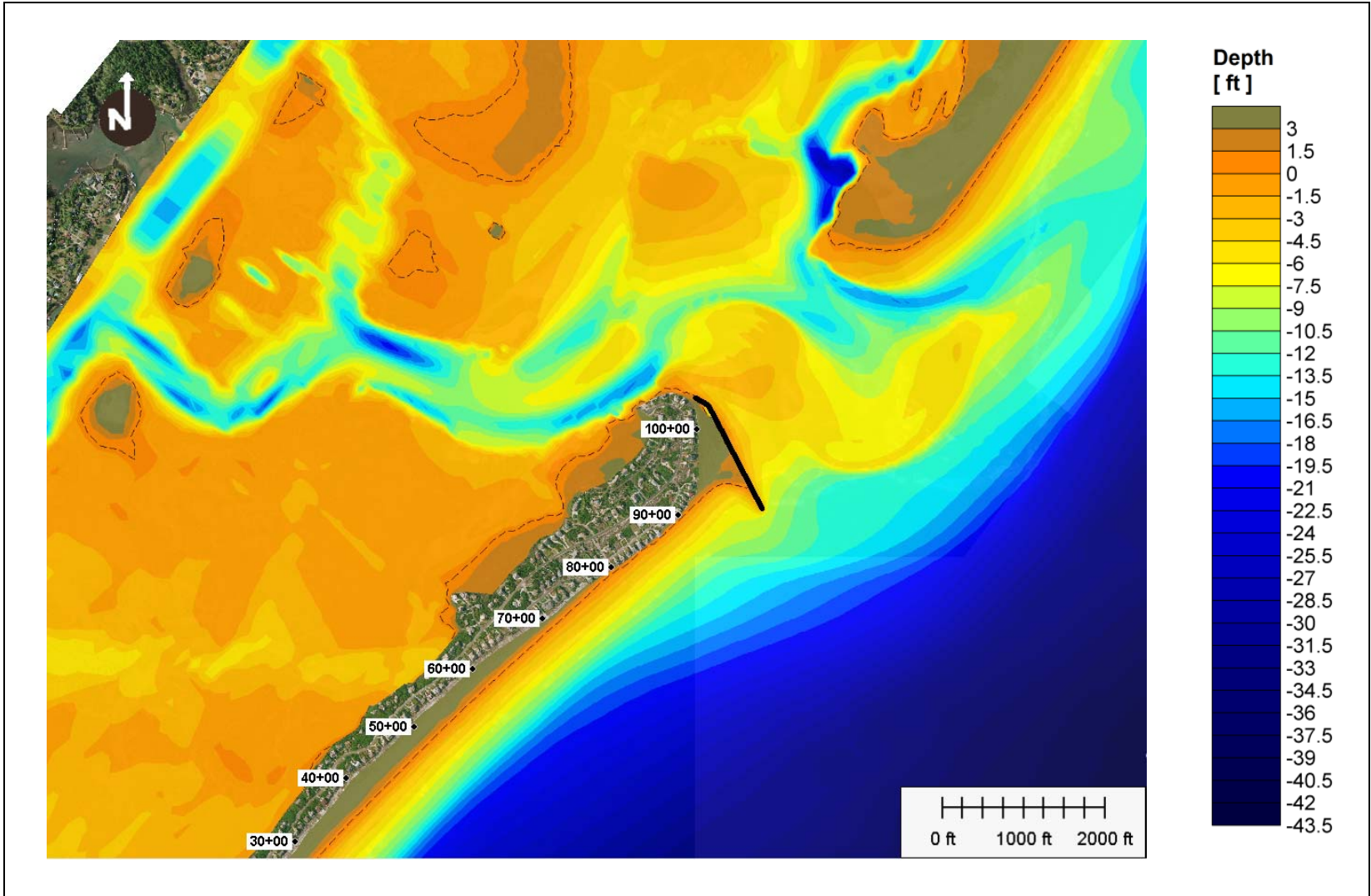


Figure 60: Alternative 5a-3 (700 ft groin), bathymetry after 5 years simulation.

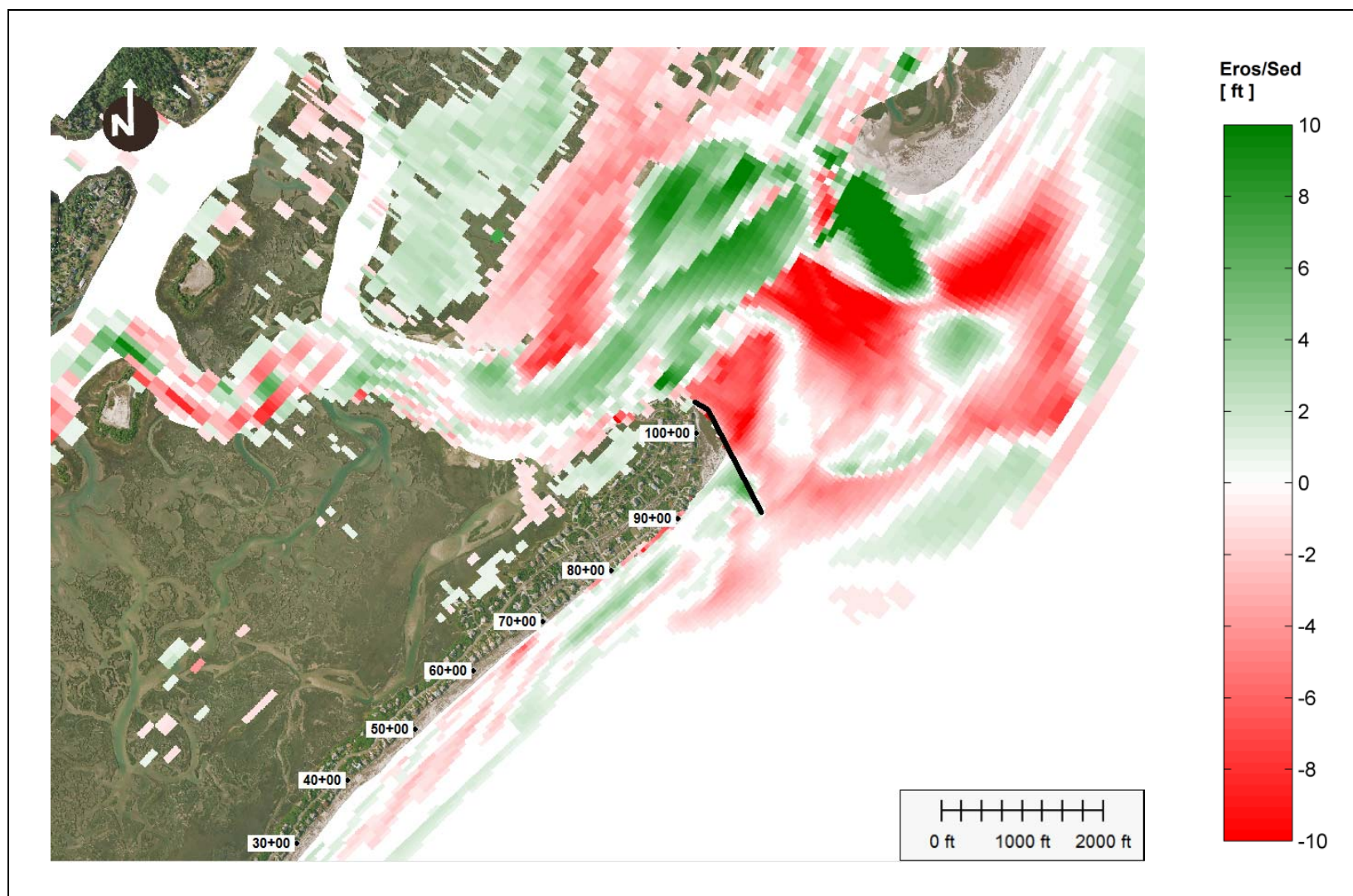


Figure 61: Alternative 5a-3 (700 ft groin), erosion/sedimentation after 5 year simulation.

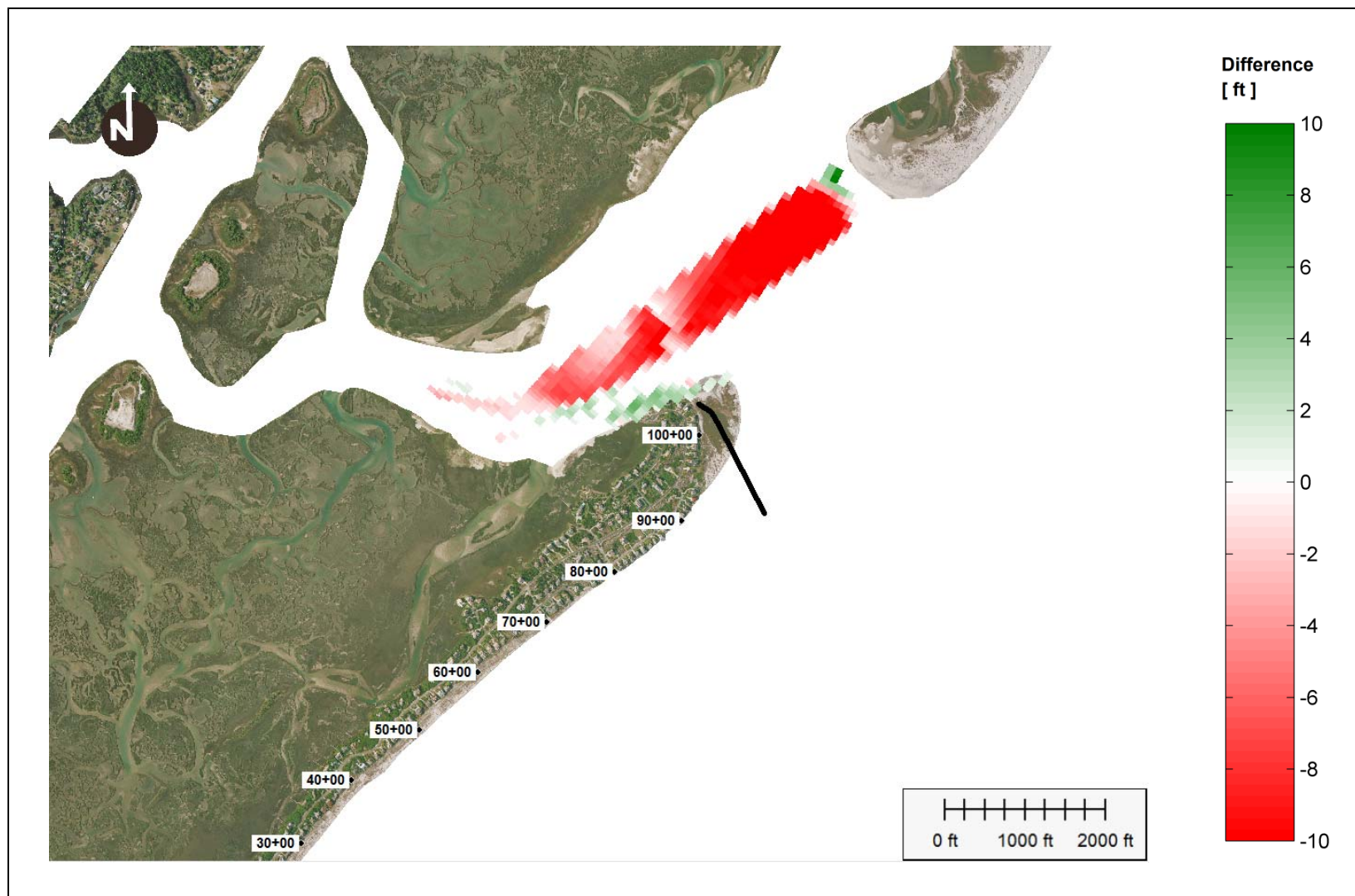


Figure 62: difference between initial bathymetries of Alternative 5a-3 (700 ft groin) and Alternative 2.

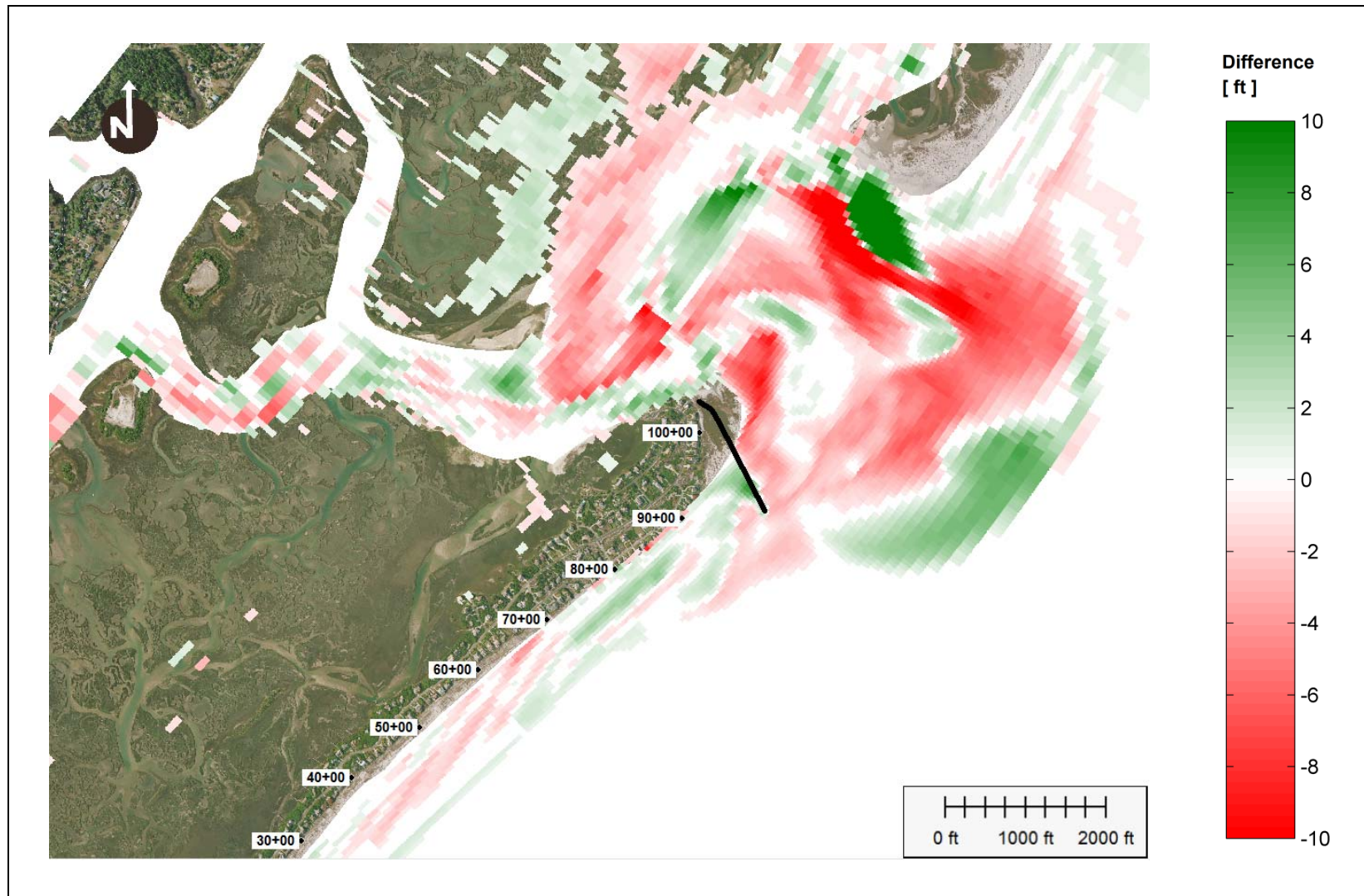


Figure 63: difference between bathymetry of Alternative 5a-3 (700 ft groin) after 2 years simulation and initial bathymetry of Alternative 2.

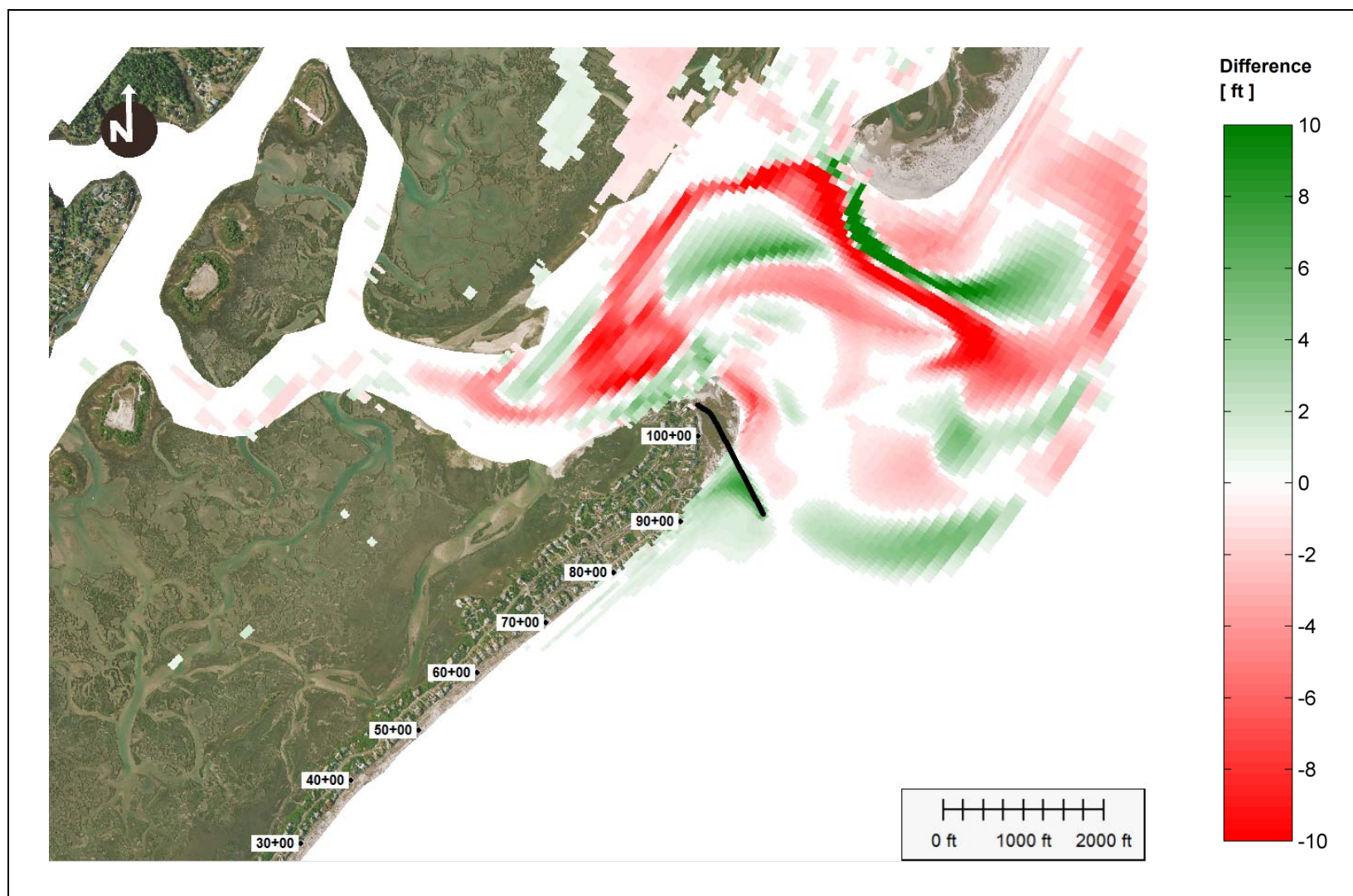


Figure 64: difference between bathymetries of Alternative 5a-3 (700 ft groin) and Alternative 2 after 2 years simulation.

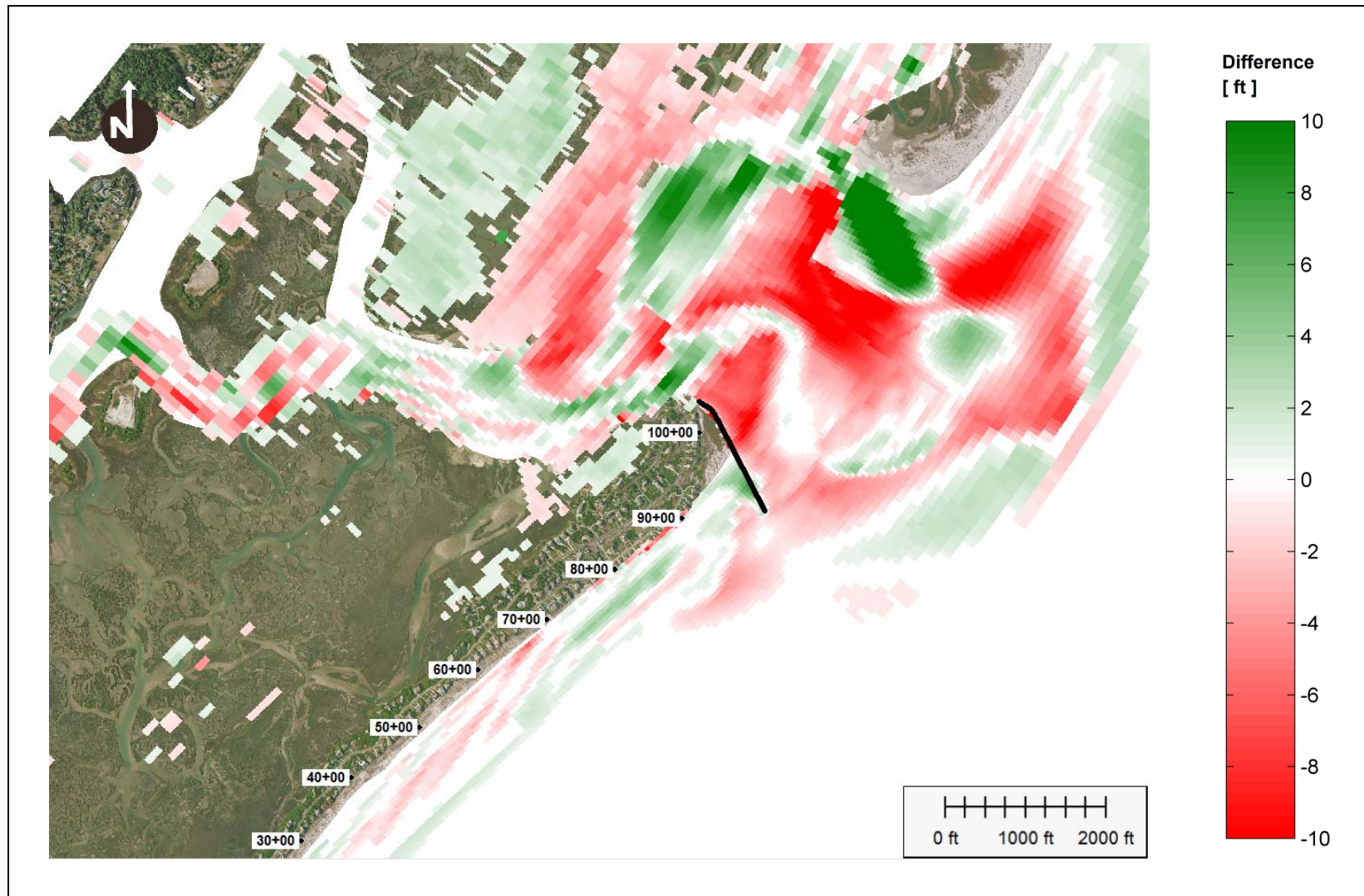


Figure 65: difference between bathymetry of Alternative 5a-3 (700 ft groin) after 5 years simulation and initial bathymetry of Alternative 2.

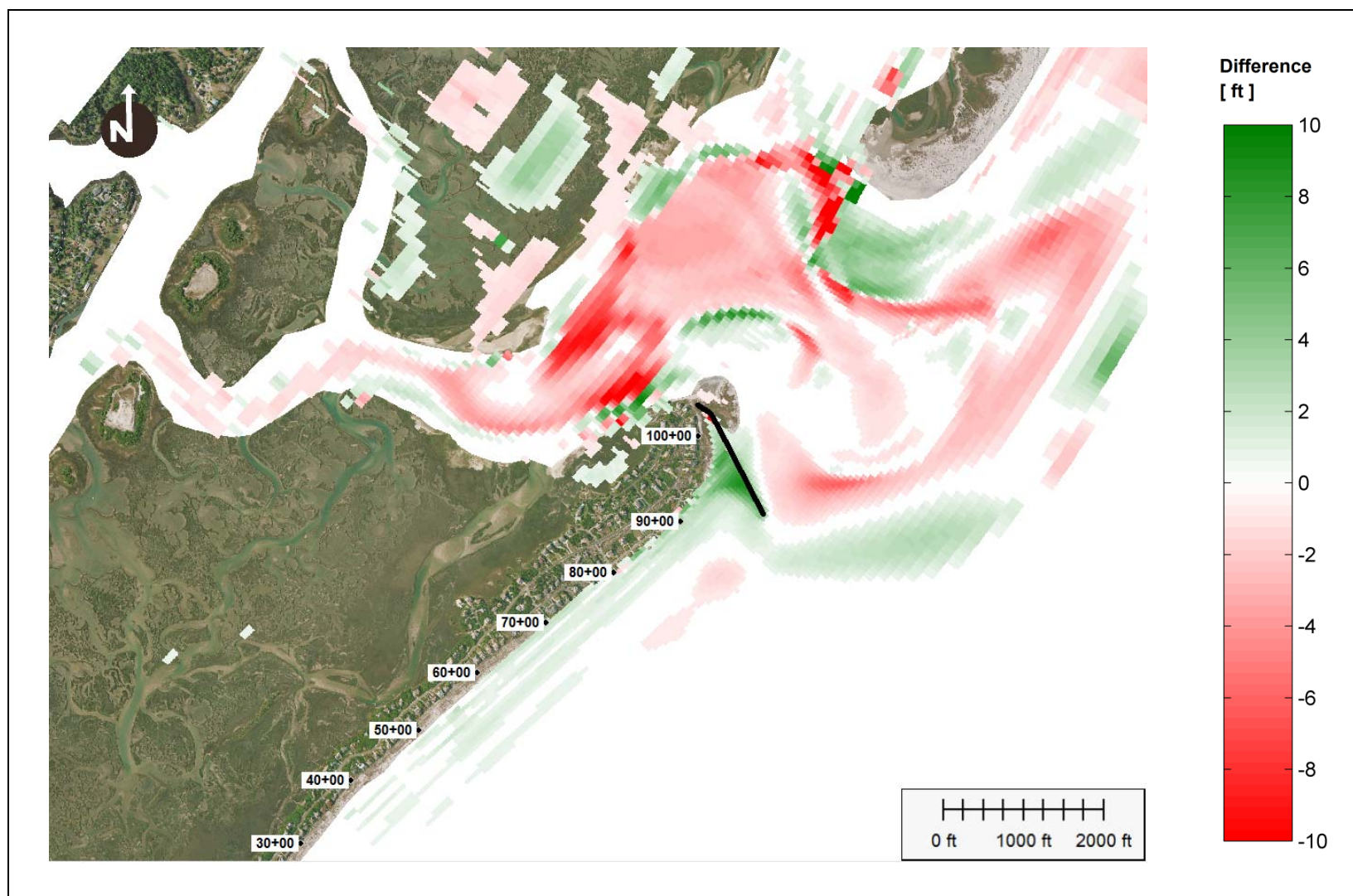


Figure 66: difference between bathymetries of Alternative 5a-3 (700 ft groin) and Alternative 2 after 5 years simulation.

Alternative 5a-3 - Terminal Groin (1,200 ft) without Oceanfront Beach Fill

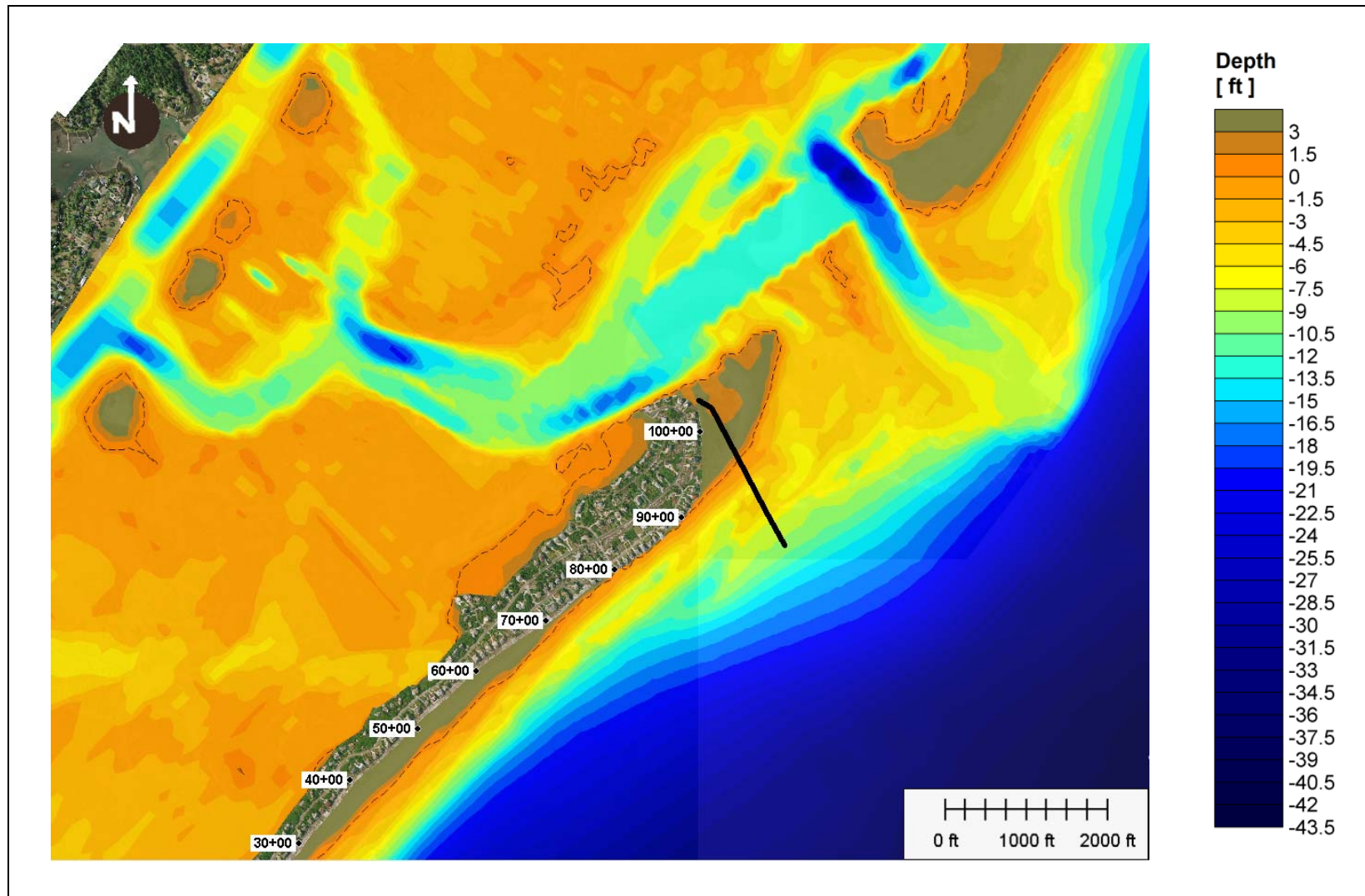


Figure 67: Alternative 5a-3 (1,200 ft groin), initial bathymetry.

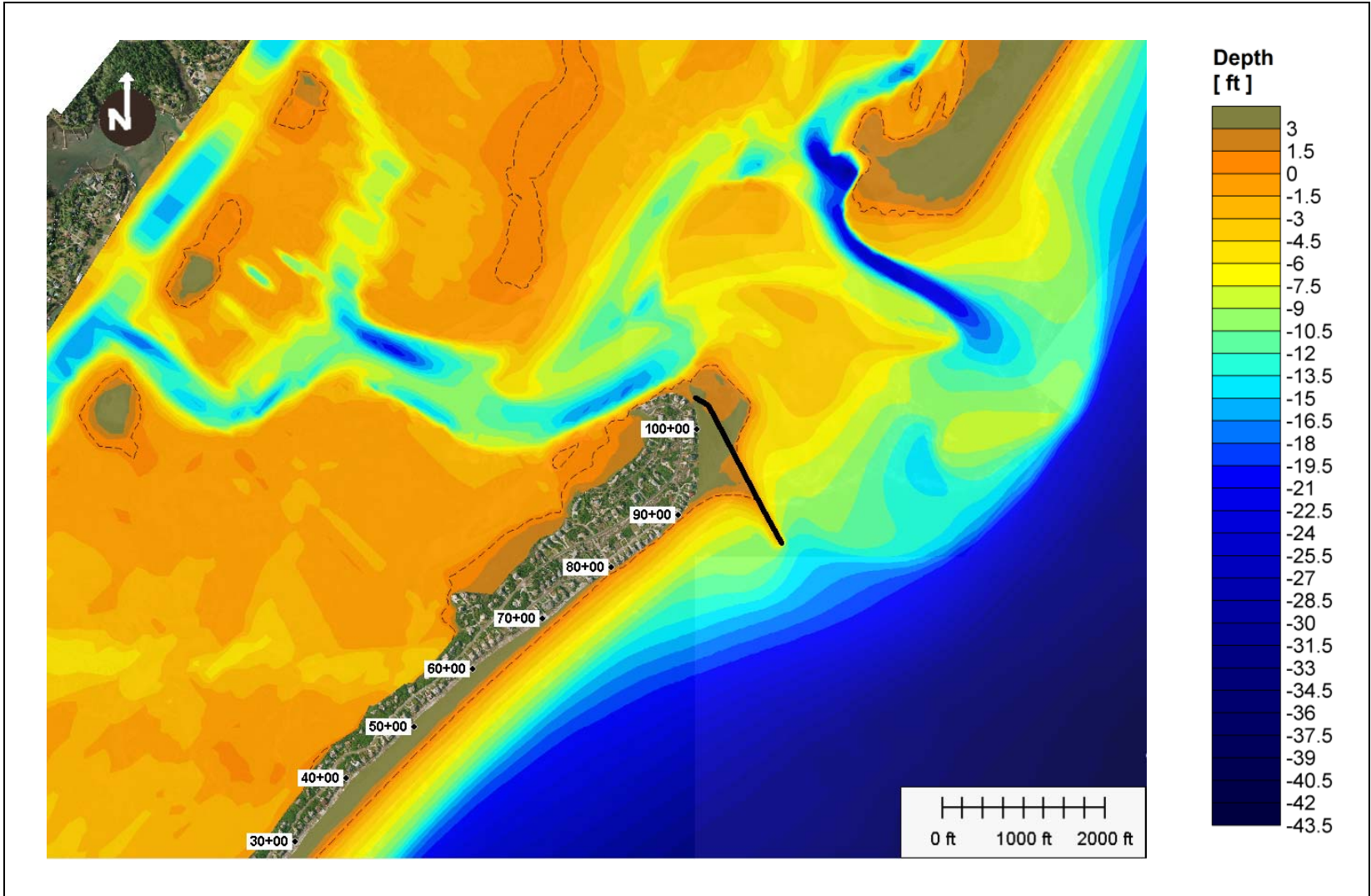


Figure 68: Alternative 5a-3 (1,200 ft groin), bathymetry after 2 years simulation.

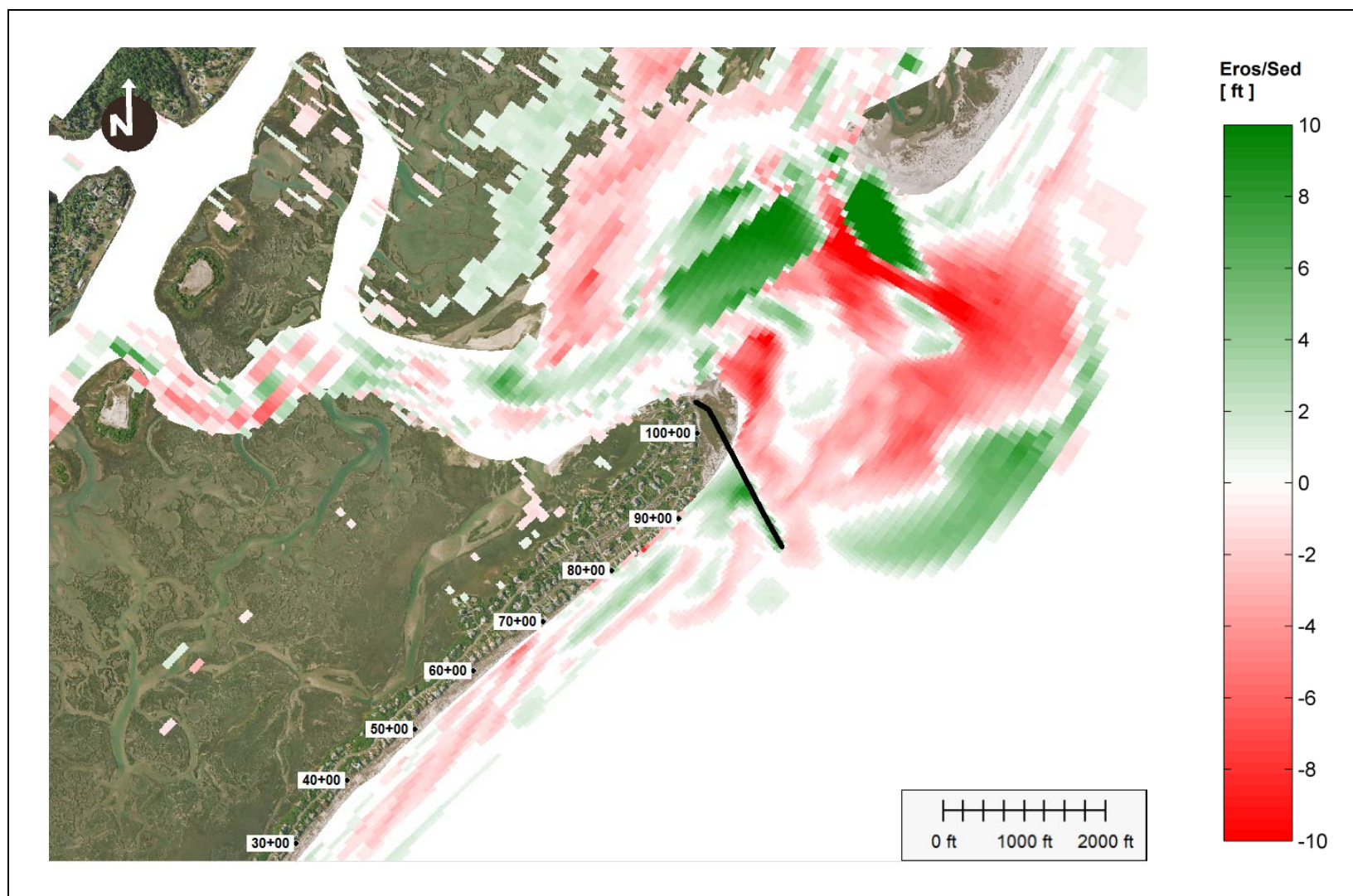


Figure 69: Alternative 5a-3 (1,200 ft groin), erosion/sedimentation after 2 years simulation.

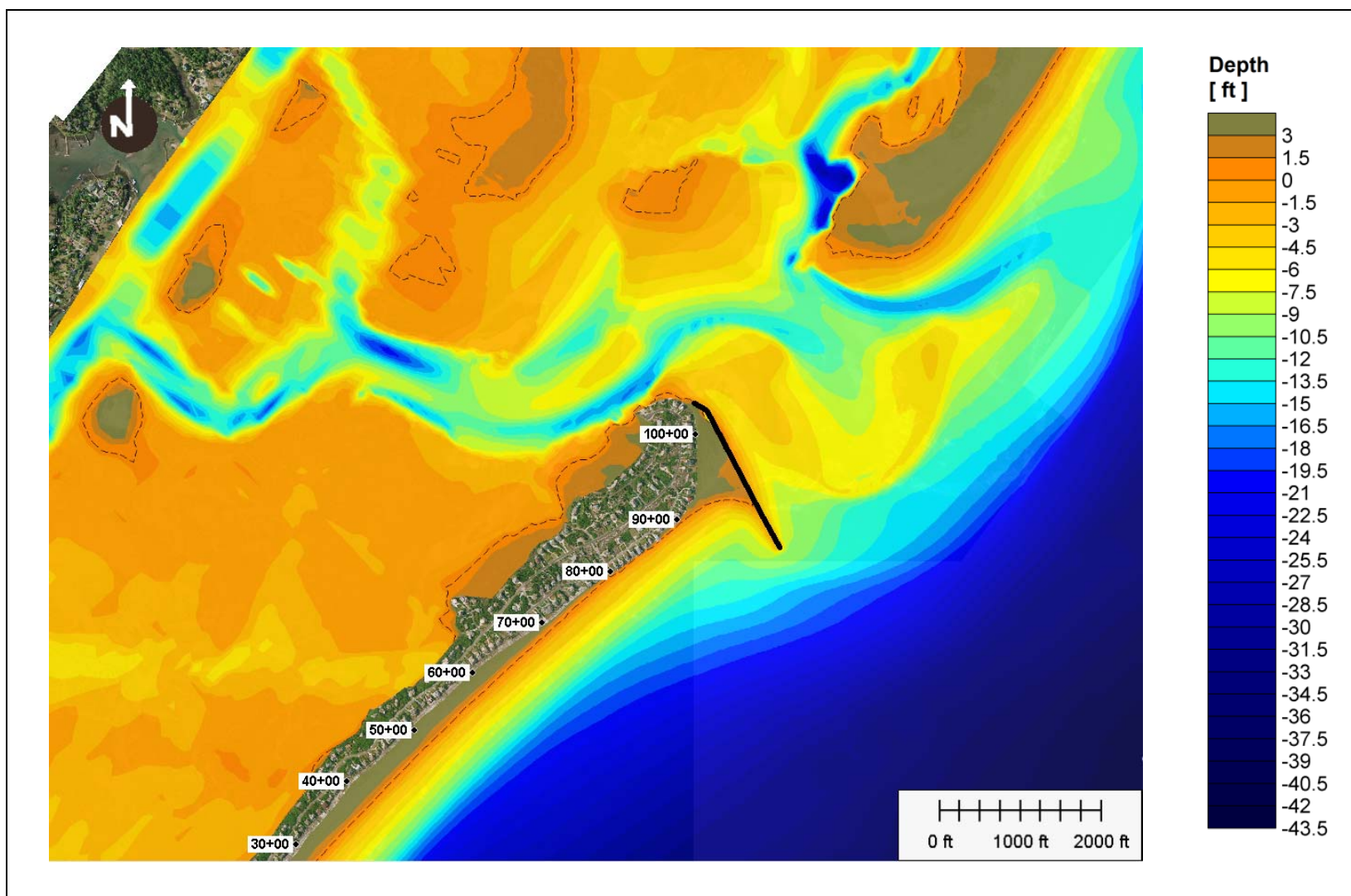


Figure 70: Alternative 5a-3 (1,200 ft groin), bathymetry after 5 years simulation.

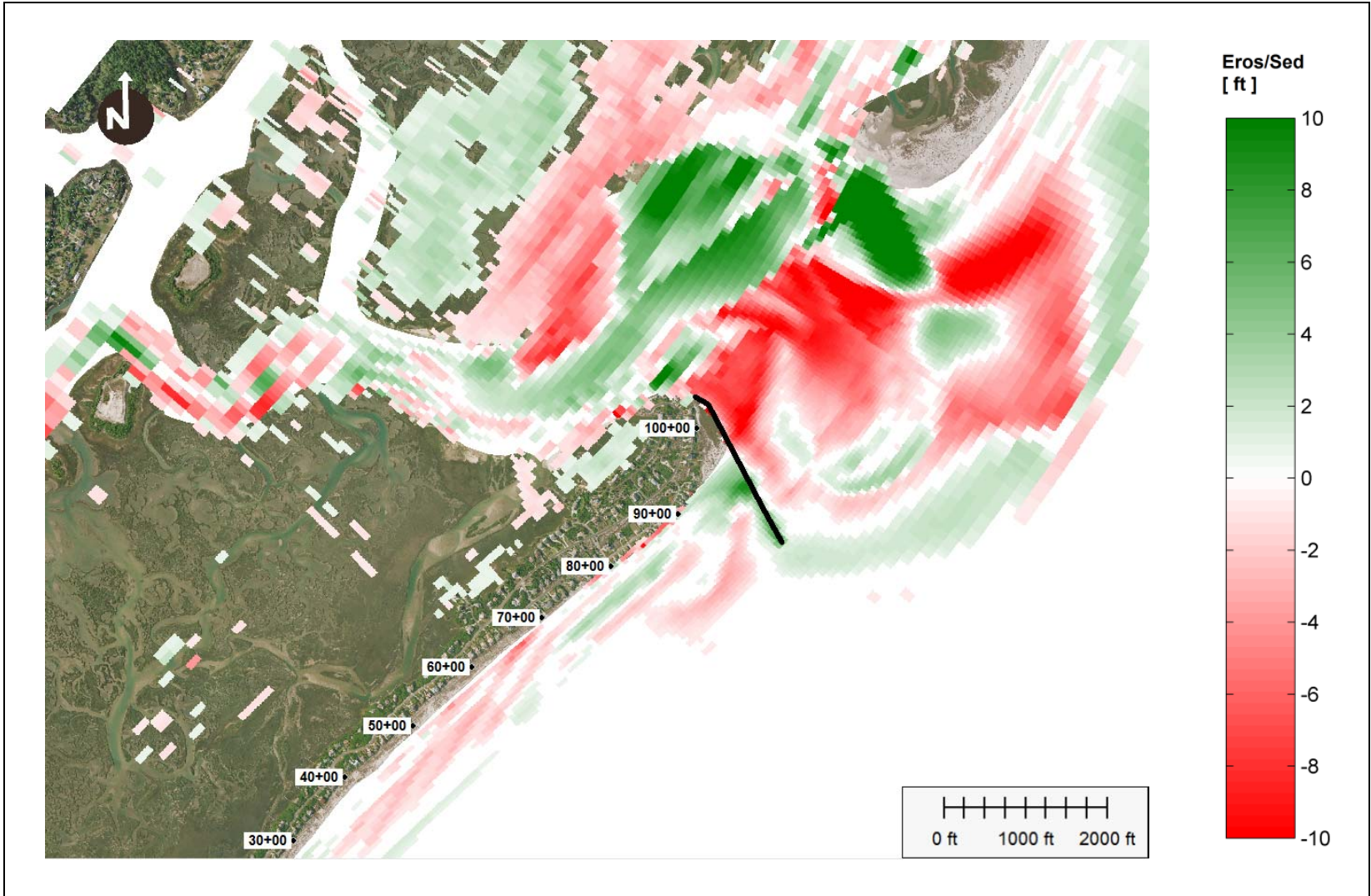


Figure 71: Alternative 5a-3 (1,200 ft groin), erosion/sedimentation after 5 year simulation.

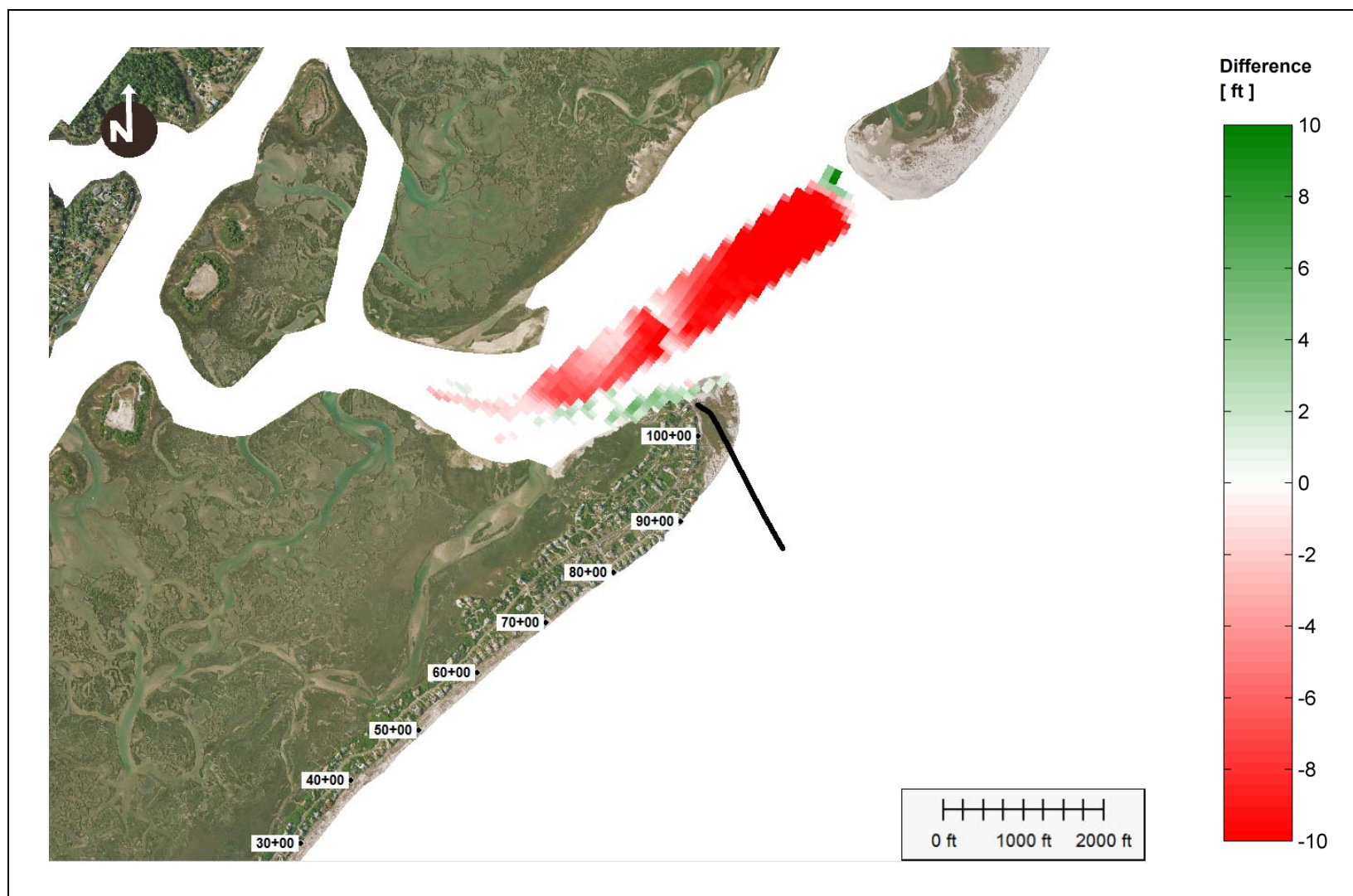


Figure 72: difference between initial bathymetries of Alternative 5a-3 (1,200 ft groin) and Alternative 2.

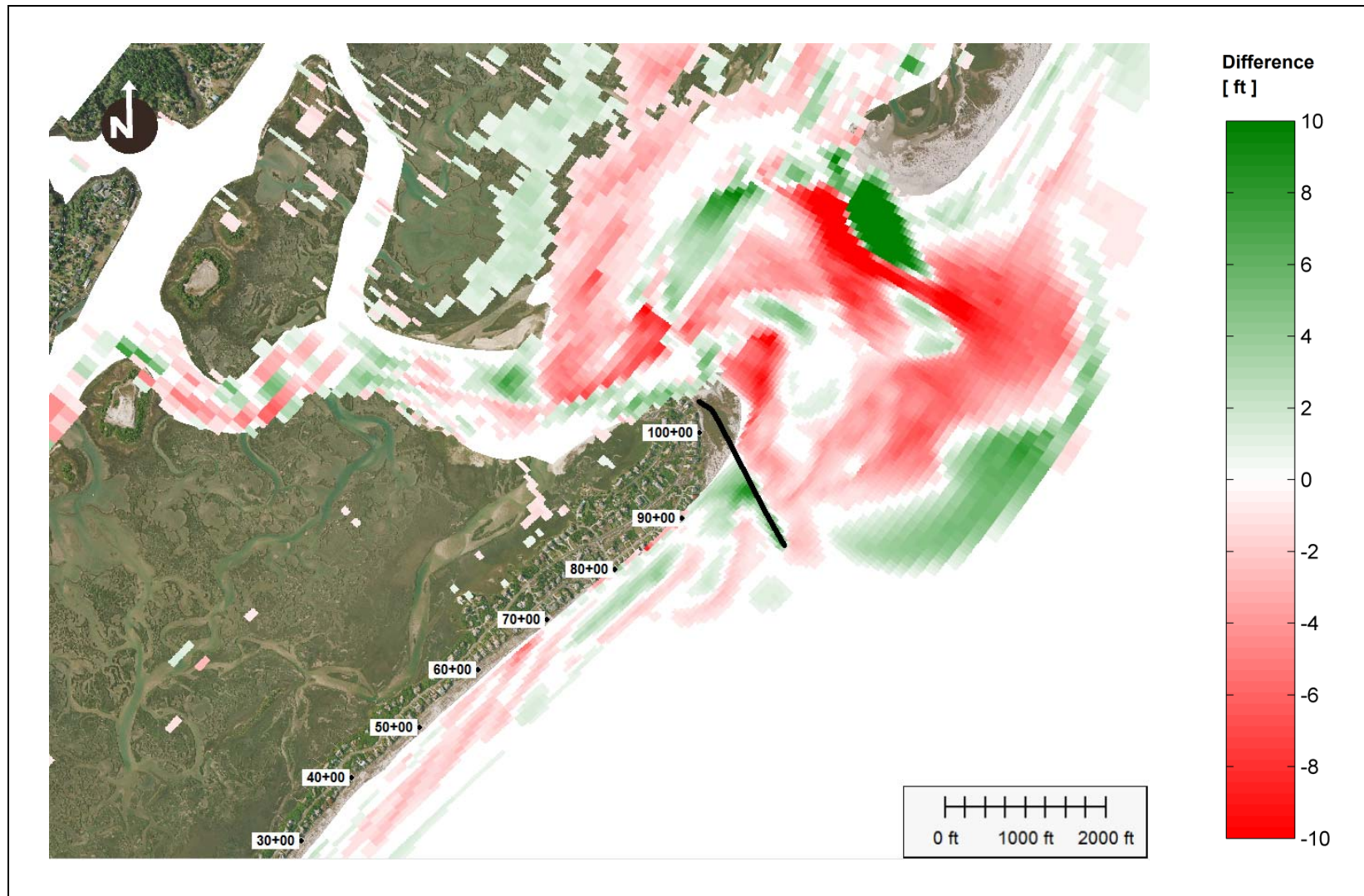


Figure 73: difference between bathymetry of Alternative 5a-3 (1,200 ft groin) after 2 years simulation and initial bathymetry of Alternative 2.

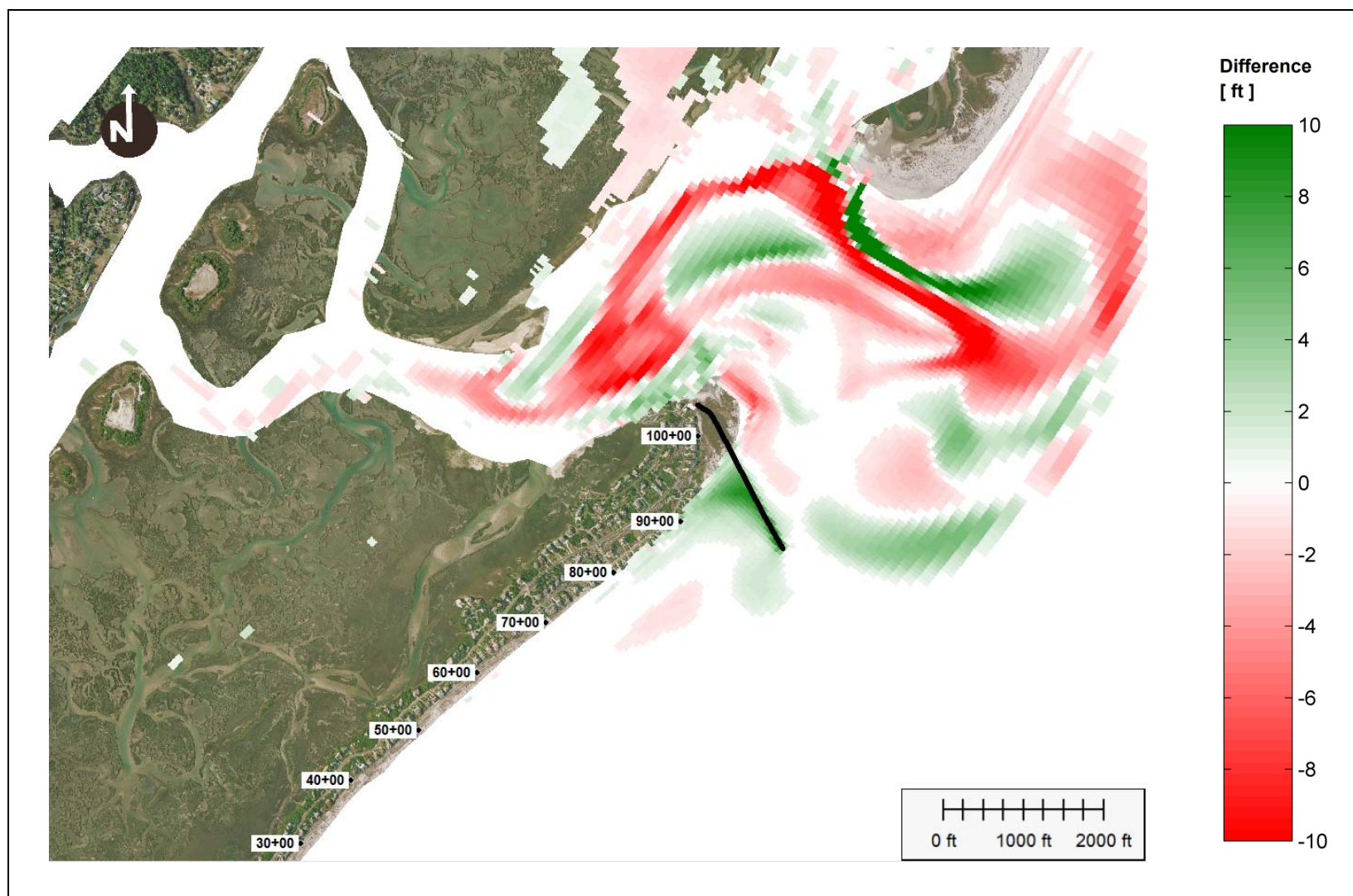


Figure 74: difference between bathymetries of Alternative 5a-3 (1,200 ft groin) and Alternative 2 after 2 years simulation.

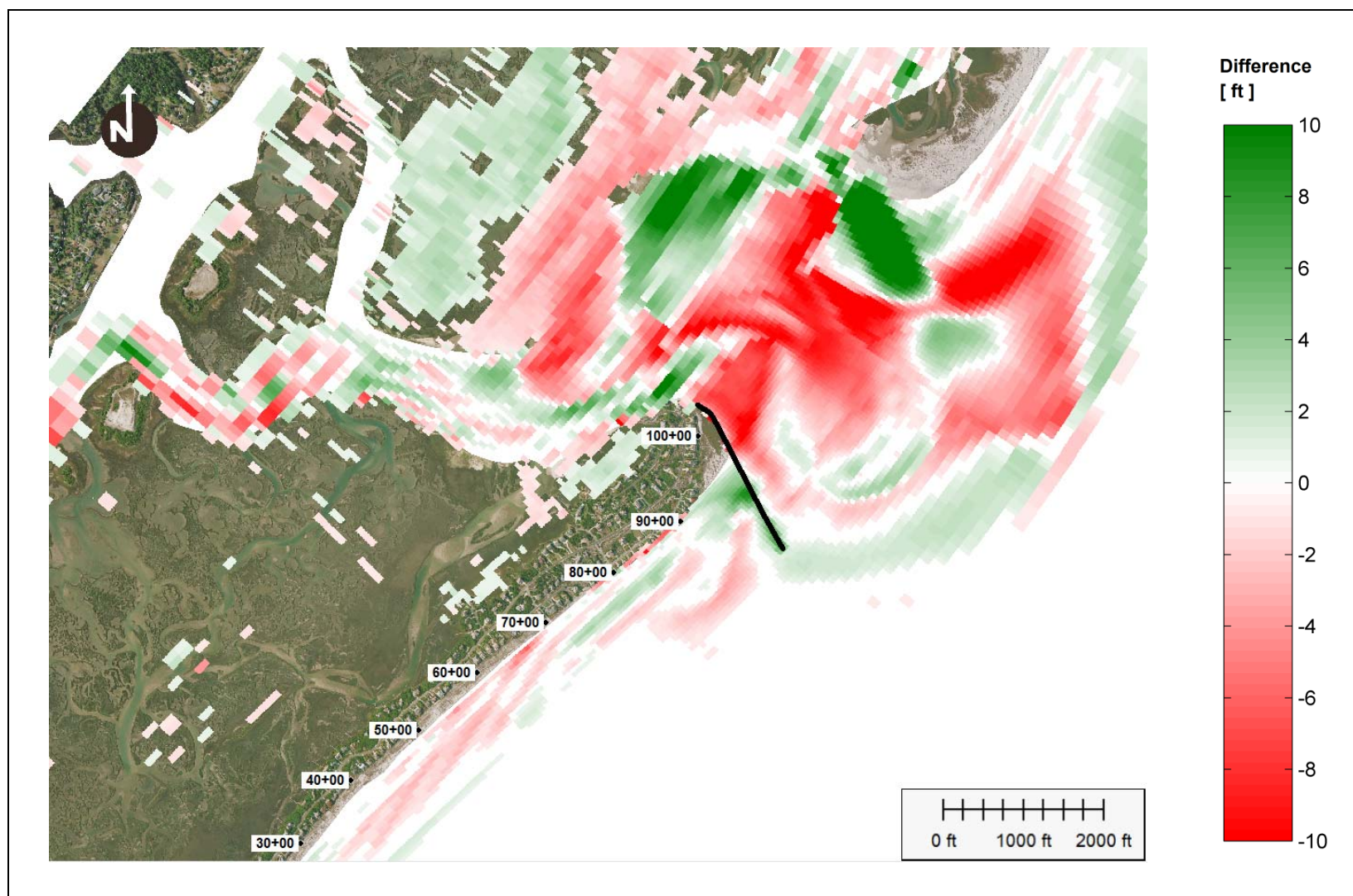


Figure 75: difference between bathymetry of Alternative 5a-3 (1,200 ft groin) after 5 years simulation and initial bathymetry of Alternative 2.

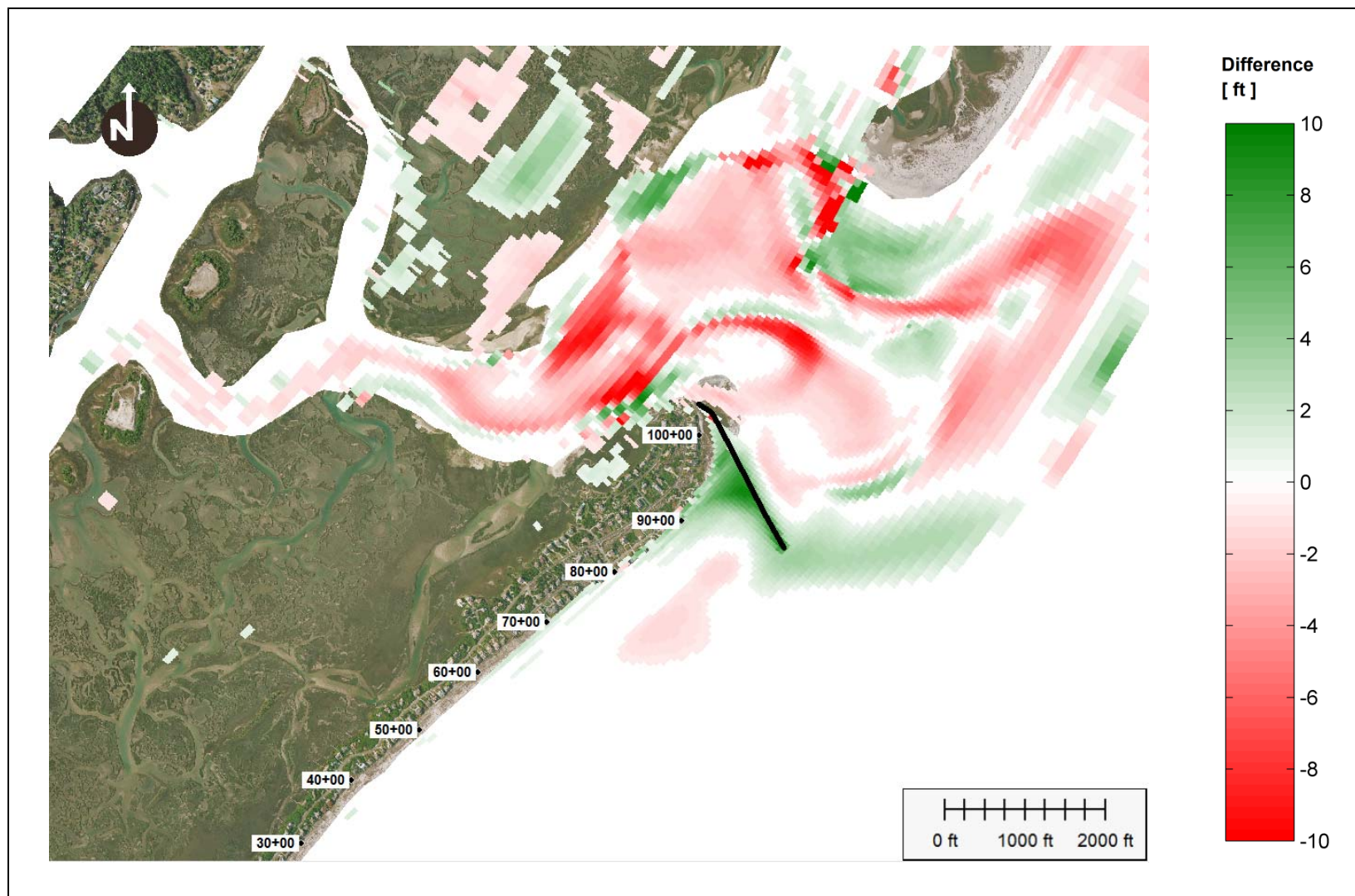


Figure 76: difference between bathymetries of Alternative 5a-3 (1,200 ft groin) and Alternative 2 after 5 years simulation.

Alternative 5a-2-10° - Alt. 5a-2 with 10° oblique terminal groin (1,200 ft)

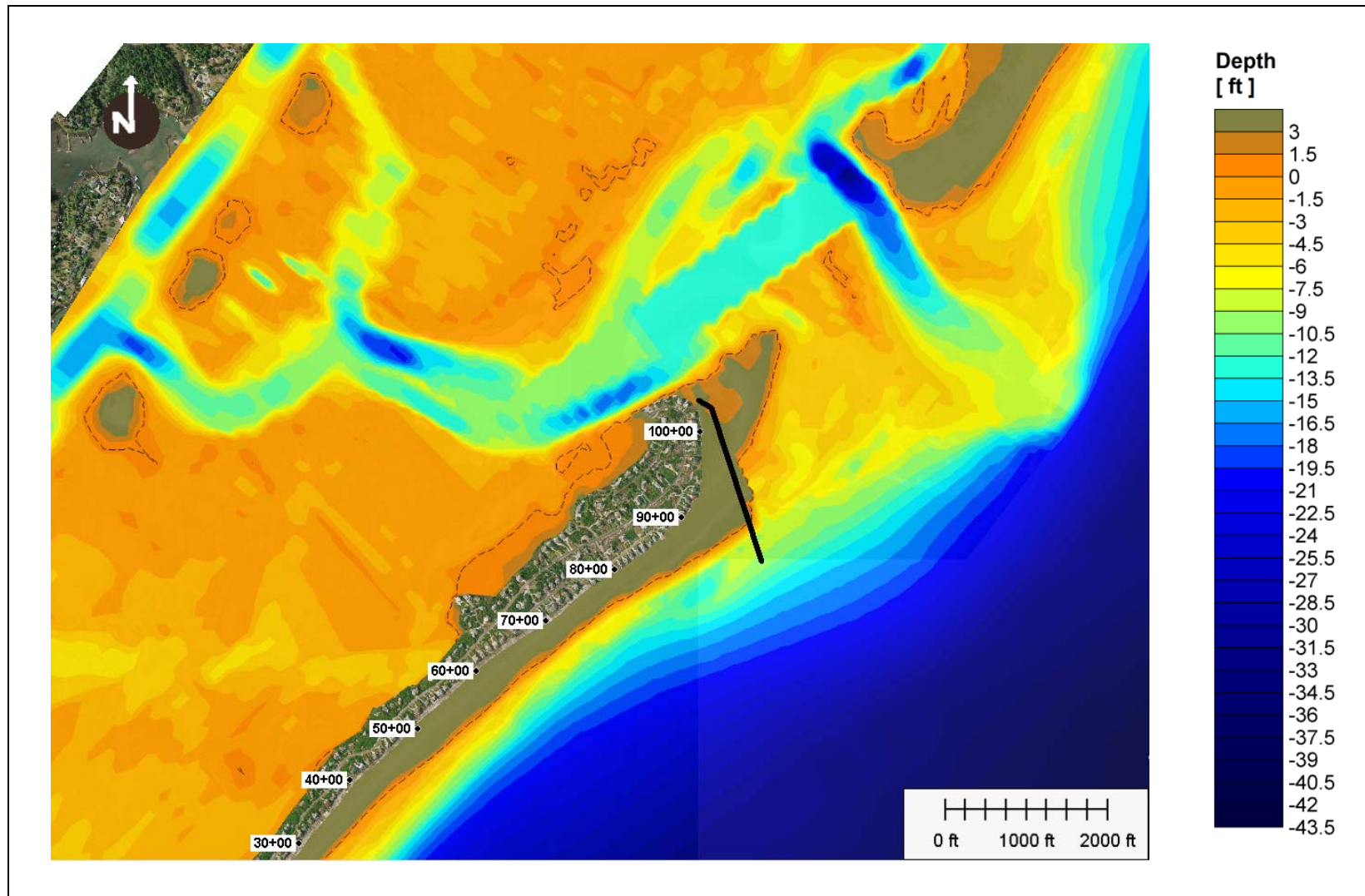


Figure 77: Alternative 5a-2 (10 deg), initial bathymetry.

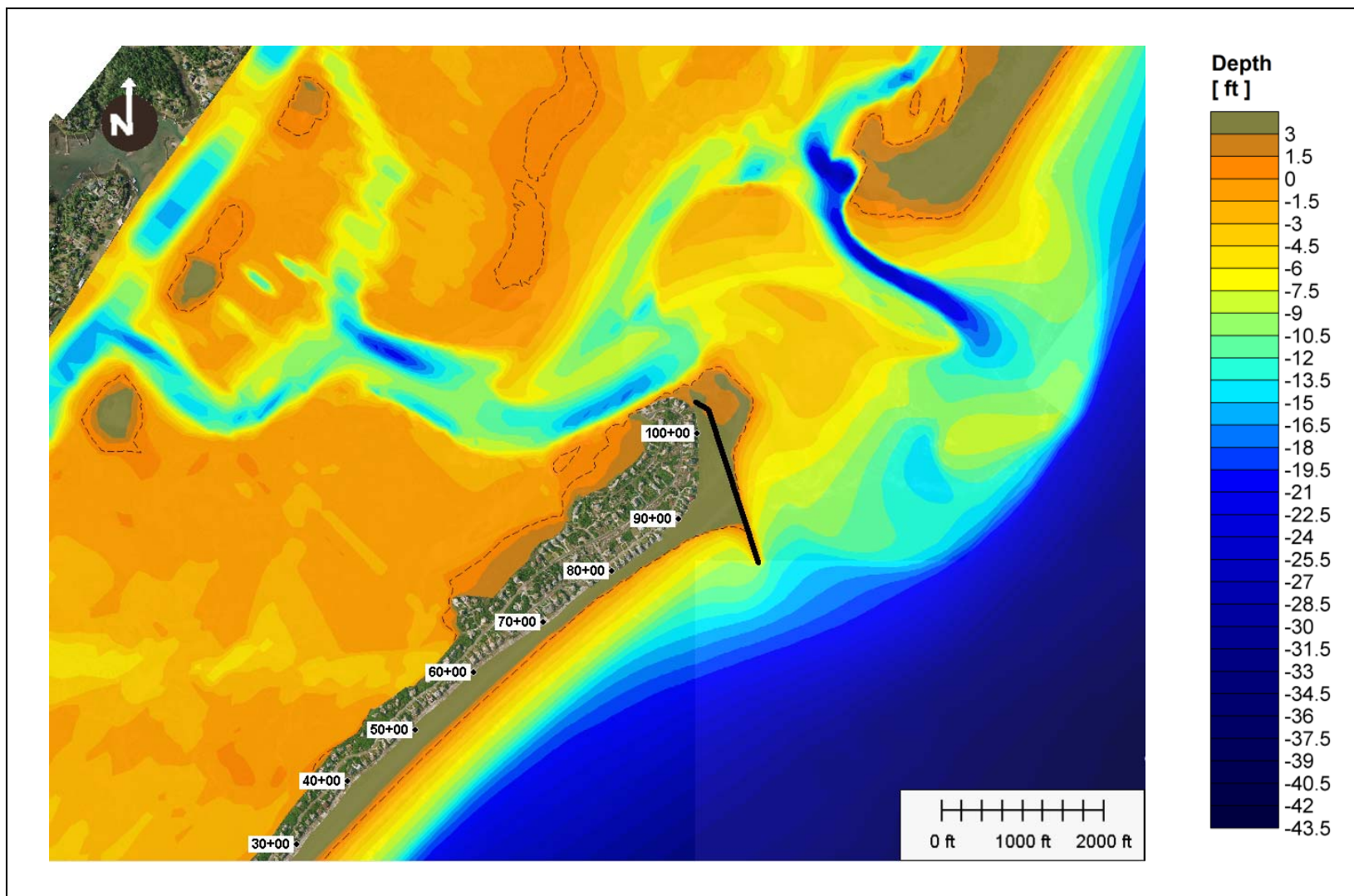


Figure 78: Alternative 5a-2 (10 deg), bathymetry after 2 years simulation.

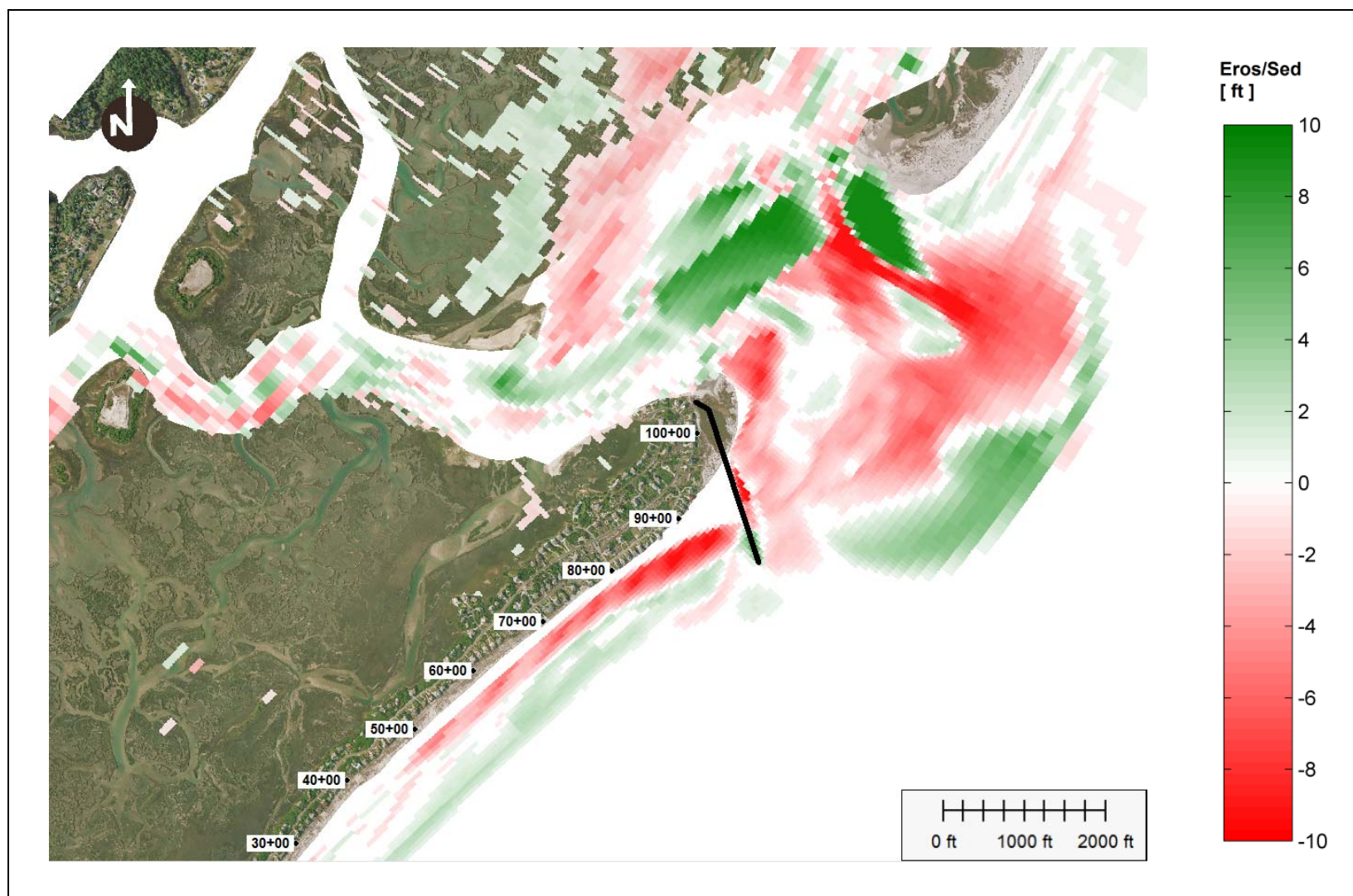


Figure 79: Alternative 5a-2 (10 deg), erosion/sedimentation after 2 years simulation.

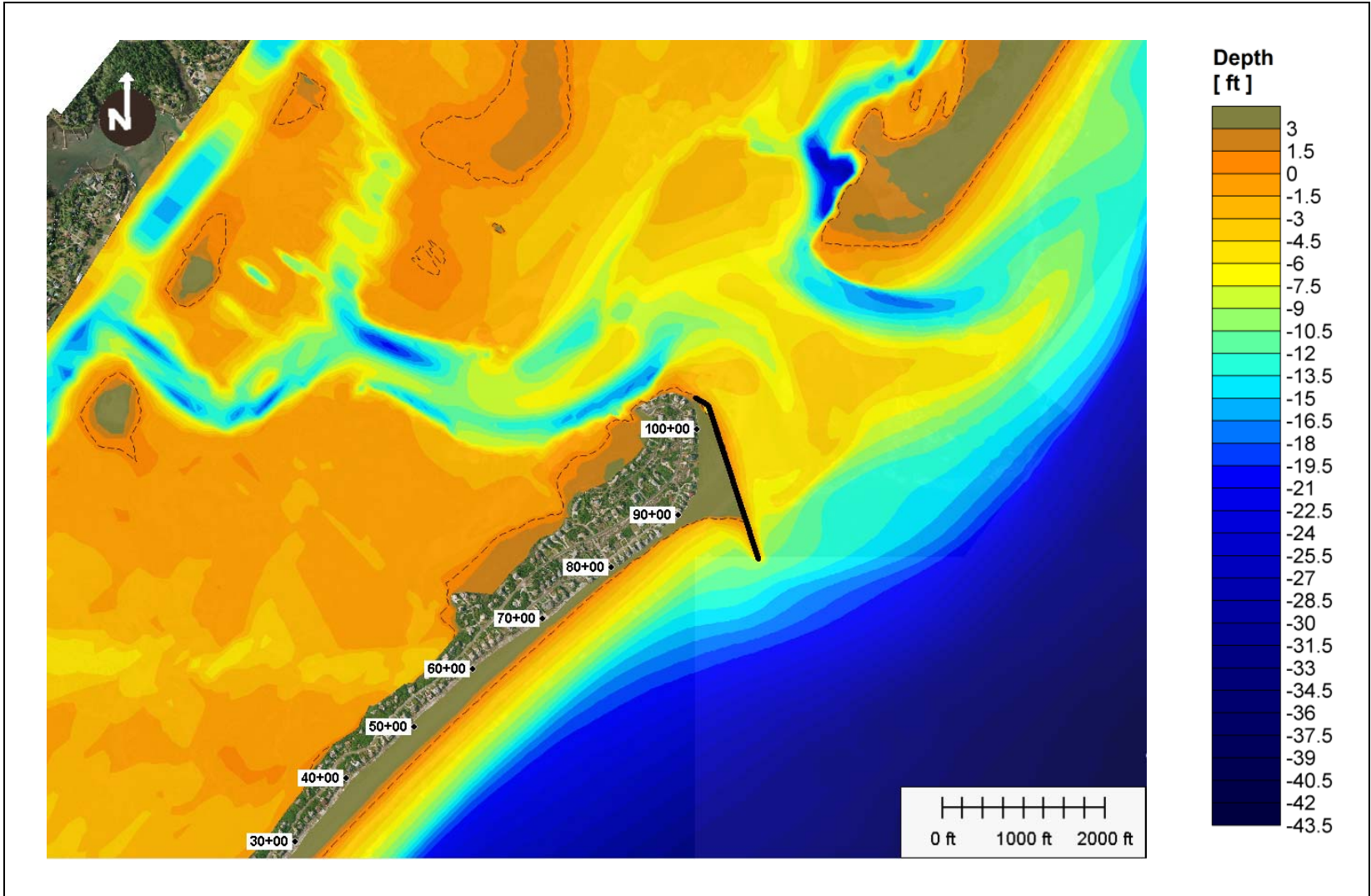


Figure 80: Alternative 5a-2 (10 deg), bathymetry after 5 years simulation.

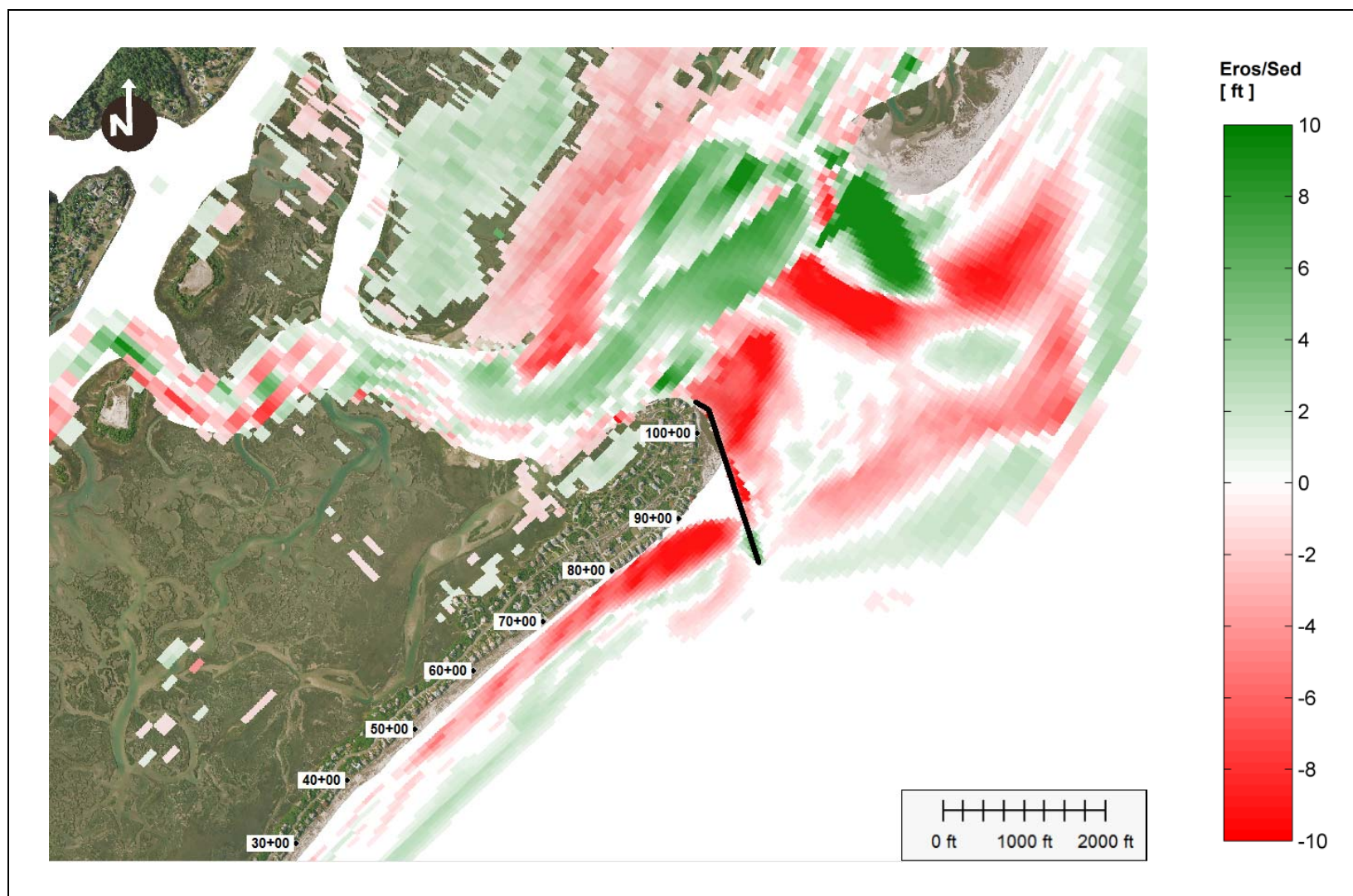


Figure 81: Alternative 5a-2 (10 deg), erosion/sedimentation after 5 year simulation.

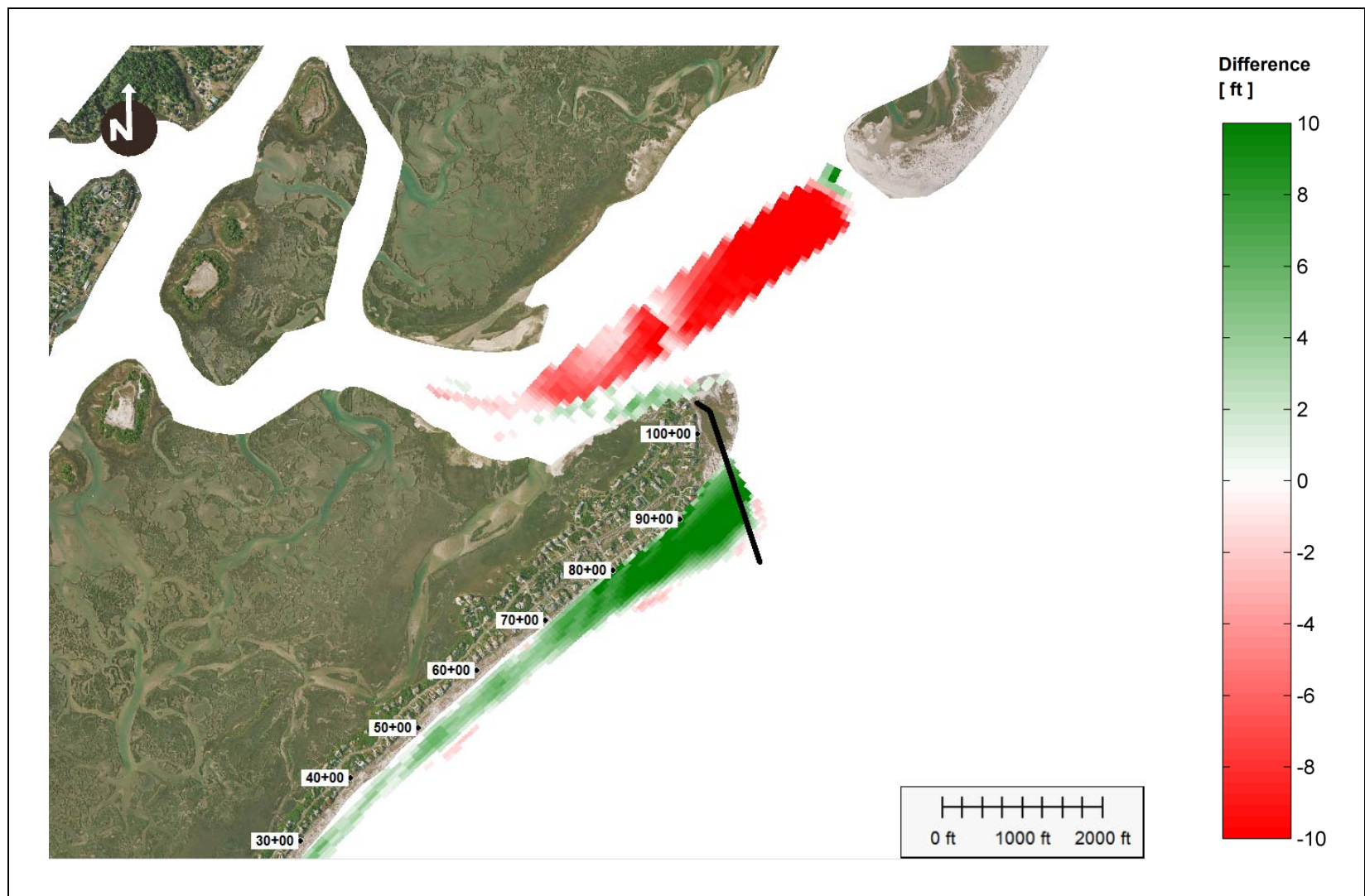


Figure 82: difference between initial bathymetries of Alternative 5a-2 (10 deg) and Alternative 2.

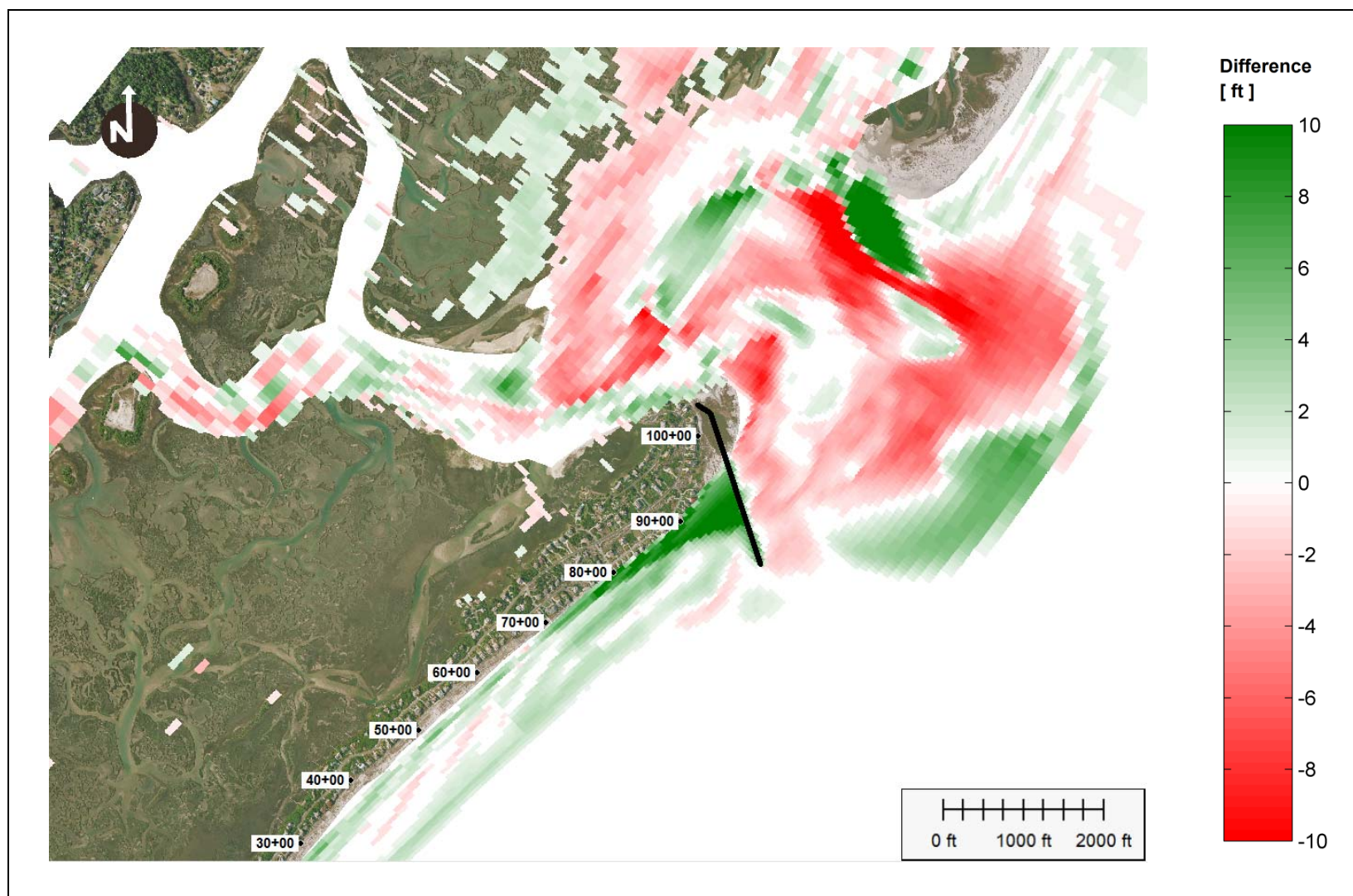


Figure 83: difference between bathymetry of Alternative 5a-2 (10 deg) after 2 years simulation and initial bathymetry of Alternative 2.

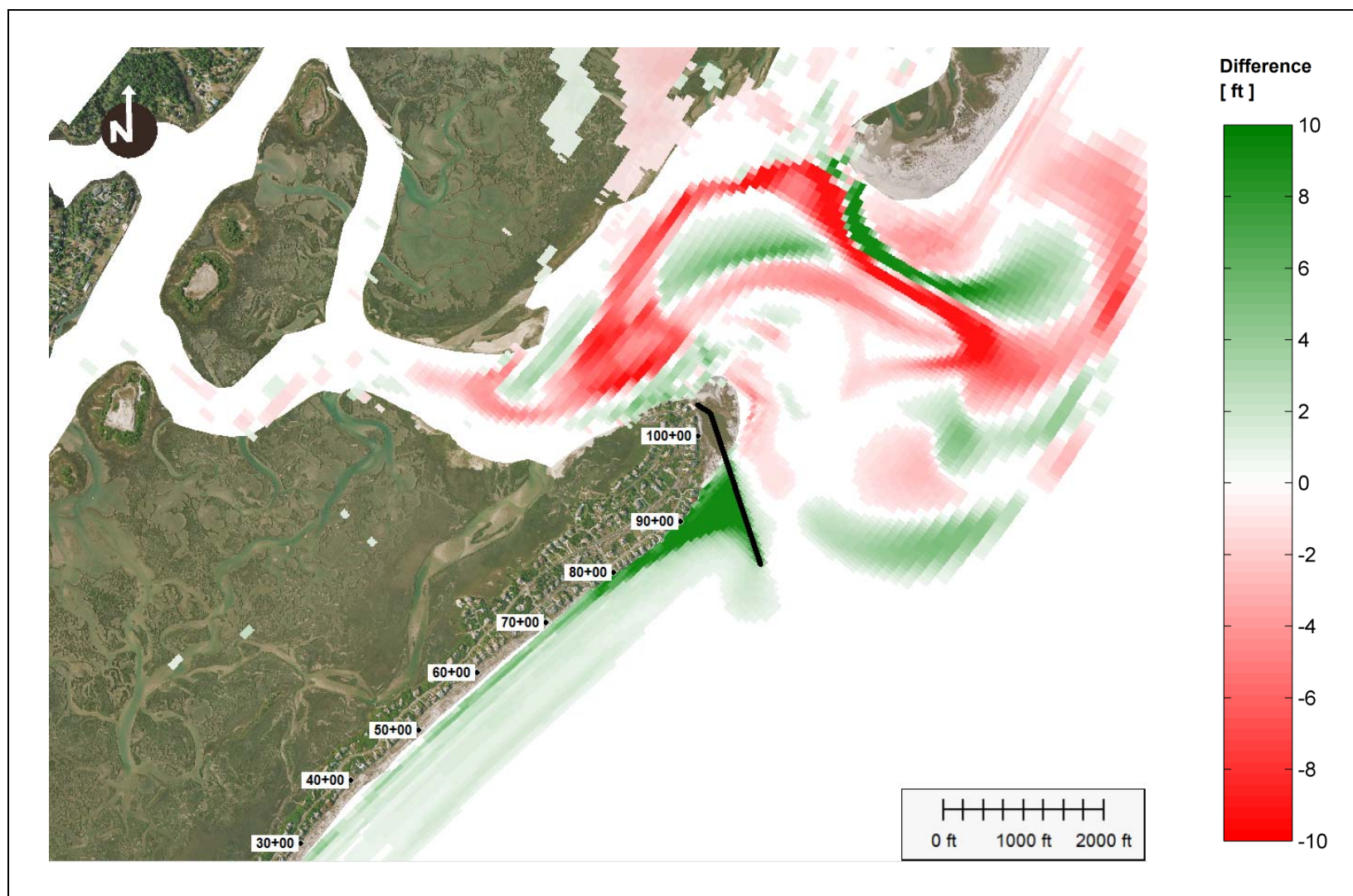


Figure 84: difference between bathymetries of Alternative 5a-2 (10 deg) and Alternative 2 after 2 years simulation.

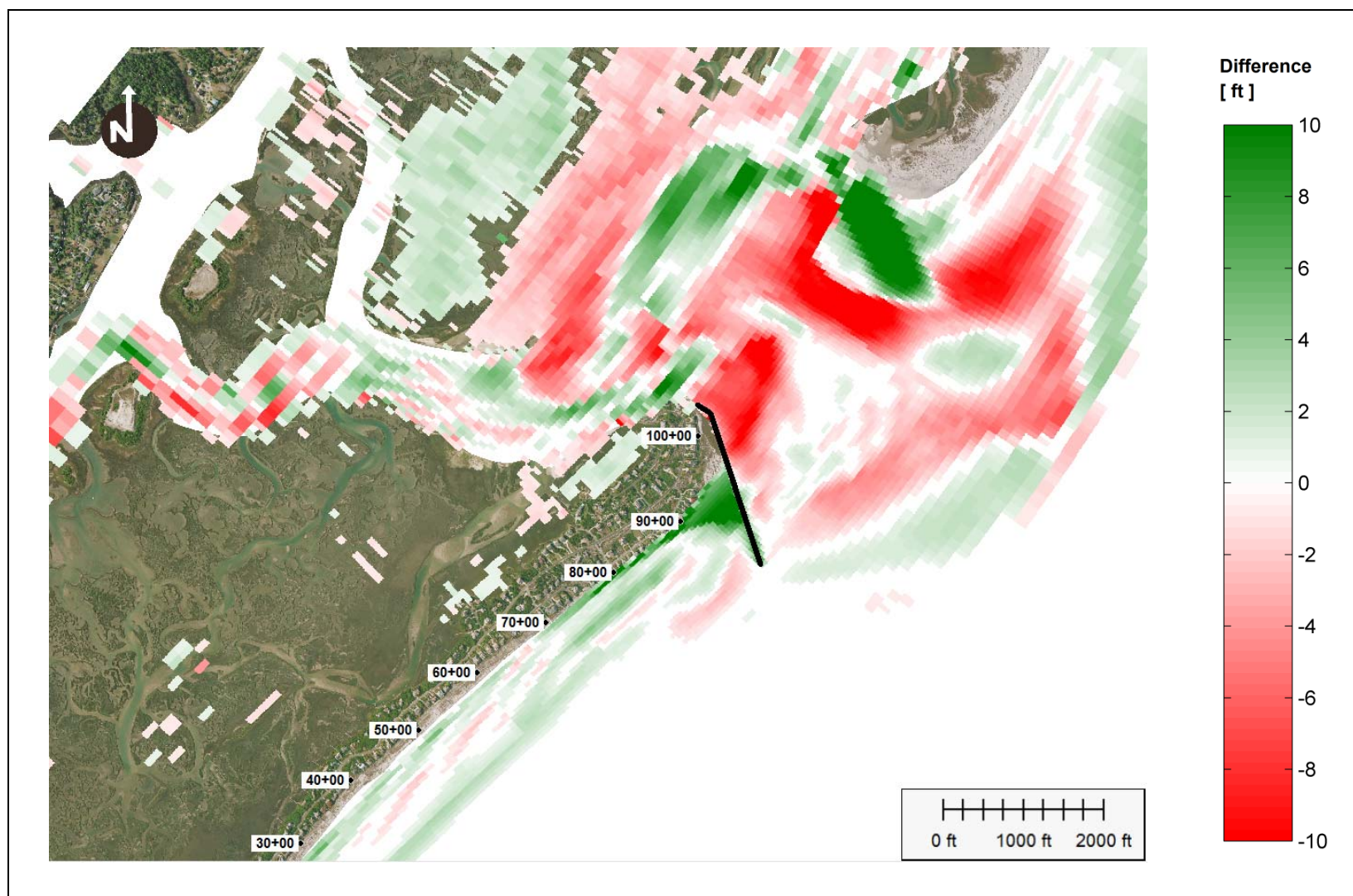


Figure 85: difference between bathymetry of Alternative 5a-2 (10 deg) after 5 years simulation and initial bathymetry of Alternative 2.

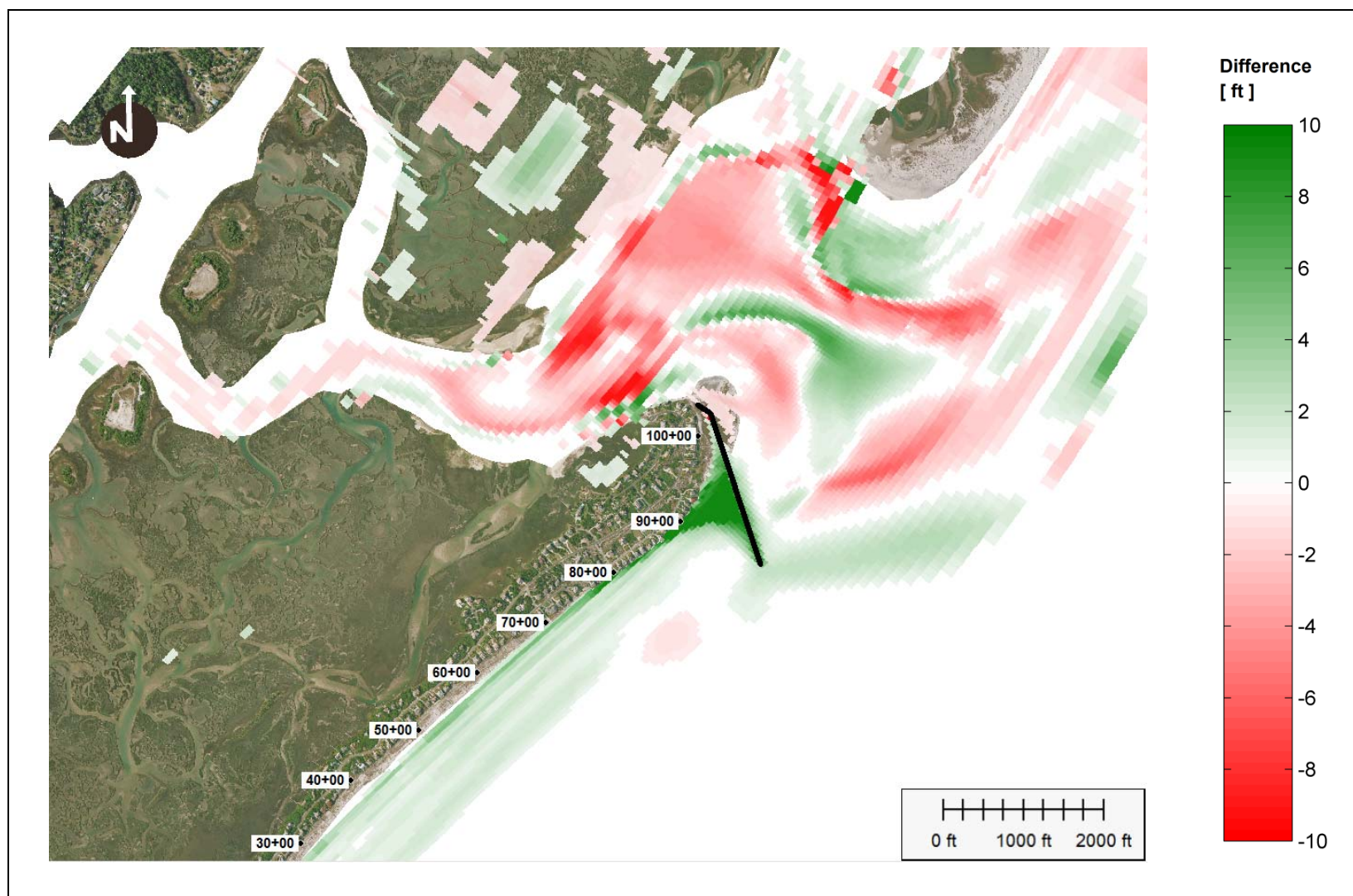


Figure 86: difference between bathymetries of Alternative 5a-2 (10 deg) and Alternative 2 after 5 years simulation.

Alternative 5a-2-20° - Alt. 5a-2 with 20° oblique terminal groin (1,200 ft)

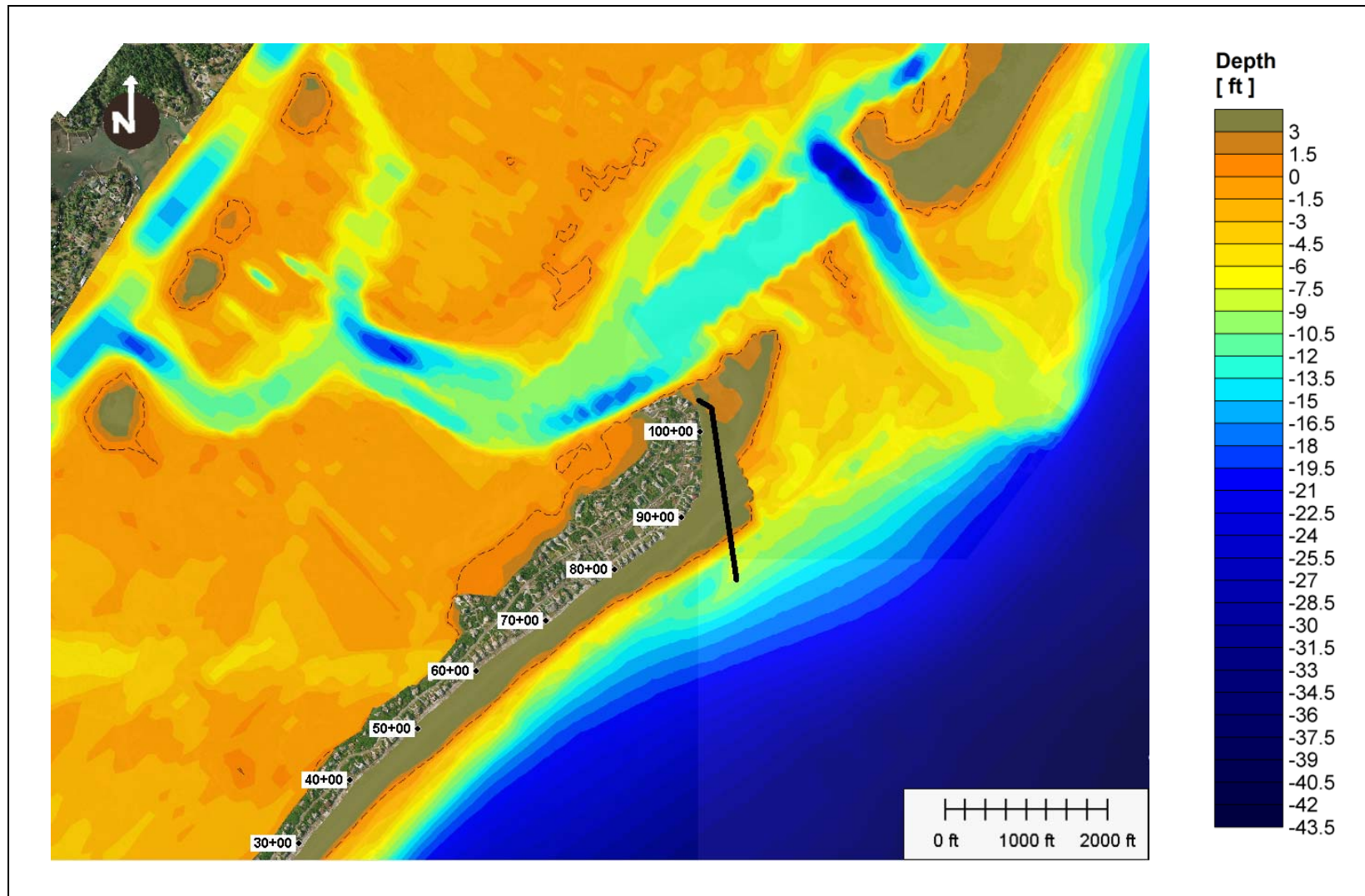


Figure 87: Alternative 5a-2 (20 deg), initial bathymetry.

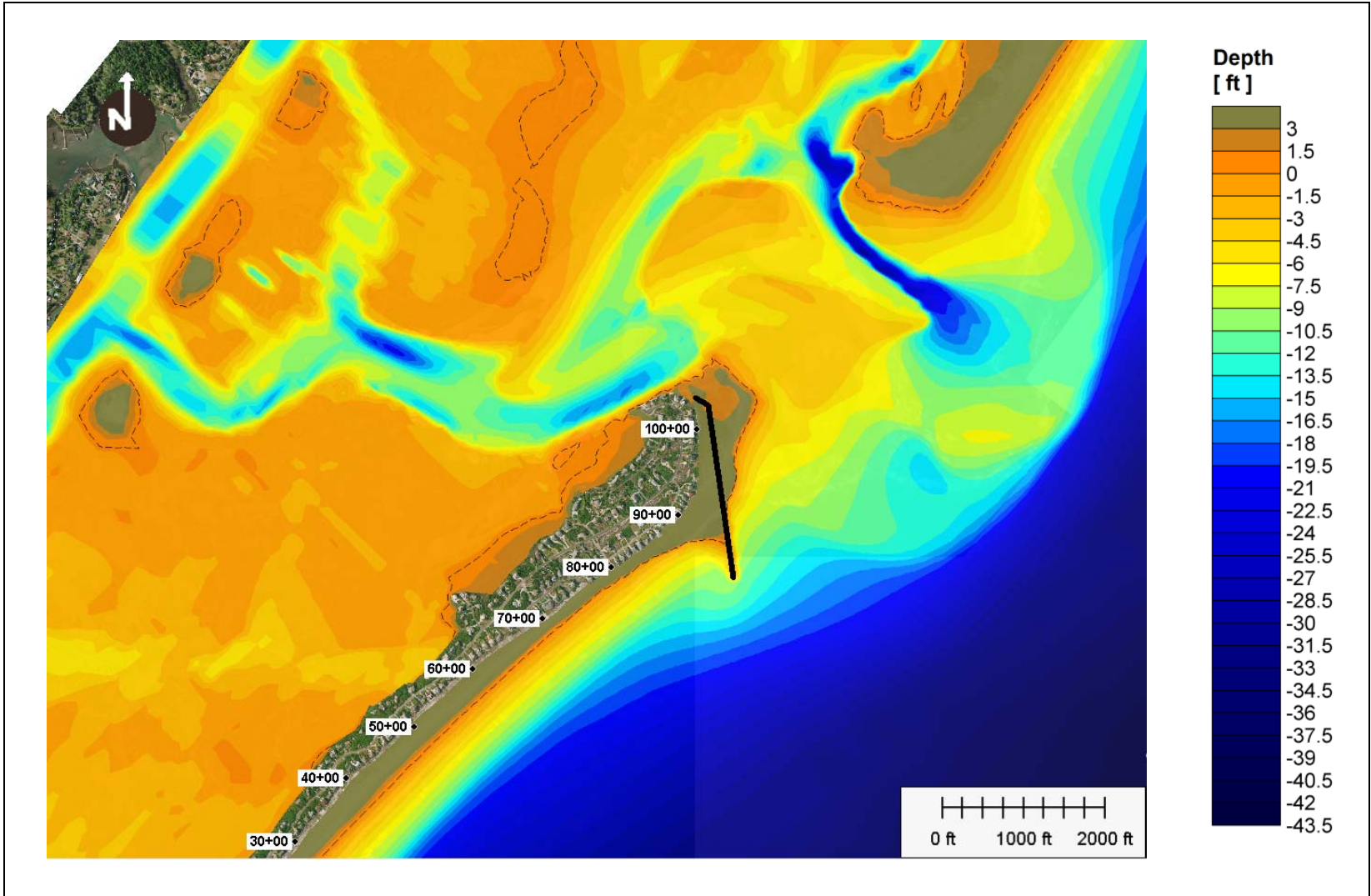


Figure 88: Alternative 5a-2 (20 deg), bathymetry after 2 years simulation.

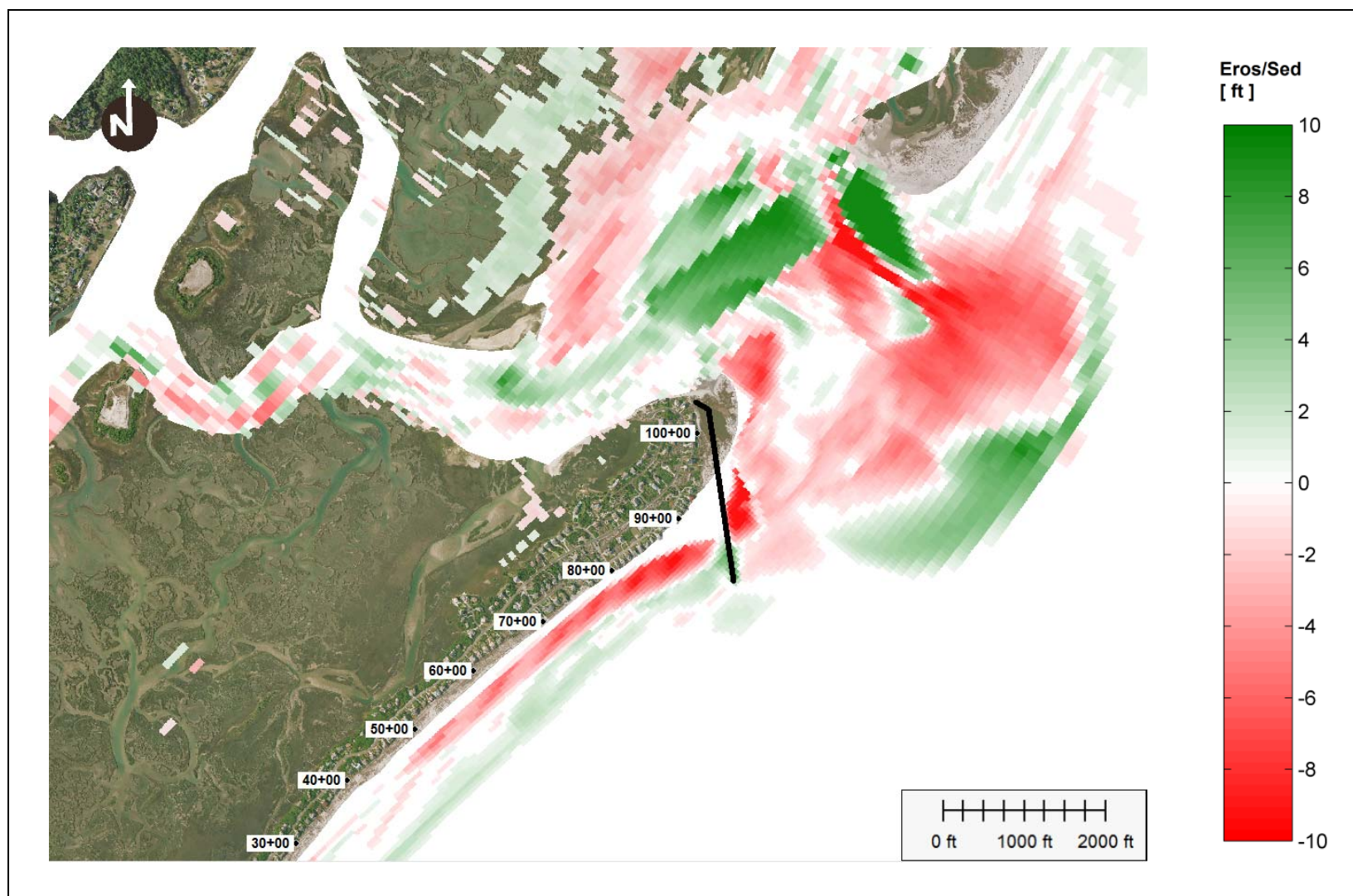


Figure 89: Alternative 5a-2 (20 deg), erosion/sedimentation after 2 years simulation.

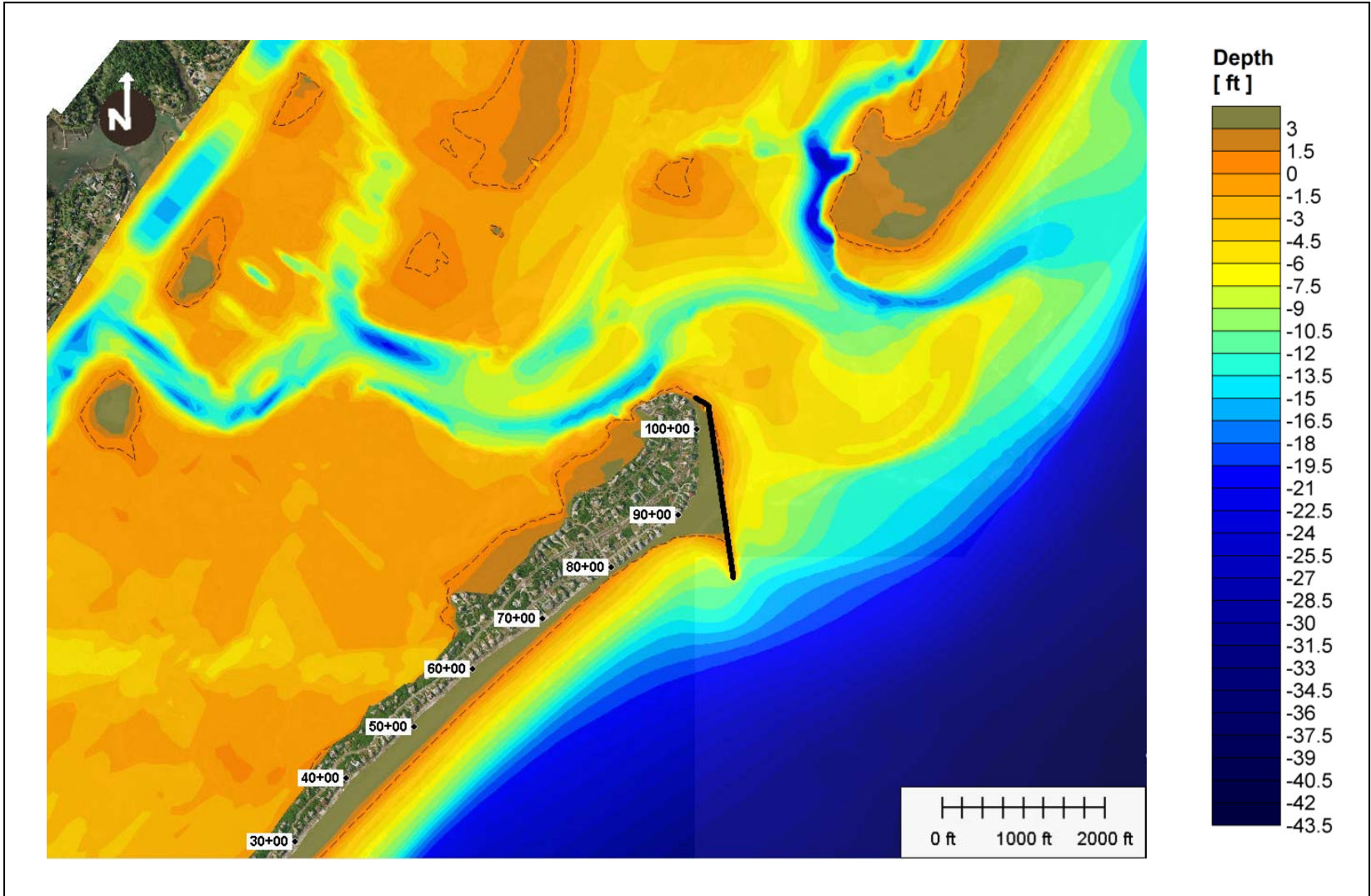


Figure 90: Alternative 5a-2 (20 deg), bathymetry after 5 years simulation.

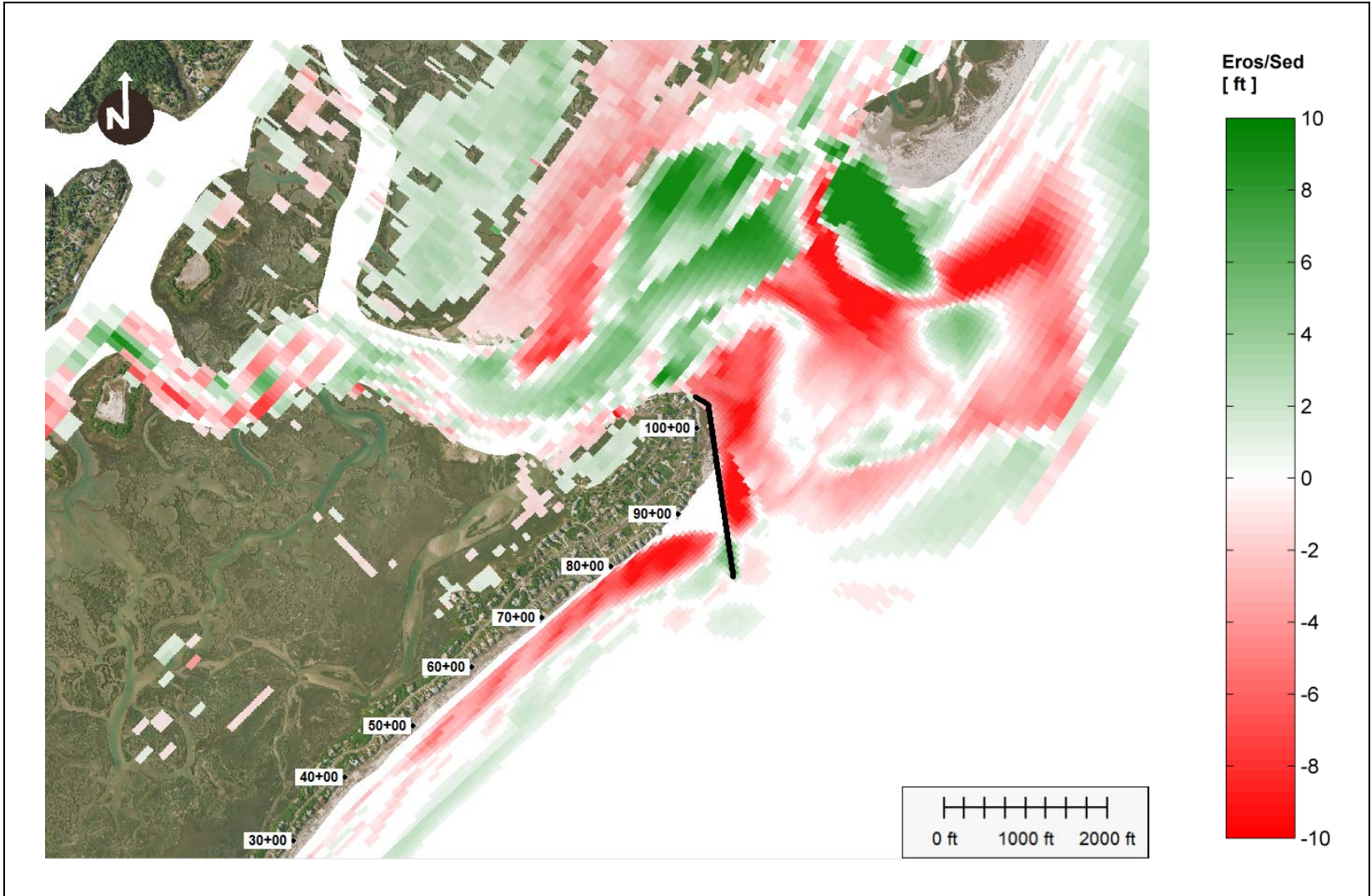


Figure 91: Alternative 5a-2 (20 deg), erosion/sedimentation after 5 year simulation.

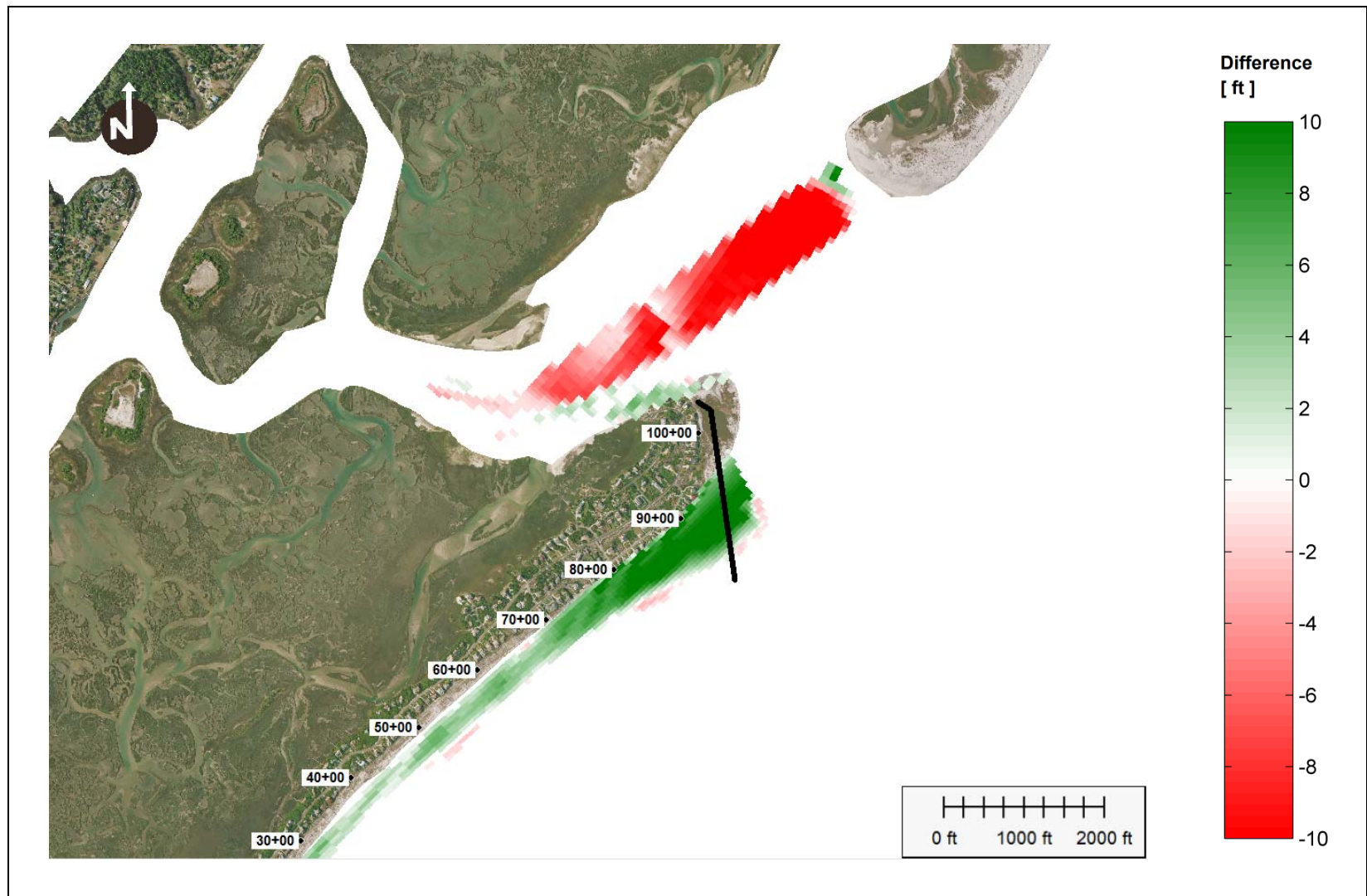


Figure 92: difference between initial bathymetries of Alternative 5a-2 (20 deg) and Alternative 2.

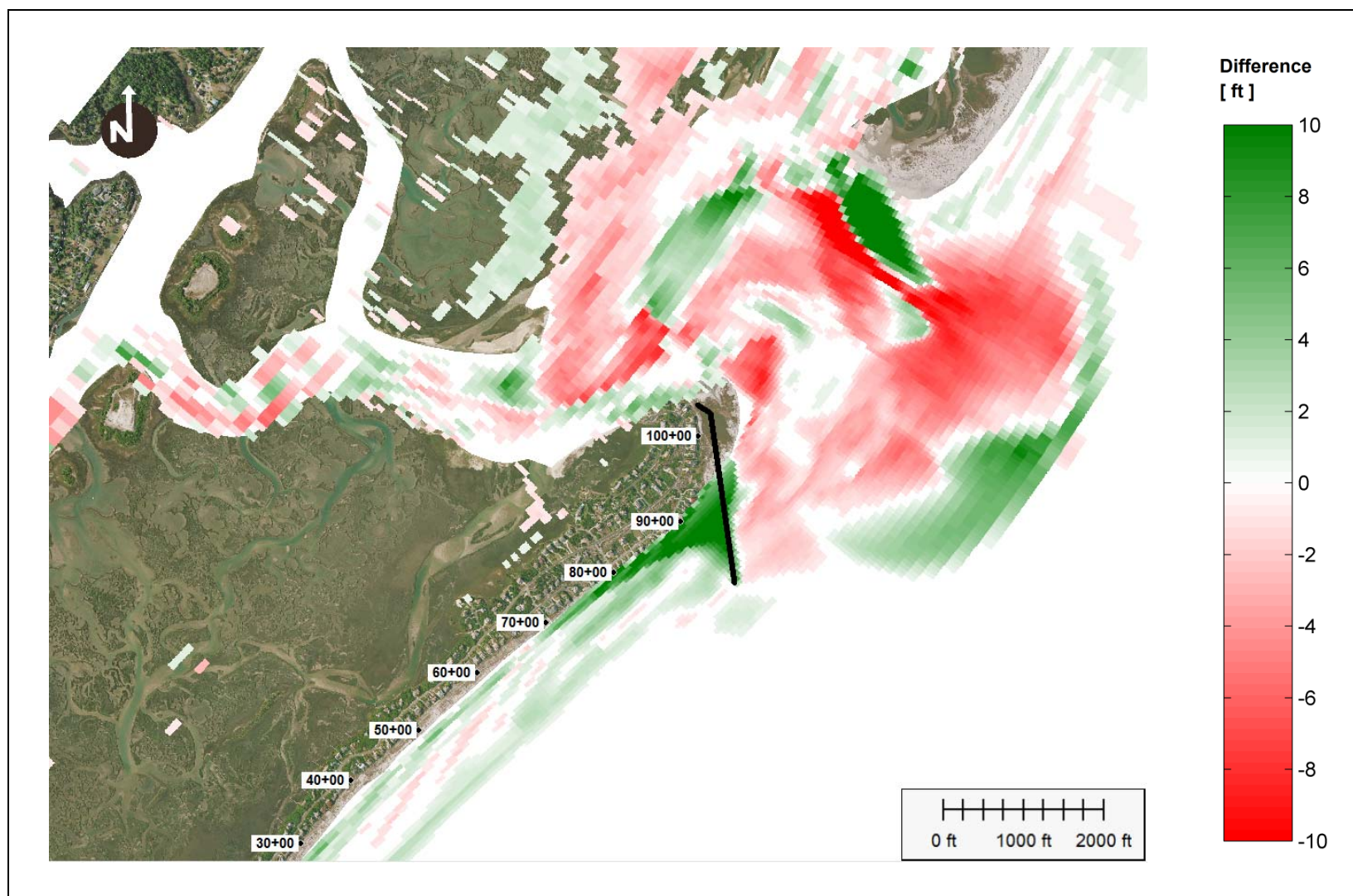


Figure 93: difference between bathymetry of Alternative 5a-2 (20 deg) after 2 years simulation and initial bathymetry of Alternative 2.

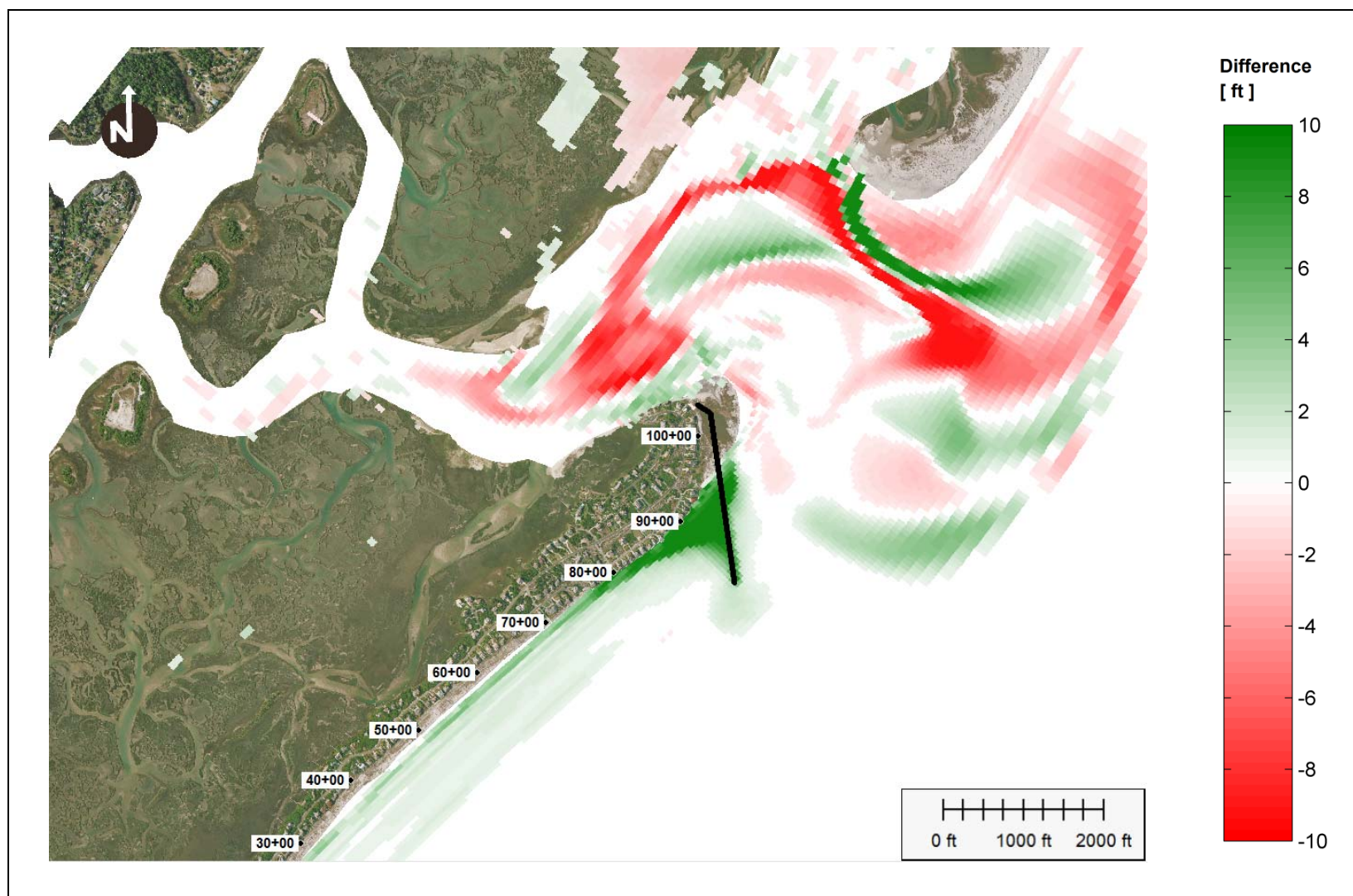


Figure 94: difference between bathymetries of Alternative 5a-2 (20 deg) and Alternative 2 after 2 years simulation.

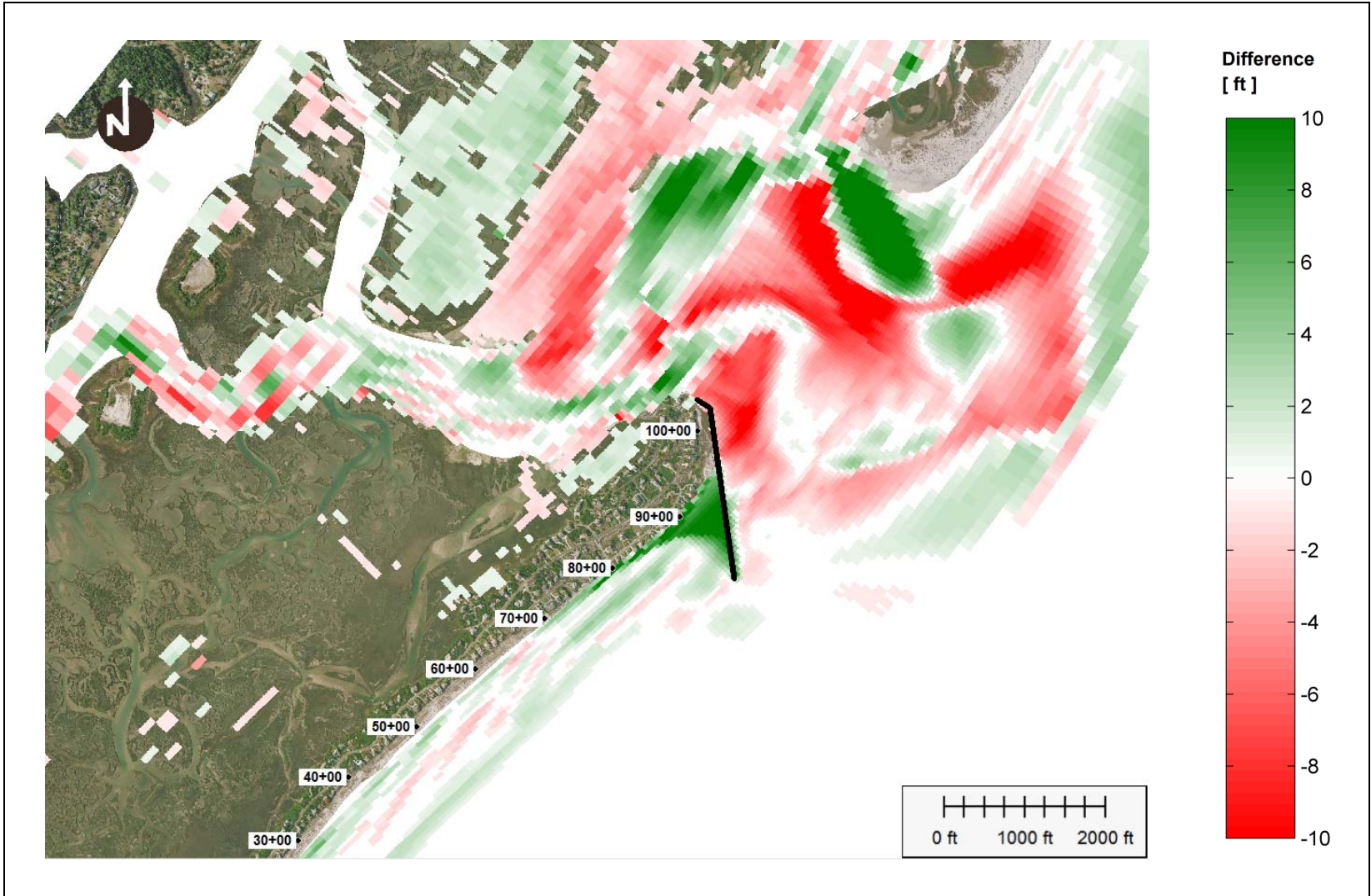


Figure 95: difference between bathymetry of Alternative 5a-2 (20 deg) after 5 years simulation and initial bathymetry of Alternative 2.

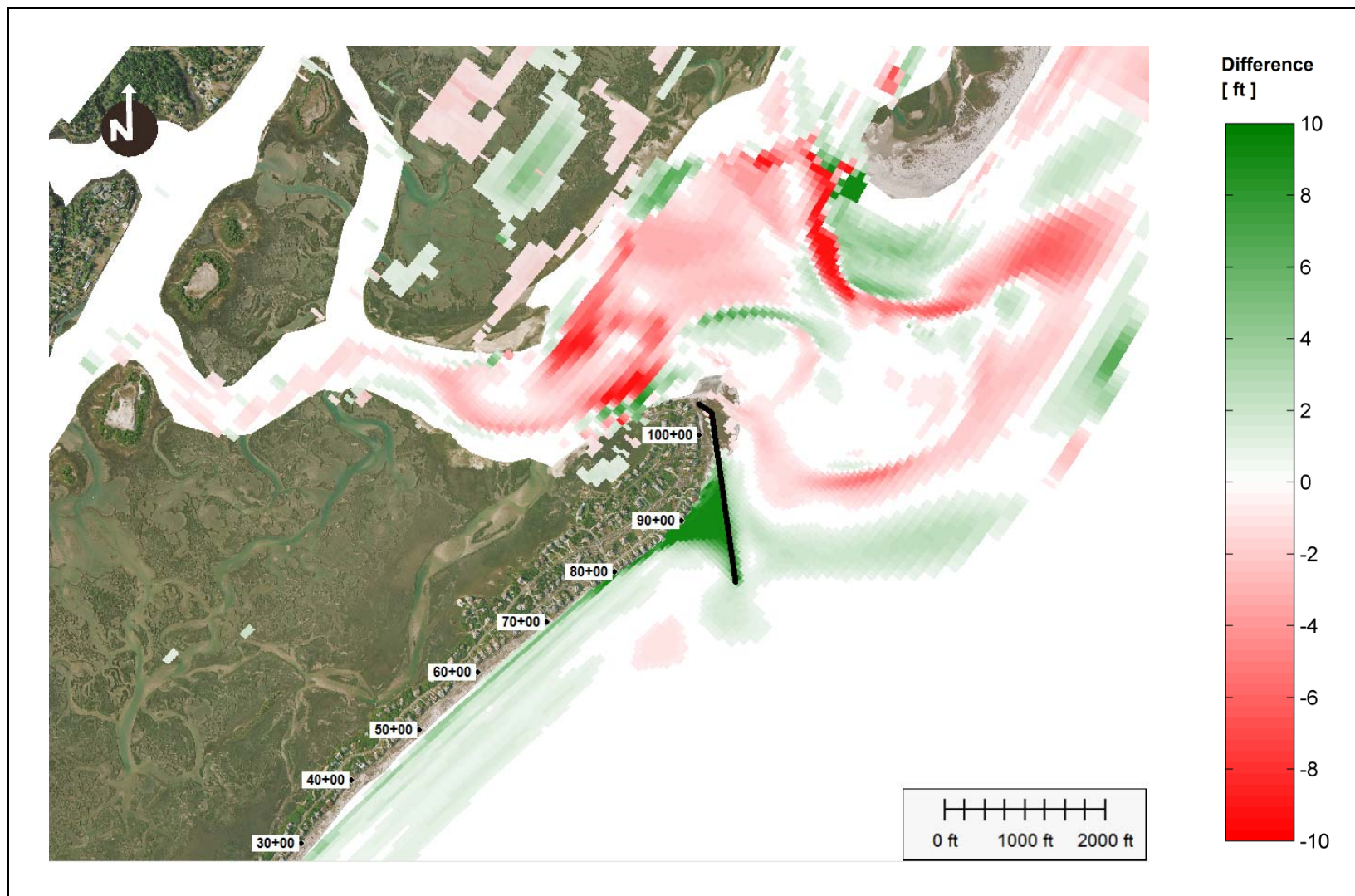


Figure 96: difference between bathymetries of Alternative 5a-2 (20 deg) and Alternative 2 after 5 years simulation.

Alternative 5a-2-30° - Alt. 5a-2 with 30° oblique terminal groin (1,200 ft)

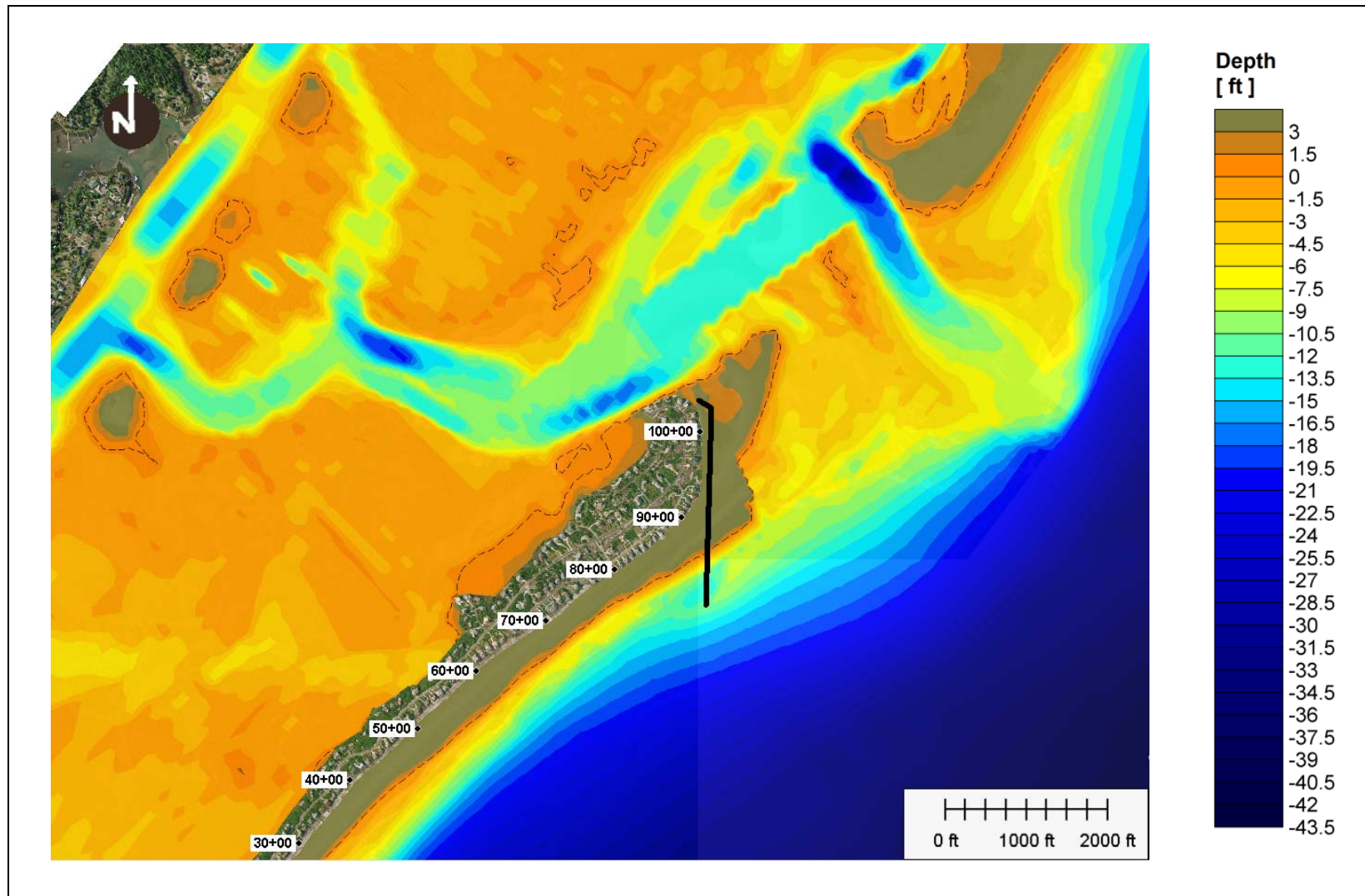


Figure 97: Alternative 5a-2 (30 deg), initial bathymetry.

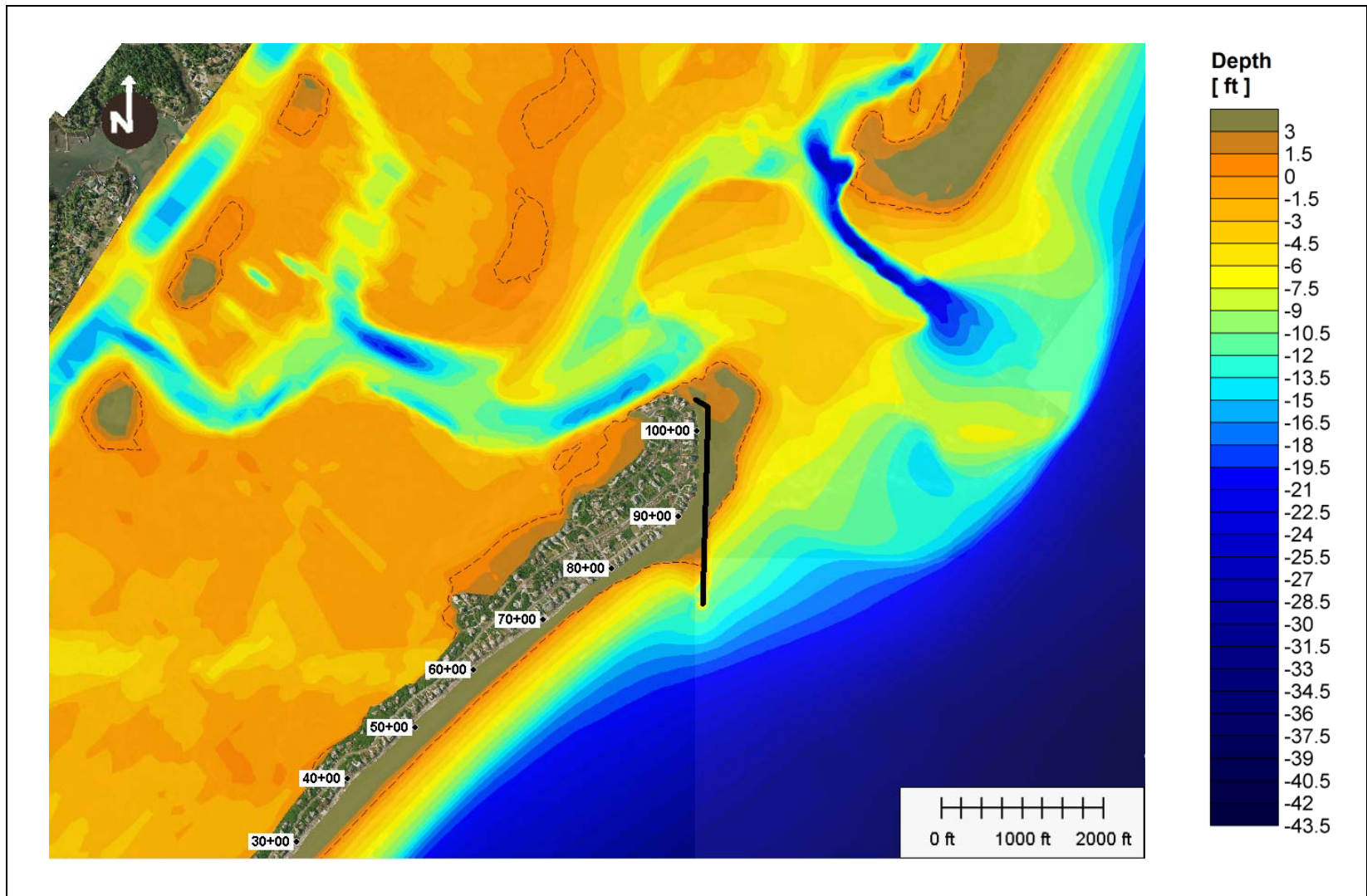


Figure 98: Alternative 5a-2 (30 deg), bathymetry after 2 years simulation.

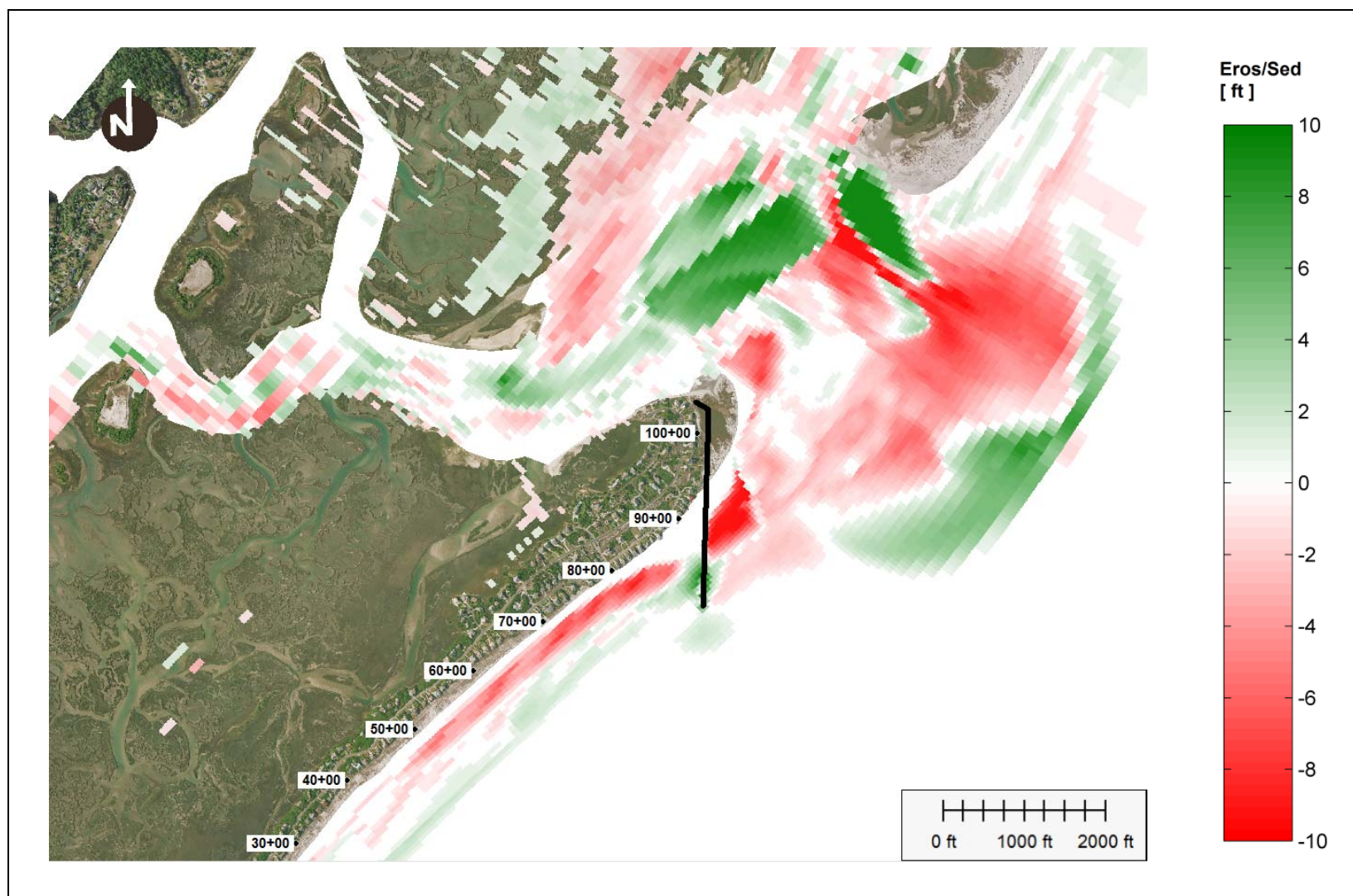


Figure 99: Alternative 5a-2 (30 deg), erosion/sedimentation after 2 years simulation.

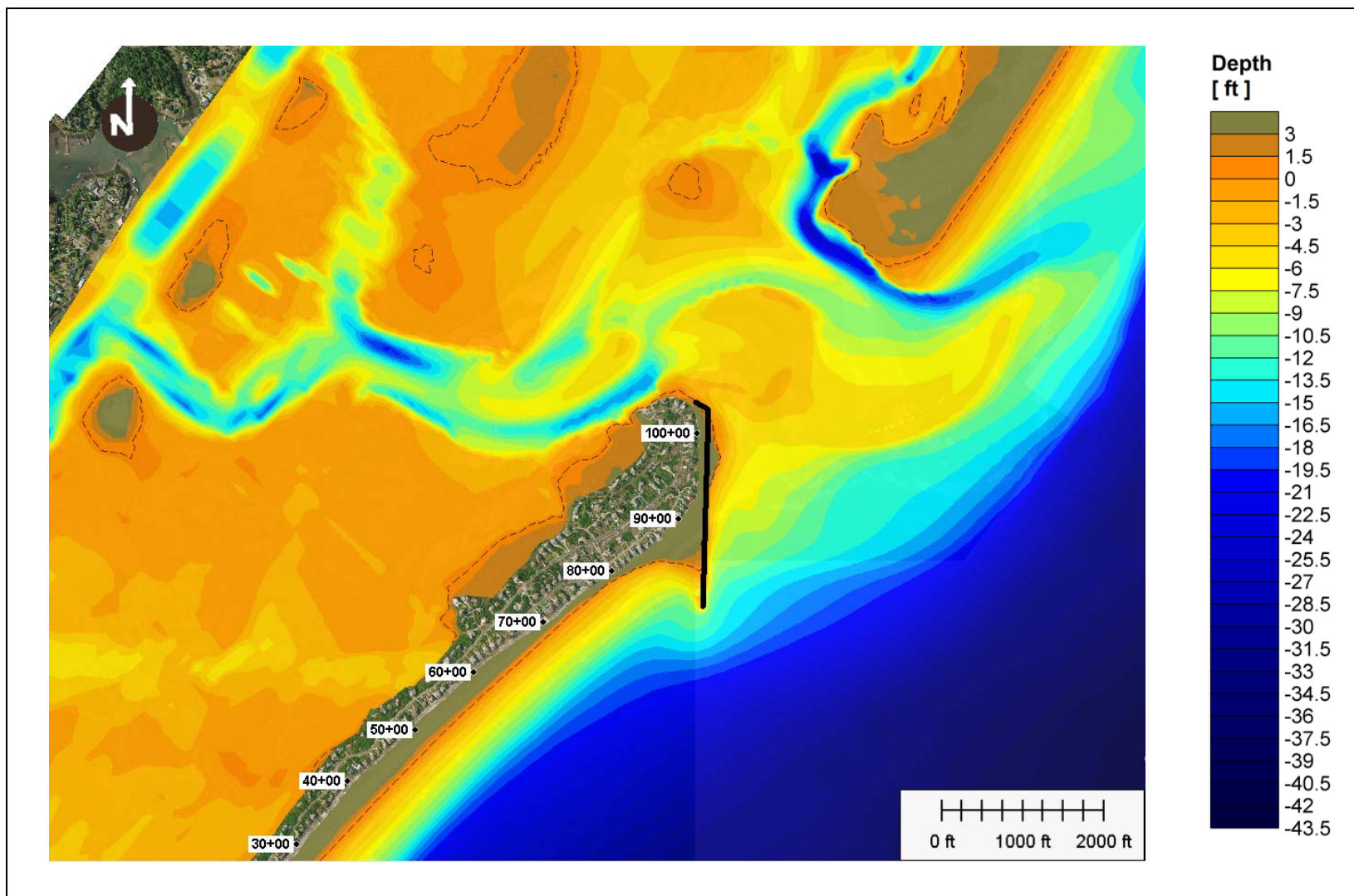


Figure 100: Alternative 5a-2 (30 deg), bathymetry after 5 years simulation.

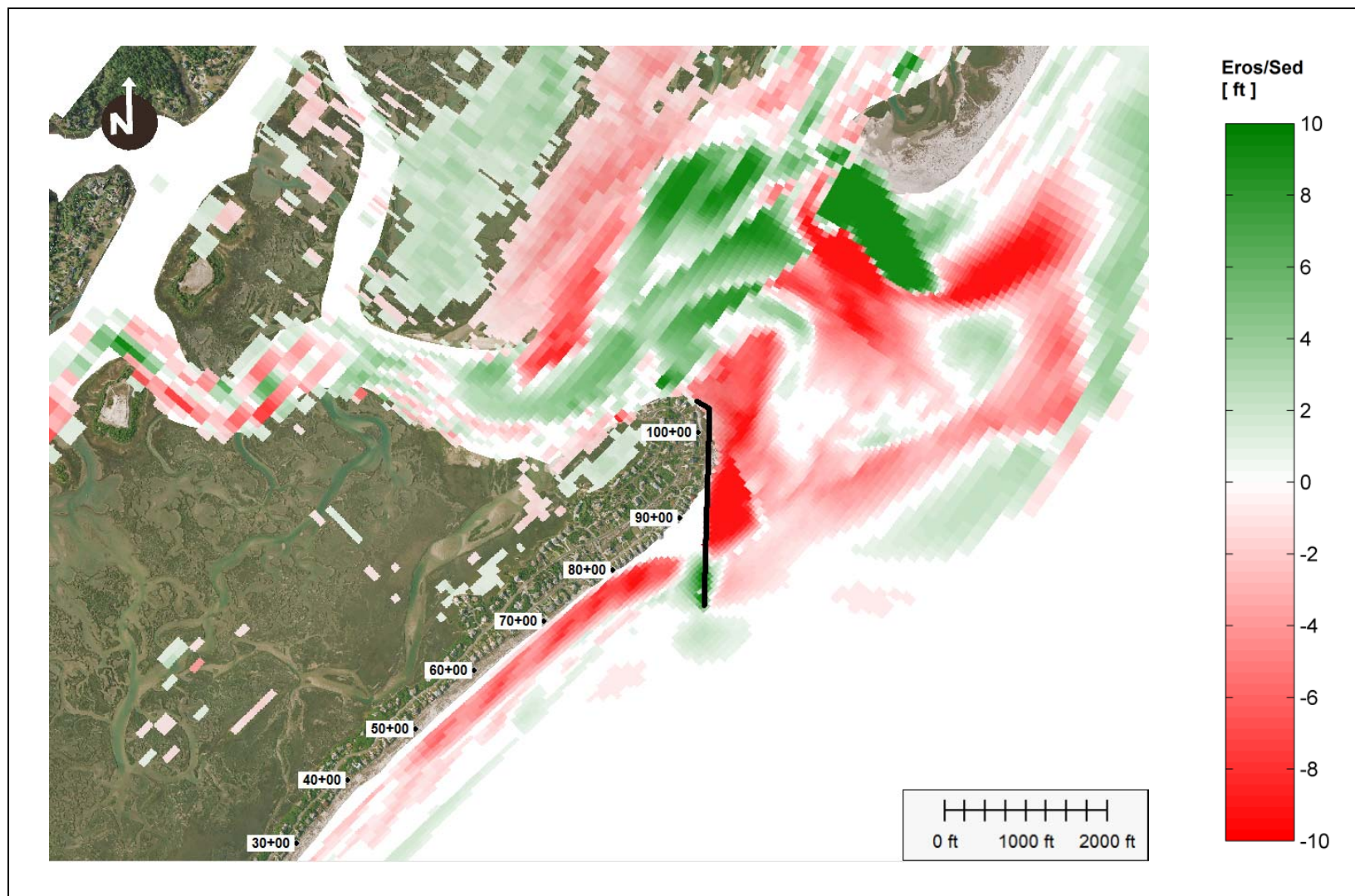


Figure 101: Alternative 5a-2 (30 deg), erosion/sedimentation after 5 year simulation.

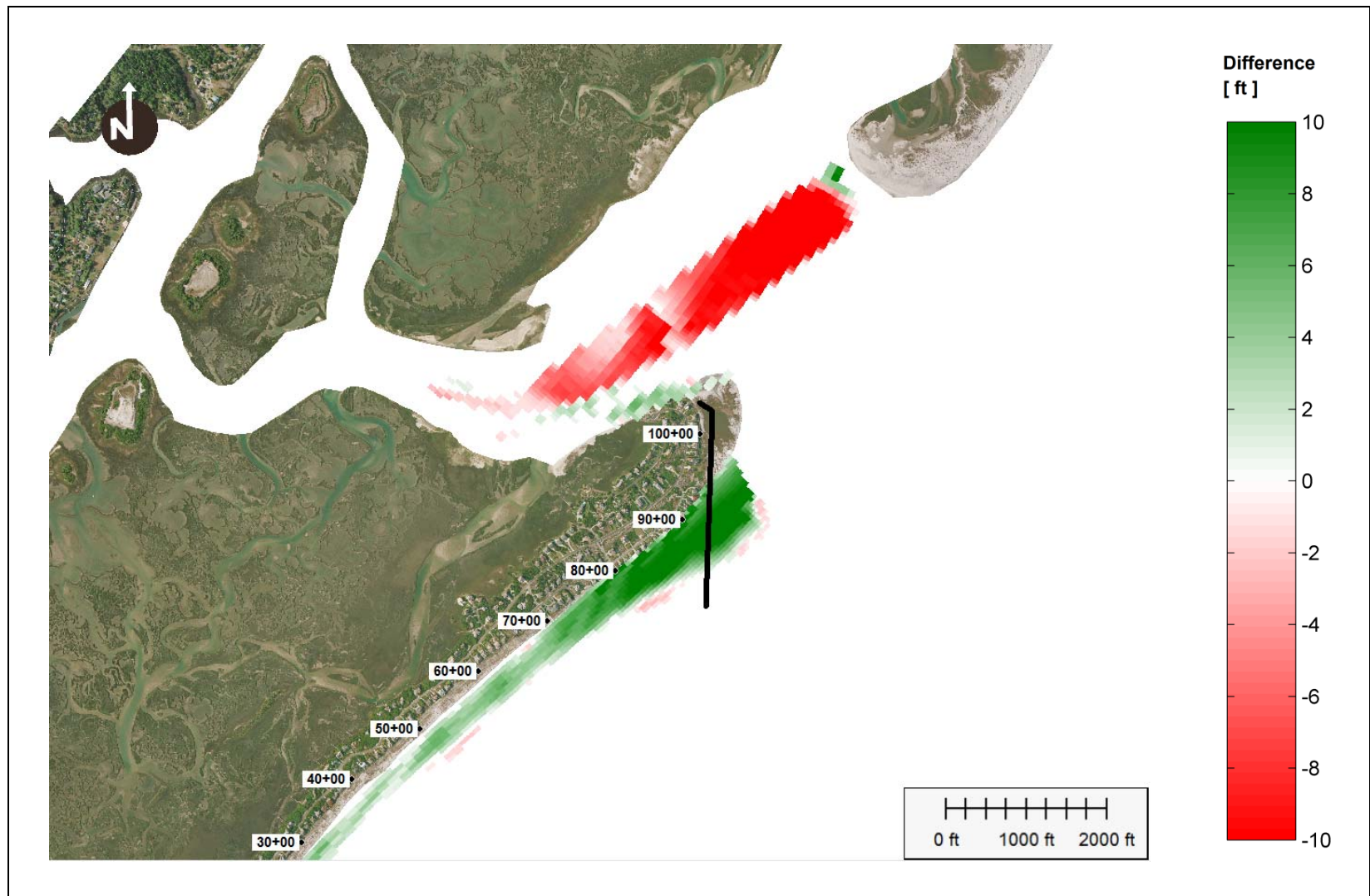


Figure 102: difference between initial bathymetries of Alternative 5a-2 (30 deg) and Alternative 2.

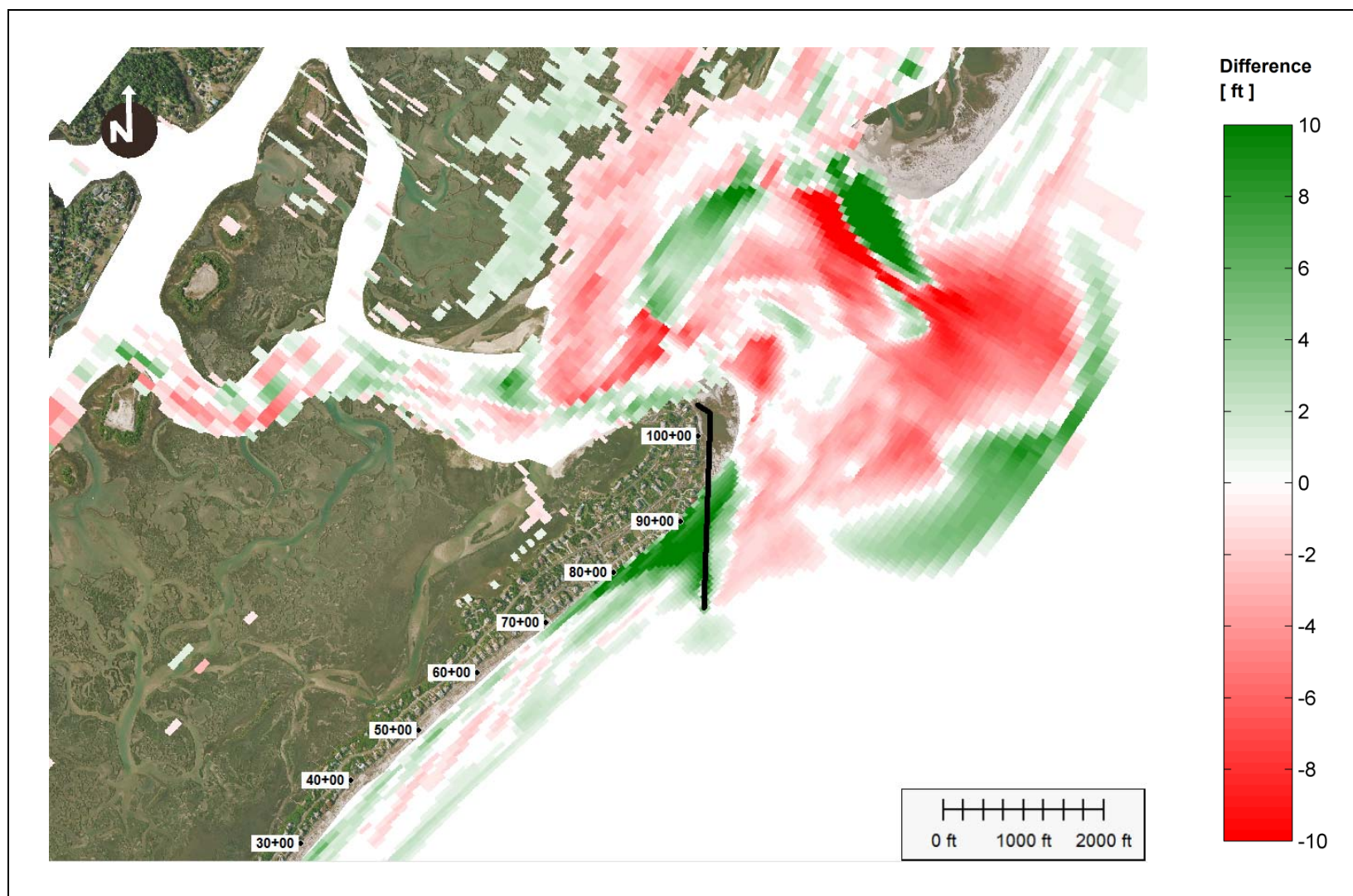


Figure 103: difference between bathymetry of Alternative 5a-2 (30 deg) after 2 years simulation and initial bathymetry of Alternative 2.

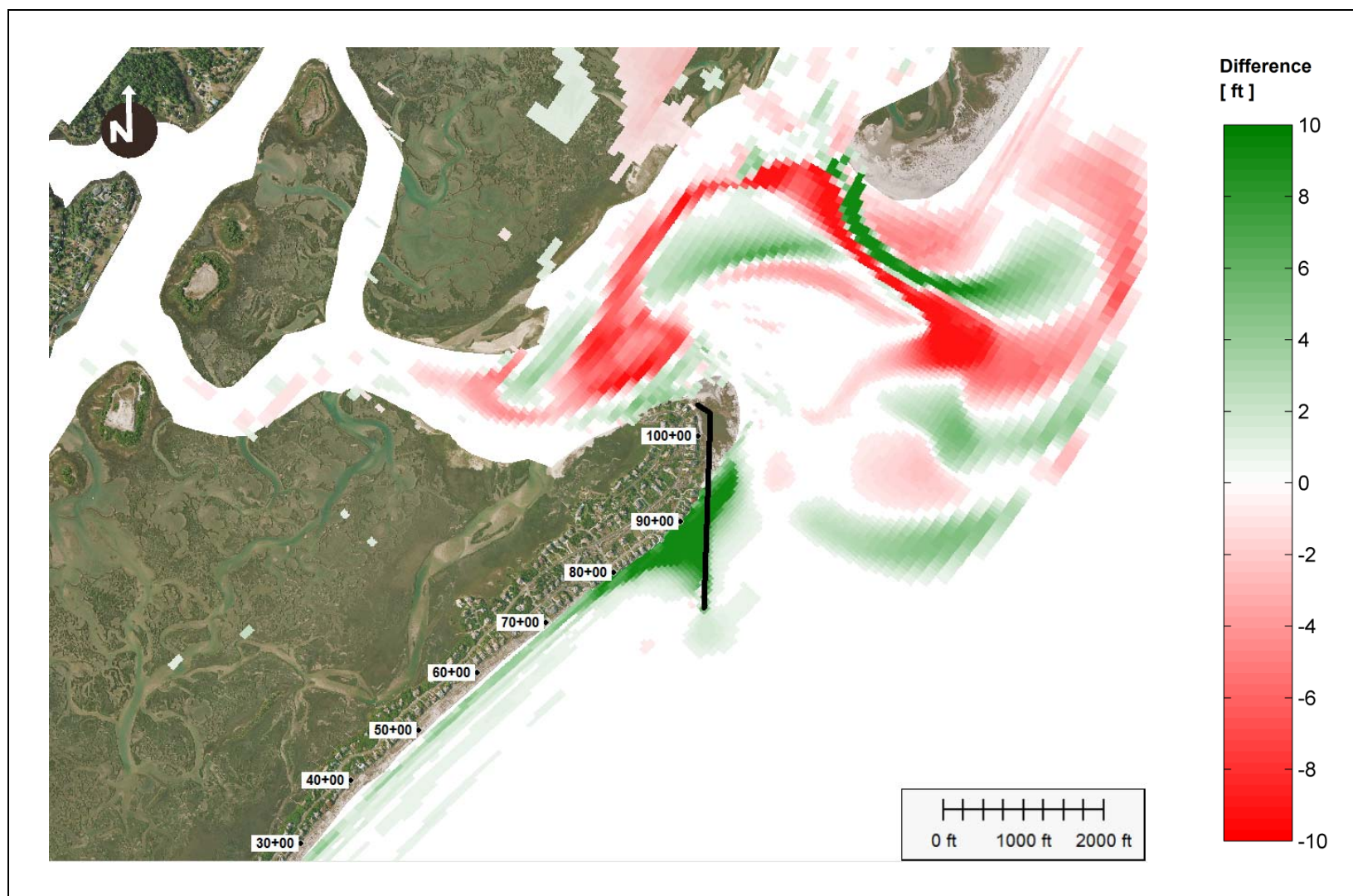


Figure 104: difference between bathymetries of Alternative 5a-2 (30 deg) and Alternative 2 after 2 years simulation.

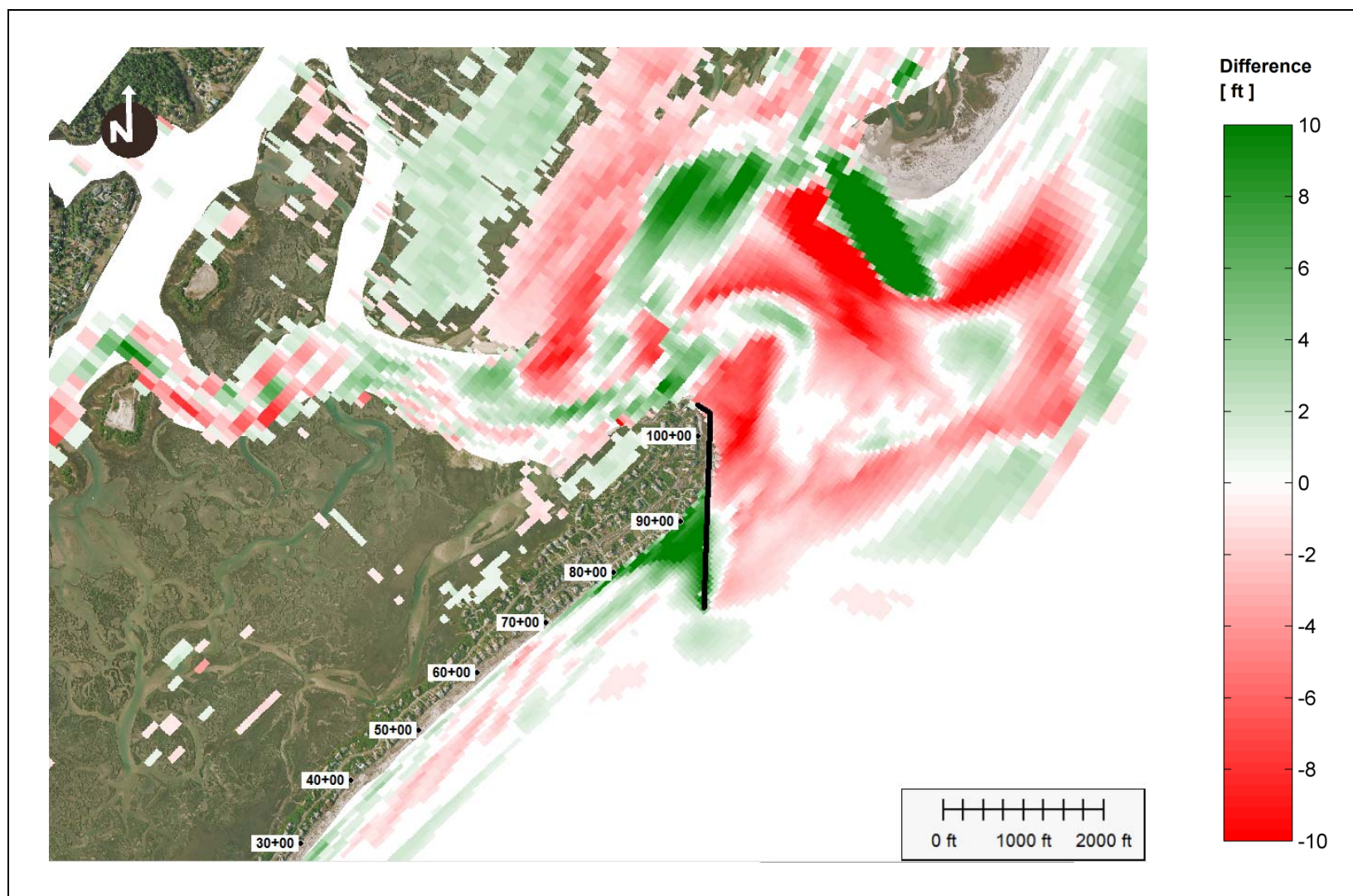


Figure 105: difference between bathymetry of Alternative 5a-2 (30 deg) after 5 years simulation and initial bathymetry of Alternative 2.

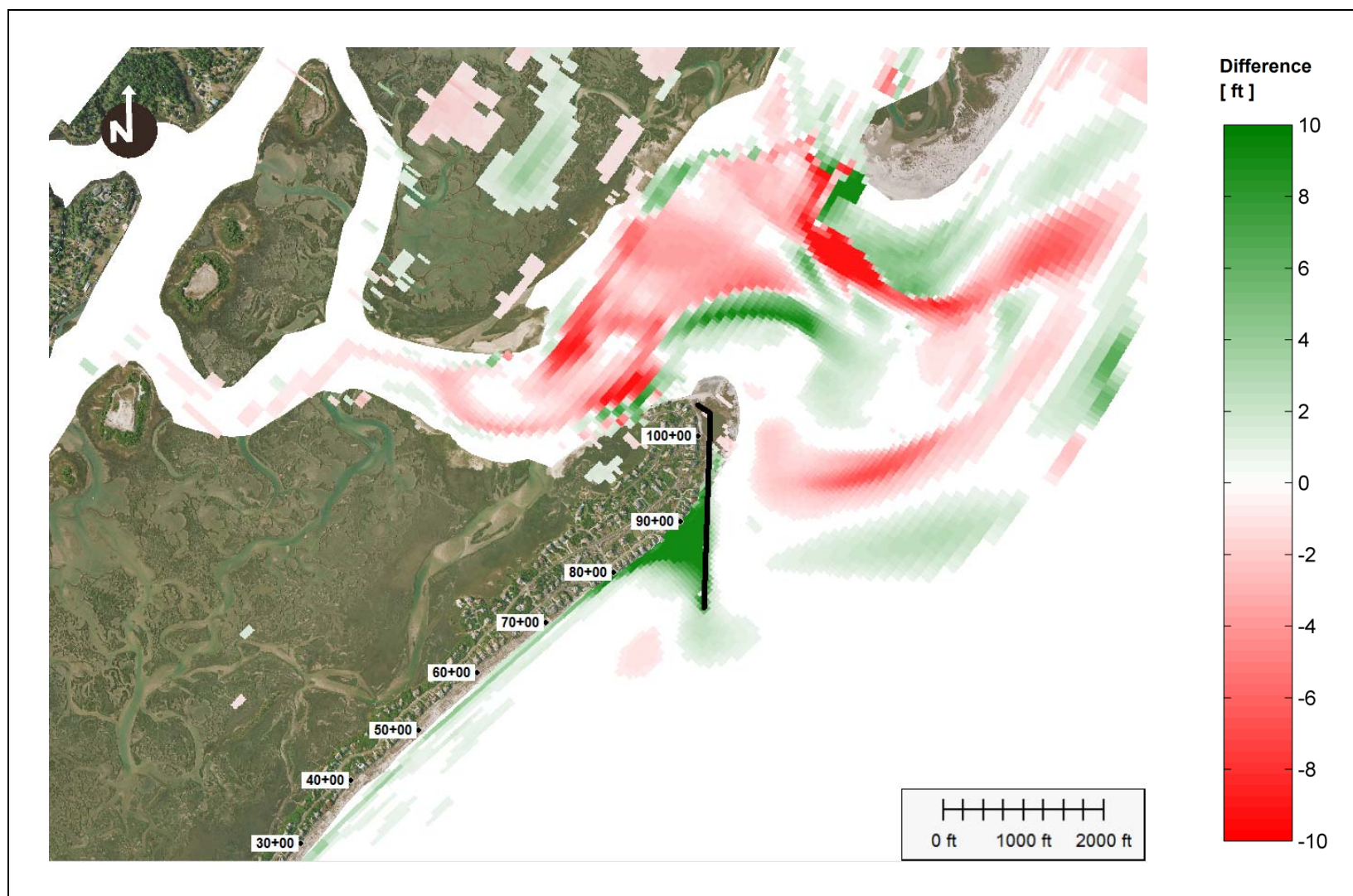


Figure 106: difference between bathymetries of Alternative 5a-2 (30 deg) and Alternative 2 after 5 years simulation.