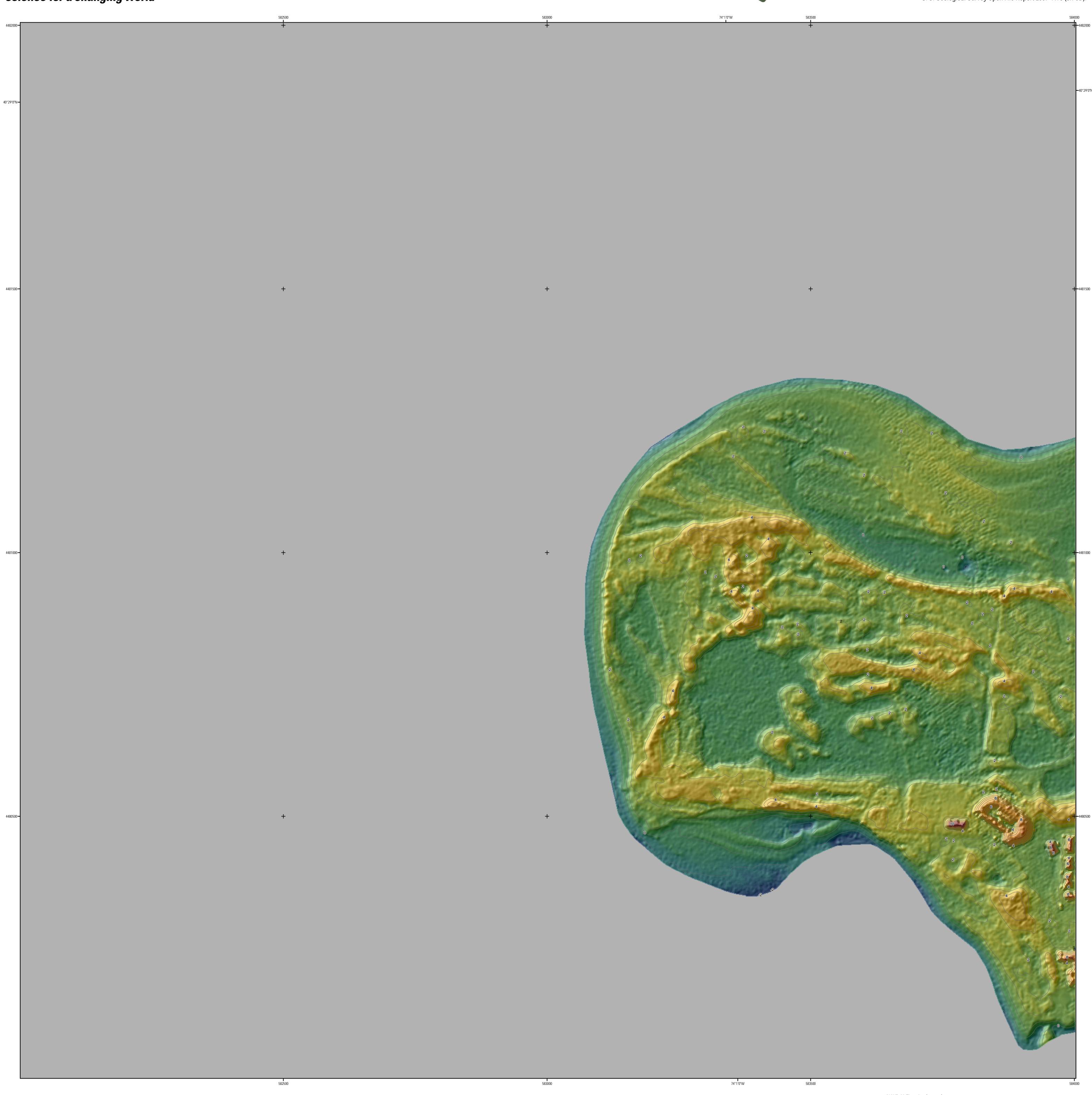




OPEN FILE REPORT 2007-1178 TILE 1 of 8 (BE) Brock. J. C., Wright, W. C., Patterson, M., Nayegandhi, A., and Patterson, J., 2007, Bare Earth Lidar Topography-Gateway National Recreation Area, U. S. Geological Survey Open File Report 2007-1178 (on CD).



Universal Transverse Mercator. 1983 North American Datum-Zone 18 North. Topography mapped using NASA Experimental Advanced Airborne Research Lidar (EAARL) April 2005. This map is not intended for use in navigation.

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### **Further Reading**

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Brock, J.C., Wright, C.W., Nayegandhi, A., Clayton, T., Hansen, M., Longenecker, J., Gesch, D., and Crane, M., 2002, Initial results from a test of the NASA EAARL lidar in the Tampa Bay Region: Transactions of the Gulf

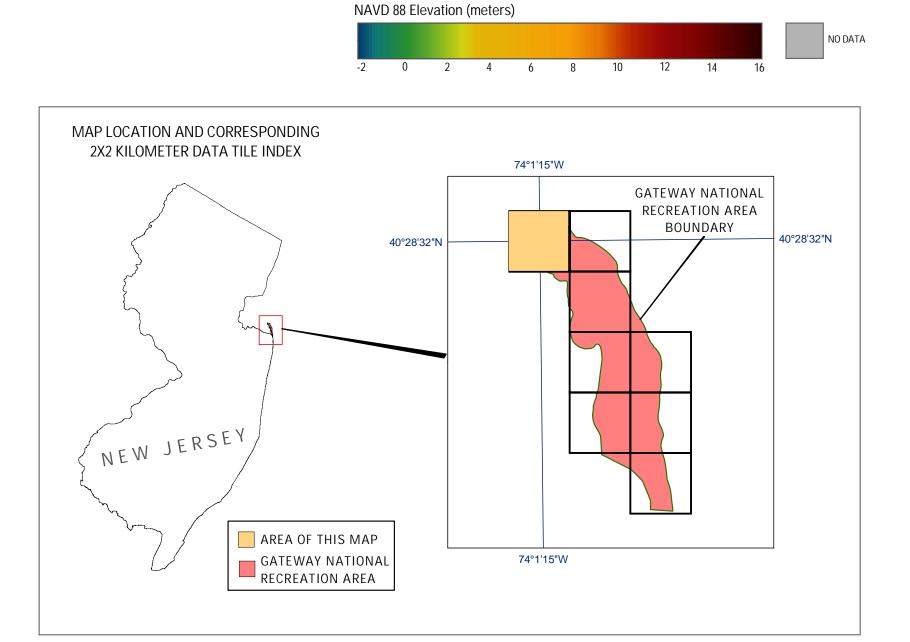
Coast Association of Geological Societies, v. 52, p. 89-98. Wright, C.W. and Brock, J.C., 2002, EAARL: A lidar for mapping shallow coral reefs and other coastal environments, in the Proceedings of the Seventh International Conference on Remote Sensing for Marine and Coastal Environments, Miami, May 20-22, 2002: Ann Arbor, MI, Veridian International Conferences, 1 computer optical disc.

SCALE 1:2500 0.3 KILOMETERS NORTH AMERICAN VERTICAL DATUM OF 1988

# Gateway National Recreation Area USGS-NPS-NASA EAARL Bare Earth (BE) Lidar Topography Map Tile 582000e\_4482000n

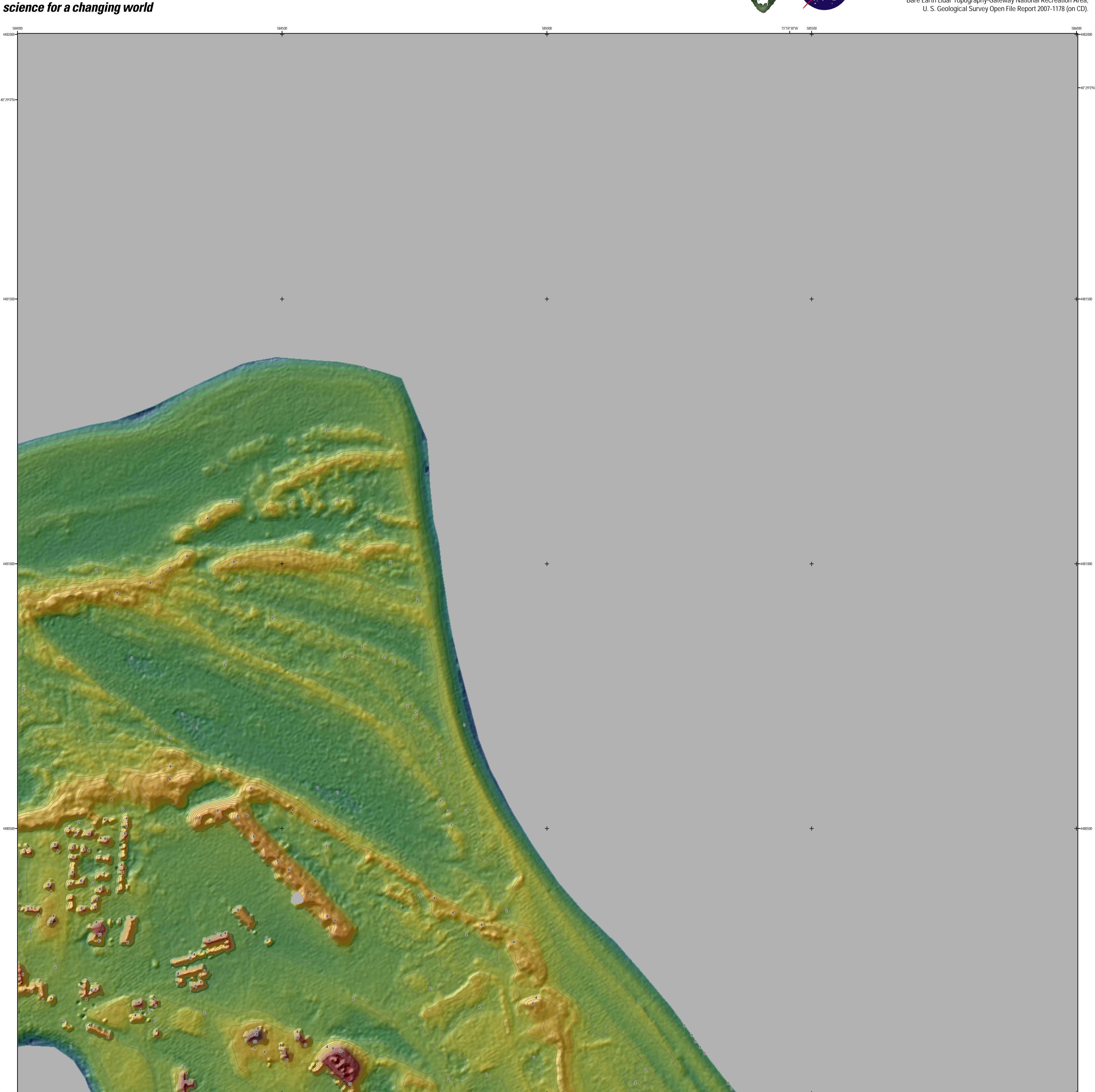
By John C. Brock<sup>1</sup>, C. Wayne Wright<sup>2</sup>, Matt Patterson<sup>3</sup>, Amar Nayegandhi<sup>4</sup>, and Judd Patterson<sup>3</sup>

- <sup>1</sup> USGS Florida Integrated Science Center, St. Petersburg, FL
- <sup>2</sup> NASA Wallops Flight Facility, Wallops Island, VA <sup>3</sup> NPS South Florida/Caribbean Network and Monitoring Program, Miami, FL <sup>4</sup> ETI Professionals, Inc. Contracted with USGS Florida Integrated Science Center, St. Petersburg, FL





OPEN FILE REPORT 2007-1178 TILE 2 of 8 (BE) Brock. J. C., Wright, W. C., Patterson, M., Nayegandhi, A., and Patterson, J., 2007, Bare Earth Lidar Topography-Gateway National Recreation Area, U. S. Geological Survey Open File Report 2007-1178 (on CD).



Universal Transverse Mercator. 1983 North American Datum-Zone 18 North. Topography mapped using NASA Experimental Advanced Airborne Research Lidar (EAARL) April 2005. This map is not intended for use in navigation.

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Coast Association of Geological Societies, v. 52, p. 89-98. Wright, C.W. and Brock, J.C., 2002, EAARL: A lidar for mapping shallow coral reefs and other coastal environments, in the Proceedings of the Seventh International Conference on Remote Sensing for Marine and Coastal Environments, Miami, May 20-22, 2002: Ann Arbor, MI, Veridian International Conferences, 1 computer optical disc.

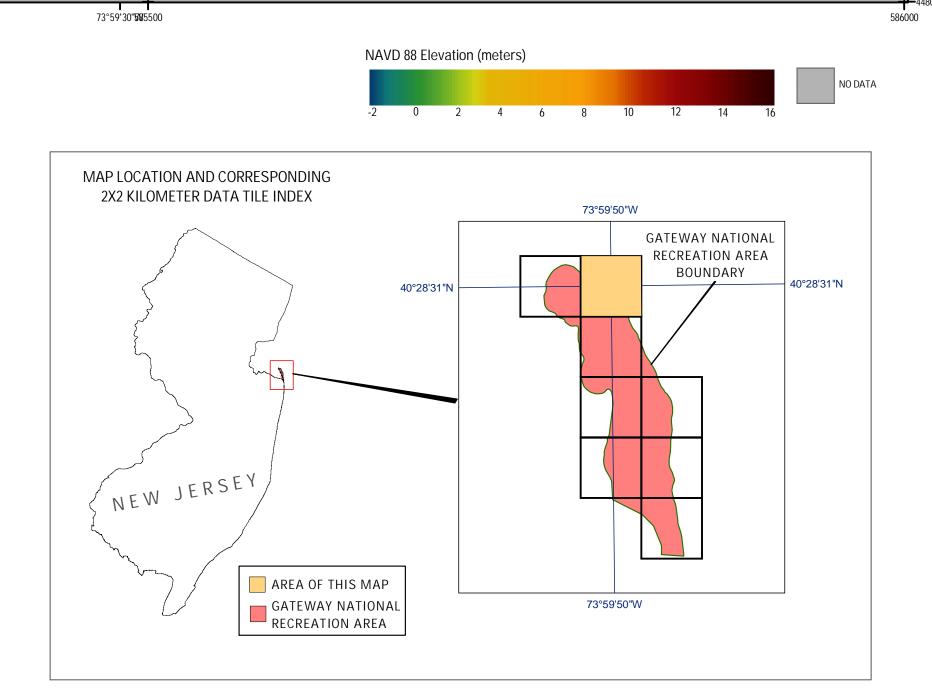
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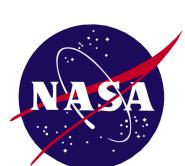
By John C. Brock<sup>1</sup>, C. Wayne Wright<sup>2</sup>, Matt Patterson<sup>3</sup>, Amar Nayegandhi<sup>4</sup>, and Judd Patterson<sup>3</sup>

<sup>1</sup> USGS Florida Integrated Science Center, St. Petersburg, FL <sup>2</sup> NASA Wallops Flight Facility, Wallops Island, VA

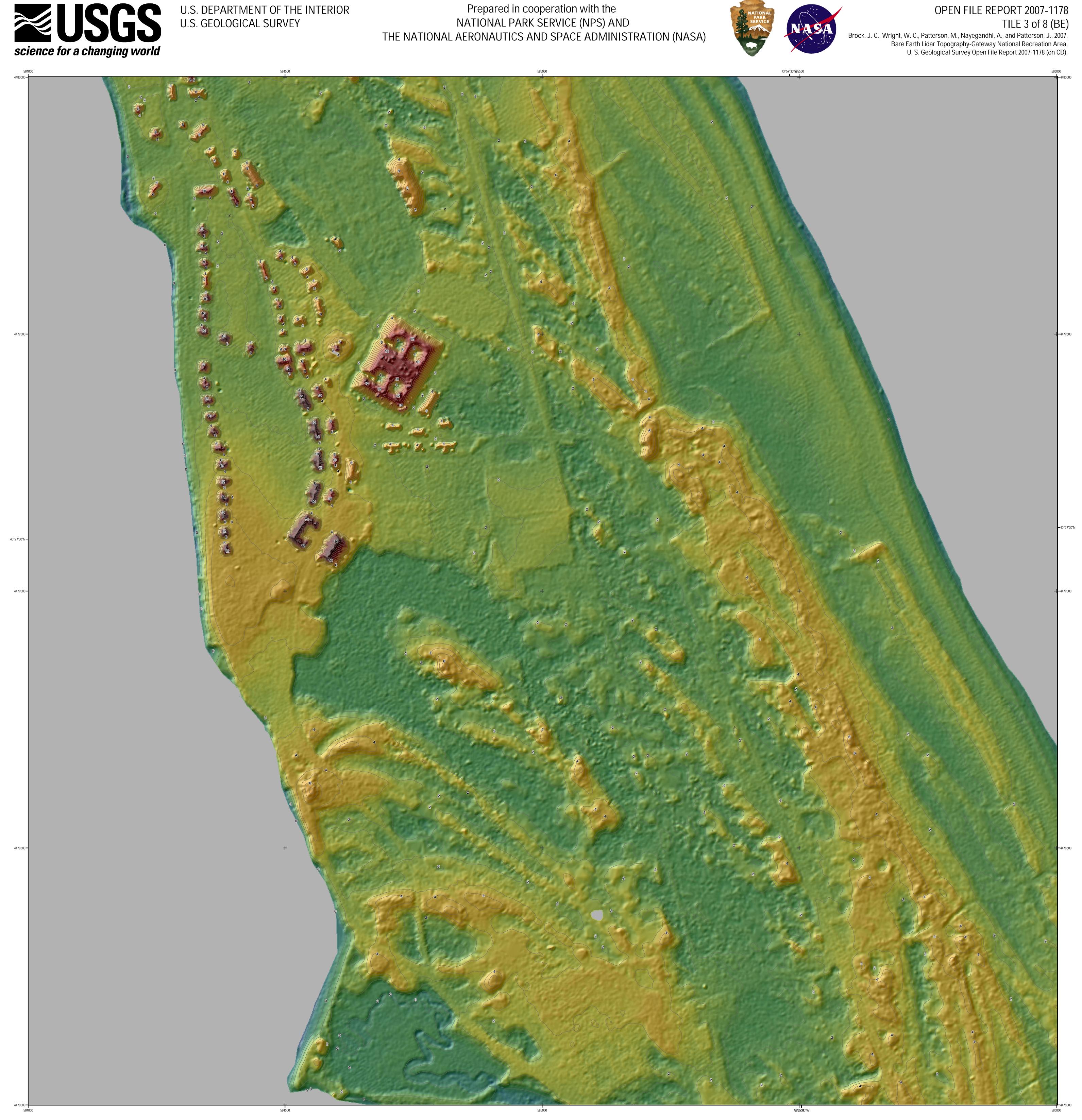
<sup>3</sup> NPS South Florida/Caribbean Network and Monitoring Program, Miami, FL <sup>4</sup> ETI Professionals, Inc. Contracted with USGS Florida Integrated Science Center, St. Petersburg, FL







OPEN FILE REPORT 2007-1178 TILE 3 of 8 (BE) Brock. J. C., Wright, W. C., Patterson, M., Nayegandhi, A., and Patterson, J., 2007, Bare Earth Lidar Topography-Gateway National Recreation Area, U. S. Geological Survey Open File Report 2007-1178 (on CD).



Universal Transverse Mercator. 1983 North American Datum-Zone 18 North. Topography mapped using NASA Experimental Advanced Airborne Research Lidar (EAARL) April 2005. This map is not intended for use in navigation.

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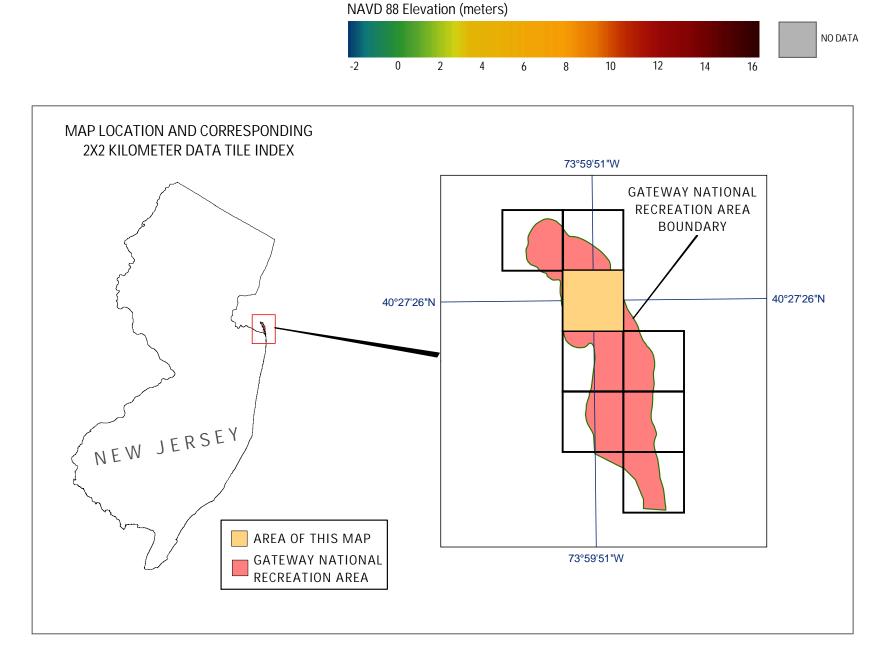
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# Gateway National Recreation Area USGS-NPS-NASA EAARL Bare Earth (BE) Lidar Topography Map Tile 584000e\_4480000n

By John C. Brock<sup>1</sup>, C. Wayne Wright<sup>2</sup>, Matt Patterson<sup>3</sup>, Amar Nayegandhi<sup>4</sup>, and Judd Patterson<sup>3</sup>

<sup>1</sup> USGS Florida Integrated Science Center, St. Petersburg, FL <sup>2</sup> NASA Wallops Flight Facility, Wallops Island, VA

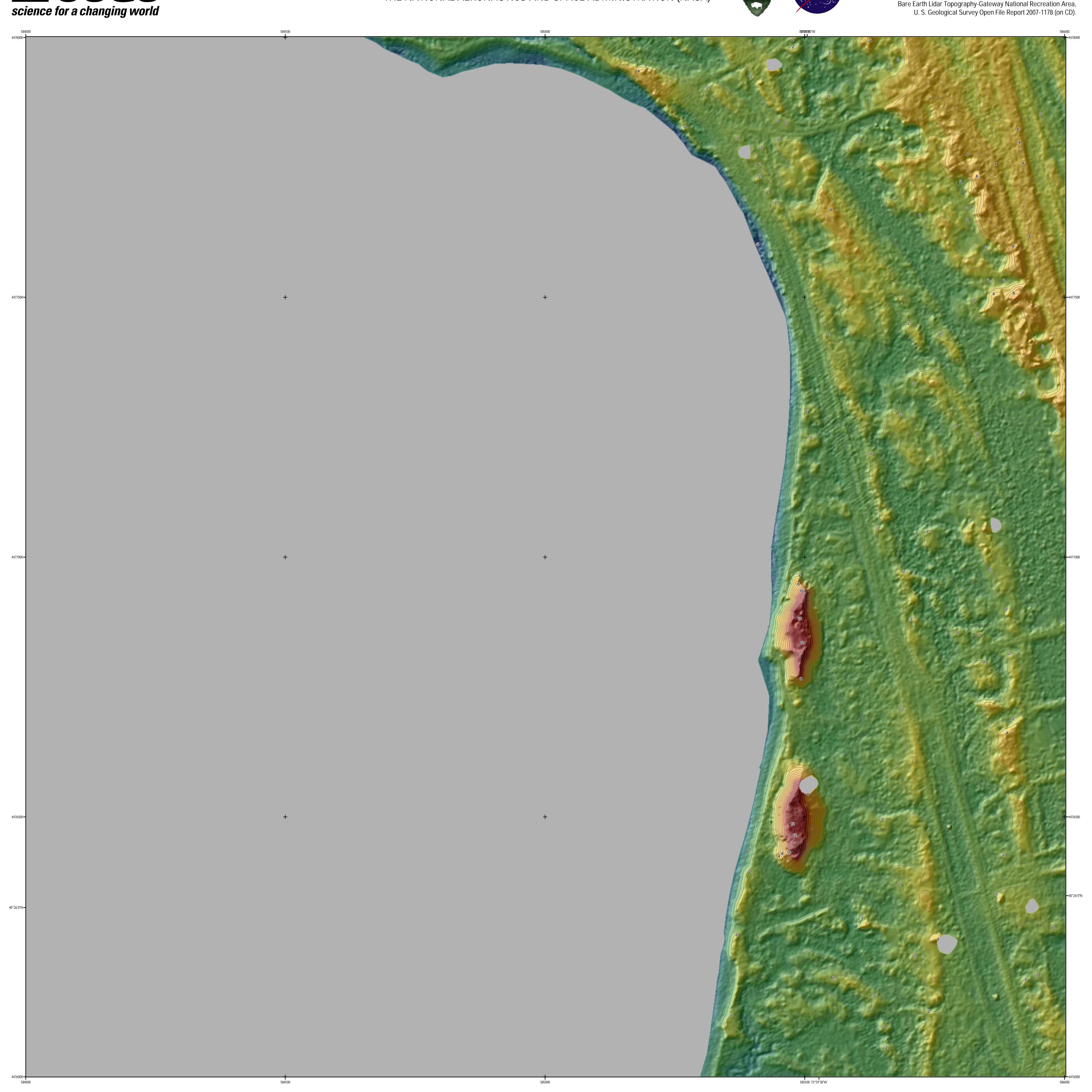
<sup>3</sup> NPS South Florida/Caribbean Network and Monitoring Program, Miami, FL <sup>4</sup> ETI Professionals, Inc. Contracted with USGS Florida Integrated Science Center, St. Petersburg, FL







OPEN FILE REPORT 2007-1178 TILE 4 of 8 (BE) Brock. J. C., Wright, W. C., Patterson, M., Nayegandhi, A., and Patterson, J., 2007, Bare Earth Lidar Topography-Gateway National Recreation Area, U. S. Geological Survey Open File Report 2007-1178 (on CD).



Universal Transverse Mercator. 1983 North American Datum-Zone 18 North. Topography mapped using NASA Experimental Advanced Airborne Research Lidar (EAARL) April 2005. This map is not intended for use in navigation.

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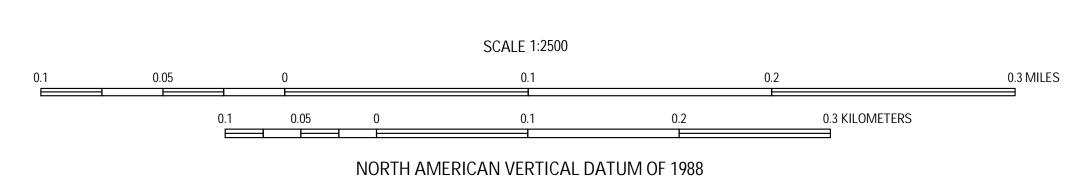
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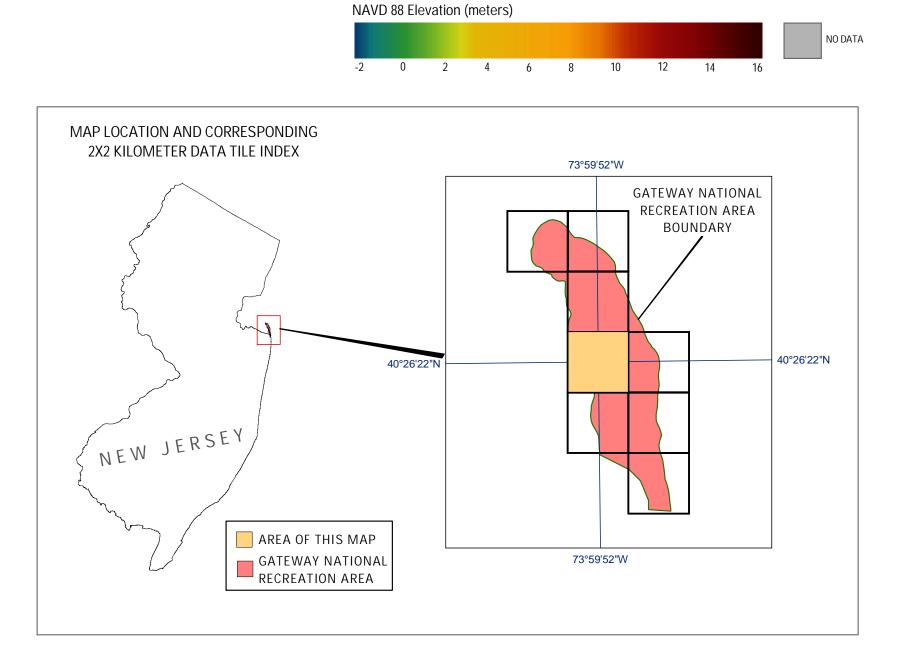


# Gateway National Recreation Area USGS-NPS-NASA EAARL Bare Earth (BE) Lidar Topography Map Tile 584000e\_4478000n

By John C. Brock<sup>1</sup>, C. Wayne Wright<sup>2</sup>, Matt Patterson<sup>3</sup>, Amar Nayegandhi<sup>4</sup>, and Judd Patterson<sup>3</sup>

<sup>1</sup> USGS Florida Integrated Science Center, St. Petersburg, FL <sup>2</sup> NASA Wallops Flight Facility, Wallops Island, VA

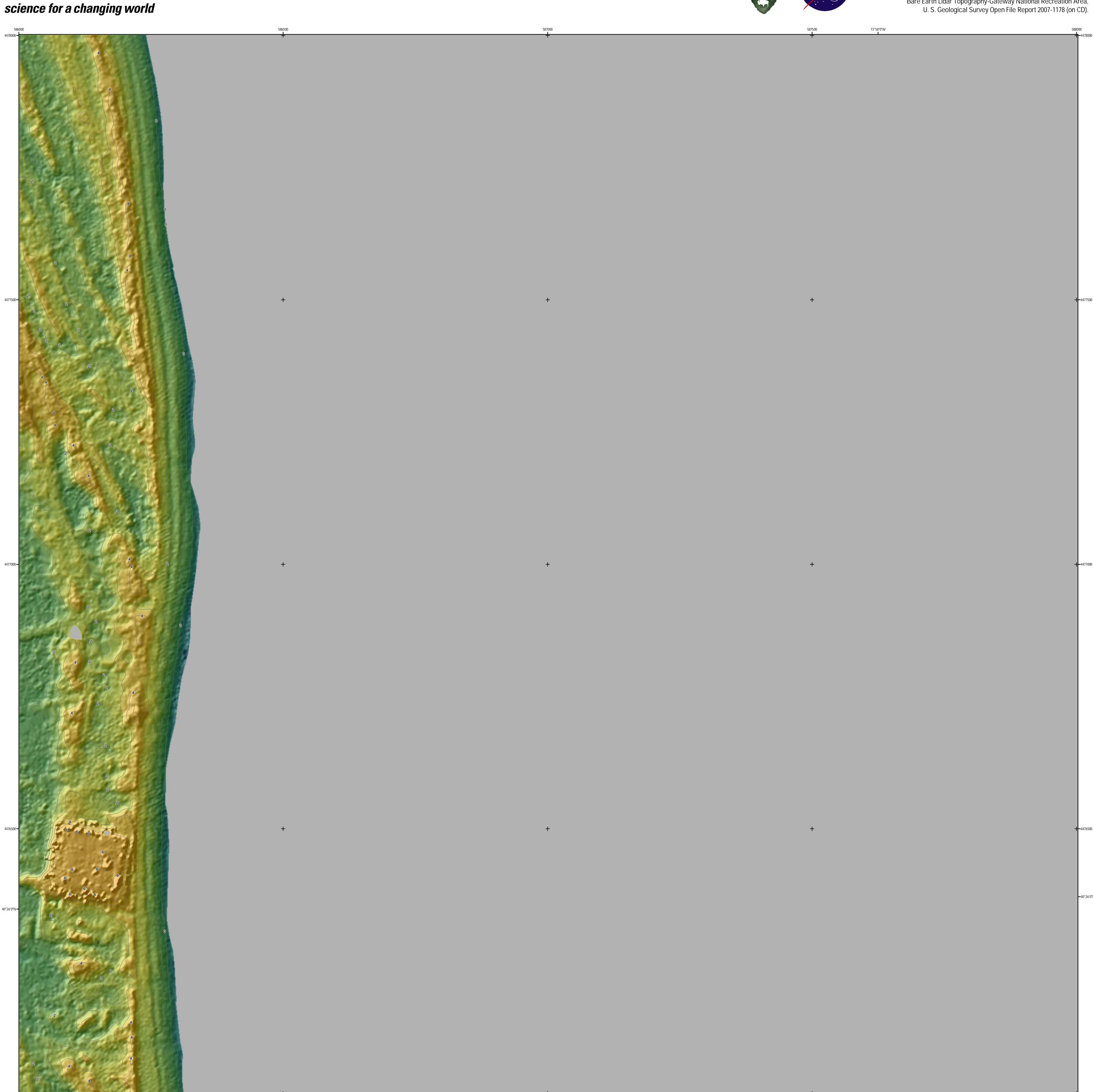
<sup>3</sup> NPS South Florida/Caribbean Network and Monitoring Program, Miami, FL <sup>4</sup> ETI Professionals, Inc. Contracted with USGS Florida Integrated Science Center, St. Petersburg, FL







OPEN FILE REPORT 2007-1178 TILE 5 of 8 (BE) Brock. J. C., Wright, W. C., Patterson, M., Nayegandhi, A., and Patterson, J., 2007, Bare Earth Lidar Topography-Gateway National Recreation Area, U. S. Geological Survey Open File Report 2007-1178 (on CD).



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Proceedings of the Seventh International Conference on Remote Sensing for Marine and Coastal Environments, Miami,

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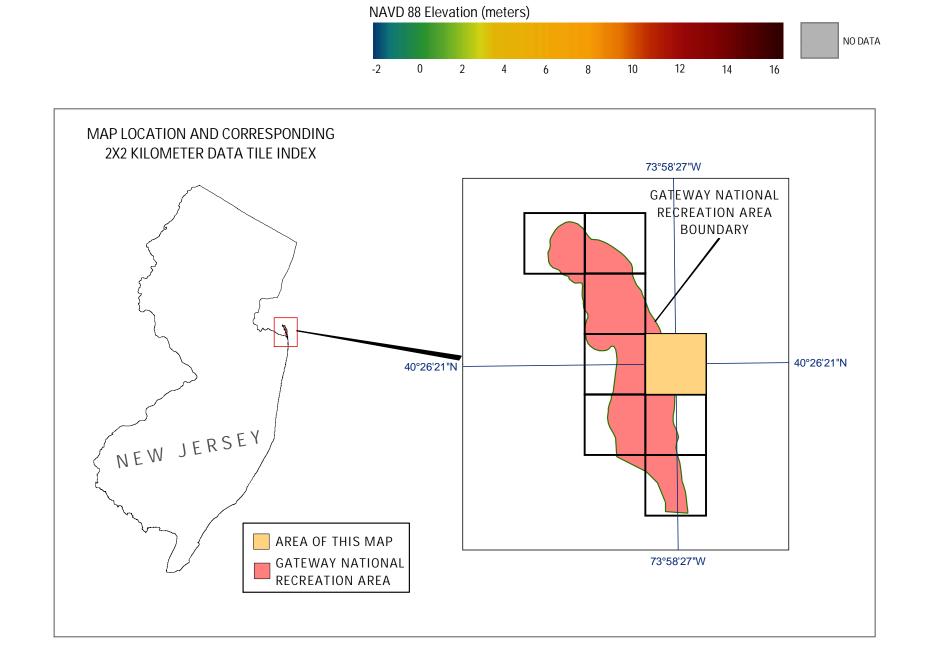
NORTH AMERICAN VERTICAL DATUM OF 1988

By John C. Brock<sup>1</sup>, C. Wayne Wright<sup>2</sup>, Matt Patterson<sup>3</sup>, Amar Nayegandhi<sup>4</sup>, and Judd Patterson<sup>3</sup> <sup>1</sup> USGS Florida Integrated Science Center, St. Petersburg, FL

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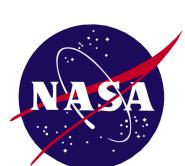
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2007

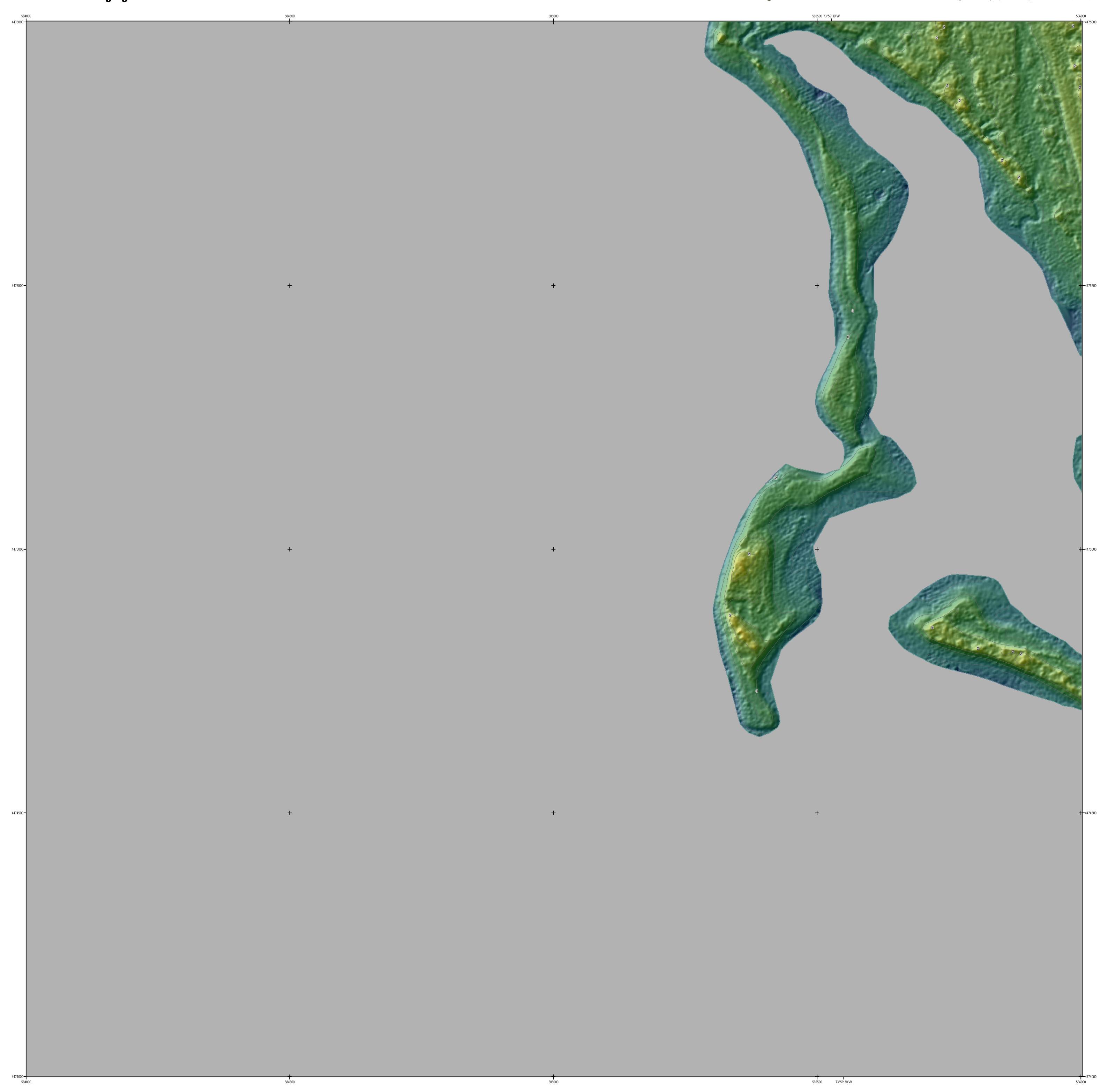


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OPEN FILE REPORT 2007-1178 TILE 6 of 8 (BE) Brock. J. C., Wright, W. C., Patterson, M., Nayegandhi, A., and Patterson, J., 2007, Bare Earth Lidar Topography-Gateway National Recreation Area, U. S. Geological Survey Open File Report 2007-1178 (on CD).



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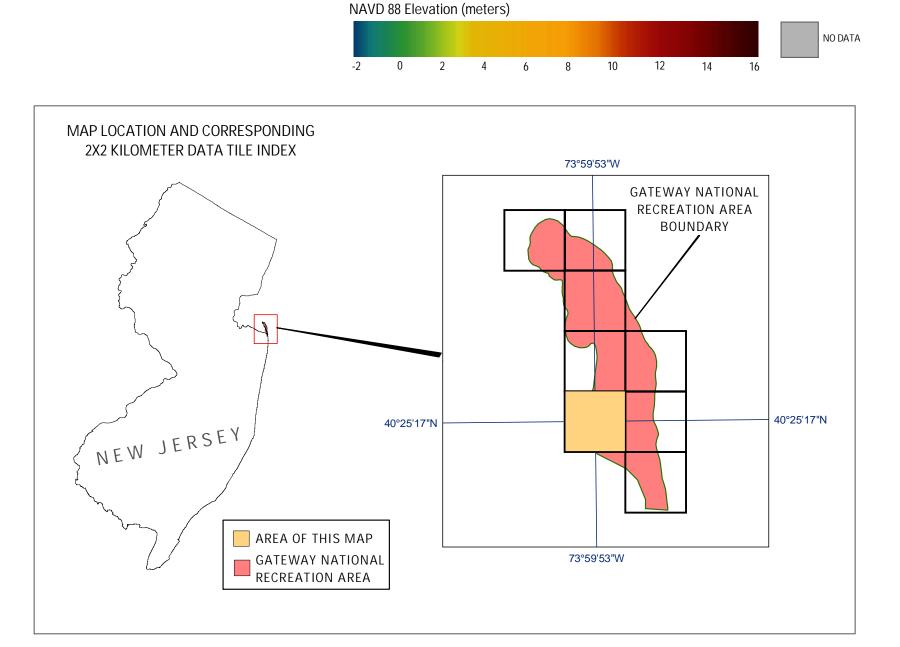
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# Gateway National Recreation Area USGS-NPS-NASA EAARL Bare Earth (BE) Lidar Topography Map Tile 584000e\_4476000n

By John C. Brock<sup>1</sup>, C. Wayne Wright<sup>2</sup>, Matt Patterson<sup>3</sup>, Amar Nayegandhi<sup>4</sup>, and Judd Patterson<sup>3</sup>

<sup>1</sup> USGS Florida Integrated Science Center, St. Petersburg, FL <sup>2</sup> NASA Wallops Flight Facility, Wallops Island, VA

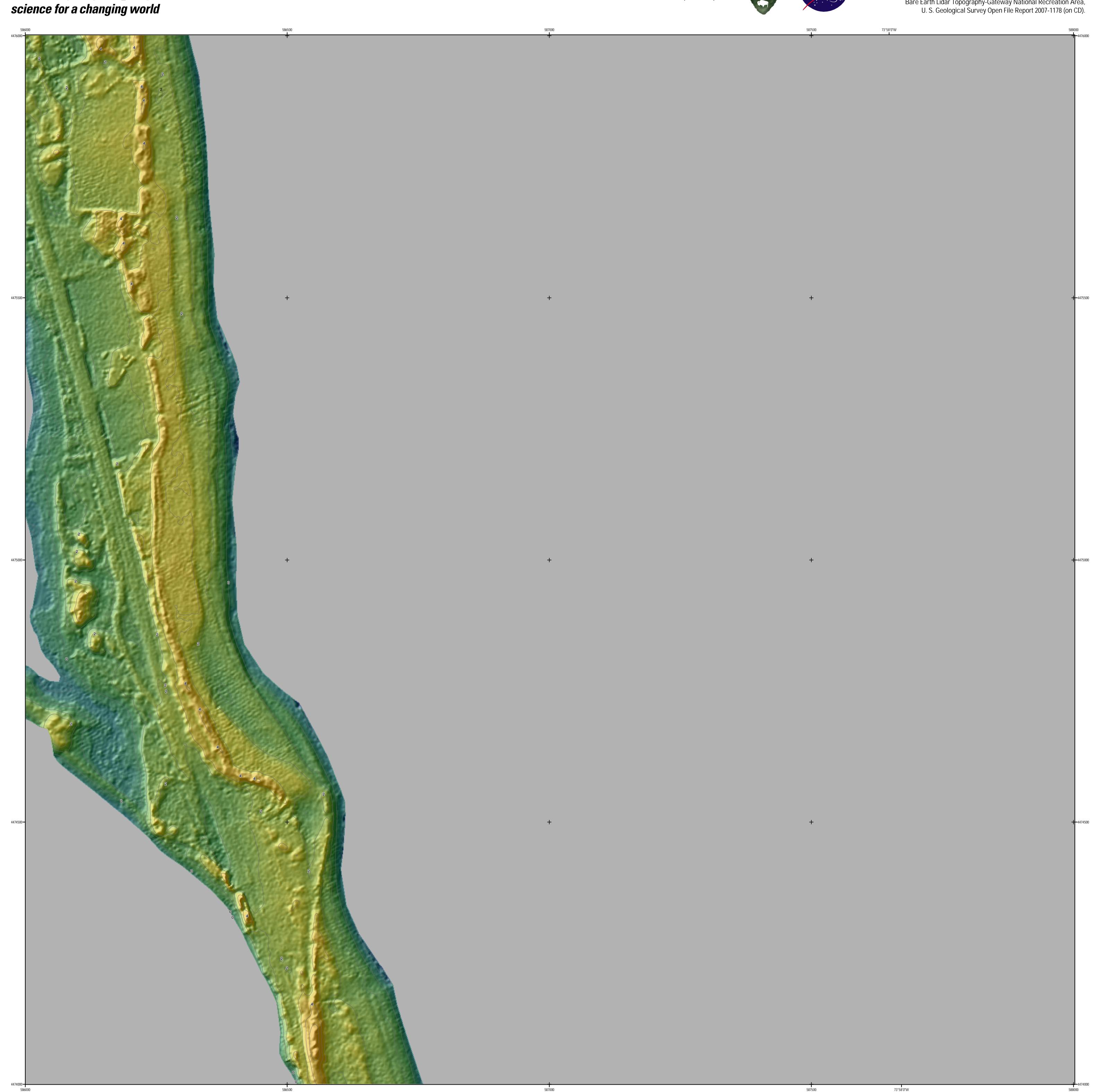
<sup>3</sup> NPS South Florida/Caribbean Network and Monitoring Program, Miami, FL <sup>4</sup> ETI Professionals, Inc. Contracted with USGS Florida Integrated Science Center, St. Petersburg, FL







OPEN FILE REPORT 2007-1178 TILE 7 of 8 (BE) Brock. J. C., Wright, W. C., Patterson, M., Nayegandhi, A., and Patterson, J., 2007, Bare Earth Lidar Topography-Gateway National Recreation Area, U. S. Geological Survey Open File Report 2007-1178 (on CD).



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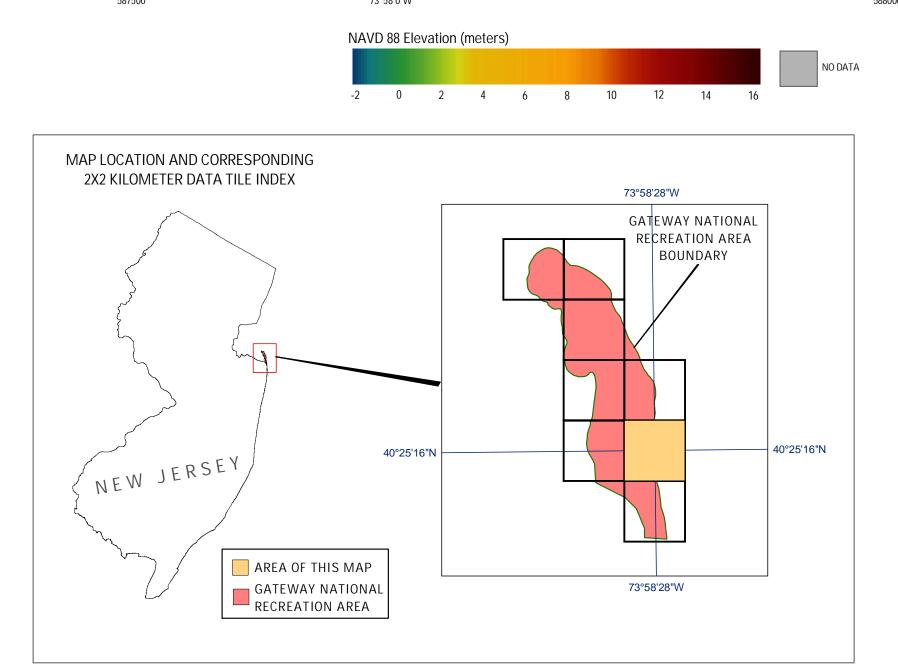
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# Gateway National Recreation Area USGS-NPS-NASA EAARL Bare Earth (BE) Lidar Topography Map Tile 586000e\_4476000n

By John C. Brock<sup>1</sup>, C. Wayne Wright<sup>2</sup>, Matt Patterson<sup>3</sup>, Amar Nayegandhi<sup>4</sup>, and Judd Patterson<sup>3</sup>

<sup>1</sup> USGS Florida Integrated Science Center, St. Petersburg, FL <sup>2</sup> NASA Wallops Flight Facility, Wallops Island, VA

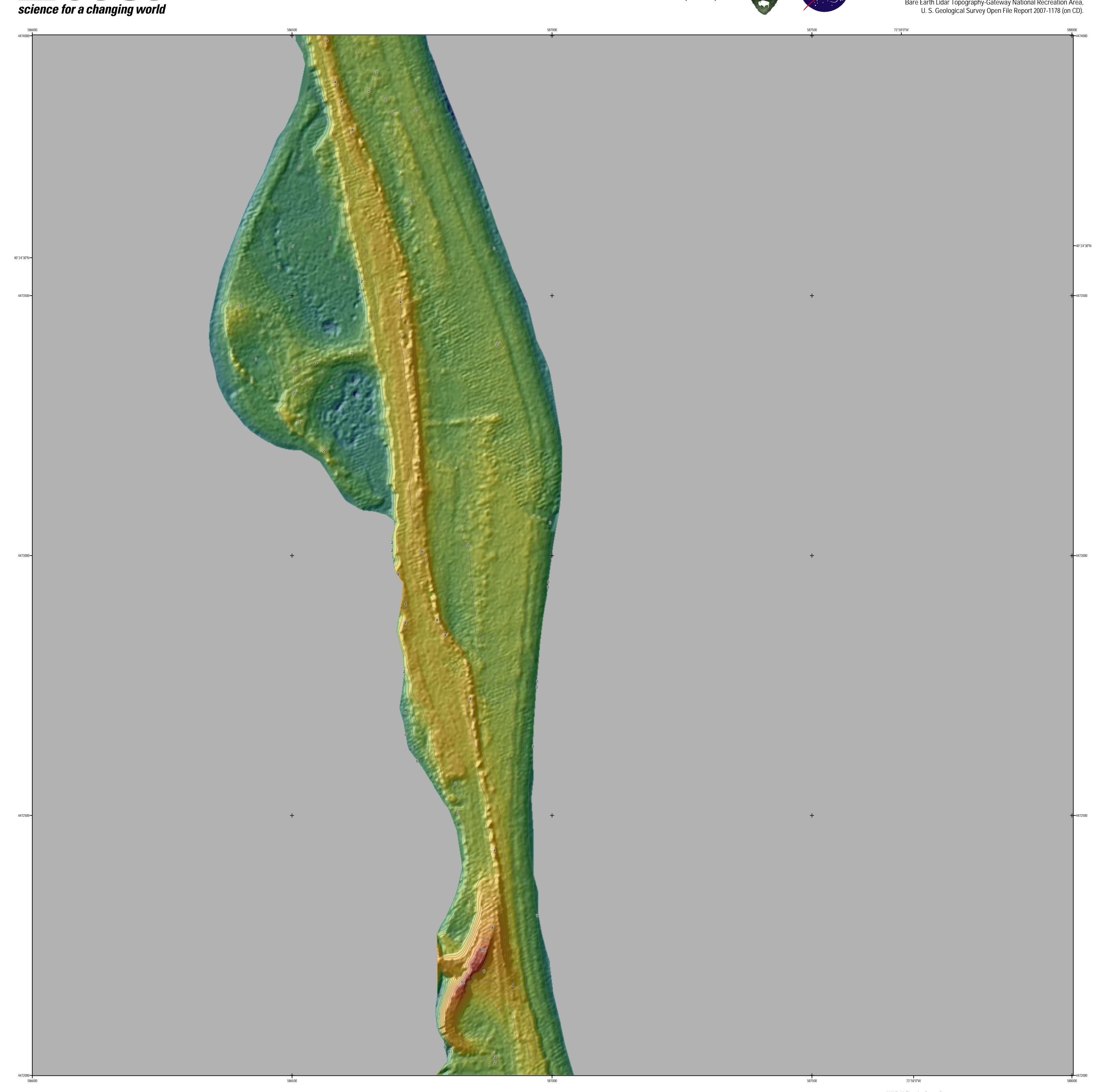
<sup>3</sup> NPS South Florida/Caribbean Network and Monitoring Program, Miami, FL <sup>4</sup> ETI Professionals, Inc. Contracted with USGS Florida Integrated Science Center, St. Petersburg, FL







OPEN FILE REPORT 2007-1178 TILE 8 of 8 (BE) Brock. J. C., Wright, W. C., Patterson, M., Nayegandhi, A., and Patterson, J., 2007, Bare Earth Lidar Topography-Gateway National Recreation Area, U. S. Geological Survey Open File Report 2007-1178 (on CD).



Universal Transverse Mercator. 1983 North American Datum-Zone 18 North. Topography mapped using NASA Experimental Advanced Airborne Research Lidar (EAARL) April 2005. This map is not intended for use in navigation.

### **Project Description**

This Lidar-derived topographic map was produced as a collaborative effort between the U.S. Geological Survey (USGS) Coastal and Marine Geology Program, the Northeast Coastal and Barrier Network of the National Park Service (NPS) Inventory and Monitoring Program, the South Florida/Caribbean Network of the NPS Inventory and Monitoring Program, and the National Aeronautics and Space Administration (NASA) Wallops Flight Facility. The aims of the partnership that created this product are to develop advanced survey techniques for mapping geomorphology and habitats, and to enable the monitoring of ecological and geological change within National Park Units. This product is based on data from an innovative airborne Light Detection and Ranging (LiDAR) instrument under development at the NASA Wallops Flight Facility, the NASA Experimental Advanced Airborne Research Lidar (EAARL).

The laser soundings used to create this map were collected during April 2005 by the NASA EAARL system mounted on a Cessna 310 aircraft. The EAARL uses a w aveform-resolving'g reen laser capable of mapping submarine and subaerial (land) topography in a single overflight. The EAARL system is typically flown at 300 m altitude AGL, resulting in a 240 m swath for each flightline. Data collection occurred with approximately 50% overlap between flightlines, resulting in about one laser sounding per square meter. The data were processed by the USGS FISC (Florida Integrated Science Center) office, St. Petersburg, FL to produce 1-meter resolution raster images that can be easily ingested into a Geographic Information System (GIS). The data were organized as 2 km by 2 km data tiles in 32-bit floating-point integer GeoTiff format. Contour line and hillshade layers were generated from the Lidar data tile and incorporated into this map product.

### **Further Reading**

Brock, J.C., and Sallenger, A., 2001, Airborne topographic lidar mapping for coastal science and resource management: U.S. Geological Survey Open File Report 01-46, p. 4.

Brock, J.C., Wright, C.W., Nayegandhi, A., Clayton, T., Hansen, M., Longenecker, J., Gesch, D., and Crane, M., 2002, Initial results from a test of the NASA EAARL lidar in the Tampa Bay Region: Transactions of the Gulf

Coast Association of Geological Societies, v. 52, p. 89-98. Wright, C.W. and Brock, J.C., 2002, EAARL: A lidar for mapping shallow coral reefs and other coastal environments, in the Proceedings of the Seventh International Conference on Remote Sensing for Marine and Coastal Environments, Miami, May 20-22, 2002: Ann Arbor, MI, Veridian International Conferences, 1 computer optical disc.

SCALE 1:2500 0.3 KILOMETERS NORTH AMERICAN VERTICAL DATUM OF 1988

# Gateway National Recreation Area USGS-NPS-NASA EAARL Bare Earth (BE) Lidar Topography Map Tile 586000e\_4474000n

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<sup>3</sup> NPS South Florida/Caribbean Network and Monitoring Program, Miami, FL <sup>4</sup> ETI Professionals, Inc. Contracted with USGS Florida Integrated Science Center, St. Petersburg, FL

