

An aerial photograph of a coastal area, likely Narragansett Bay. The image shows a mix of dark green marshland, lighter green areas, and a city with buildings and roads. A prominent road or canal runs vertically through the center. The water is dark blue/black.

# Development of Salt Marsh Monitoring Methodology Using Remote Sensing and GIS

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# **New Satellite Data in Salt Marsh Change Monitoring**

**Given that salt marsh monitoring requires repeatable and reliable updates of cover maps, exploration of new data and approaches that could efficiently update the salt marsh maps are necessary. Recent development of high spatial resolution satellite remote sensing data can meet the needs of the project.**

**For example, The QuickBird-2 satellite, launched in October 2001, possesses 0.61-meter spatial resolution for the panchromatic band and 2.5-meter spatial resolution for the multispectral bands (visible to near infrared).**

**The capability of repeated data acquisition by QuickBird-2 should be tested and evaluated for the practice in salt marsh change monitoring.**

# Objectives

- Document historical salt marsh coverage and detect the aerial changes in the Gateway NPS areas using historical aerial photographs and obtain the most recent salt marsh map from QuickBird-2 satellite remote sensing data
- Compare and validate the agreement between satellite derived salt marsh map and the delineation result from historical aerial photographs, so that we can repeat monitoring of salt marsh change in a regular time frame, reliable accuracy, and reasonable cost
- Develop a working protocols that are transferable among NPS projects for salt marsh mapping and monitoring.

# **Project Progress**

**Project duration: 09/2003-08/2005**

**QuickBird image acquired September 10, 2003**

**First fieldwork conducted: October 31, 2003**



**QuickBird satellite image of the Jamaica Bay shows spatial distribution of the salt marsh. The image was acquired on September 10, 2003. This is a true color display with 2.5-m resolution**



QuickBird 2 panchromatic image with  
0.6-meter spatial resolution



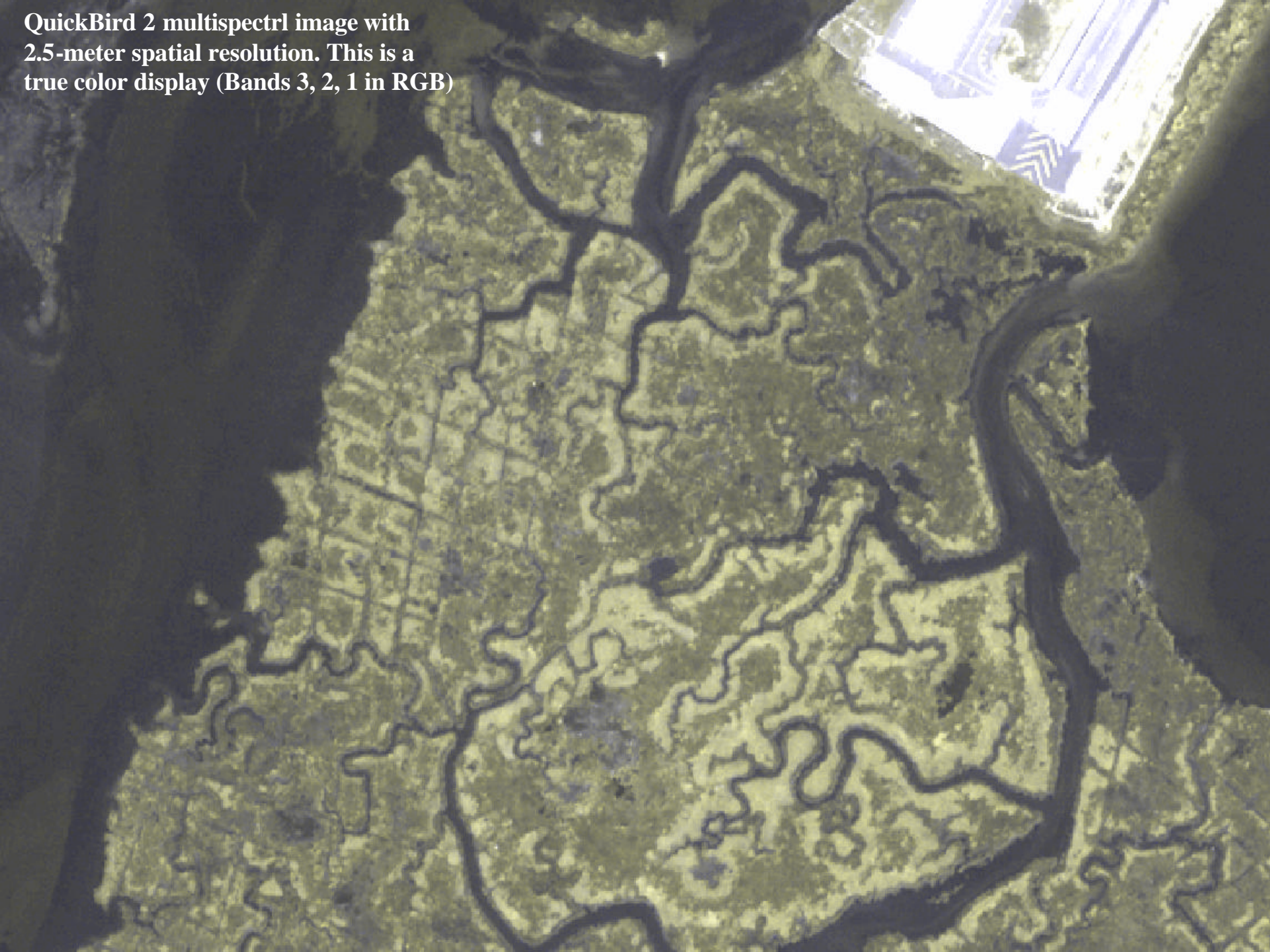


QuickBird 2 multispectral image with  
2.5-meter spatial resolution. This is a  
pseudo color display  
(Bands 4, 2, 1 in RGB)





**QuickBird 2 multispectral image with  
2.5-meter spatial resolution. This is a  
true color display (Bands 3, 2, 1 in RGB)**

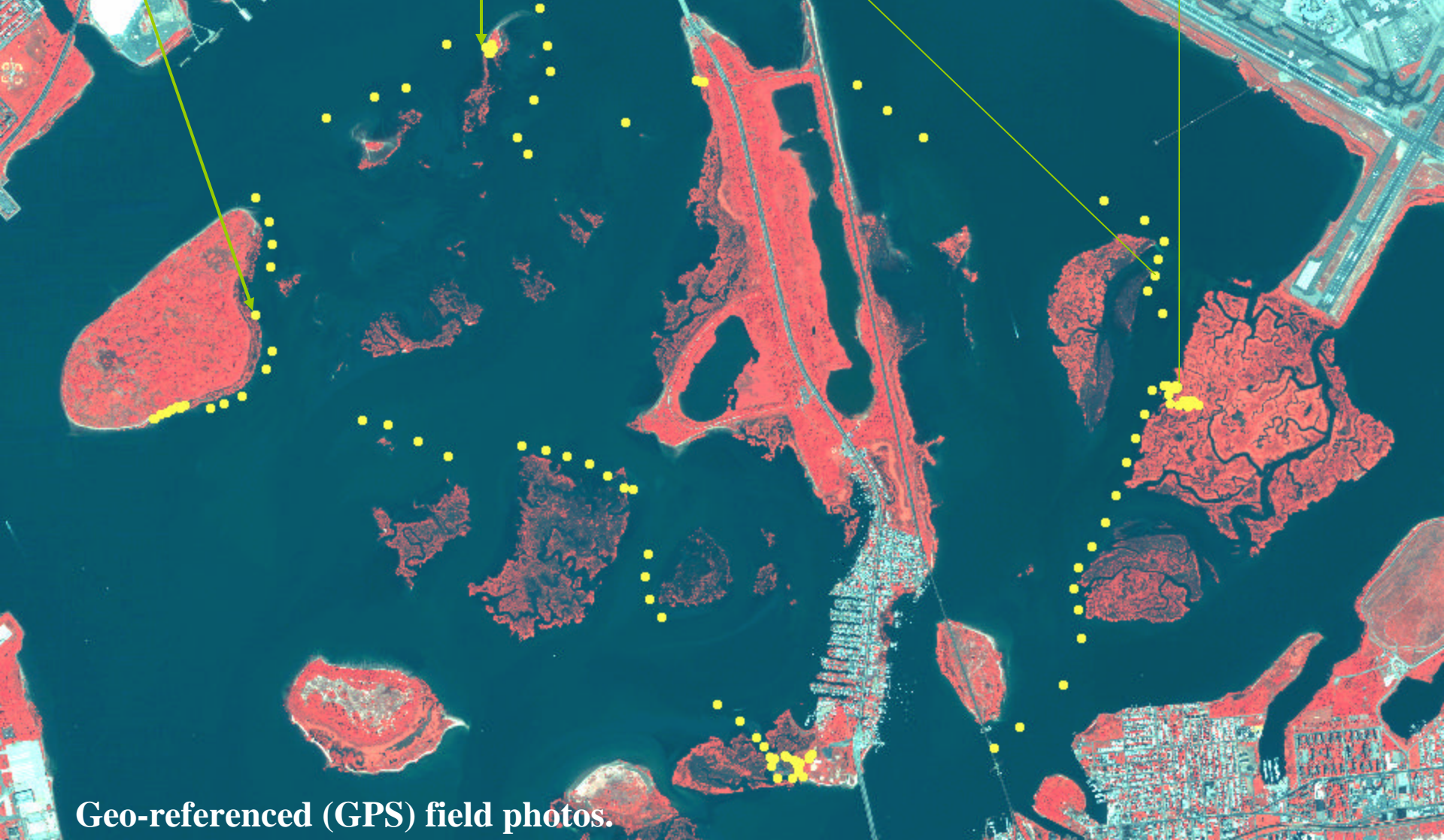
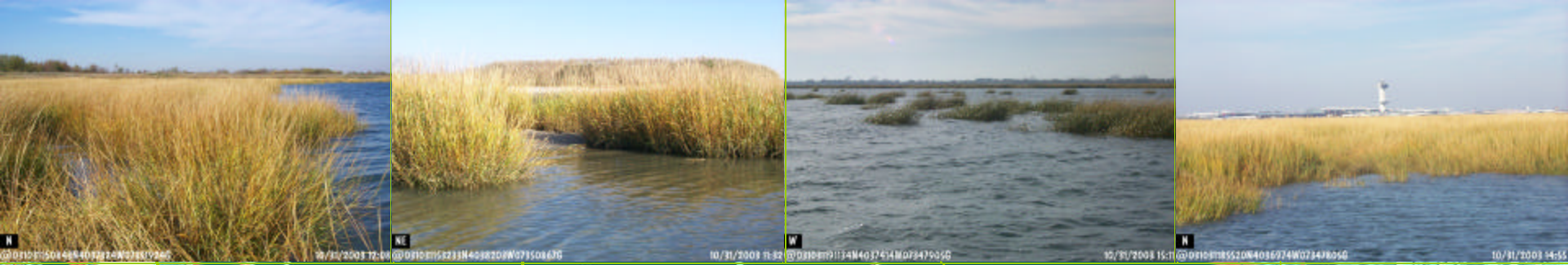




An aerial photograph of a coastal area, likely a salt marsh or estuary. The image shows a complex network of water channels (dark blue/black) and land parcels (light brown/tan). Numerous yellow dots are scattered across the land parcels, indicating the locations of salt marsh ground checking conducted on October 31, 2003. The dots are concentrated in several areas: a cluster in the upper left, a line along the left edge of a large central land parcel, a cluster in the lower left, a cluster in the lower center, and a cluster in the lower right. The overall scene is a mix of natural and developed land, with some areas appearing more densely vegetated or marshy than others.

**Yellow dots show the locations  
of salt marsh ground checking  
conducted on October 31, 2003.**





Geo-referenced (GPS) field photos.





## Examples of GPS Georeferenced Field Photos







## Examples of GPS Georeferenced Field Photos





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