

Adapting to Climate Change: Practical Strategies at the Port Authority

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Climate Change Adaptation at PANYNJ

Introduction

- **Port Authority of New York and New Jersey**

- 1921 Bi-State Compact:

“To enhance the region's competitiveness and prosperity by providing transportation services that efficiently move people and goods within the region and facilitate access to the nation and the world “

- 6 operating arms; 31 major facilities
- Financially self-sufficient
 - \$3.1 Billion in capital funding 2010
- **We're BIG**



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PANYNJ Sustainability Policy

Policy Overview

- **PANYNJ Sustainability Policy, March 2008**
- **Policy Goals**
 - Reduce GHG emissions by 80% by 2050 (2006 baseline)
 - For GHG emissions that cannot be reduced, purchase offsets (goal of net-zero emissions by 2010)
 - Promote sustainability among tenants and customers
 - Adapt facilities to reduce climate change risks



PANYNJ Sustainability Policy

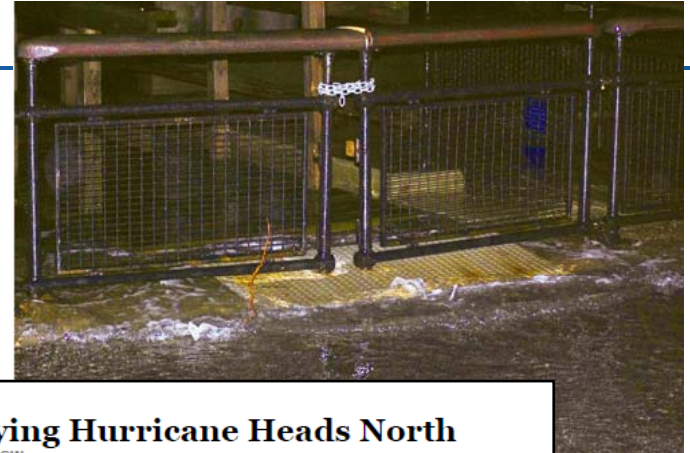
Why have a Sustainability Policy?

September 2, 2010

Offshore Oil Rig in the Gulf of Mexico Explodes

By **CAMPBELL ROBERTSON** and **JACK HEALY**

NEW ORLEANS — An offshore oil rig exploded in the Gulf of Mexico on Thursday morning, injuring one worker, the United States Coast Guard said.



August 31, 2010

Intensifying Hurricane Heads North

By **MICHELLE KANTROW**

CAROLINA, P.R. — Hurricane Earl passed through the northern Caribbean early on Tuesday after strengthening to Category Four status and veered onto a path toward the East Coast of the United States.



July 6, 2010, 11:30 am

Heat Wave Report: 102 Degrees in Central Park

By **PATRICK MCGEEHAN**

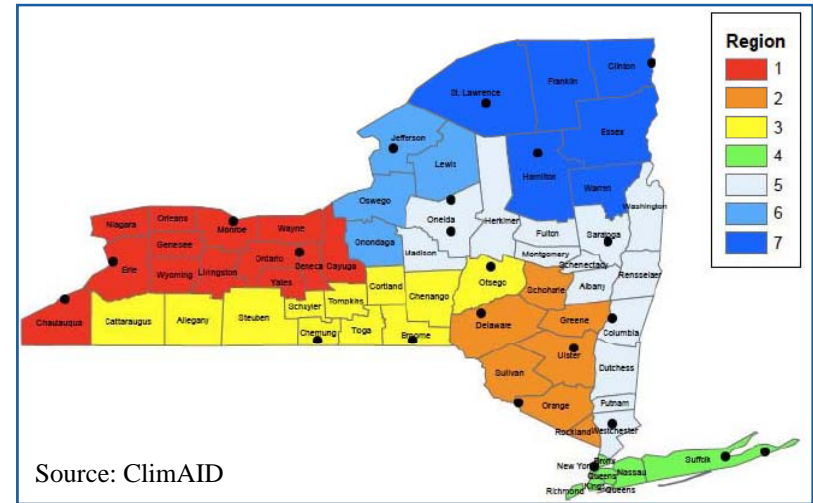
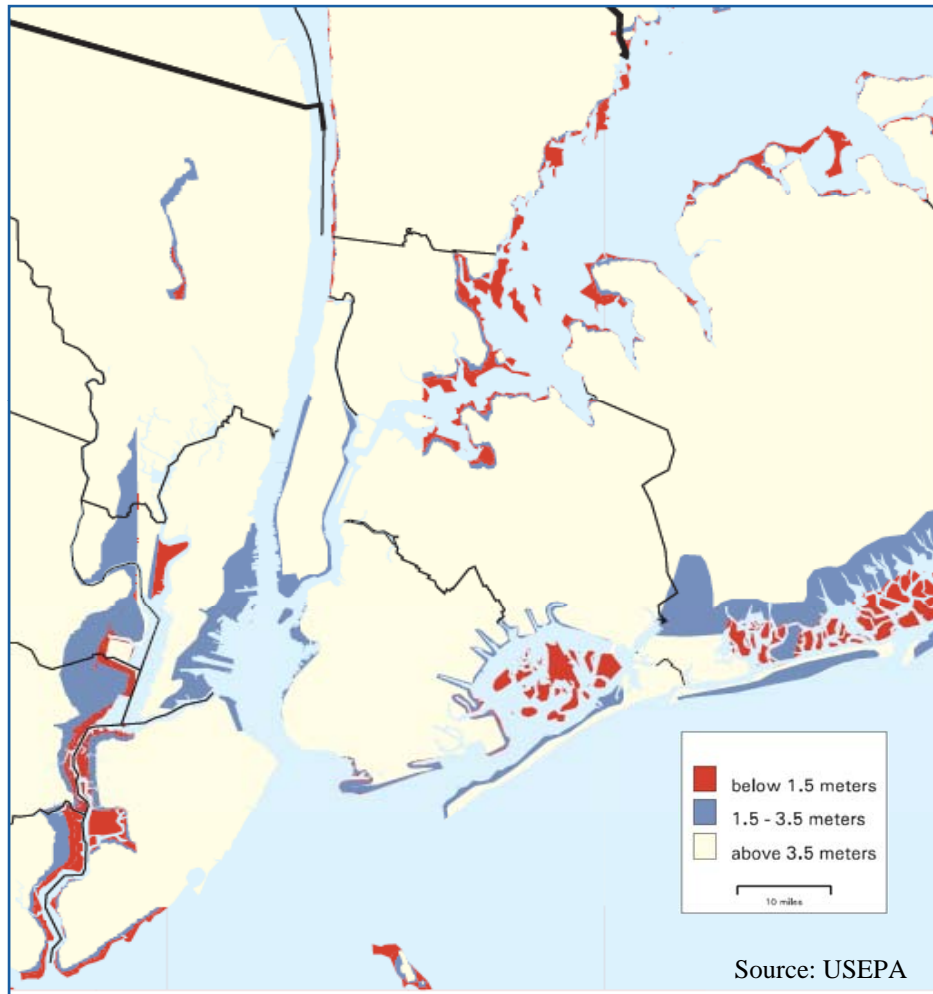
Updated, 3:29 p.m. | At 3:30 p.m., it was 102 degrees in Central Park, with a heat index — that's how it feels — of 107 degrees.



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PANYNJ Sustainability Policy

Climate Change Predictions



Region 4	Baseline ¹ 1971-2000	2020s	2050s	2080s
Air temperature Central Range ²	53° F	+1.5 to 3.0° F	+3.0 to 5.0° F	+4.0 to 7.5° F
Precipitation Central Range	47 in	0 to +5 %	0 to +10 %	+5 to 10 %

Stations used for Region 4 are New York City (Central Park and LaGuardia Airport), Riverhead, and Bridgehampton.



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PANYNJ

Vulnerable Facilities

- PANYNJ infrastructure is coastal
- Over **Half** of PANYNJ facilities are potentially vulnerable
 - Sea level rise
 - Storm surges
 - Increased precipitation
 - Wind



PANYNJ Adaptation Program

Projects and Collaboration

- **Internal Projects**

- Inventory and assess
 - Multi-hazard Risk Assessment
- Mitigate
 - Sustainable Design Guidelines
 - Physical and operational projects

- **External Collaboration**

- NY City Panel on Climate Change (NPCC)
- ClimAID (NY State)
- NY State Climate Action Council
- NY State Sea Level Rise Task Force







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Security and Climate Change

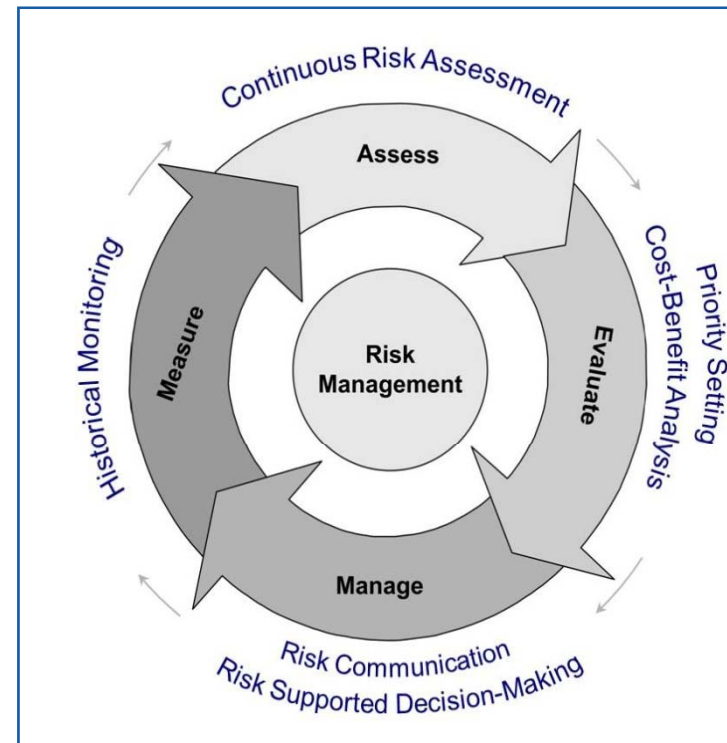
- **Federal Grant:** Climate Change as Security Risk

- **SMRT**  **System-wide**
 **Multi-Hazard**
 **Risk**
 **Tool**

- **Measuring Risk**

- Across different scenarios
- Weigh risks against each other
- Prioritize funding

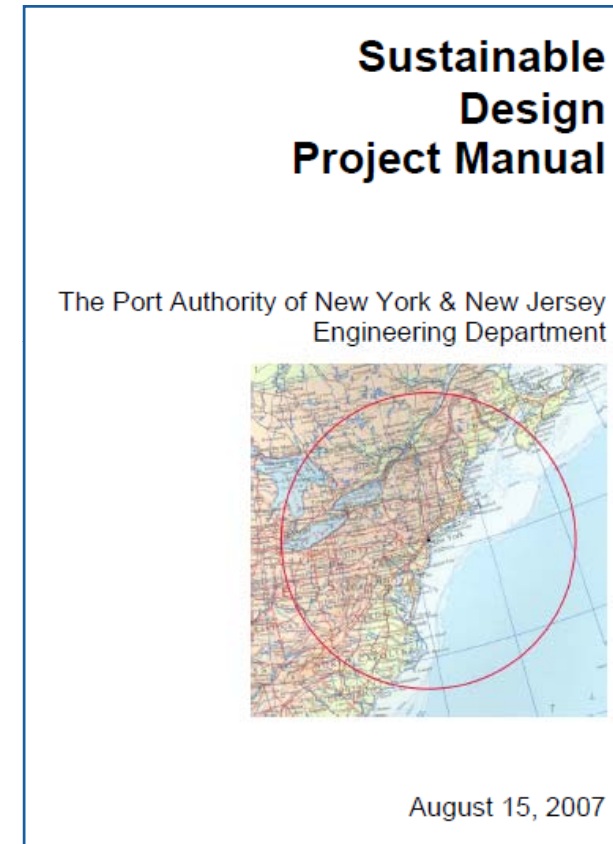
- **Applied Center of Excellence**



PANYNJ Adaptation Program

Operational Adaptation Projects

- Property Insurance
 - Green Coverage Endorsement Program
 - \$5 million towards rebuilding to green
- Sustainable Design Manual
 - July 2006 Board adopted Policy
 - Sustainable Design Guidelines (complete)
 - Sustainable Infrastructure Guidelines (in progress)
 - Includes adaptive design measures
 - Issued memo on interim design criteria
 - LGA Airport Terminal Modernization



PANYNJ Adaptation Program

Physical Adaptation Projects

- **PATH**

- Address flooding
- 1992 Nor'easter, Hoboken station
 - flooding
 - commuter service interrupted for 10 days
- Flood gates at Hoboken
- Sealing all openings below 100 year flood

- **LGA**

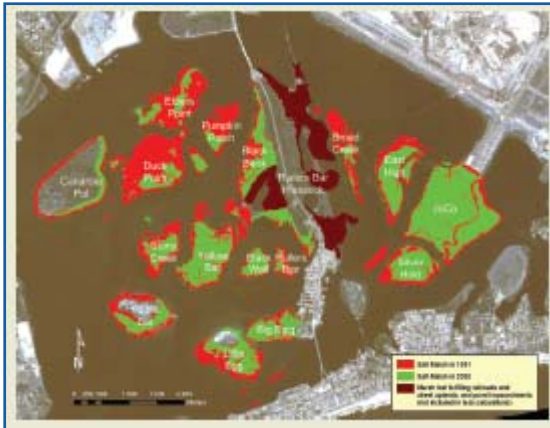
- Addressing power outages due to heat waves
- Redundancy built into substations



PANYNJ Adaptation Program

Physical Adaptation Projects

- **Protecting Natural Systems**
- **Hudson-Raritan Estuary Resources Program**
 - \$60M to preserve open space in Hudson-Raritan Estuary
 - \$30 million New Jersey
 - \$30 million New York



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PANYNJ Adaptation Program

Operational and Physical Adaptation Projects

- **WTC Design and Construction**
 - Elevated structures
 - Bulkhead wall raised to 305'
 - Plaza at 313'
 - West Street at 308'
 - Flood gates at WTC PATH station
 - Structural and operational redundancy
 - Sustainable design
 - 20% Energy reduction
 - Fuel cells at WTC Tower 1
 - » 1.2MW fuel cell plant installed



PANYNJ Adaptation Program

Energy Adaptation

- **Port Jersey Wind Farm**
 - \$3.6M grant
- **PSE&G Direct Install Program**
 - Approx 5M KW-hours
 - \$1M in annual savings
 - \$6M in avoided capital costs
- **Demand Response Program Participation**
 - 11 facilities over \$45,000 in direct revenue
 - Adaptive strategy for climate change



PANYNJ Adaptation Program

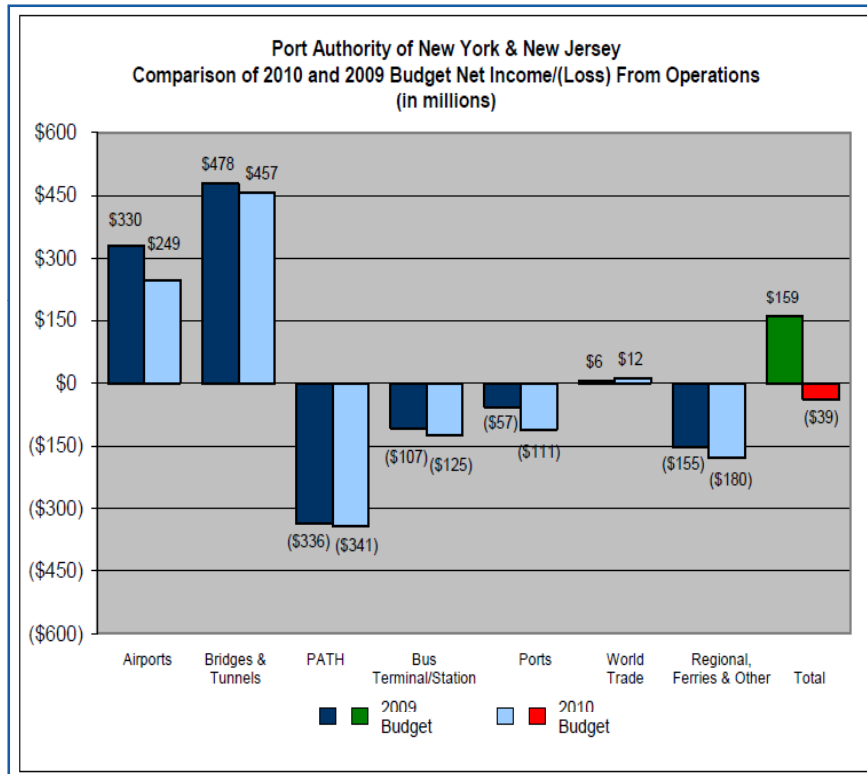
Challenges Towards Adaptive Management

- **Funding and Budgeting**
 - Capital Planning
 - Economic Realities
- **Politics and Regulatory**
 - State and Federal Regulatory Guidance
- **Immediate Problems**
 - Aging Infrastructure
 - Congestion and Growth
 - Economy
- **Geographical and Operational Boundaries**
 - Infrastructure Location
 - Transportation System-wide Planning
- **Technology and Research**
 - Hard Infrastructure Limitations
 - Costs and Benefits



Adaptive Management Challenges

Financial Concerns



- **10 year Capital Capacity**
 - Shrunk by \$5 billion
 - \$29.5B, to \$24.5B
- **Net income from operations:**
 - Negative \$39 million in 2010
 - A decline of \$197 million from the 2009 Budget
- **Committing \$21 million**
 - Port Clean Air Program
 - Reducing GHG emissions
 - Promoting environmental protection
 - Conserving energy



Adaptive Management Challenges

Immediate Problems

- **Growth**

**Forecasted Increase in Demand
for Port Authority Transportation Services
2005-2020³**

Air Passenger	40%
Air Cargo (by volume)	70%
Port Cargo (by volume)	100% ⁴
PATH Passenger	60%
Truck and Bus Traffic, Tunnels and Bridges ...	20%
Auto Traffic, Tunnels and Bridges	16%



Adaptive Management Challenges

Immediate Problems

- **Infrastructure** designed for a different time



Crossing the Outerbridge, 1928. The bridge, named for Eugenius Outerbridge, the Port Authority's first chairman, connects Staten Island, N.Y., with Perth Amboy, N.J.



The George Washington Bridge opened on October 25, 1931. Completion of the bridge had a profound effect on the development of the region by opening a whole new transportation corridor between the two states.



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Adaptive Management Challenges

Immediate Problems

- Issues are not new



PANYNJ Adaptation Program

PANYNJ Recommendations

- **Promote Research**
- **Adopt Climate Change Projections**
 - State adopted projections
 - Sea level rise and storm surge
 - Precipitation rates
 - Temperature: extremes and averages
 - Wind direction
 - Regional contour maps and projections
- **Provide State and Federal System Level Guidance**
 - Adaptation strategies
 - Cost-benefit analyses
- **Provide State and Federal Funding**

