The City of Miami Beach

Citywide Comprehensive Stormwater Management Master Plan

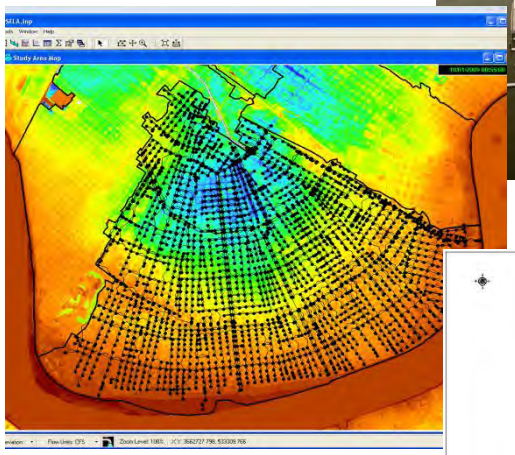
Presentation to the Finance Committee

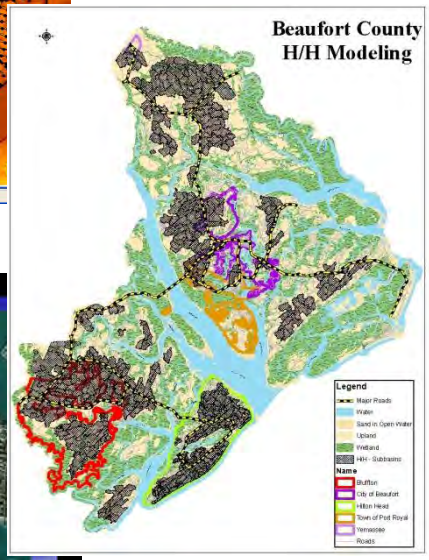
June 2012

CDM Smith

Global Experience in Coastal Stormwater Management

- Singapore- Marina Barrage Multi-Purpose Urban Reservoir and Flood Protection Project
- New Orleans- Stormwater Management (Post Katrina)
- Beaufort, South Carolina (Hilton Head region)- Master Plan and Tidal Model Analysis
- Conducted Workshop on Venice, Italy Management of Pollution and Climate Change





Stormwater Master Plan Goals

- Flood Control
- Water Quality Protection
- Aquifer Recharge & Water Supply
- Conservation and Reuse
- Operation and Maintenance
- Long Term Financing
- Community Acceptance

Timeline Since Completion of the Master Plan

- Submittal of the Draft of the Stormwater Master Plan- December 29, 2011
- Presentation held with City Manager January 12, 2012
  - Meeting summarized final analysis in SWMP
  - Questions developed requiring responses from CDM Smith-Memo submitted to the City on February 17, 2012
- Follow-up meeting with City Manager held on March 23, 2012
  - Recommendation for presentation to Finance Committee

City of Miami Beach Stormwater Issues

- Low and relatively flat terrain

- High imperviousness
  - Existing Development
  - New Construction

- Tidal constraints and backflow
- High groundwater table
- Aging infrastructure in corrosive conditions

Differences between Past and Present Stormwater Master Planning Efforts

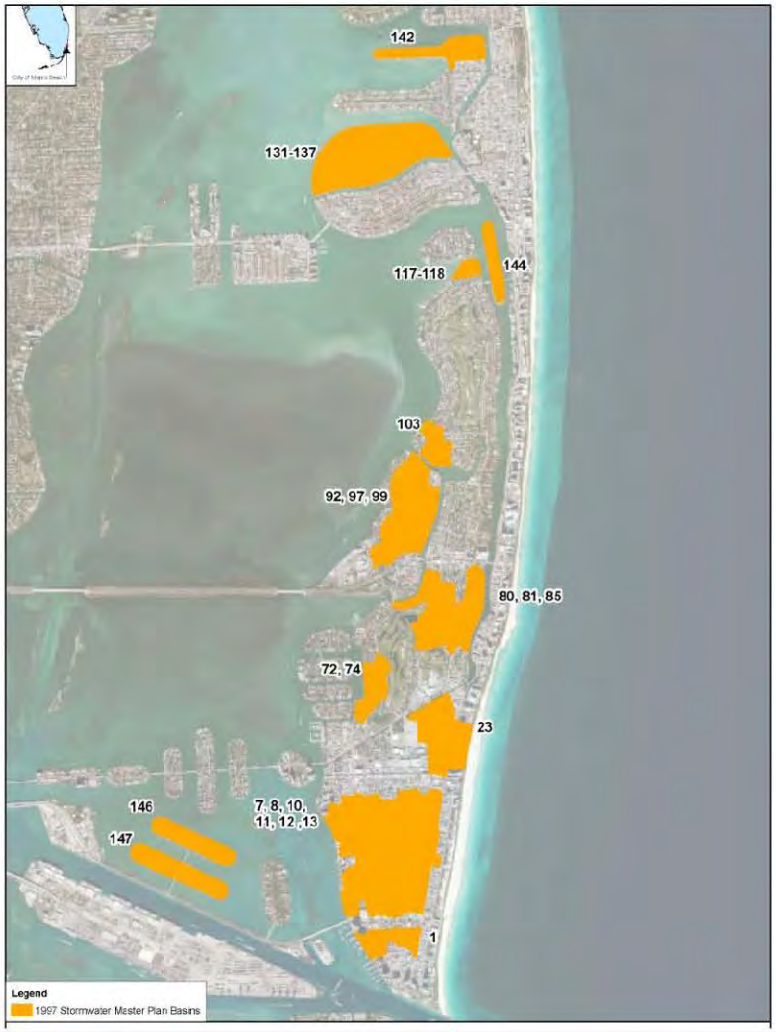
1997 Stormwater Master Plan

- Accelerated master planning process for high priority basins to support bonding in early 1995 **(no system-wide modeling)**.
- **Prioritization based on water quality**, flooding potential, **citizen complaints** and City staff ranking
- Recommended 5-year Capital Improvement Program = $42M (1996 dollars)

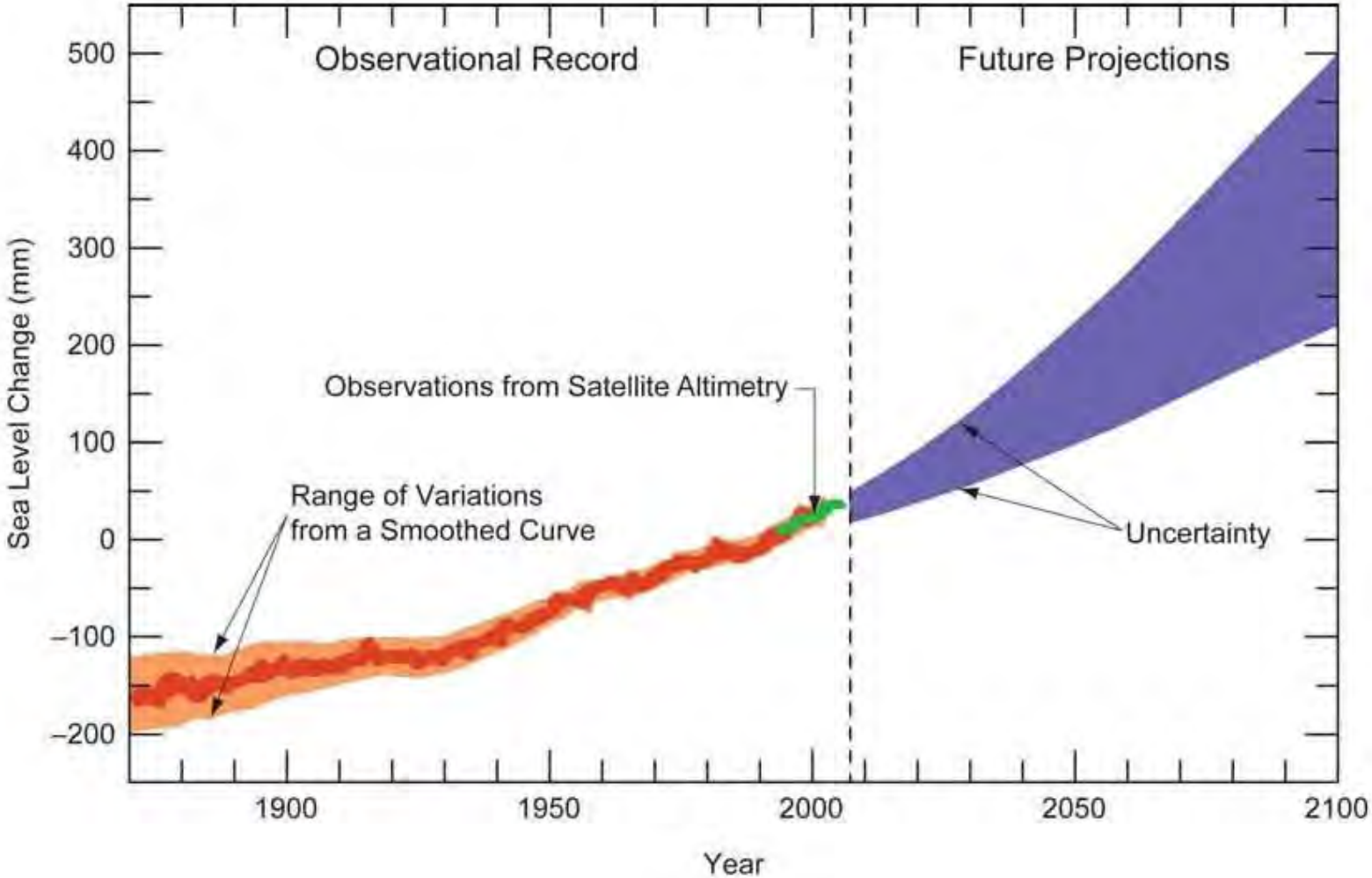
2011/12 Stormwater Master Plan

- **System-wide water quality and flooding model analysis**
- **Review and coordinate with active capital projects**
- Expedite Early Out Projects
- Recommend updates to ordinances, policies, and utility
- Recommended 20-year Capital Improvement Program = $200M (2010 dollars)

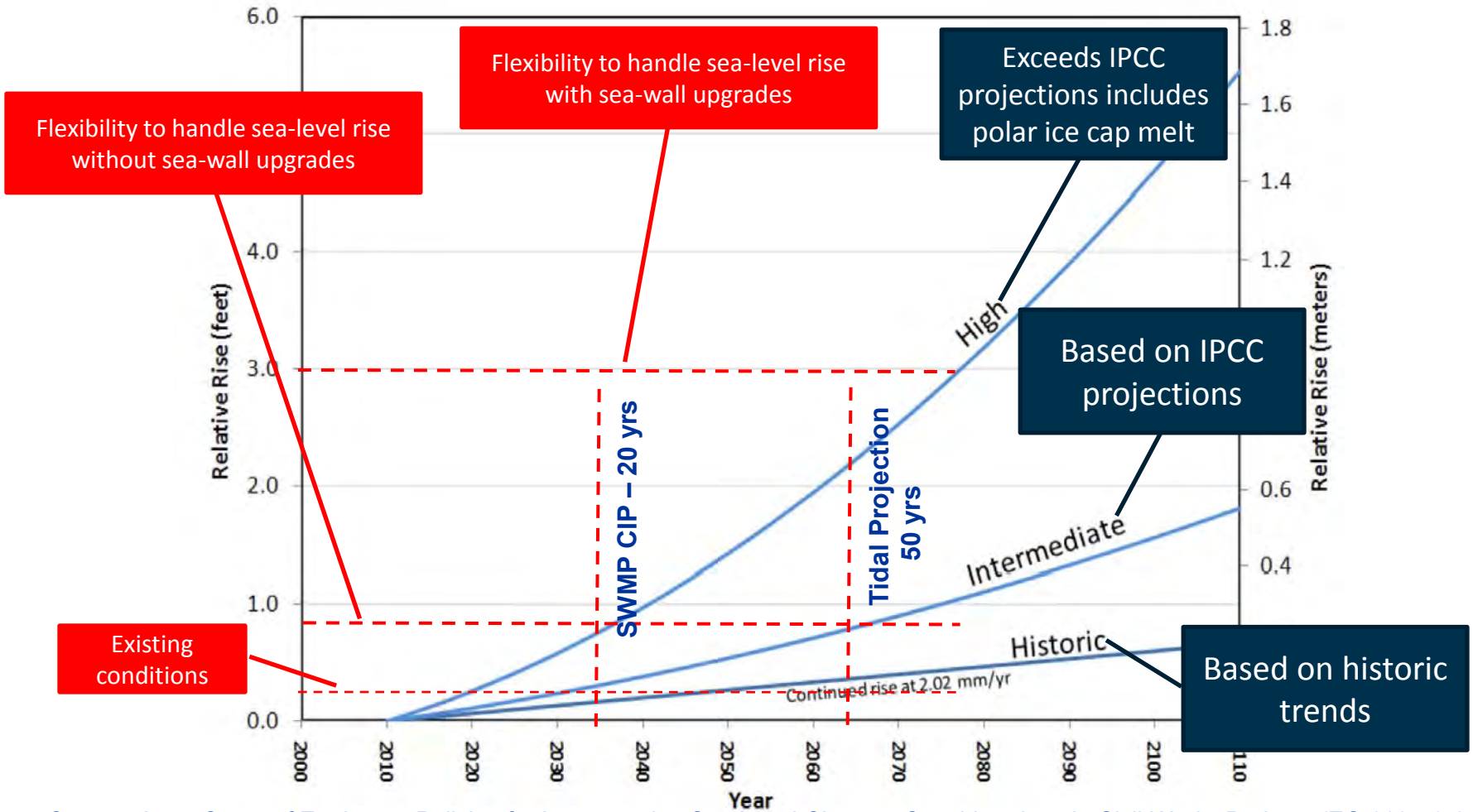
1997 Stormwater Master Plan Capital Improvement Projects



Global mean sea level (deviation from the 1980-1999 mean) as observed since 1870 & projected for future. (Page B-12 USACE Policy)



Miami Beach Stormwater Improvements Flexibility to Accommodate Sea Level Rise



Source: Army Corps of Engineers Policies for Incorporating Sea Level Change Considerations in Civil Works Projects (EC 1165-2-211)

Sea Level Rise (Question Asked During Presentation to City Manager)

- **Question:** What degree of sea level rise variance can be accommodated by the presented SWMP alternatives?

- Response: Three primary factors define degree that proposed improvements can manage and reduce flooding effects due to sea level rise:
  - Elevation and integrity of contiguous sea walls,
  - Backflow preventers for stormwater outfalls, and
  - Degree of pumping from the City's lowest lying areas.

Stormwater Master Plan Capital Improvement Program (in Million $)

Not Currently Funded →

	0-5 Years	5-10 Years	10-15 Years	15-20 Years	Total
Biscayne Point				11	11
North Shore		11			11
North Shore (72nd Street)			10		10
Normandy Isle			20		20
Upper La Gorce*		11		1	12
Lower La Gorce*	12			2	14
La Gorce Island/Allison Island		9			9
Oceanfront			0.3		0.3
Nautilus				4	4
Sunset Islands 3 & 4*	4				4
Flamingo+	25			59	84
West Avenue	13				13
Total	54	31	30.3	77	192.3

* Under design

\+ Does not include $6M in RDA funding

$50M currently funded
$5M req'd additionally

Operation and Maintenance

- Pumping Stations
  - Currently maintain 14 pump stations
  - 14 additional pump stations in projects under construction
  - Additional 17 pump stations identified with capital projects
  - 3 FDOT Pumping Stations (30 cfs/station)
  - As sea level rises, pumping may become more frequent or will require replacement with larger pumps
    - Currently estimate $0.28/kWh running 90 hours annually per station
    - 1.4 full-time equivalents (fte) for pump station inspections @ approx. $55k per year
- Est. Pump O&M Cost Currently = $300k/yr
- Est. Pump O&M Cost (with construction projects) = $630k/yr (based on 2.8 fte)
- Est. Pump O&M Cost (with all est. pumps) = $900k/yr (based on 4.2 fte)

Stormwater Utility Fee Adjustment Trends