



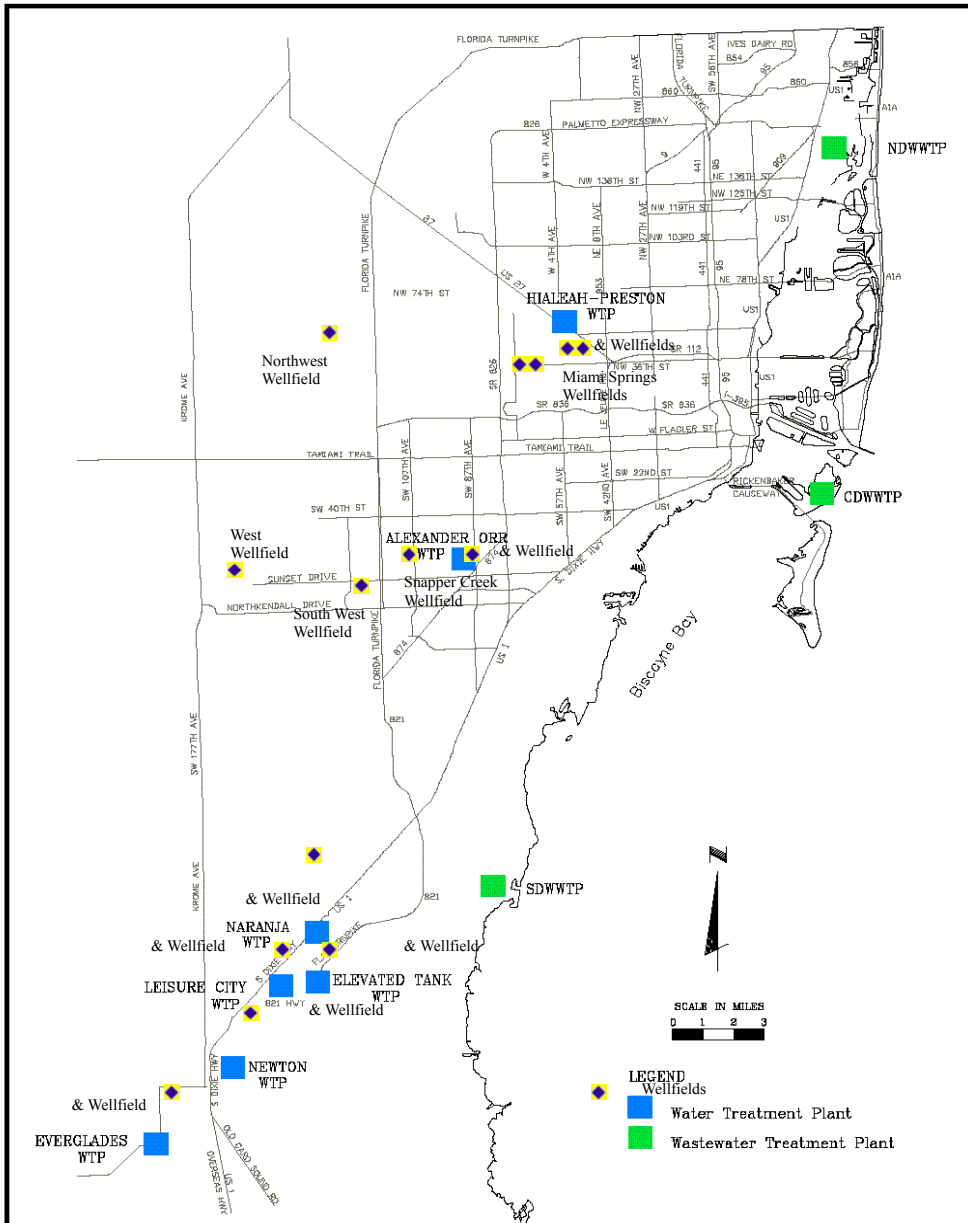
# Planning for the Worst; Hoping for the Best



Climate Change Impacts on Water, Presented by  
Douglas Yoder

Miami-Dade Water and Sewer Department





MDWASD - Water and Wastewater  
Treatment Plant Locations

Figure  
1

## MDWASD Water & Wastewater Treatment Plants

### Water:

- 407,000 retail & 15 wholesale customers
- 94 water supply & 5 ASR wells
- 7,253 miles of water distribution pipe
- 350 MGD production

### Wastewater

- 322,000 retail & 12 wholesale customers
- 1,006 pump stations
- 5,586 miles of sewer collection pipes
- 352 MGD treatment

# Potential Climate Change Impacts

- Sea Level Rise
  - Salt Intrusion
  - Flooding
  - Inflow & Infiltration
- Tropical Storm Activity
  - Storm Frequency
  - Storm Intensity
- Precipitation Patterns
- Future Demand Forecast
  - Population Growth/Loss
  - Tourism Patterns



# Sea Level Rise Top 10

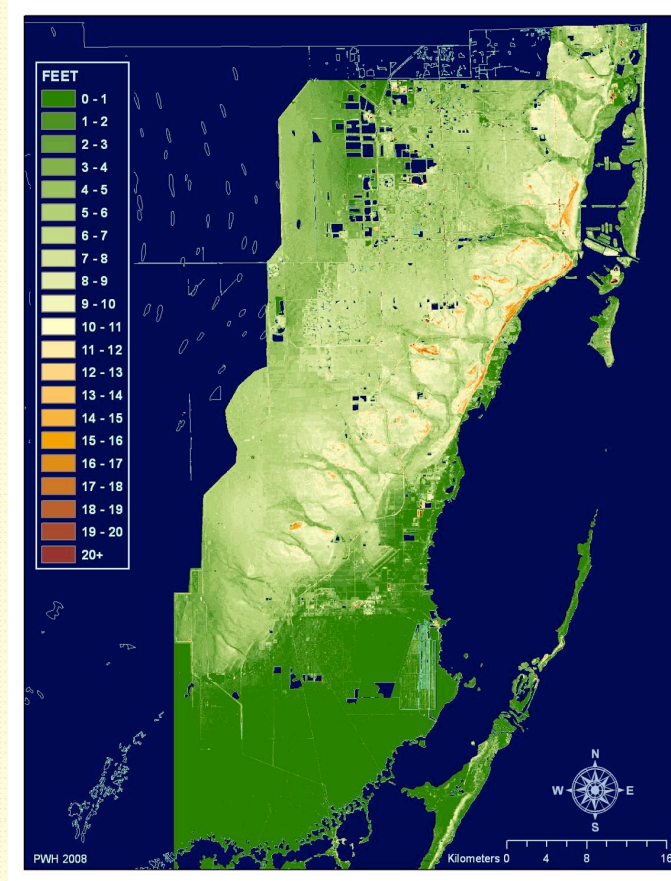
## Exposed Assets (2070)

1. Miami
2. Guangzhou (China)
3. New York
4. Calcutta
5. Shanghai
6. Bombay
7. Tianjin (China)
8. Tokyo
9. Hong Kong
10. Bangkok

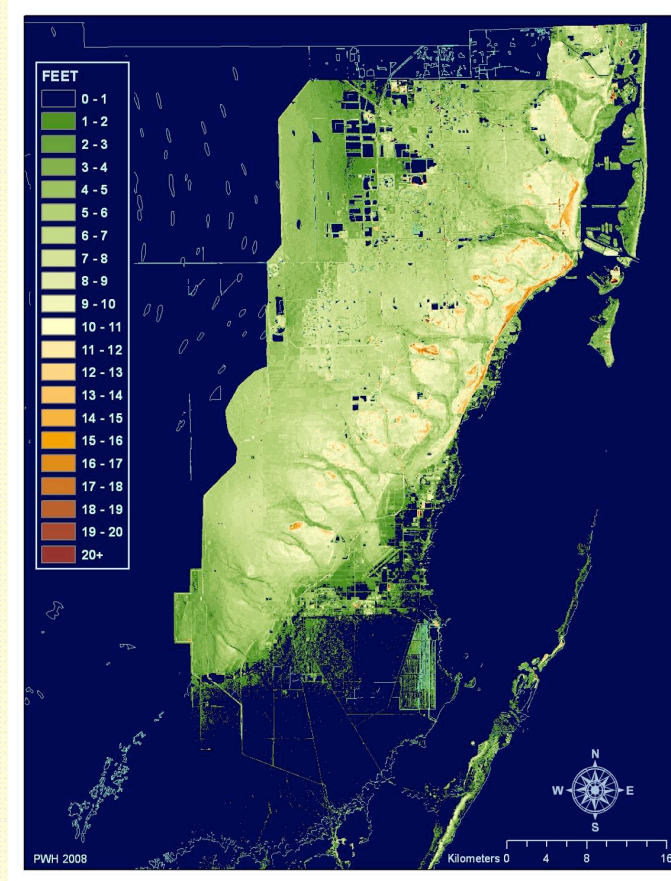
## Exposed Population

1. Calcutta
2. Bombay
3. Dhaka (Bangladesh)
4. Guangzhou
5. Ho Chi Minh City
6. Shanghai
7. Bangkok
8. Rangoon
9. Miami
10. Hai Phong

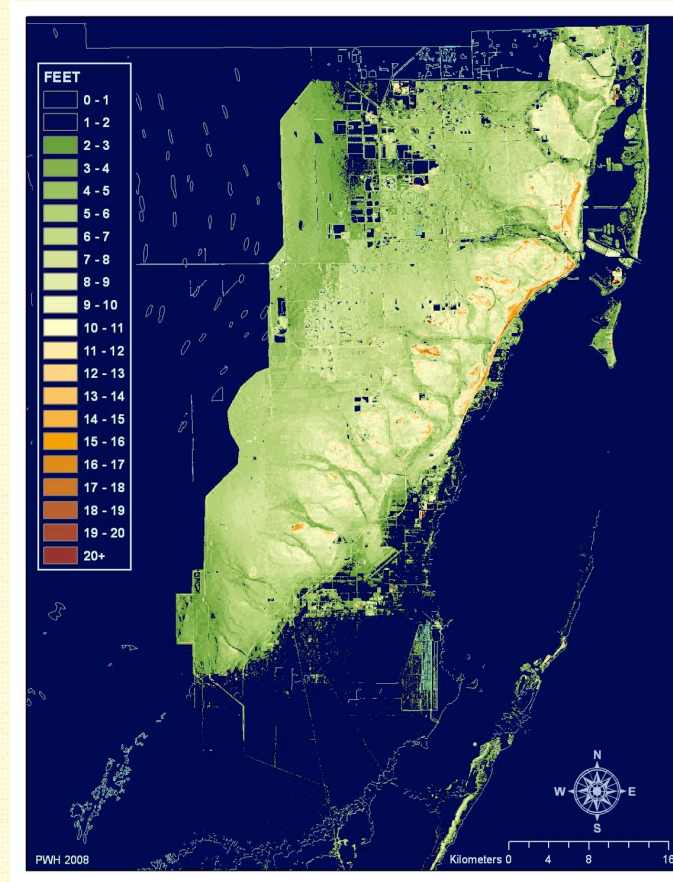
# Sea Level Rise=0



# Sea Level Rise=1 Foot

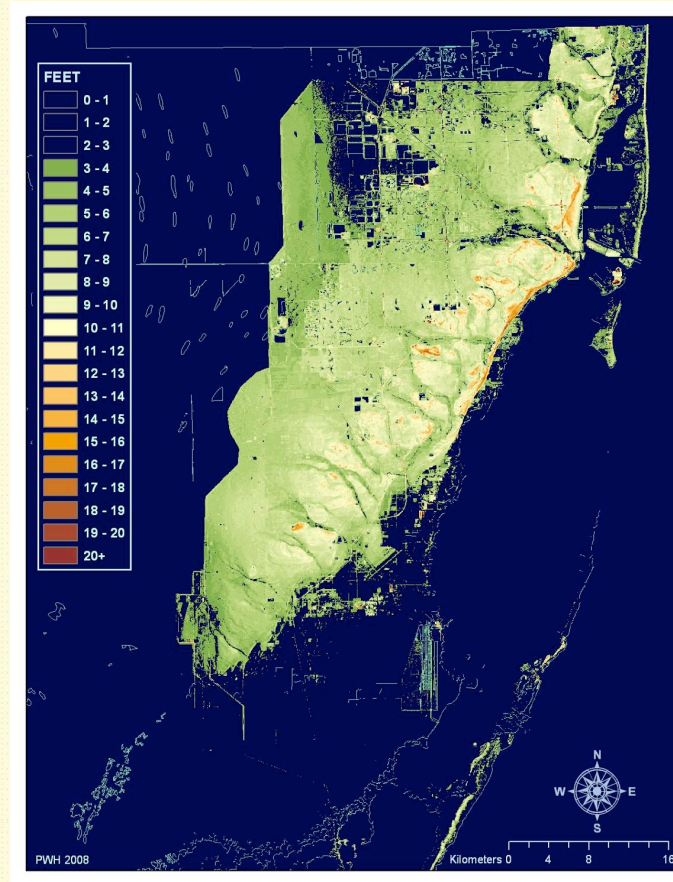


# Sea Level Rise=2 Feet

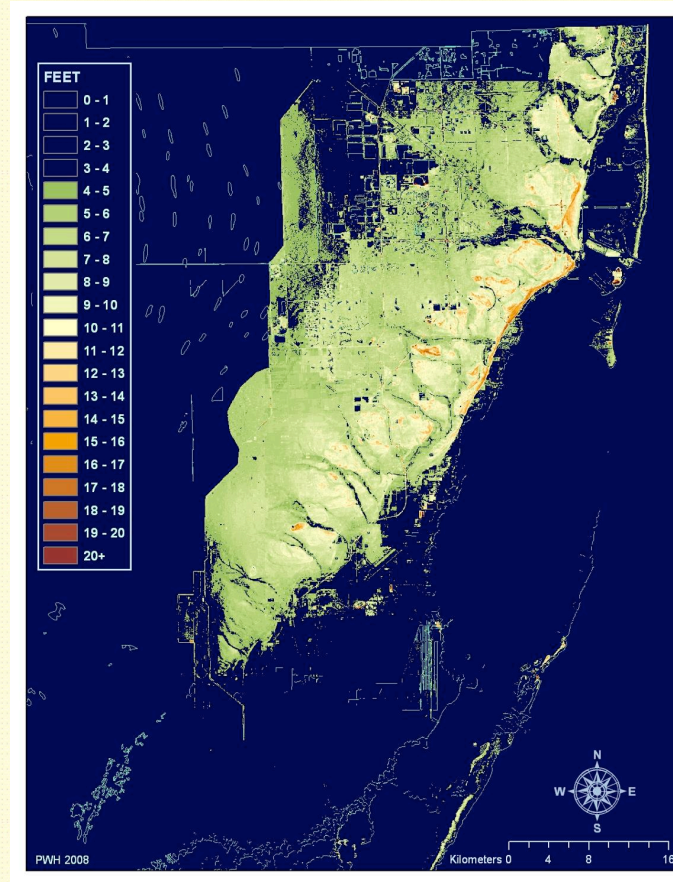




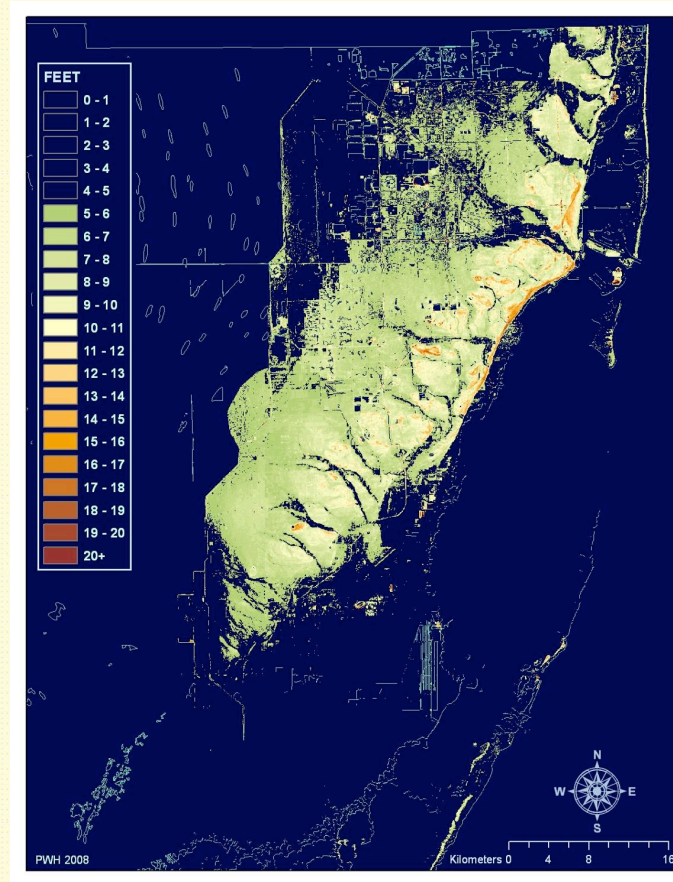
# Sea Level Rise=3 Feet



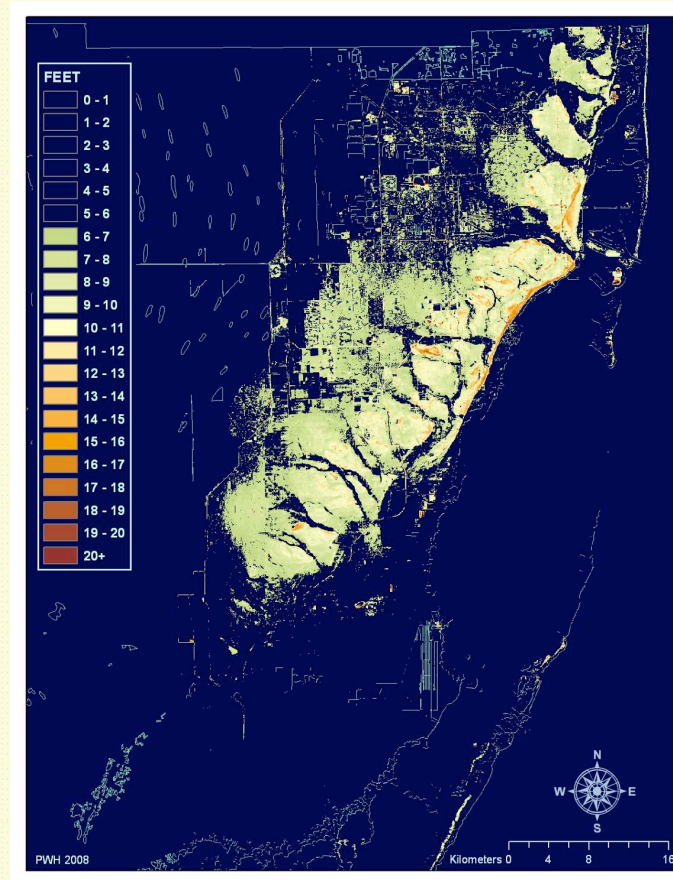
# Sea Level Rise=4 Feet



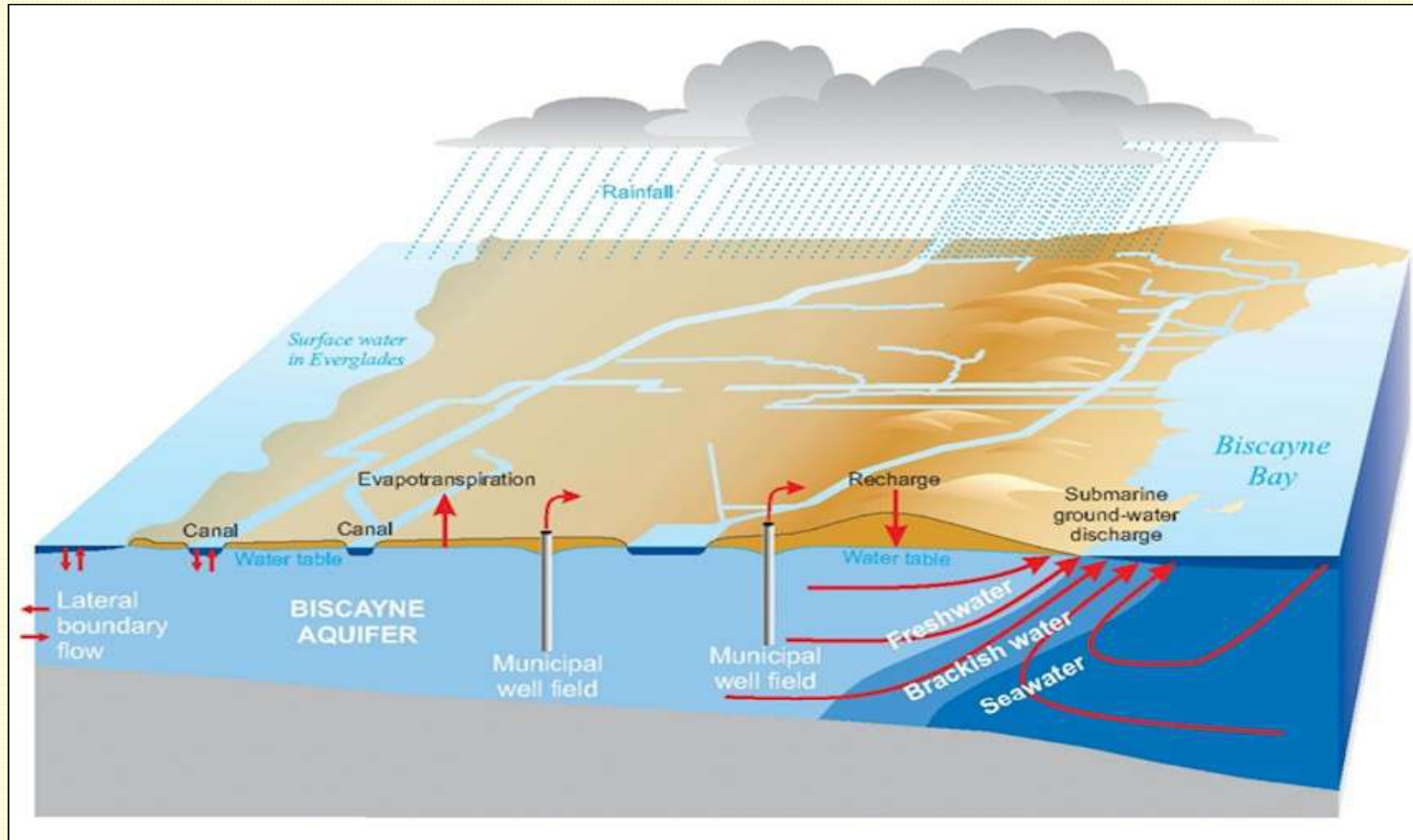
# Sea Level Rise=5 Feet



# Sea Level Rise=6 Feet



# Our Delicate Water Balance



# What are we doing about Climate Change?

- 1993 – County Commission adopted plan to reduce greenhouse gas emissions – 34 million metric tons avoided to date
- Focus on solid waste, transportation, urban design, energy efficiency
- Reduction goals not met primarily due to transportation
- 2007 – creation of climate Change Advisory Task Force to advise County commission, with focus on adaptation strategies

# Some Task Force Recommendations

- Expect 1.5' of sea level rise by 2050; 3'-5' by 2100
- Model groundwater, salt intrusion, and drainage/flooding consequences
- Limit development in most vulnerable undeveloped areas
- Accelerate natural system restoration to create greater resilience of the natural system (the Everglades)
- Further reduce GHG emissions across all sectors
- Establish a countywide masterplan element for climate change

## Utility-Specific “To Do” List

- More precise estimates of role of sea level rise & tropical storm activity patterns
- Treatment technology to deal with more brackish groundwater
- More energy-efficient treatment technologies to reduce greenhouse gas emissions
- Refining growth projections to account for possible climate change impacts that might reduce demands
- Revising land use and capital plans to adapt to climate change; future financing issues impacting the local economy and capital plan



# Observations

- Utilities cannot plan for climate change in isolation
- Utility adaptation strategies may be very capital and energy intensive with long lead times
- Monitoring and verifying conditions attributable to climate change as triggers for implementing adaptation actions has technical, political, and financial dimensions
- Forecasting future habitability on a metropolitan or regional scale is uncharted territory
- Coastal utilities may be at most obvious risk, but all communities will have impacts