Hydrologic Baseline for CC/SLR Planning

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Letting Science Tell the Story: Practical and Powerful Resiliency Planning

JonesEdmunds

Introduction- What Risks Will Change?

- Flooding
  - Watershed
    - Larger extreme events
    - Wetter wet seasons
    - Higher boundary conditions
  - Coastal
    - Higher sea level
    - Stronger tropical events
- Water Quality
  - Rainfall patterns
  - Salinity changes

Introduction - What Risks Will Change?

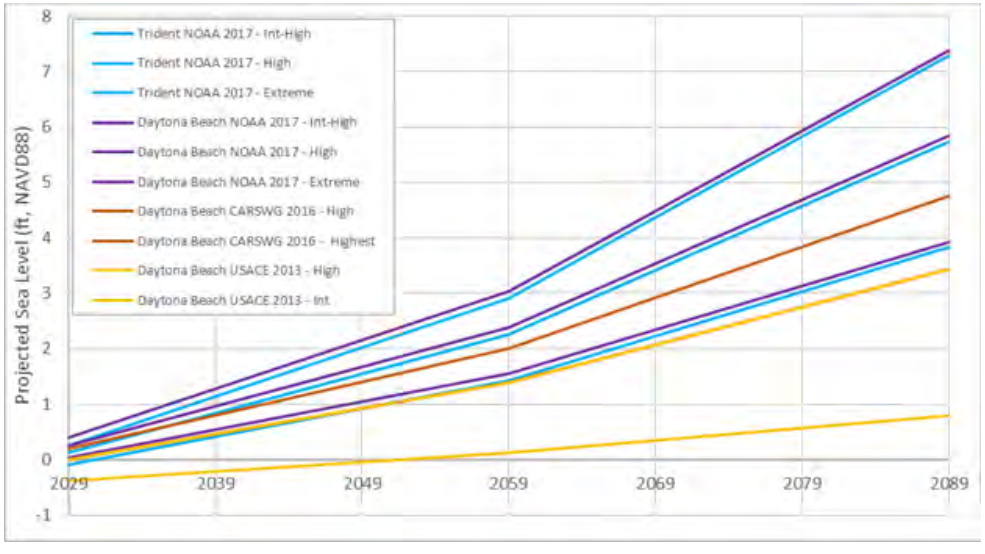
- Transportation
  - Saturated subbase
- Electrical Infrastructure
  - Significant increase in days >95º
- Water Supply
- Wastewater Collection
- Natural Systems
- Fire
- Wind

Introduction - What Risks Will Interact?

- Water Supply vs. Minimum Flows and Levels
- Flooding vs. Wastewater Collection (sanitary sewer overflows) vs. Water Quality
- Flooding vs. Natural Systems
- FEMA does not analyze for changes in future risk

Introduction – How Do We Quantify the Risks?

- Useful, understandable presentation of results
- Consider everything that could change and how it interacts
- Live with some uncertainty



Introduction – How Do We Quantify the Risks?

- Define what you want to protect
- Define when risks become actionable
- Tie to economic life of infrastructure or asset
  - E.g., 10, 25, and 100 years

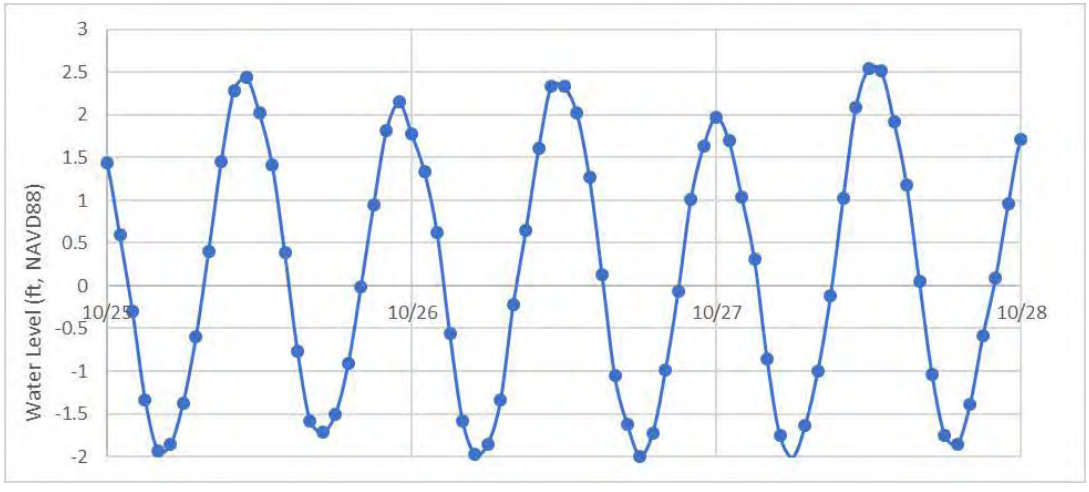
	Projected BFE (ft NAVD88)			Critical Elevation	Projected Flood Depth (ft)		
Asset	2029	2059	2089	(ft NAVD88)	2029	2059	2089
Water Pump Station	7.8	9.3	9.9	13.20	0.00	0.00	0.00
Radar Site	6.5	8.0	10.6	3.70	2.80	4.30	6.90
Air Traffic Control Tower	8.1	9.7	12.2	12.60	0.00	0.00	0.00
Industrial Water Pumping Station	7.5	9.6	12.5	10.10	0.00	0.00	2.40

Introduction – How Do We Adapt to Changing Risks?

- Specific to the risk or group of risks
- Planning and prevention
- Individual asset vs. group
- Timeline of risk vs. economic life of infrastructure
- Social equity

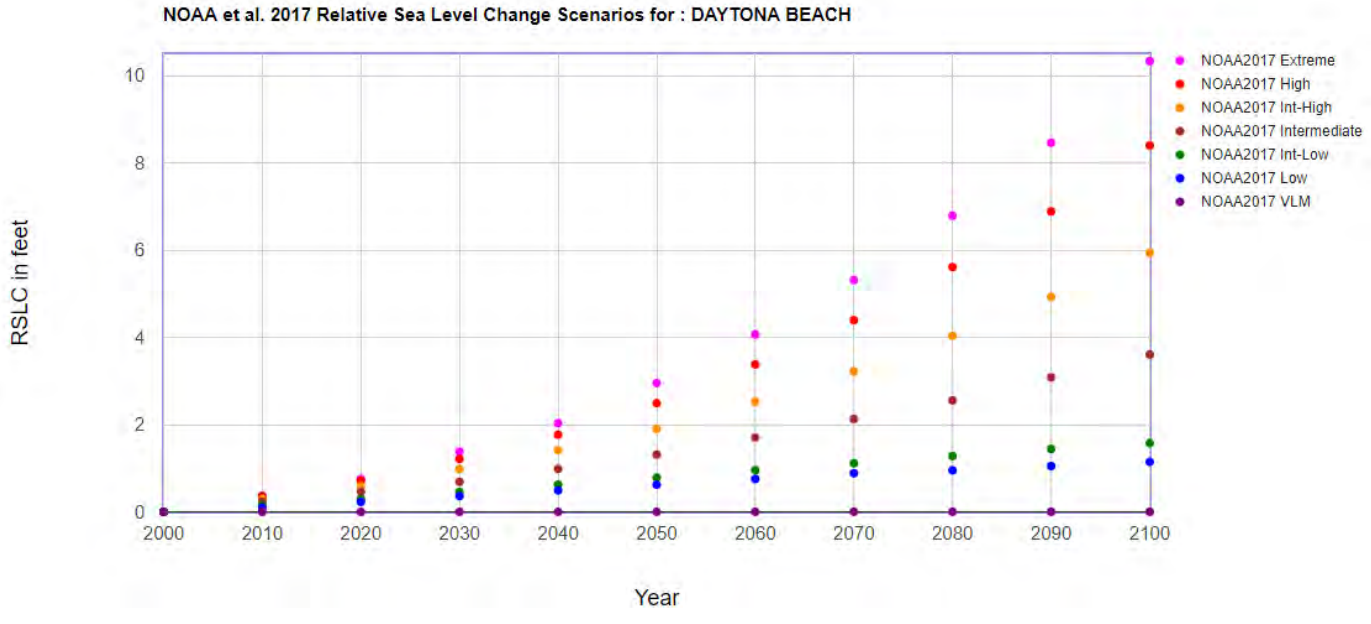
Watershed Risk Analysis – Tailwater Elevation

- Watershed and surge risk not dependent or independent
- Timing within the tidal cycle
- Convention: Mean higher high tide



Watershed Risk Analysis – Tailwater Elevation

- Decision on SLR prediction
- US Army Corps of Engineers' Sea Level Change Curve Calculator tool



Watershed Risk Analysis – Initial Conditions

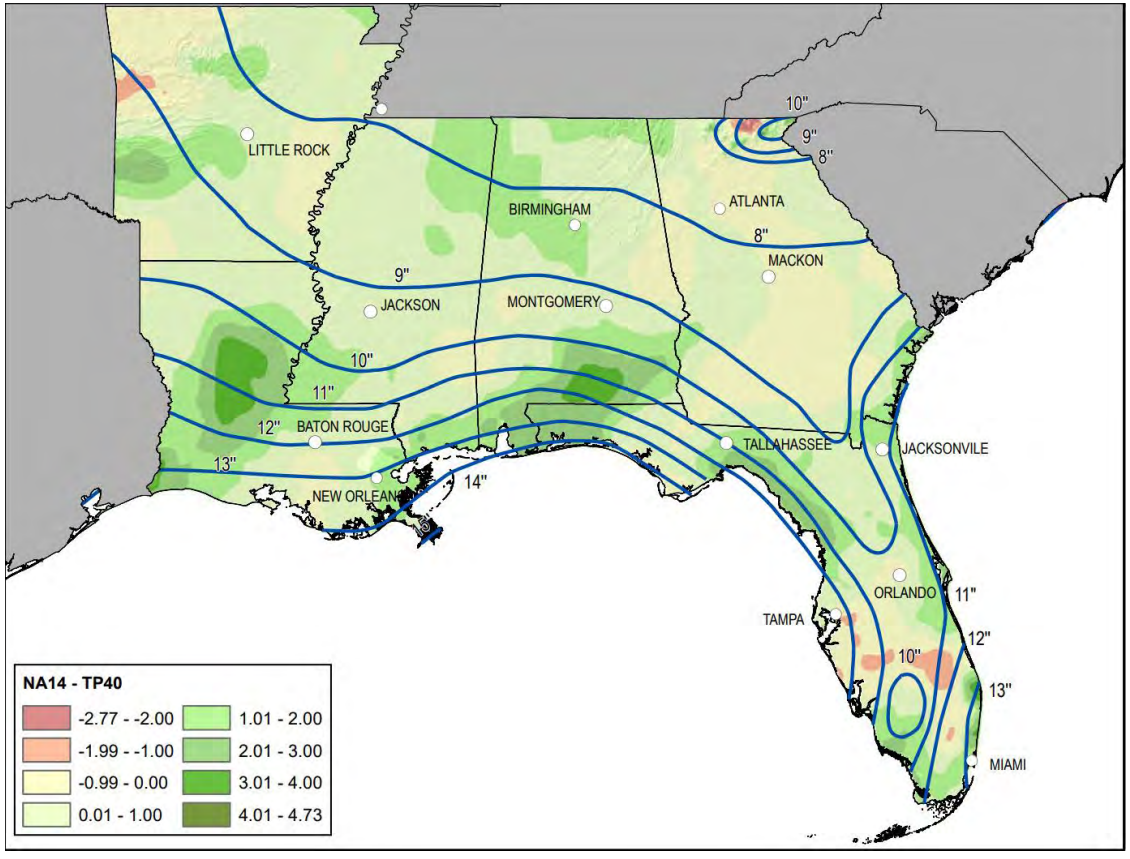
- Surface storage filled from increased tailwater
- Surface storage filled from wetter wet season?
- Constructed stormwater features often not impacted

Watershed Risk Analysis – Soil Storage/Groundwater

- Coastal areas affected by higher tides
- High water table areas affected by wetter wet seasons
- Increases dependent on water table elevatins, distance, local drainage, etc.
- See Singhofen presentation

Watershed Risk Analysis – Extreme Rainfall Events

- Long-term changes hard to quantify
- Warmer air can hold more moisture
- Use higher published values, at a minimum
- E.g., SFWMD working with FIU on new data



Watershed Risk Analysis – Timeline and Economic Life

- Application of results to assets
- Compare timeline of risk to economic life
- Future considerations (e.g., tie ins)

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Adaptation Plan

- Green infrastructure more adaptive than gray
- Storage, conveyance, diversion, and avoidance
- Integrated water resources planning (e.g., water quality)

Combined Hydrologic Risks

- Current semi-independent approach is reasonable for coastal and watershed dominated portions
- May be inadequate where both are important
- Combined approach may be needed in some areas