

Climate Change and Coastal Hazards: Assessment for Long-Term Master Water Plan

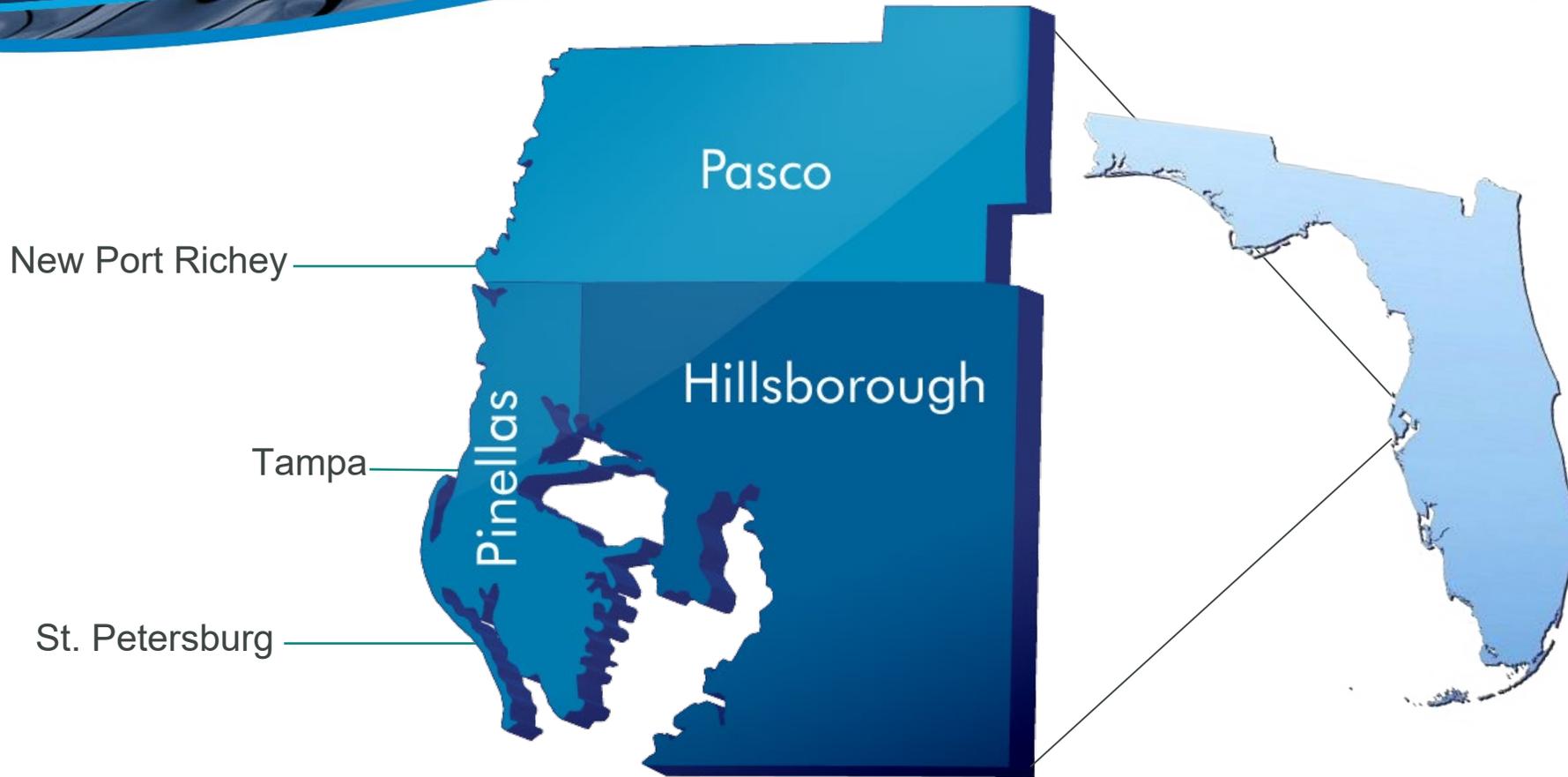
Tampa Bay Water

UF Water Institute Symposium

February, 2020

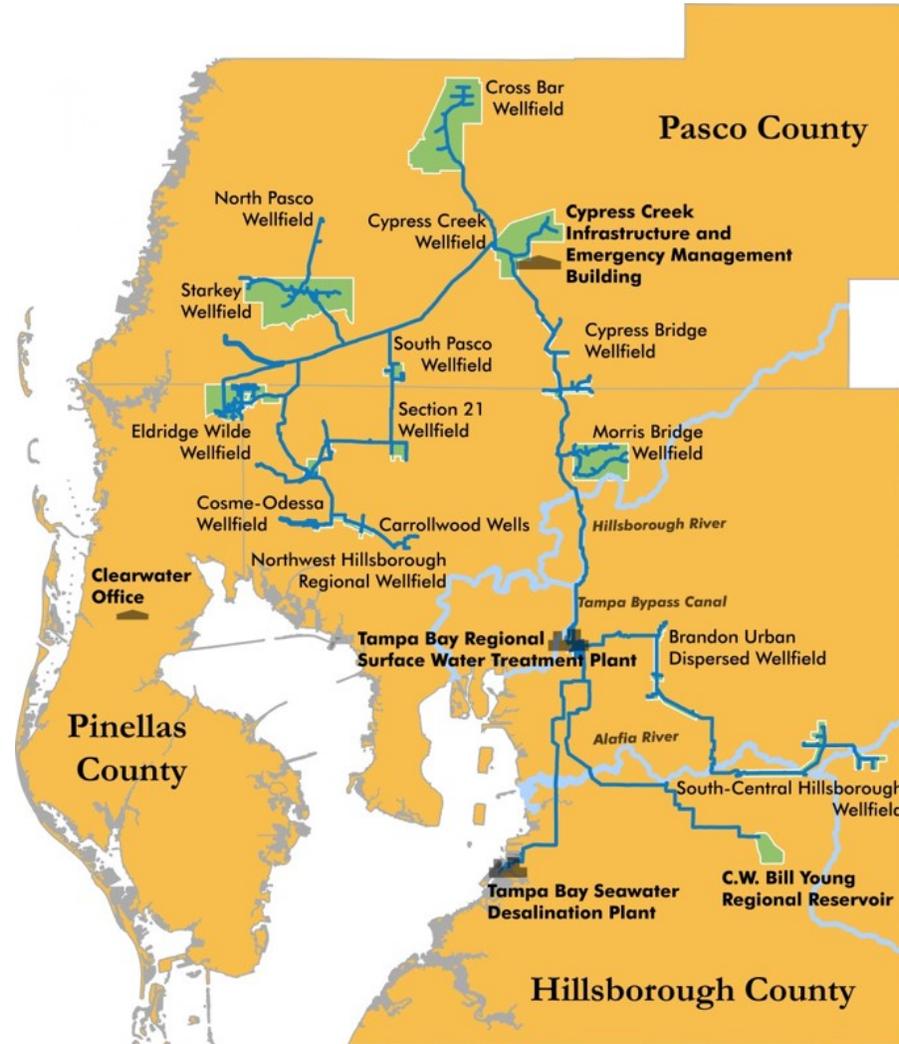


Who Is Tampa Bay Water?



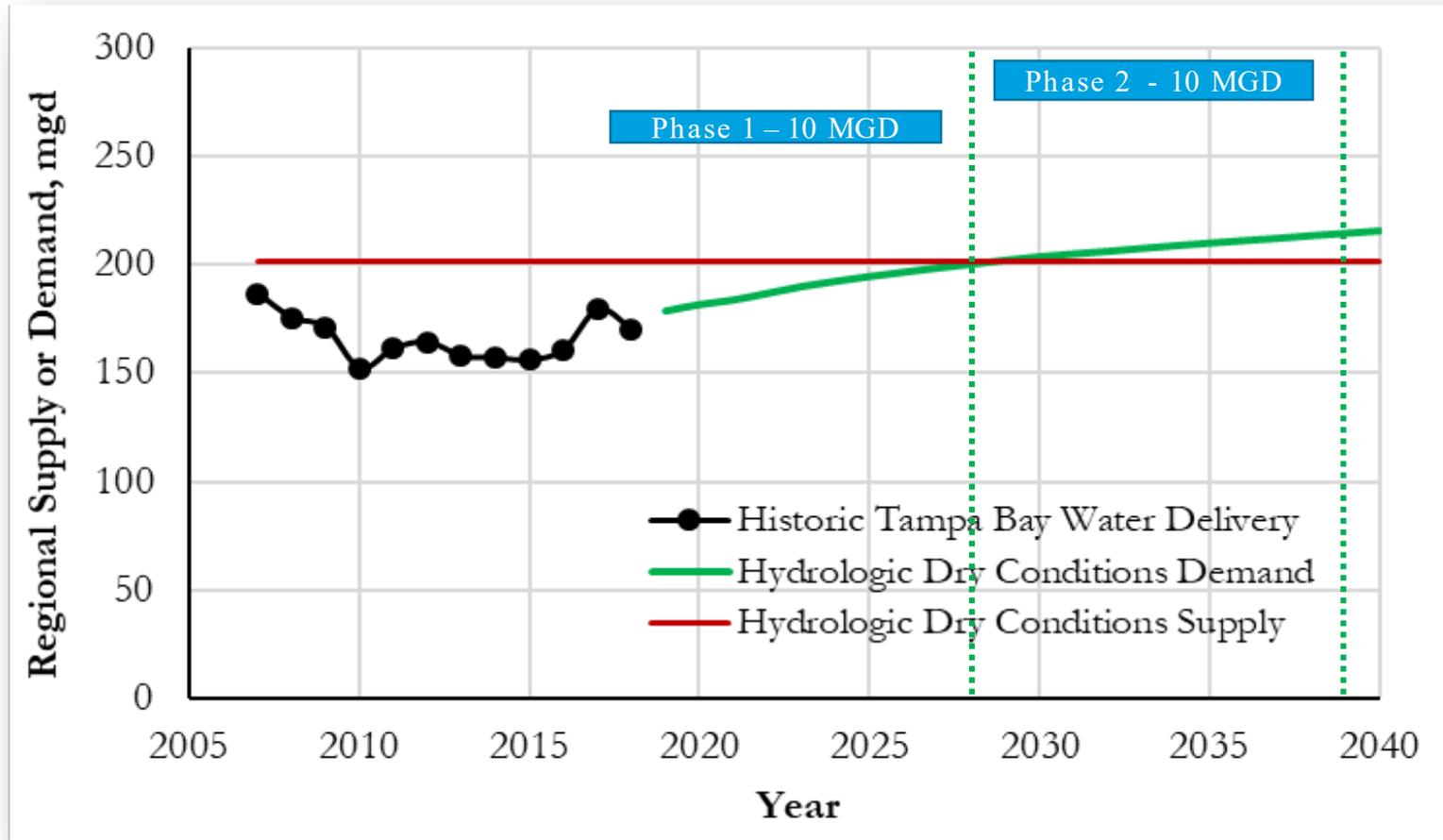
Tampa Bay Water's System

- Integrated supply system
 - 13 wellfields
 - 8 groundwater treatment facilities
 - Surface Water Treatment Plant
 - Desalination Treatment Plant
 - 9 pump stations
 - 270 miles of transmission mains



- **Population served: 2.5 million**
 - Regional average annual demand 220 mgd to 259 mgd
- **Supply sources**
 - Groundwater - permitted capacity 90 mgd (*capacity 120 mgd*)
 - Surface Water Treatment Plant – permitted capacity 120 mgd
 - Sustainable capacity 99 mgd; hydrology -dependent
 - Seawater Desalination Treatment Plant – permitted capacity 25mgd
 - Sustainable capacity 16 mgd; drought resistant
- **Off-stream regional reservoir – 15.5 billion gallons capacity**

Regional Demand Projections



Three Water Supply Projects

Surface Water Treatment
Plant Expansion with
existing source water

Desalination Facility
Expansion with existing
source water

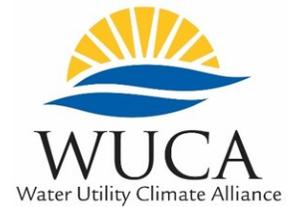
New Groundwater Water
Treatment Plant with
South-Hillsborough
Aquifer Recharge Project
credits

South County Projects

New Groundwater Treatment via Aquifer Recharge Credits via SHARP
Pipeline from Regional SWTP to South Hillsborough County

Addressing Climate Change and Coastal Hazards

The bottom of the slide features a decorative graphic consisting of several wavy, overlapping lines in shades of blue and green, creating a sense of movement and depth, reminiscent of water or a stylized landscape.



Vision: Climate -resilient water utilities, thriving communities

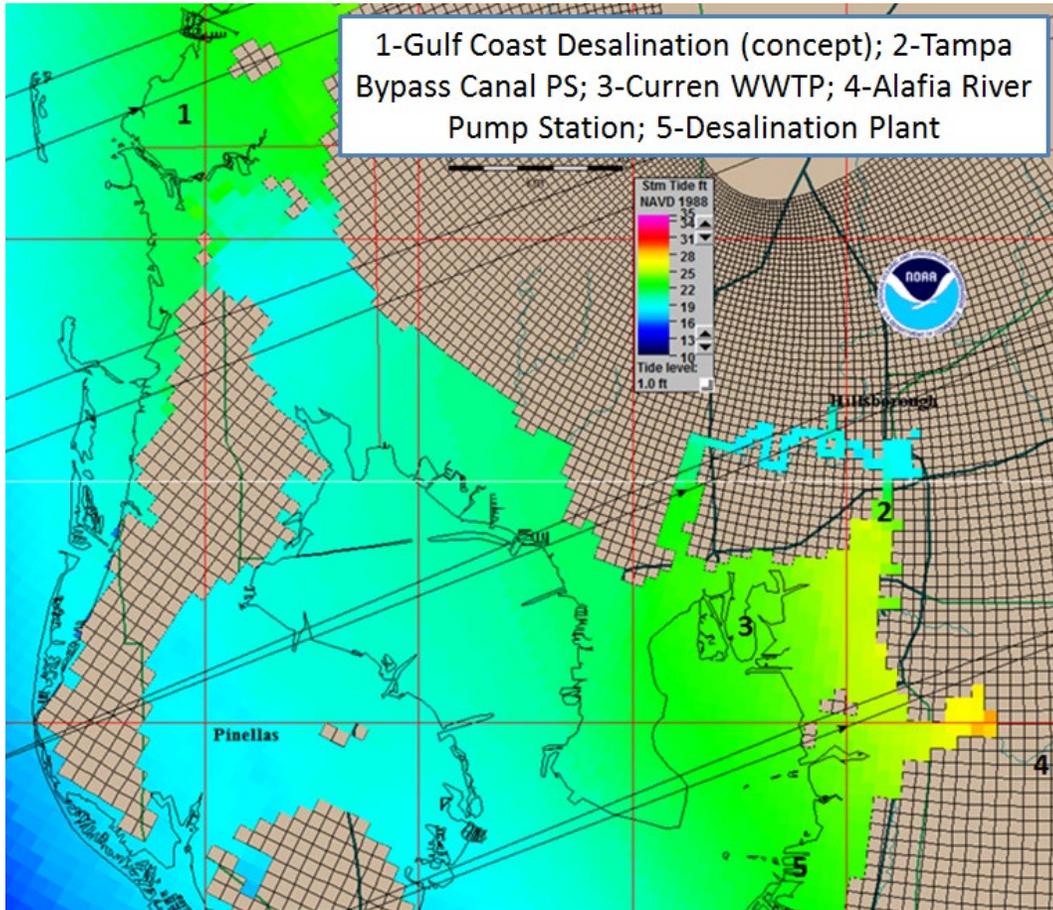
Mission: Collaboratively advance water utility climate change adaptation

<http://www.wucaonline.org>

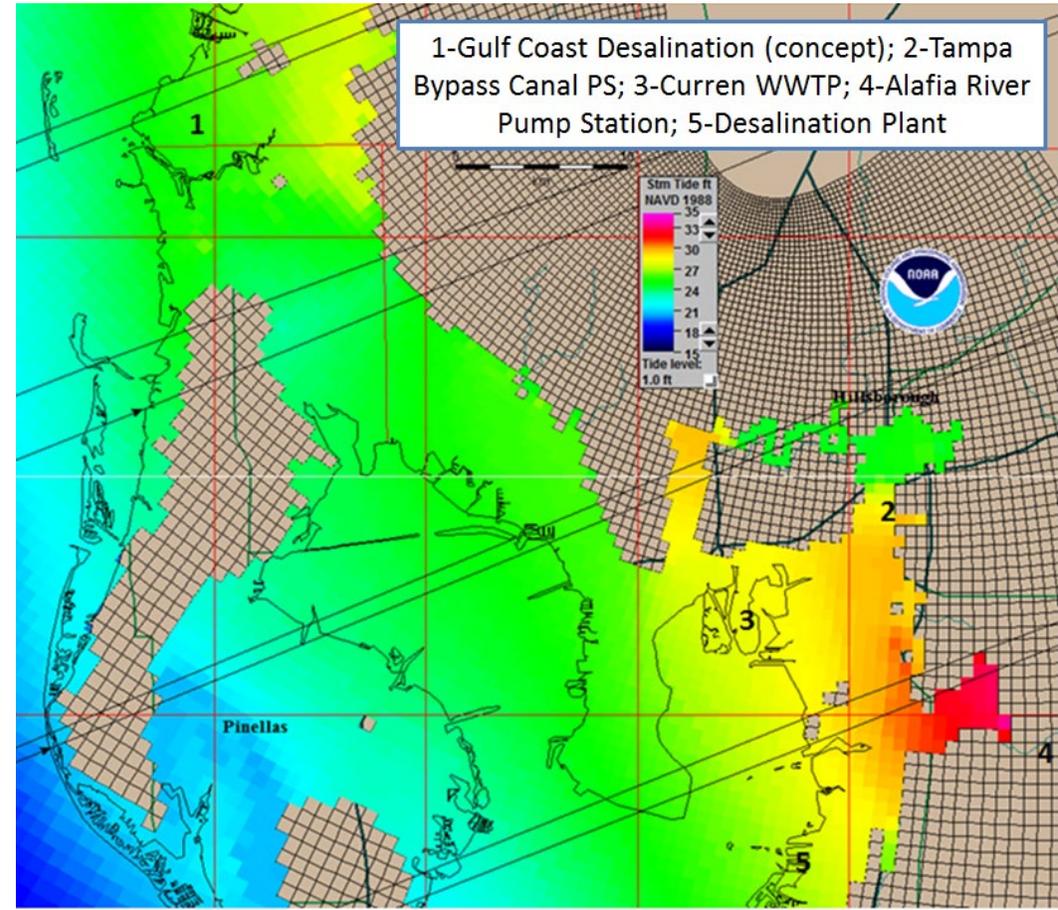
- Surface temperatures projected to increase 4-8° F by 2100
 - Tampa Bay expected to see 2'-8.5' sea level rise by 2100
- Vulnerability to heat waves and days with max temp exceeding 95° projected to increase
- Health effects on vulnerable population projected to worsen
- Disruption in essential services projected to increase
- Urban areas experiencing shorter, intense wet seasons relative to rural areas
 - Wet season length decreased by ~3.5 hours in the last 40-60 years

- Vulnerability Assessment:
 - Flooding and storm surge from hurricanes
 - Sea level rise
 - Short and long- term water quality impacts
- Assessment performed on potential future projects
 - Some project concepts evaluated have not moved forward

- SLOSH (Sea, Lake, and Overland Surge from Hurricanes) NOAA model used
- Model results indicate:
 - Surge increased as the speed of advance increased for storms moving E and NE
 - Surge levels related to tide stage
 - Surge increased as the hurricane category increased
 - Worst-case hurricane approach moving ENE



Category 4



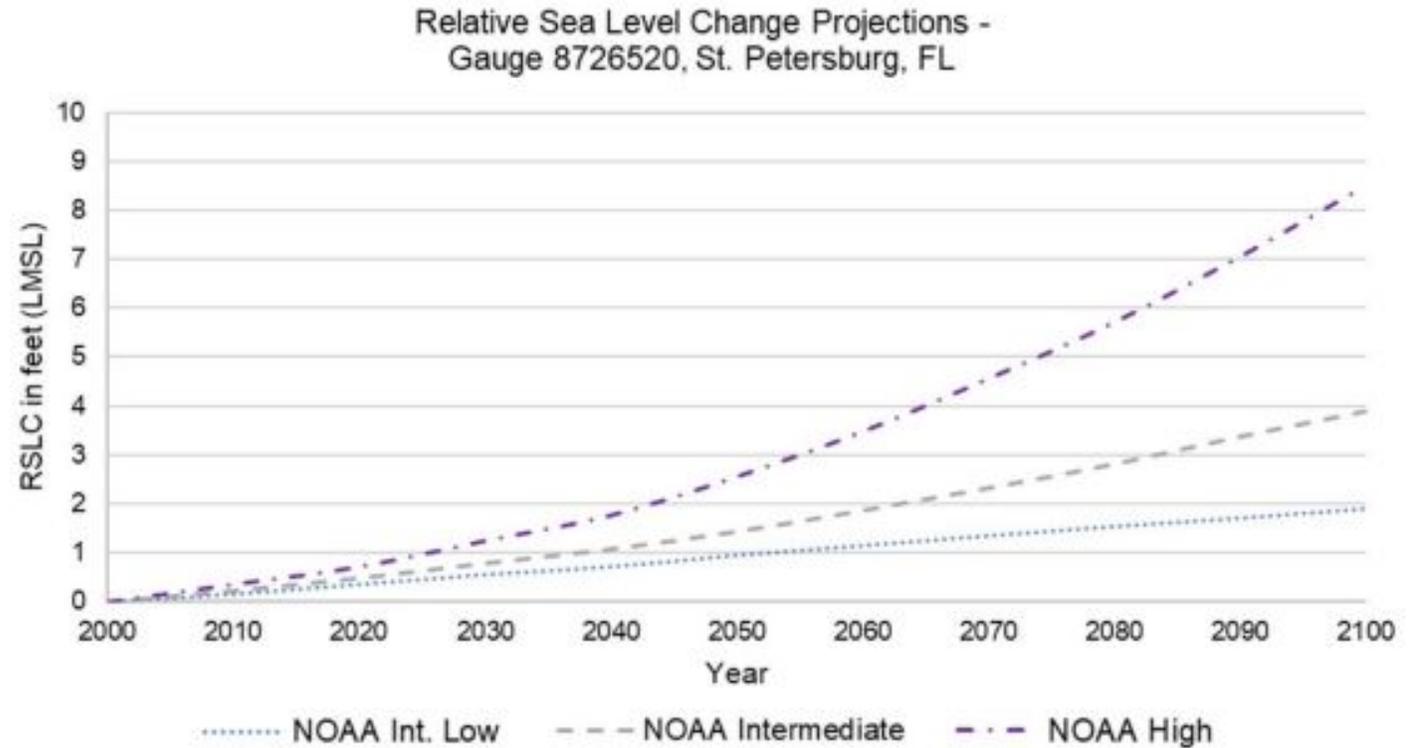
Category 5

Facilities Affected by Storm Surge

FACILITY	Approximate Low Ground Elevation (NAVD88)	Surge Elevation Category 4 Hurricane (Feet, NAVD88)	Surge Elevation Category 5 Hurricane (Feet, NAVD88)
Regional Surface Water Treatment Plant	34	Adjacent to 25.2	Adjacent to 29.6
Seawater Desalination Plant	9.5	22.7	27.1
New Gulf Coast Desalination Facility ¹	9	21.6	25.6
New South Hillsborough Wellfield and Groundwater WTP ¹	100	NA	NA
New Tampa Augmentation Project Wellfield ¹	43	NA	NA
New Advanced WTP (at Regional Facilities Site)	34	Adjacent to 25.2	Adjacent to 29.6
New Treated Reclaimed Water Recharge & Recovery Wellfield and WTP ¹	100	NA	NA
Hillsborough Co. SHARP Recharge Wellfield ²	6	22.8 to 23.5	27.2 to 28.4
Hillsborough County South County AWTP ²	38	NA	NA
City of Tampa H. F. Curren AWTP ²	9	23.5	27.8

Sea Level Rise in Tampa Bay

- 2ft – 8.5ft of SLR by 2100
- High uncertainty in future projections

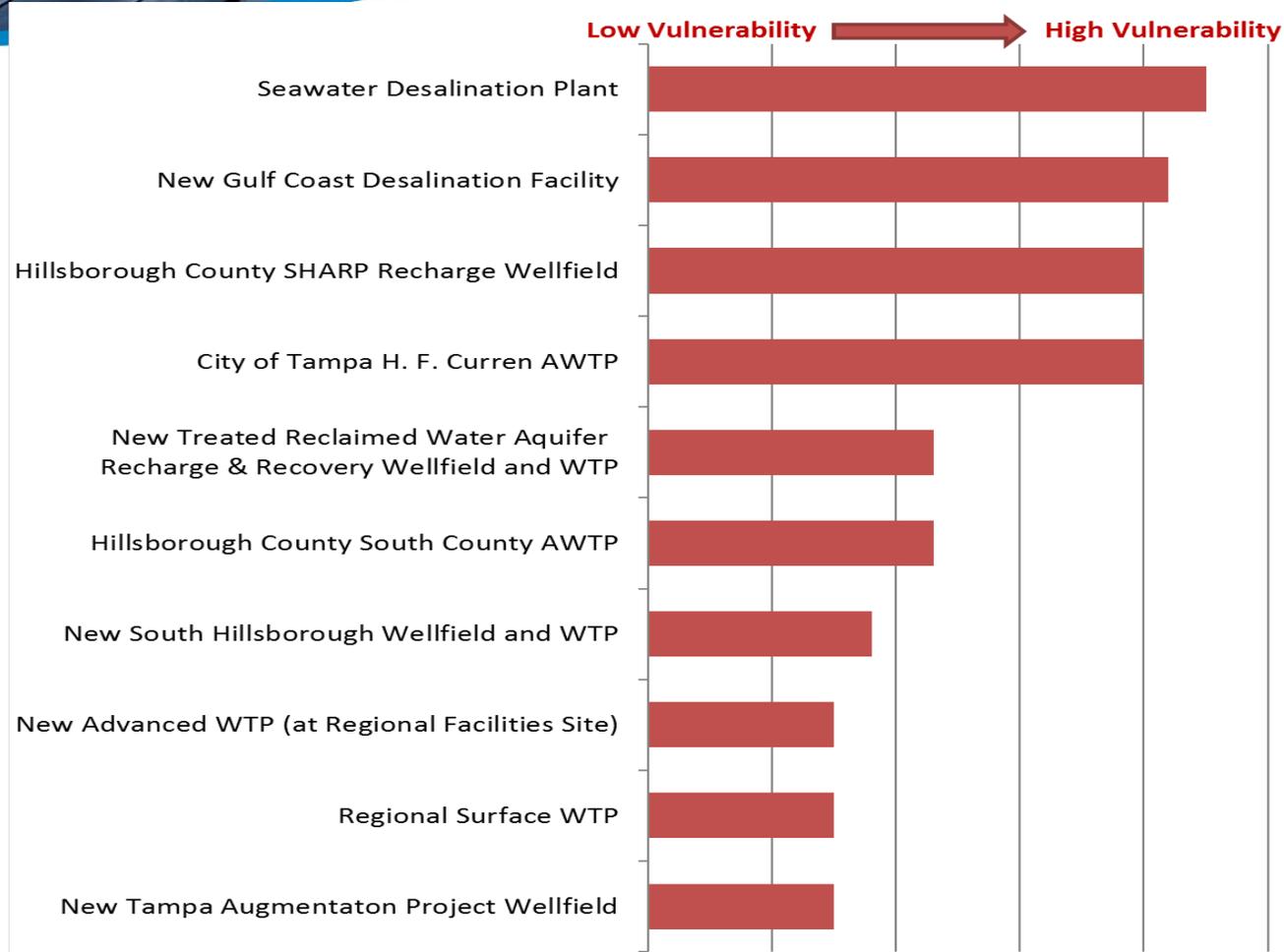


Facilities Affected by Sea Level Rise

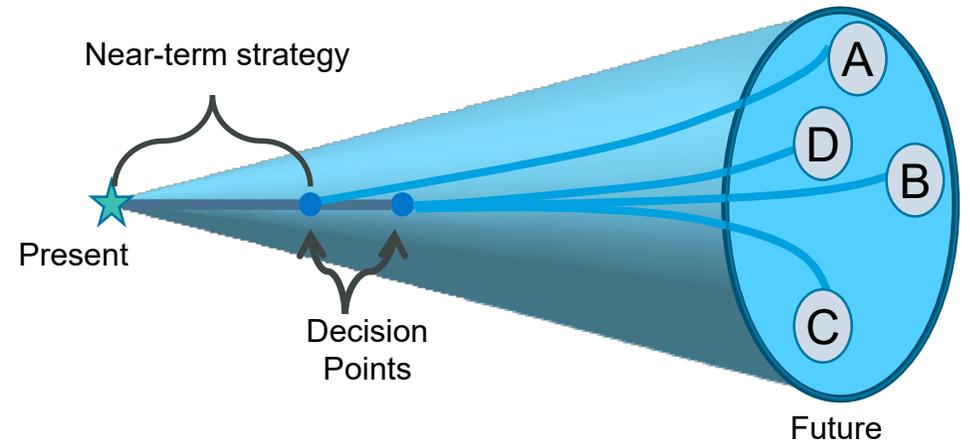
FACILITY	Approximate Low Ground Elevation (NAVD88)	Surge Elevation Plus Intermediate Low SLR Projection (Feet, NAVD88)	Surge Elevation Plus Intermediate High SLR Projection (Feet, NAVD88)
Seawater Desalination Plant	9.5	23.8	24.8
New Gulf Coast Desalination Facility ¹	9	22.7	23.8
New Tampa Augmentation Project Wellfield ¹	22	25.2	26.2
Hillsborough Co. SHARP Recharge WF ¹	6	23.9 to 24.6	25.0 to 26.8
Hillsborough County South County AWTP ²	38	23.1	24.1
City of Tampa H. F. Curren AWTP ²	9	24.6	25.6

- Hazards considered for overall analysis:
 - Flooding 25%
 - 5=within inundation area; 3=marginal/adjacent; 1= outside of flood area
 - Storm Surge 35%
 - 5=within surge area; 3=marginal/adjacent; 1= outside surge area
 - Sea Level Rise 15%
 - 5=within surge area Cat 4+1.7ft; 3=marginal/adjacent +1.7ft; 1=outside flood area
 - Changes in Water Quality and Availability 25%
 - 5=significant changes in quality/availability; 3=minor changes in quality/availability; 1=impact unlikely

Results of Vulnerability Assessment



- All plans must consider multiple futures
- Robust plans for *multi*-scenario future better than an optimal plan for a *single*-scenario future.
- Plans must be flexible and adaptive
- Each scenario offers options for adaptation



Credit: DMDU Society; deepuncertainty.org

- Engaging the public is crucial and challenging
 - Human lifespans vs. climate timescale
 - Psychological barriers (i.e. “the ostrich effect”)
 - Uncertainty often equated to complete lack of knowledge (i.e. “throwing the baby with the bathwater effect”)
 - How are we going to pay for it?



Credit: Water Utility Climate Alliance

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Questions

