CLIMATE CHANGE IMPACTS TO WATER SUPPLY

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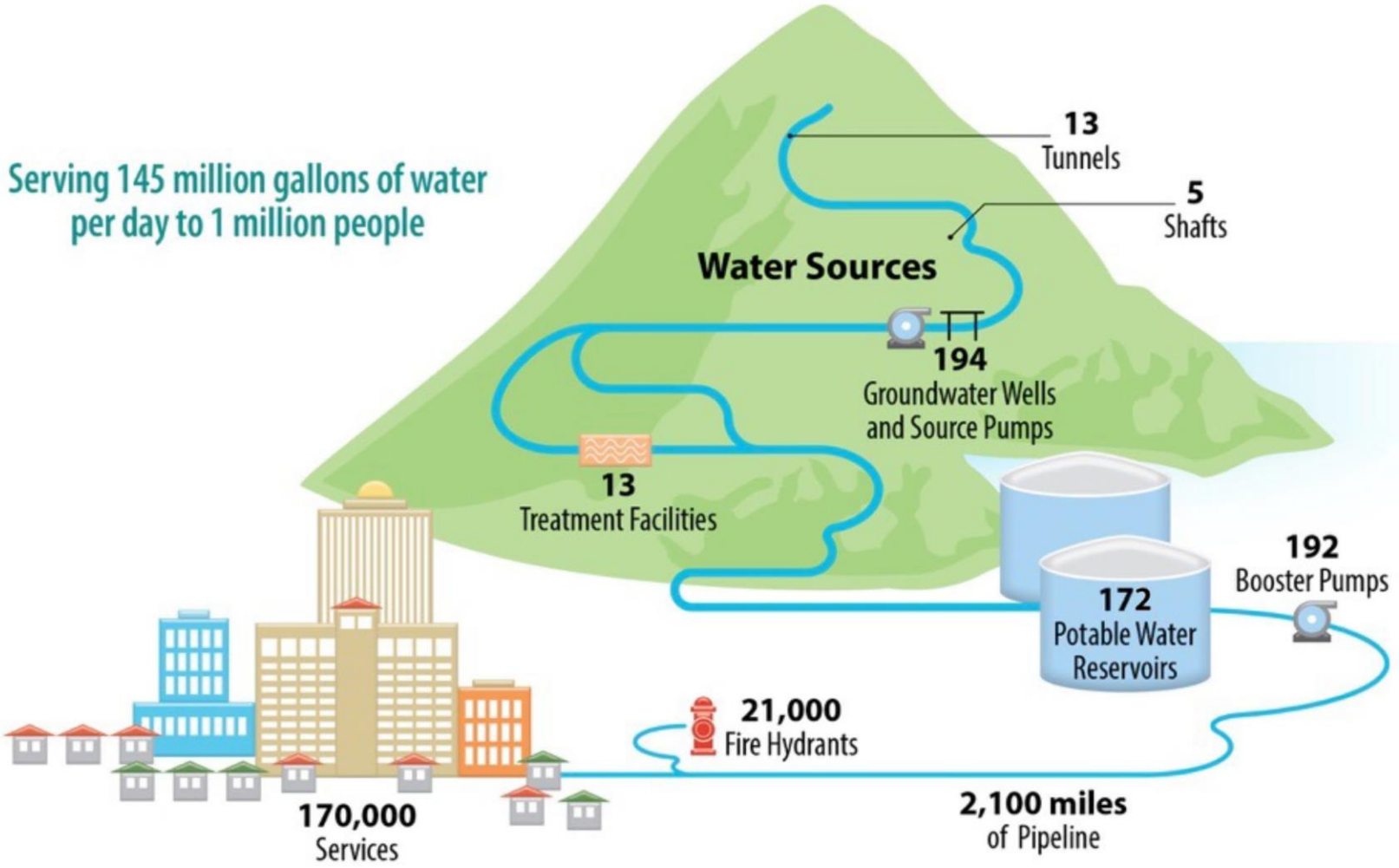
Impacts of Climate Change on Honolulu Water Supplies and Planning Strategies for Mitigation

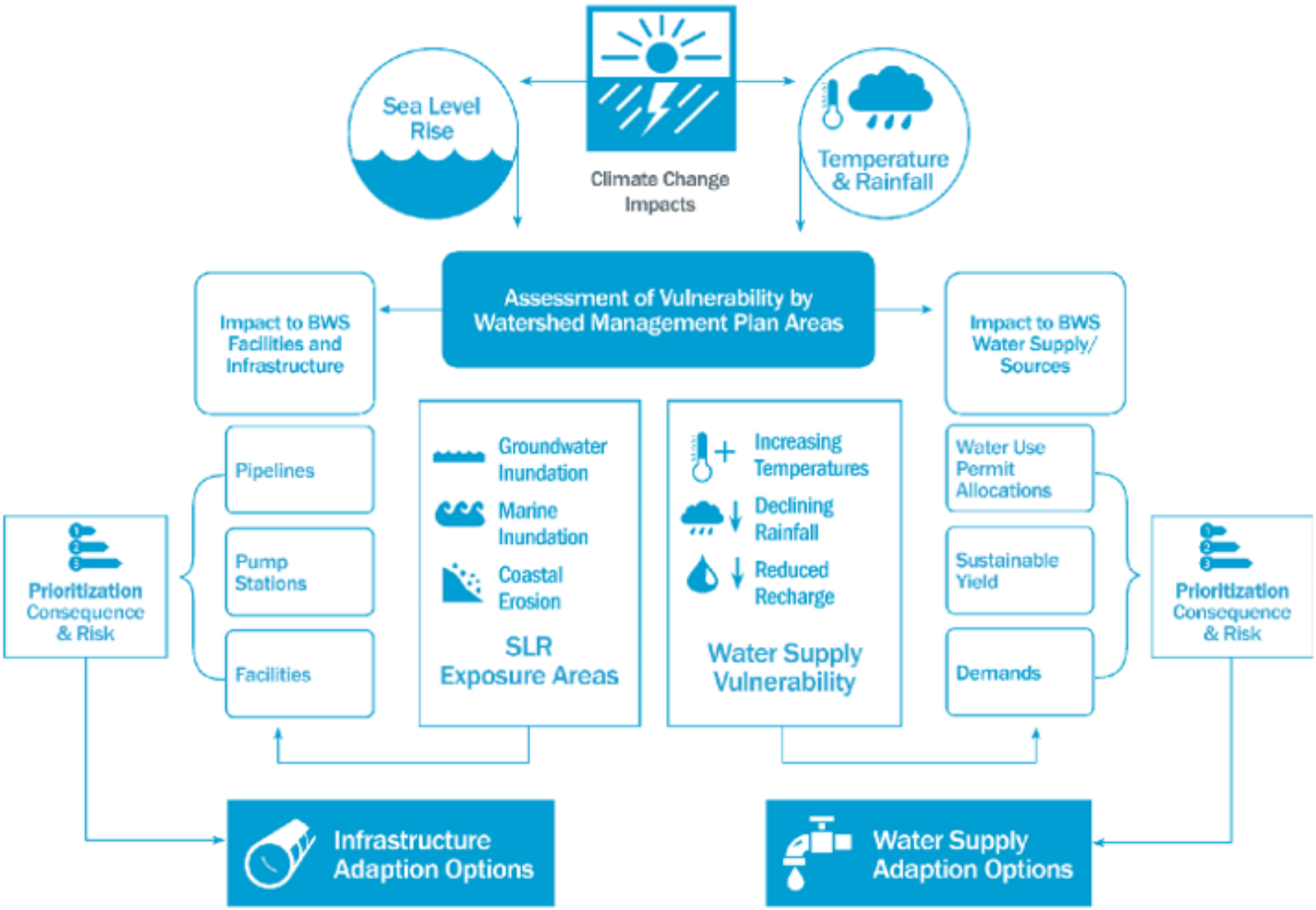
Study Objectives

- Utilities are facing unpredictable climate-related risks to their water supplies and infrastructure.
- Long range water resource planning must account for a changing climate in addition to historical weather patterns and population growth in order to realistically plan for the future.
- BWS and the Water Research Foundation undertook a vulnerability assessment to mitigate climate change risks to:
  - Water supply from forecasted temperature & precipitation changes
  - Coastal water system infrastructure from projected sea level rise
- Develop a suite of strategies to address climate impacts to 2100 that encourage “no regrets” outcomes

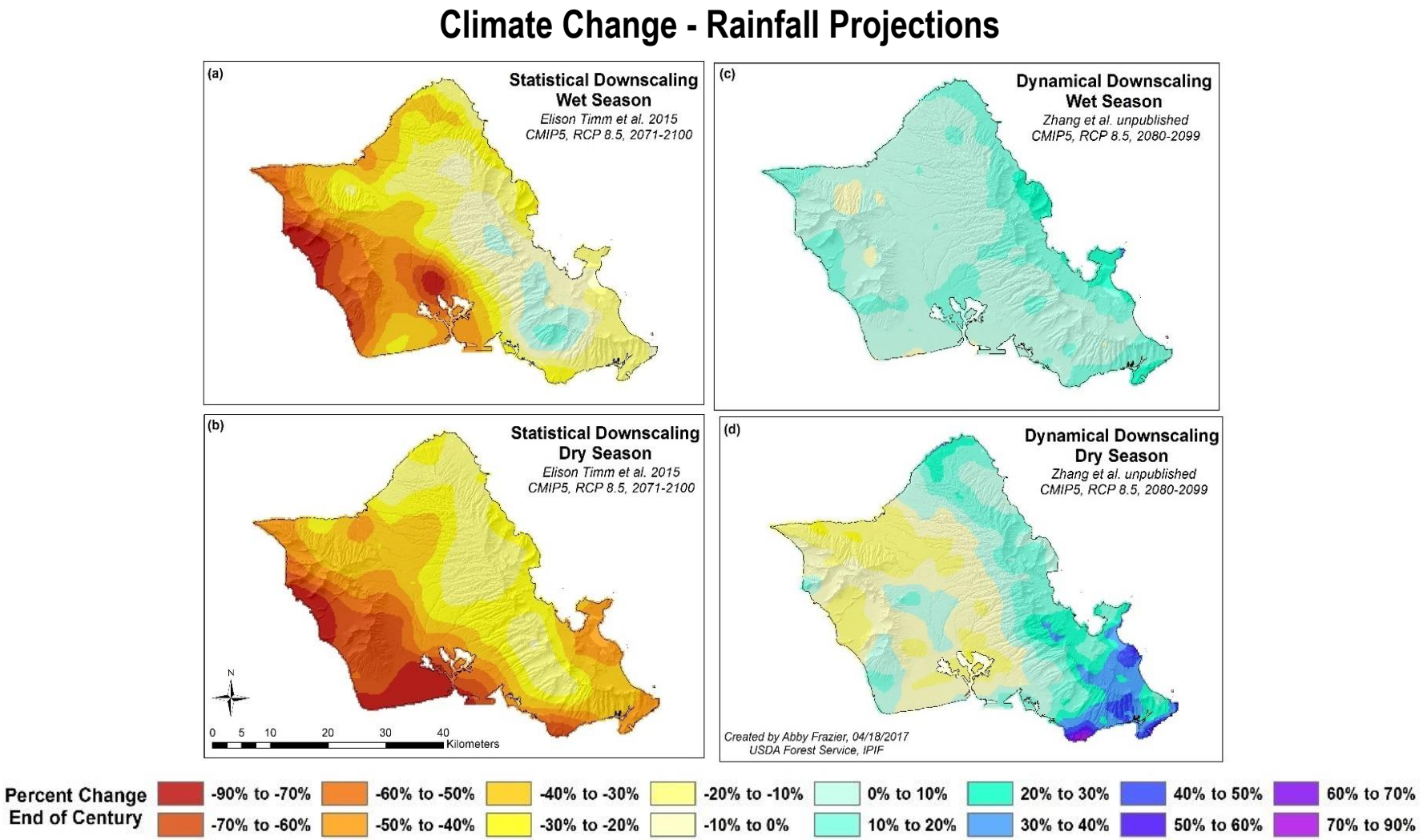
DELIVERING WATER FROM UNDERGROUND WATER SOURCES TO YOUR HOME REQUIRES A LARGE AND COMPLEX SYSTEM



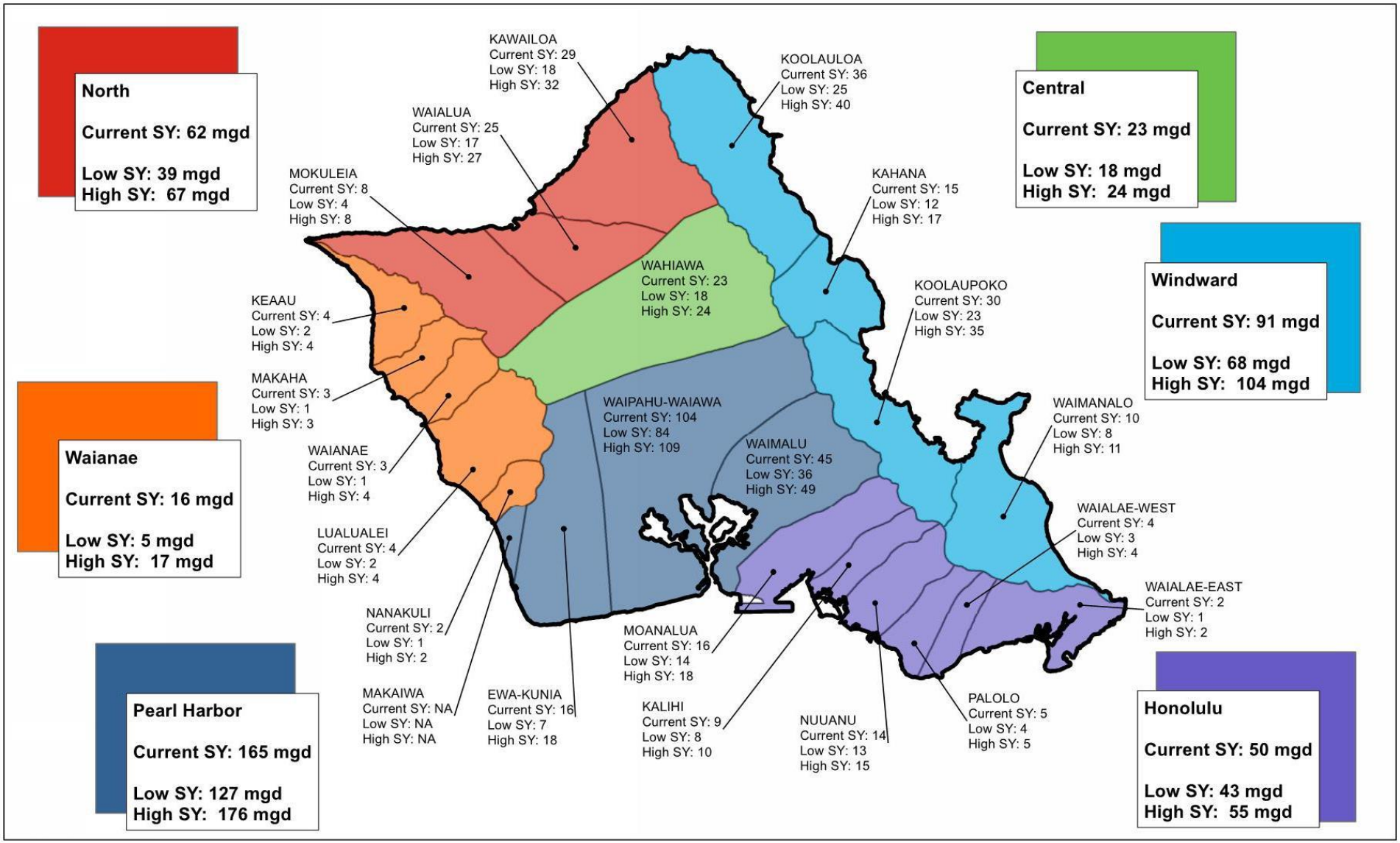
Vulnerability Assessment Approach to SLR & Drought



Downscaled Climate Models indicate a Range of Rainfall Futures, Dry and Wet, to 2100,



Potential Range of Aquifer Yields, Dry & Wet, to 2100

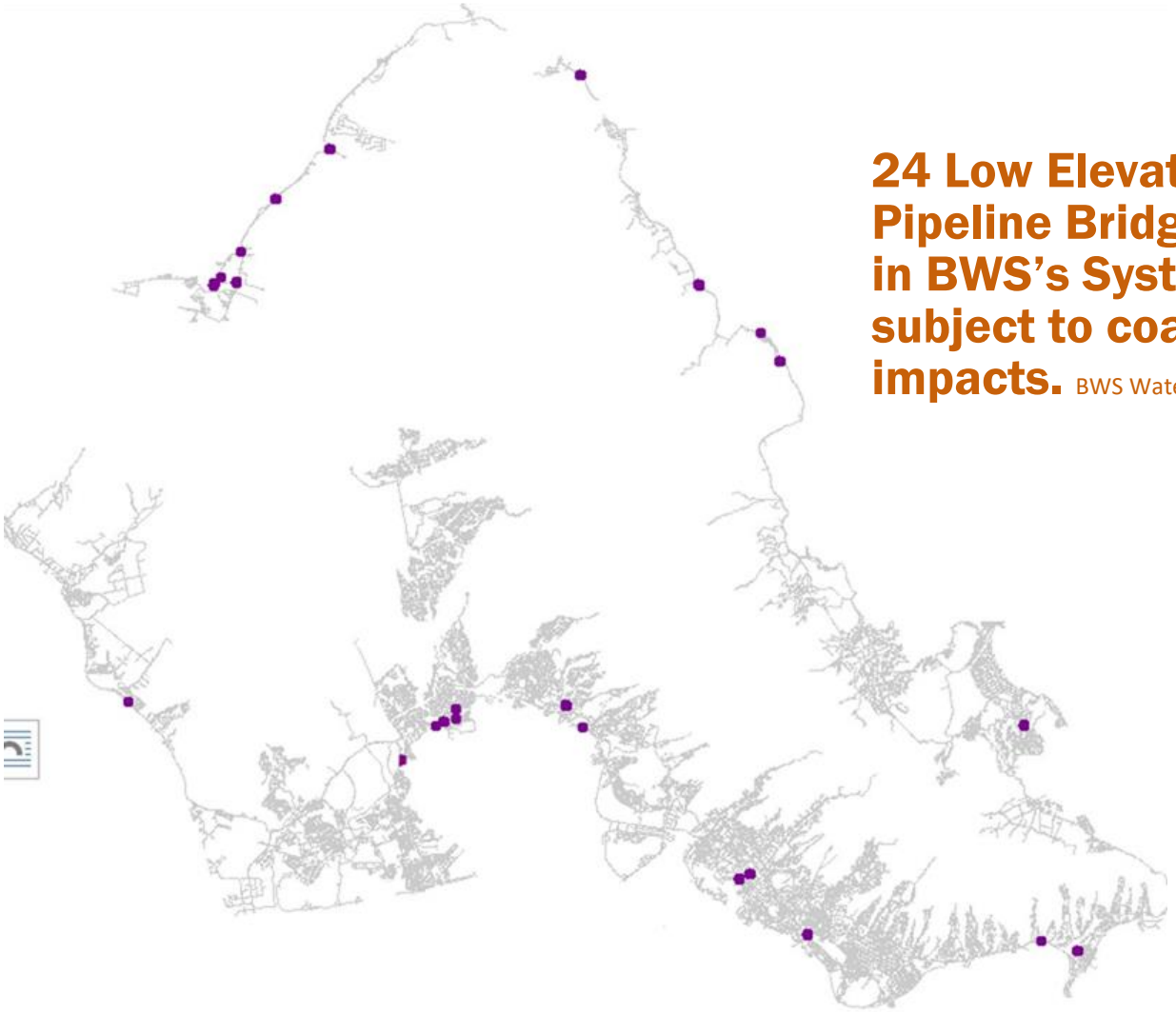


Preliminary Supply Adaptation Strategies:

Reduced rainfall could decrease sustainable yields by ~34%. Statistical model From 407 mgd to 269 mgd a difference of 138 mgd, Turk, Report #9, B&C.

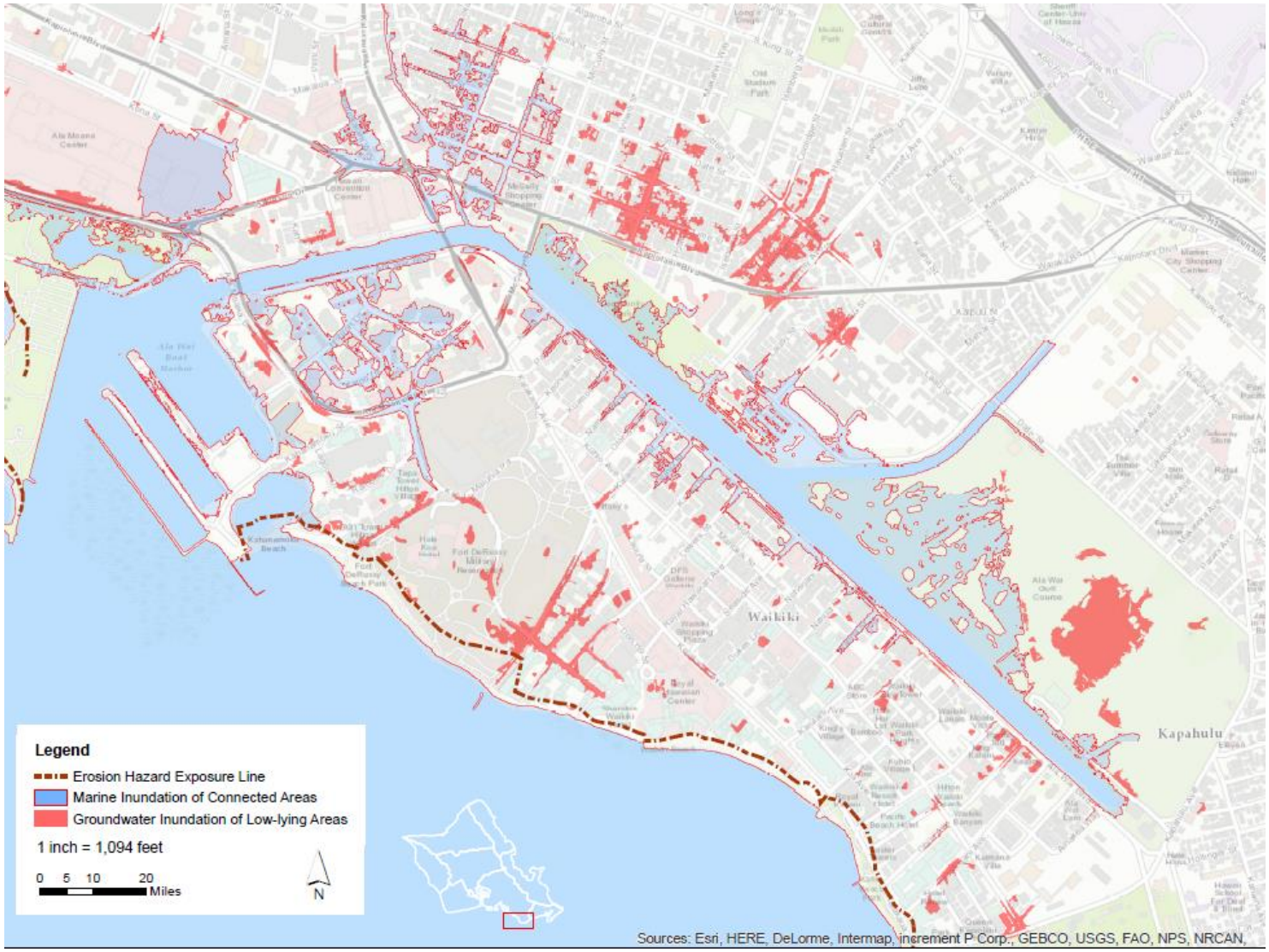
- Aggressive water conservation, like dual plumbing with recycled water
- Storm water capture in Nuuanu and for new development
- Expanded Reuse at Honouliuli, Mililani, Wahiawa and Waimanalo WWTP's
- On-site graywater reuse
- Increase transfers from Waipahu Waiawa aquifer to Waianae and Honolulu. Drill additional wells in Waipahu-Waiawa and Waimalu
- Assess Public Trust Water Rights for Domestic Use
- Develop seawater desalination in Ewa
- Desalinated reuse in Honolulu, Waianae and Hawaii Kai where wastewater effluent is too salty for irrigation
- Indirect or Direct Potable Reuse with RO desalination and UV/Ozone disinfection

The vulnerability assessment investigated impacts on an island wide and watershed scale



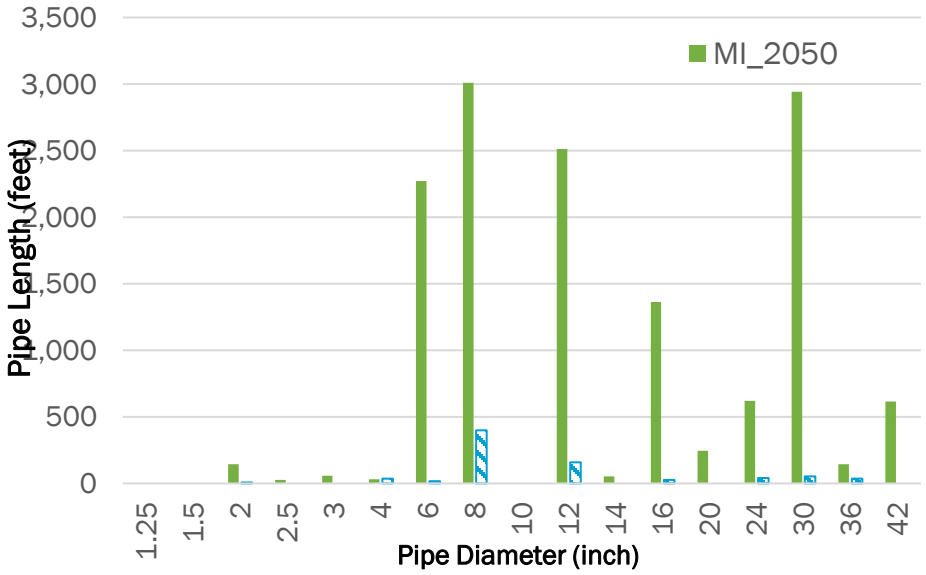
24 Low Elevation/Coastal Pipeline Bridge Crossings in BWS's System may be subject to coastal erosion impacts. BWS Water Master Plan 2016

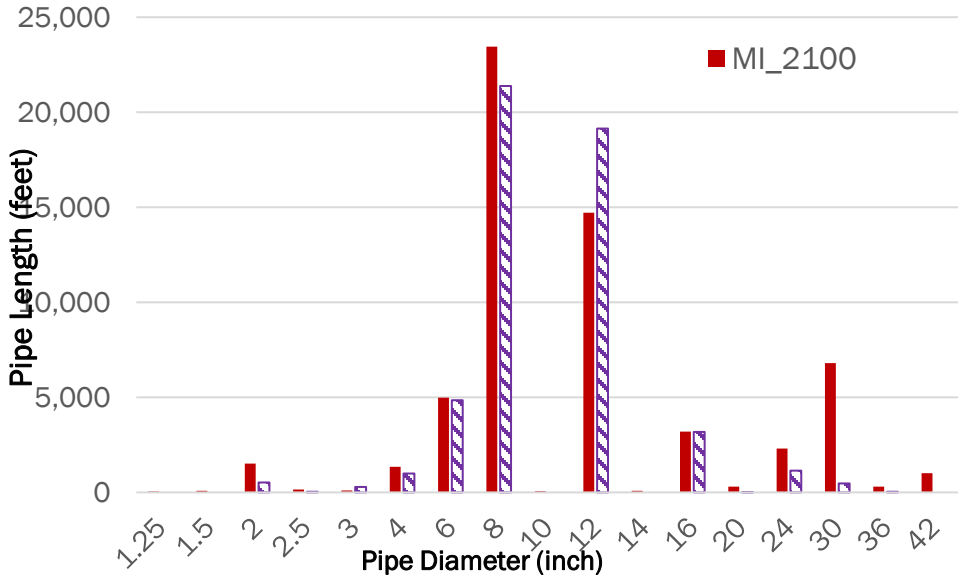
Groundwater and Marine Inundation in Waikiki and Erosion Hazard (brown dotted line) with 3.2 ft of SLR



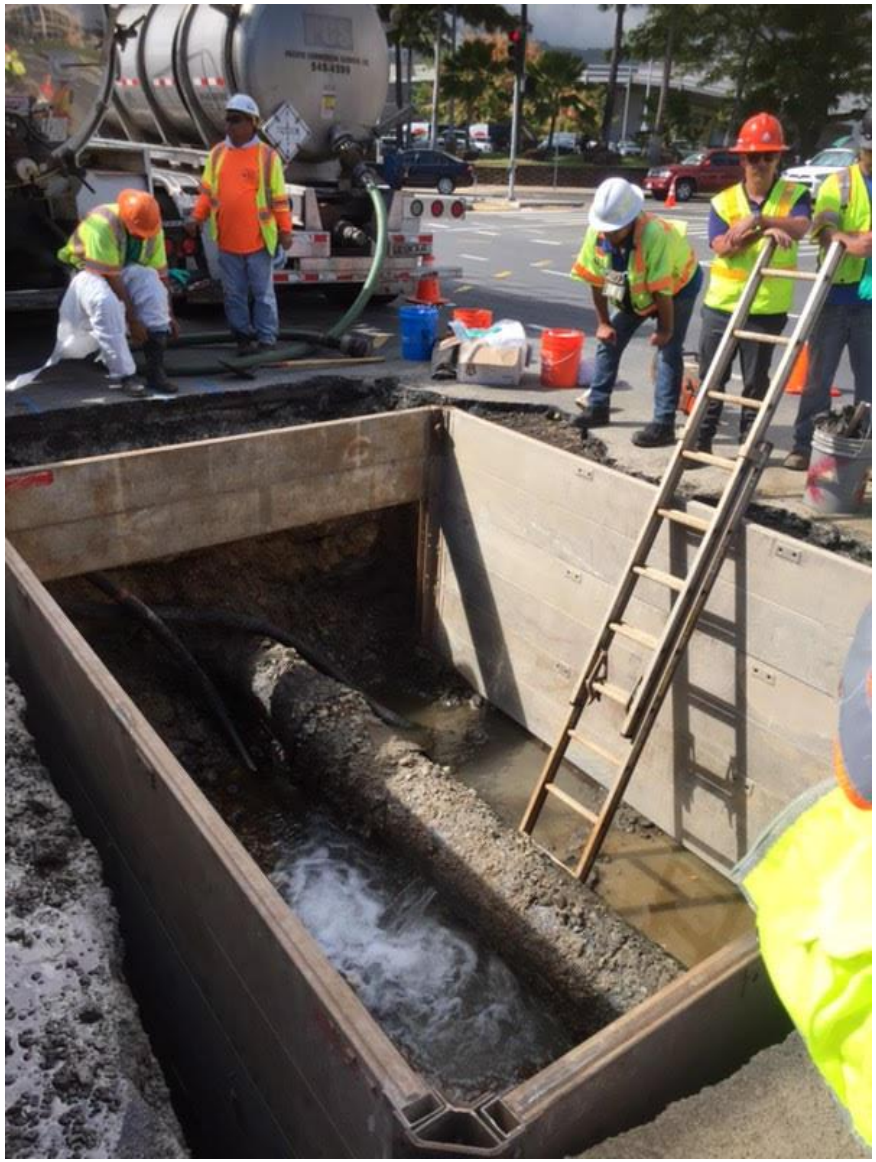
Corrosion impact to metallic pipelines will increase with sea level rise

Pipe Lengths Impacted Island-wide by Hazard (feet)						
Time Period	Year	SLR (feet)	Pipe Length for All Diameters (1.25-inch to 42-inch (feet)		Percent of Total BWS Infrastructure Impacted	
			MI	GWI	MI	GWI
Mid-Century	2050	1	14,038	772	0.1%	0.01%
End-of-Century	2100	3.2	60,409	52,026	0.6%	0.5%





Main Break Repairs will be more challenging with SLR



Nimitz & Alakawa, July 3, 2018, 8:00 am, Lowest high tide of the day. Highest tide 1' higher

$4M FRF Grant to Develop a One Water Plan & Collaboration Framework to Create a Roadmap & CIP Projects for Climate Adaptation & Resilience

- Proactively adapt to climate disruption
- Support, *and inform*, community planning
- Improve infrastructure resilience
- Avoid damages, losses and costs
- Coordinate projects to save money
- Coordinate actions w/ state, federal and private stakeholders

Mahalo!

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