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An aerial photograph showing a residential neighborhood completely inundated with floodwater. Houses and trees are partially submerged, and the streets are completely underwater.

NEW ENGLAND WATER ENVIRONMENT ASSOCIATION
NEWEA
WORKING FOR WATER QUALITY


**Resiliency Planning –
More Important than Ever...**
By Roger Null, HDR

January 26, 2021

The infographic features two water drop shapes. The top drop is blue and labeled 'DRINKING WATER' with a faucet icon above it. The bottom drop is green and labeled 'WASTEWATER' with a sewer pipe icon below it. Both drops contain pie charts showing funding sources.

Category	Funding Source	Percentage
DRINKING WATER	Funded by utility providers or deferred	93%
	GRANTS	7%
	Other	6%
	Other	4%
	Other	2%
WASTEWATER	Funded by utility providers or deferred	92%
	GRANTS	8%
	Other	10%
	Other	6%
	Other	2%

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Introduction

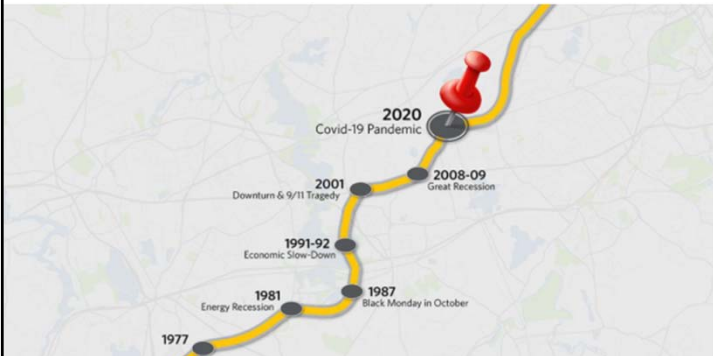

Roger Null, HDR Vice President National Water Infrastructure Planning Practice Lead

- Serves as HDR's Lead for America's Water Infrastructure Act's (AWIA's) Risk and Resiliency Assessments
- Serves on AWWA's Emergency Planning and Security Committee
- 35 years Municipal Engineering and Management Consulting experience
- Specializes in Integrated Planning, Master Planning, Financial Planning, and associated technical services

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Session 4 – Our Theme for Today Utility Management – What a Year!!!

- Today's Topics...
- From Resiliency Planning, to Dealing with Covid19, to Maximizing & Leveraging Technology today and tomorrow
- **Lessons from 2020 - Resiliency Planning – More Important than Ever...**

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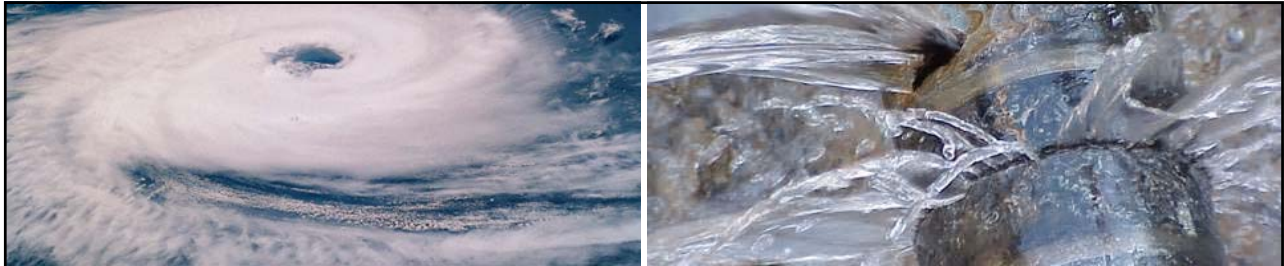
Old Normal... New Normal... Next Normal... Resiliency Planning Sets the Stage for Tomorrow



- What is Resilience?
- How can we improve Resilience?
- Where do we start?
- When is enough, enough?
- How do we decide?
- **For Most Agencies – We Have More Questions than Answers...**



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What is Resilience?

- We define resilience as the capacity for people, communities, buildings and infrastructure to **endure, rapidly respond to and prosper** despite impacts from shocks and stresses. Our goal is to create **dynamic, adaptive systems that protect** human health, economic security and environmental wellbeing.

Prepare.

Protect.

Prosper.



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Resiliency Planning Begins with Understanding the Risk & Resiliency Relationship

RISK

- Effect of uncertainty on objectives (ISO*, 2009).
- An effect is a deviation from expected – either positive or negative.
- *International Organization for Standardization

RESILIENCY

- The ability to reduce the magnitude and/or duration of disruptive events (National Infrastructure Advisory Council (2009)).
- The effectiveness of a resilient infrastructure or enterprise depends upon its ability to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event.

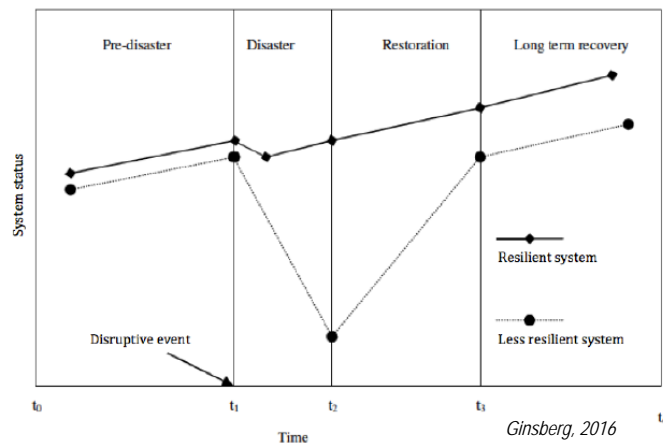


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How do we Improve Resilience? Begin with – Risk and Resiliency Defined

RESILIENCY

- The ability to reduce the magnitude and/or duration of disruptive events
- Resiliency - depends upon its ability to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event.



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The Resilience Framework – A Good Place to Start

A holistic, iterative framework to addressing climate hazards.

An evolution of best practices and lessons learned from previous studies.



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EPA's Integrated Planning Framework Often Provides Additional Benefits

- Prioritized
- Affordable
- Implementable



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Another Approach – ANSI/AWWA J100 Standard for Risk and Resilience Assessments

- Industry Standard for water and wastewater utilities
- Adopted as an ANSI Standard (2010)
- US SAFETY Act Approved
- All-hazards approach
- Provides due diligence

$R = T \times C \times V$

Where:
 R = Risk
 C = Consequence
 V = Vulnerability
 T = Threat Likelihood

ANSI/ASME-ITI/AWWA J100-10
(First Edition)

ASME INNOVATIVE
TECHNOLOGIES
INSTITUTE, LLC

American Water Works
Association

Risk Analysis and Management for Critical
Asset Protection (RAMCAP®) Standard for

Risk and Resilience Management of Water and Wastewater Systems

Using the ASME-ITI
RAMCAP Plus® Methodology



Effective date: July 1, 2010.
 Approved by ASME-ITI Management Committee January 15, 2010.
 Approved by AWWA Board of Directors January 17, 2010.
 Approved by American National Standards Institute May 4, 2010.



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Natural Hazard Vulnerability/Risk Assessment

- Hurricane
- Tornado
- Flooding
- Earthquake
- Wildfire
- Fire
- Erosion/Landslide
- Dam Failure
- Extreme Heat/Algae Blooms
- Drought
- Storms/Lightning/Hail
- Winter Weather
- Animals



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Climate Uncertainty Drives a Need for Climate Driven Resiliency Planning

Not if, when...



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Human-Caused Hazard Vulnerability Risk/Assessment

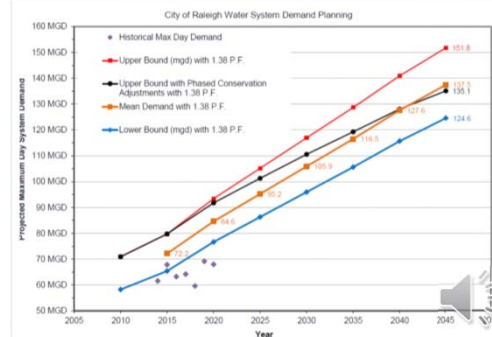
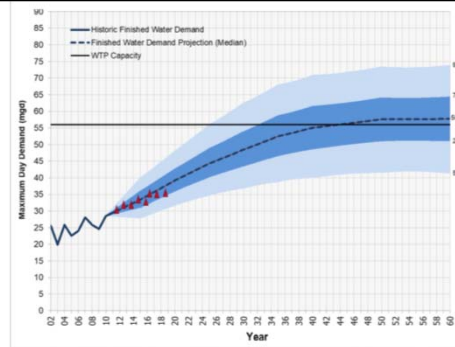
- Vandalism
- Physical Sabotage – Internal & External
- Physical Sabotage - External
- Cyber – Internal & External
- Terrorism
- Contamination – Accidental & Intentional
- Dependency – Loss of Power
- Dependency – Loss of Supply Chain
- Dependency – Loss of Staff
- Dependency – Human Error/Neglect
- Dependency - Loss of Communication
- Transportation Accidents/Incident
- Hazmat Incident
- Proximity Hazard



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Resiliency Planning Forecasting Planning for Uncertainty

- Implementation-based System “Triggers”
- Typical variables to create develop adaptive triggers:
 - Capacity vs. Flow/Demand
 - Regulatory requirements
 - Asset condition/reliability

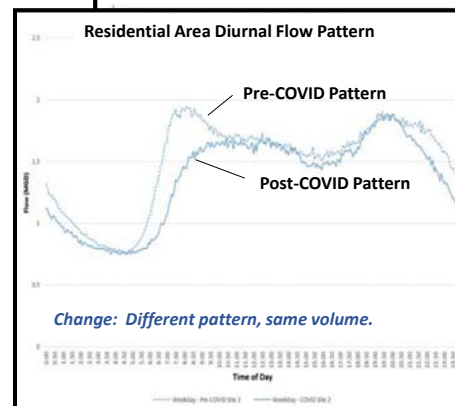
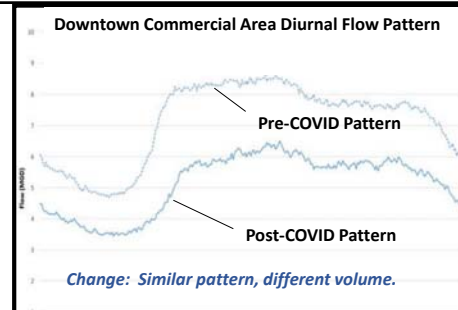


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Resiliency Planning Forecasting What About COVID19?

- Data indicates that Covid19 impacted WW Flows
- Will these findings continue? Is this permanent or temporary? How long?
- Should it be used to inform our Capital Improvement Planning?
- For Most Agencies, the answer is... Manage the risk of uncertainty with Adaptive Planning

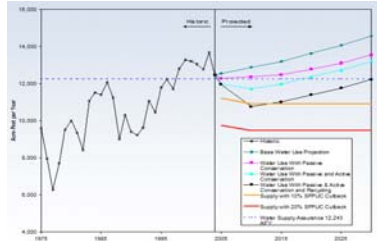
THE GOAL - NO REGRET CAPITAL IMPROVEMENTS



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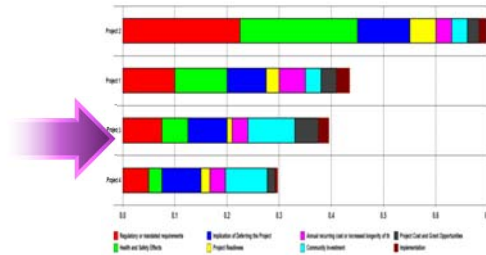
Promoting Resilience Through Multi-Criteria Decision Support Tools and Applied Technology

Incorporate Demand & Supply Management Strategies



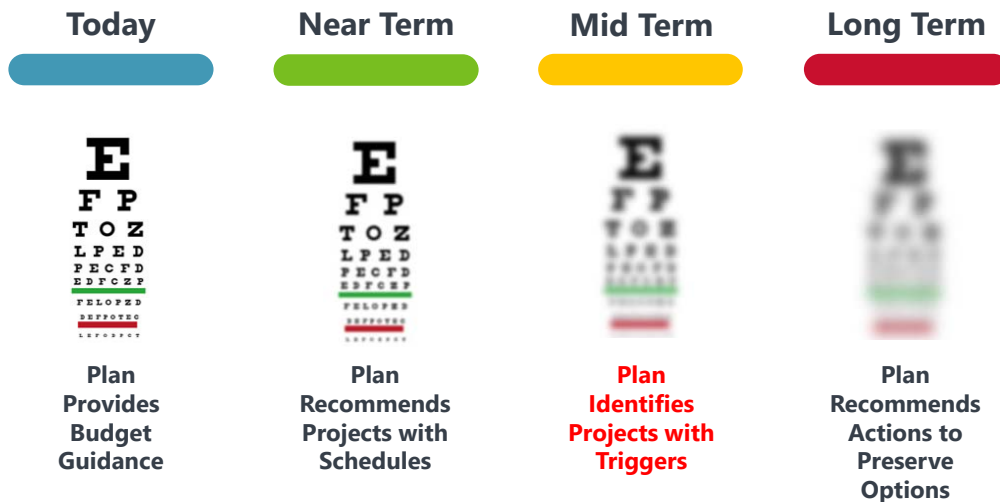
Portfolios will be Developed to Promote Informed Decision Making

Portfolio Evaluation Through Decision Modeling



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Resilience Planning – Adaptive Planning Accounts for Uncertainty Enables Course Correction



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CONCLUSION....

**Balancing Risk, Reliability and
Costs is not an Easy Process**

BUT....

**Like many things in Life,
Working Together
Yields Great Results**



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Questions?

Contact Roger Null at
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