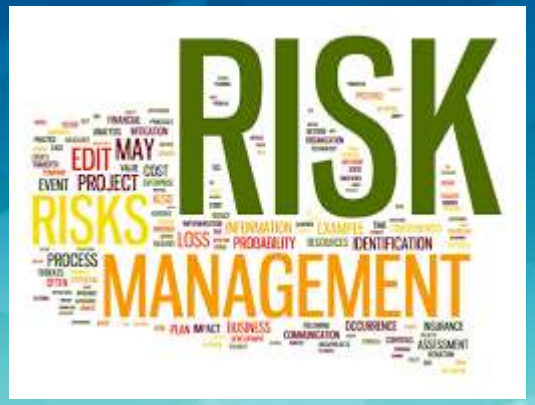
Hazard Mitigation Planning

Risk & Resiliency – Water Supply



Risk Management

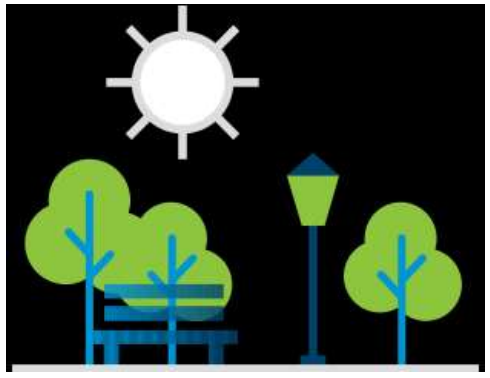
HAZARD MITIGATION PLAN

Presentation for Stakeholder and Public Engagement

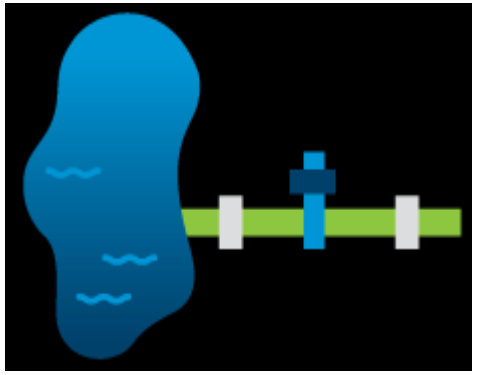
MEETING PURPOSE

- Engage TRWD stakeholders and the public to gather feedback on TRWD's draft Hazard Mitigation Plan
- Document TRWD efforts to align planning efforts and strategic initiatives in **ONE LOCATION**, including:
  - TRWD Strategic Plan
  - Customer Coordination
  - American Water Infrastructure Act (AWIA) Risk and Resilience Assessment
  - Risk Management
  - Emergency Response Planning

FLOOD PROTECTION



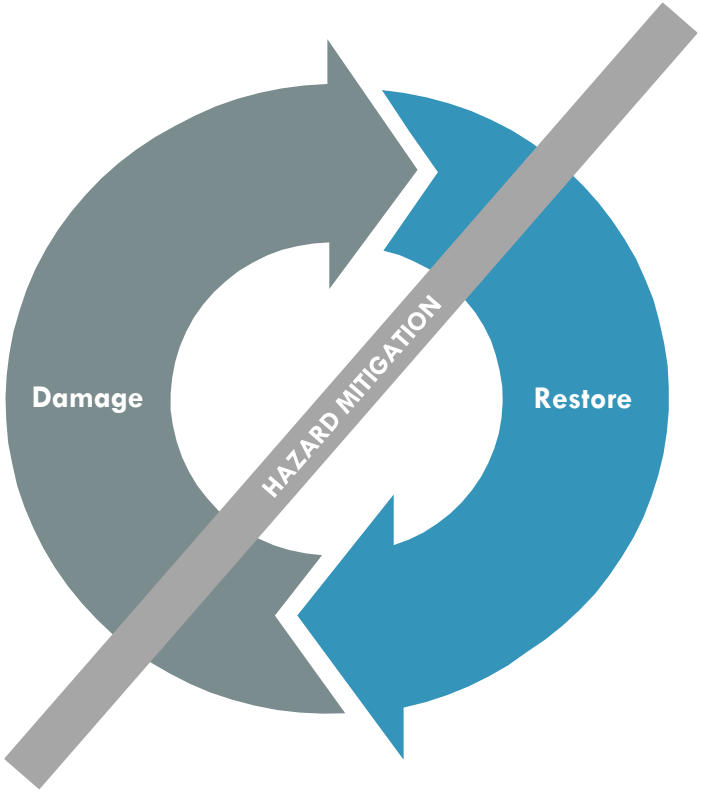
RECREATION



WATER SUPPLY

HAZARD MITIGATION PLANNING CONTEXT

- Hazard mitigation is one of the fundamentals of emergency management.
- It is any sustained action taken to reduce or eliminate the loss of life, property, and infrastructure from natural and man-made hazards.
- Mitigation breaks the cycle of disaster, damage, restoration, and repeated damage.
- Mitigation reduces the financial impact of disasters for governments, businesses and individuals.

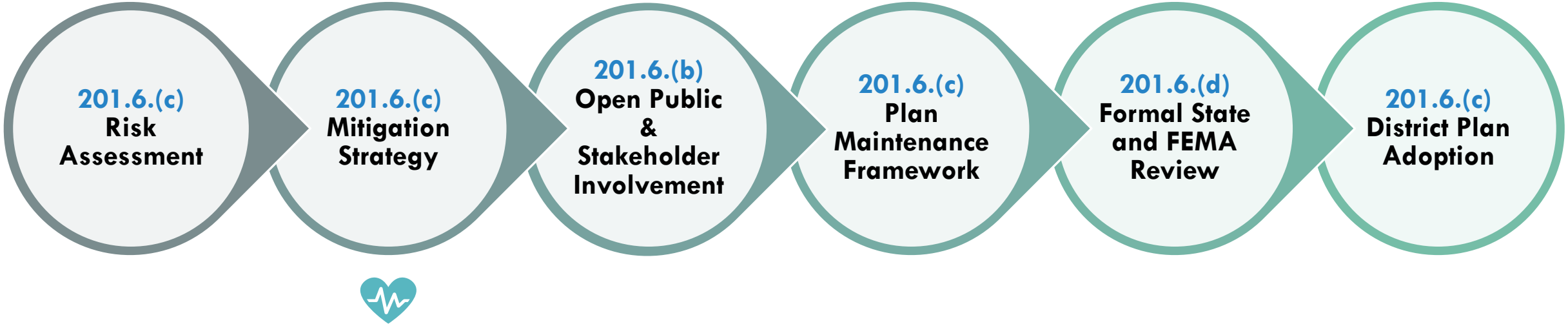


WHAT IS A HAZARD MITIGATION PLAN (HMP)?

FEMA defines the Hazard Mitigation Planning Process and Plan Components in 44 CFR Section 201.6.

The HMP evaluates natural and man-made hazards.

The HMP also develops a strategy to reduce or eliminate impacts.



The heart of the HMP is the Mitigation Strategy.

THE MITIGATION STRATEGY

What long-term outcomes do you want to achieve?

How will you define and organize mitigation actions to connect with goals?

What specific actions will the District and others take to reduce risk to hazards?

How will the action be prioritized and implemented?

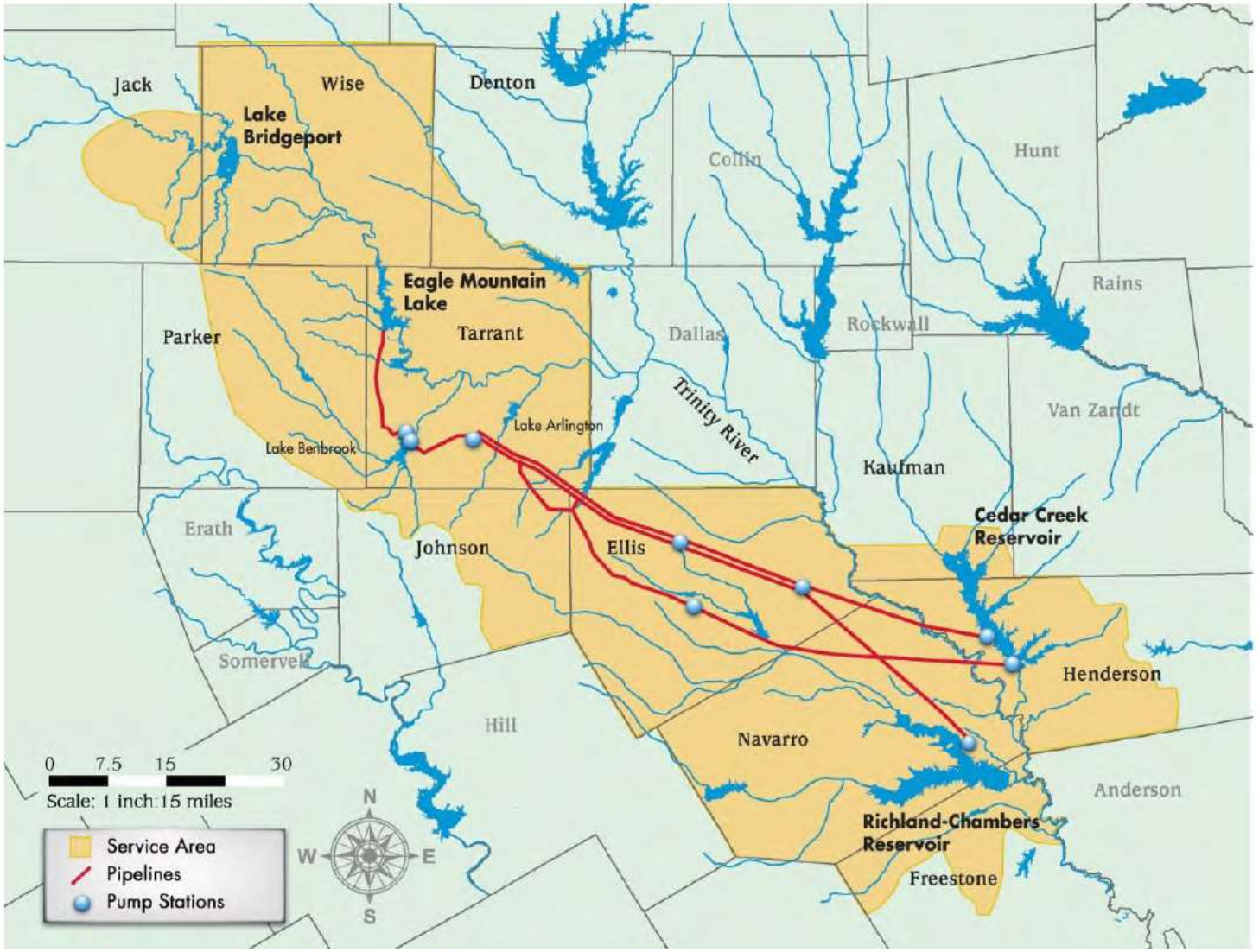
RISK PROFILES AND MITIGATION STRATEGIES

HAZARD MITIGATION PLANNING CONTEXT

Hazard mitigation is an integral part of TWRD's core mission:

- Deliver a reliable, resilient supply of water to the public at the lowest cost and highest quality possible.
- Reduce the risk of flooding in our communities with dependable flood damage reduction infrastructure and operations.
- Enhance the quality of life in North Texas communities by creating recreation opportunities around TRWD infrastructure to enable active lifestyles.

TRWD SERVICE AREA



HAZARDS AND THREATS EVALUATED

Natural & Dependency Hazards: Review Risk & Mitigation

- Drought
- Floods and Flash Floods
- Invasive Species
- Pandemic
- Severe Winter Weather
- Tornado
- Wildfire
- Climate Change

Man-Made Hazards and Dependency Hazards: Review Mitigation

- Malevolent Threats
  - Physical Security
  - Cyber Security
- Dependency Hazards
  - Loss of Fuel
  - Loss of Chemicals
- Proximity Hazards
  - Hazardous Materials
  - Railway, Roadway, Bridge Crossings
- Accidental Hazards
  - Dam / Asset Failure

METHODOLOGY FOR CALCULATING RISK

$$R = T_L \times V \times C$$

- R is annual risk in $
- T_L is annual threat likelihood (frequency)
- V is vulnerability
- C is consequence in $

The equation is from the EPA recommended J100 methodology, tailored to water utilities

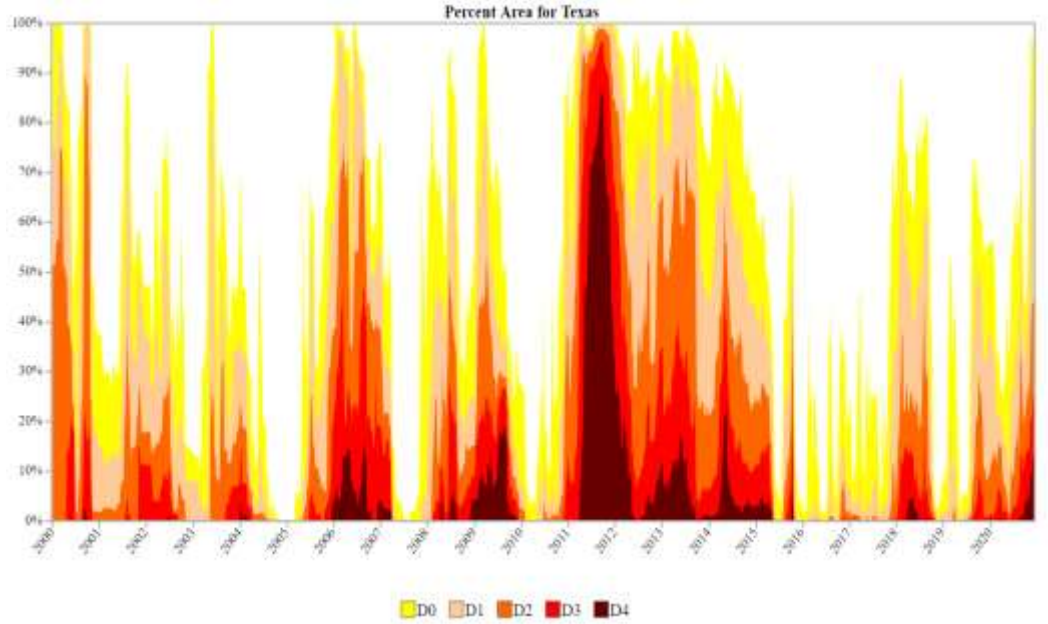
DROUGHT

Droughts are defined as “a period of drier-than-normal conditions that result in water-related problems.” Drought can result from a lack of precipitation and over time can reduce soil moisture and surface water supply.

High **Risk**

Risk Reasoning

- Droughts are likely and small droughts have increased in frequency since 1996.
- The Integrated Pipeline, regional coordination efforts, and TRWD’s Water Conservation and Drought Contingency Plan has reduced drought vulnerability.
- Regional economic effects of drought can be high, particularly for agricultural industries.
- Climate change is expected to increase frequency and curation of droughts.



State of Texas Drought Years

DROUGHT MITIGATION STRATEGY

Goal

Reduce risk of extreme and exceptional drought that impacts the District's ability to meet 275 MGD. This is the minimum supply needed for health, safety, and fire suppression.

Aligned with the District's AWIA Risk and Resilience Assessment

Objectives

Introduce diversity and redundancy into the water supply and delivery system that allows for increased resilience and operational flexibility.

Optimize IPL operations to minimize cost and ensure reservoirs have supply after an extreme or exceptional drought, defined by the 1,000-year climactic record.

Explore the best utilization of existing TRWD assets within the water supply system.

Aligned with the District's Strategic Plan

FLOODS AND FLASH FLOODS

Flooding is a "general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland or tidal waters, or the rapid accumulation of runoff from surface waters of any source."

Moderate **Risk**

Risk Reasoning

- Flood control in Fort Worth is a major component of TRWD's mission
- A flood event is very likely to occur in the District's service area. Between 2 and 37 flood/flash flood days have occurred every year for the past 25 years.
- Vulnerability is low due to Lake Bridgeport, Eagle Mountain Lake, and 27 miles of levees operated and maintained by TRWD.
- Consequences of flooding are moderate overall because of existing flood control services and development policies.

FLOODS AND FLASH FLOODS MITIGATION STRATEGY

Goal

Minimize flooding in regional communities with dependable flood damage reduction infrastructure and operations.

Aligned with the District's Mission

Objectives

Further TRWD's flood control mission through regional partnerships.

Aligned with the District's Strategic Plan

Use the current asset management program to ensure responsible management of the TRWD floodway system.

Aligned with the District's Strategic Plan

INVASIVE SPECIES

Invasive aquatic species include “fish, shellfish, and aquatic plants that are not native to Texas and compete with native animals and plants for food and space. Because they lack natural enemies, they multiply and spread at alarming rates.”

Moderate **Risk**

Zebra Mussels currently impact Eagle Mountain Lake and the Richland Chambers Reservoir

Risk Reasoning

- Species of interest that can infest lakes, reservoirs, and pipelines: zebra/quagga mussels, giant Salvinia, water hyacinth, and hydrilla
- TRWD’s Zebra Mussel Control Strategy reduces the ability for such species to use pipelines to travel and populate different lakes.
- Consequences of invasive species infestation is high and impacts TRWD’s ability to meet water supply needs in a cost-effective manner.

INVASIVE SPECIES MITIGATION STRATEGY

Goal

Prevent infestation of zebra mussels at all reservoirs and pipelines.

Aligned with the District's AWIA Risk and Resilience Assessment

Objectives

Monitor zebra mussel population in all reservoirs to prevent degradation of water quality and conveyance.

Aligned with the District's AWIA Risk and Resilience Assessment.

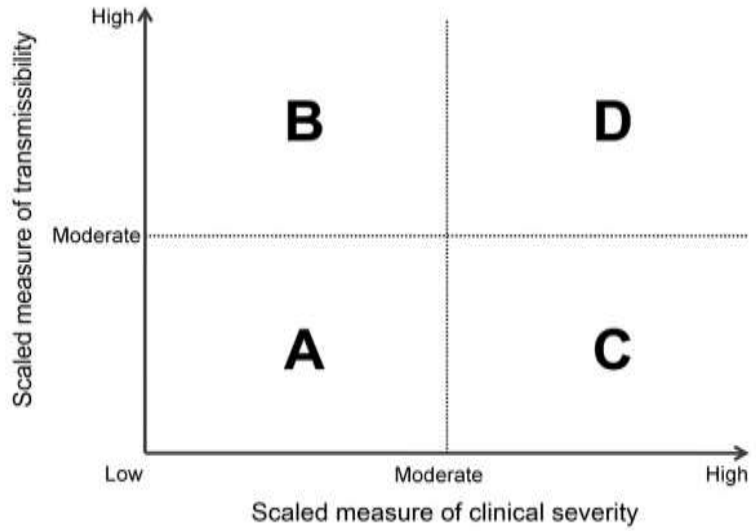
Explore innovative technology and policy mechanisms to reduce existing zebra mussel populations.

Aligned with the District's AWIA Risk and Resilience Assessment.

PANDEMICS

Infectious pandemics can occur when new viruses emerge, infecting people easily and spreading in a swift and sustained manner.

Moderate **Risk**



CDC Framework for Assessing Pandemics

Risk Reasoning

- Pandemic likelihood is increasing due to globalization and population growth. For example, the COVID-19 pandemic has infected over 100 million people globally.
- TRWD provides essential water services that are critical during a pandemic to protect public health.
- TRWD's business continuity process for pandemics includes implementing remote working, closing offices to the public, and increasing the frequency of cleaning and disinfecting equipment.

PANDEMIC MITIGATION STRATEGY

Goal

Maintain critical functions and operations during a pandemic.

Objectives

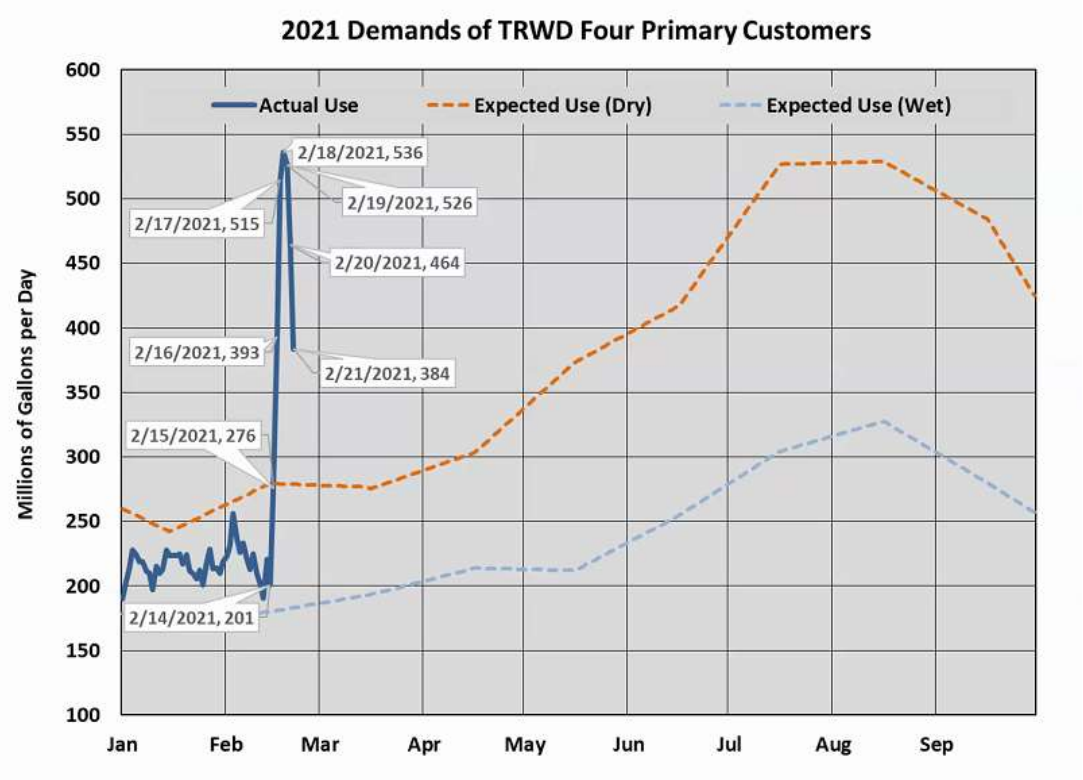
Staff all positions appropriately to meet daily operational requirements.

Implement work shifts and CDC recommendations to protect essential workers.

SEVERE WINTER WEATHER

A winter storm is a combination of heavy snow, blowing snow, and/or dangerous wind chills. TRWD's service area is impacted by hail, consecutive days of freezing temperatures, and snow.

Moderate **Risk**



Risk Reasoning

- Winter Storm Uri was a severe winter storm that spread show and ice, followed by the coldest temperatures in decades in the south-central states.
- Gravity flow is limited and cannot meet service area water needs for a long-duration power outage.
- TRWD has diversified power sources; the IPL system is on a separate power grid to increase reliability.
- Cold weather events can cause pipe and valve bursts, potentially resulting in lower pressure, water loss, service disruption, and/or boil water notices.

SEVERE WINTER WEATHER MITIGATION STRATEGY

Goal

Continue TRWD water supply operations during and after a severe winter weather event.

Aligned with the District's AWIA Risk and Resilience Assessment

Objectives

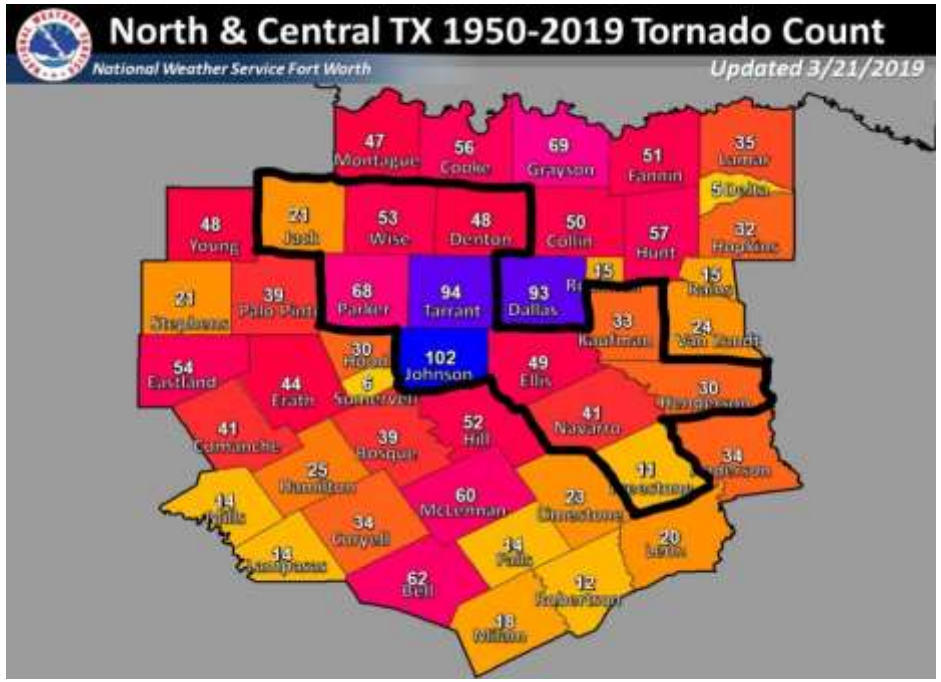
Improve the winterization of critical equipment and supplies (e.g. fuel supply).

Coordinate with TRWD customers to discuss water demand management during winter months.

TORNADOS

Tornados are “narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground.” They originate from thunderstorms and can occur anywhere at any time.

Low **Risk**

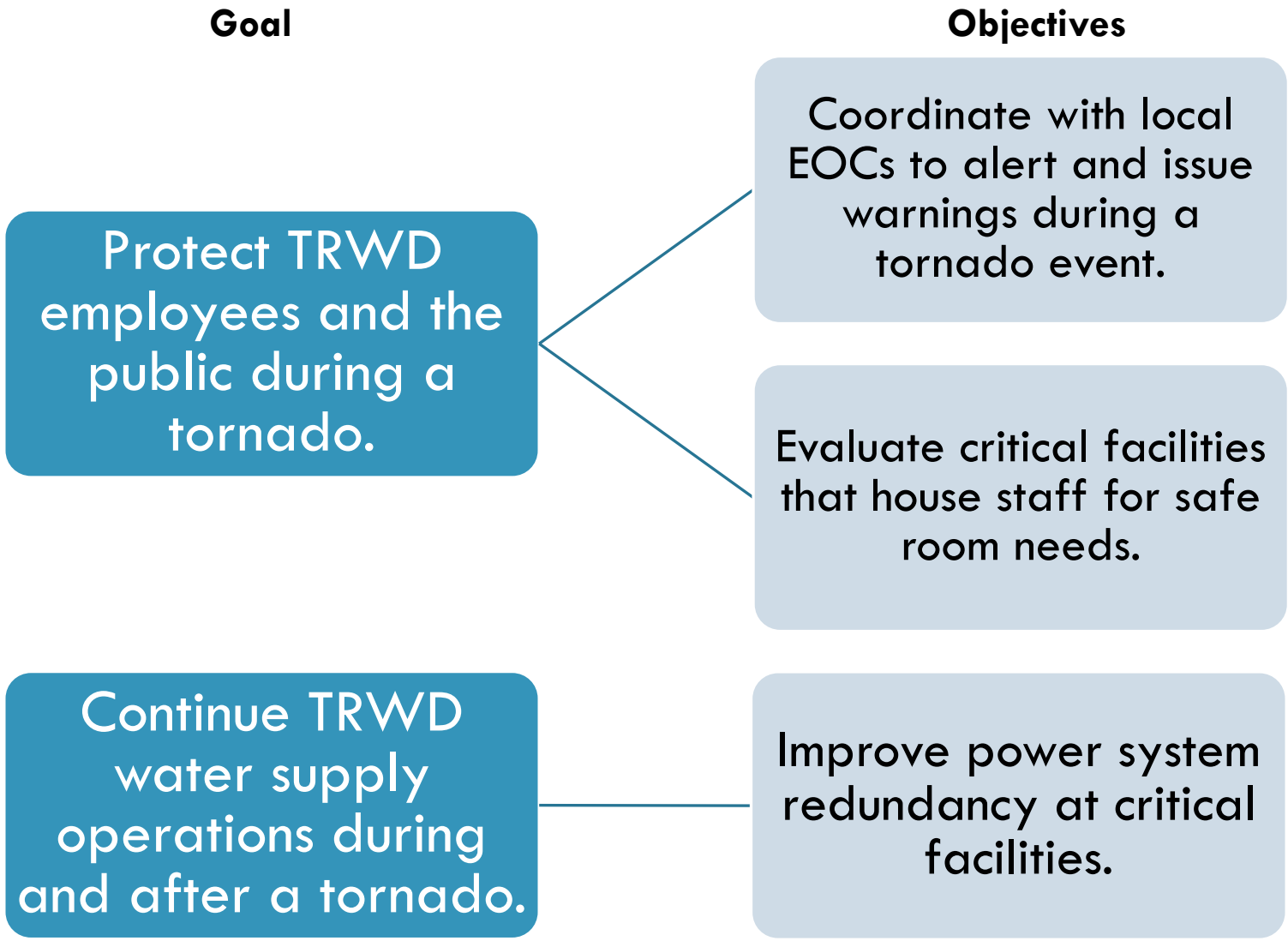


Tornados within TRWD’s service are from 1950-2019

Risk Reasoning

- North Texas is within Tornado Alley, an area with the strongest and more violent tornados.
- The probability that a tornado will impact a TRWD critical asset is very low and water supply and flood protection services have not historically been impacted.
- Some TRWD assets are relatively hardened/protected against strong winds, due to system redundancy, buried pipes, and steel/concrete building materials.

TORNADOS MITIGATION STRATEGY



WILDFIRE

A wildfire is an uncontrolled fire that occurs in forest wildland or brush covered areas. They can result from a variety of ignition sources including natural causes, such as wind and lightning, or anthropogenic sources like arson and debris burning.

Low **Risk**

Texas A&M Wildfire Response

Risk Reasoning

- There have been 76 wildfires in the TRWD service area in the last 25 years, though none have historically impacted water supply and flood protection services.
- Debris, ash, and other wildfire bi-products could enter the watershed and impact water quality at reservoirs, placing greater strain on water treatment plants.
- Due to system redundancy, TRWD could divert water from other water sources.

WILDFIRE MITIGATION STRATEGY

Goal

Reduce impacts of wildfire on water quality by increasing water sampling and customer coordination

Objectives

Leverage available system redundancy and shift production to other reservoirs to minimize water quality impacts if water quality is compromised.

Contribute to fire suppression efforts via ongoing maintenance and mutual aid efforts.

MALEVOLENT THREATS MITIGATION STRATEGY

Goal

Prevent and promote preparedness for physical threats inside and outside the District's facilities.

Aligned with the District's AWIA Risk and Resilience Assessment

Objectives

Improve physical security at District facilities to prevent threats.

Reduce the potential for cyber attacks that affect business continuity, finance, and IT.

Aligned with the District's AWIA Risk and Resilience Assessment

Evaluate existing security operations, including internal roles, polices, and procedures, to increase physical and cyber security.

Improve manual operations typically driven by Finance and IT.

Aligned with the District's AWIA Risk and Resilience Assessment

DEPENDENCY HAZARDS MITIGATION STRATEGY

Goal

Prevent or minimize loss of power, fuel, and chemicals during natural disasters or events that would impact TRWD's core service offerings.

Objectives

Incorporate redundancy in the District's power and communication systems, particularly at critical facilities.

Use existing asset management program to document and itemize critical spare parts.

PROXIMITY HAZARDS MITIGATION STRATEGY

Goal

Minimize exposure and risk of proximity hazards on TRWD personnel, infrastructure, and water supply availability and quality.

Objectives

Identify and quantify agricultural and industrial chemical hazards within the watershed on an ongoing basis.

Identify and quantify HazMat facilities within a 1-mile radius of critical TRWD reservoirs, horizontal, and vertical assets on an ongoing basis.

ACCIDENTAL HAZARDS MITIGATION STRATEGY

Goal

Minimize the possibility of asset failure resulting from design flaws, neglect, and acts of nature.

Aligned with the District's Strategic Plan

Objectives

- Continue asset management programs, including condition assessment and proactive/preventative maintenance on all asset classes.
- Continue annual and 5-year dam safety inspections and awareness trainings.
- Continue annual levee inspections in coordination with the Army Corp of Engineers.

INPUT REQUESTED

- Have we accurately captured the natural and man-made hazards affecting our area and their consequences (e.g., damage and disruption of service)?
- Are we missing important hazards and risks you would like to see addressed?
- Do the mitigation strategies and goals adequately respond to the hazards?
- Are there opportunities to align with your organization's objectives?

Please provide feedback through the TRWD Hazard Mitigation Plan Review Survey

Survey Link:
https://www.surveymonkey.com/r/LXVYQ8M

The survey will be open until May 30, 2021

For further questions, contact Norman Ashton at norman.ashton@trwd.com

Visit trwd.com for more details

THANK YOU!

trwd Tarrant Regional Water District