

Building Resilience in the Water Sector

Kevin Morley, PhD
Senior Manager, Federal Relations
American Water Works Association

AWWA RISK & RESILIENCE RESOURCE SUITE





ANSI/AWWA G440-11:
Emergency Preparedness Practices

Requirements:

4.1 Explicit Commitment to Emergency Preparedness
4.2 Preparedness Culture
4.3 Defined Preparedness Roles & Employee Expectations
4.3 Risk Assessment
4.4 Preparedness Plans
4.5 Internal and External Communications
4.6 Training
4.7 **Partnerships**
5.0 Verification

Prepare for the *effect*, do not manage the cause



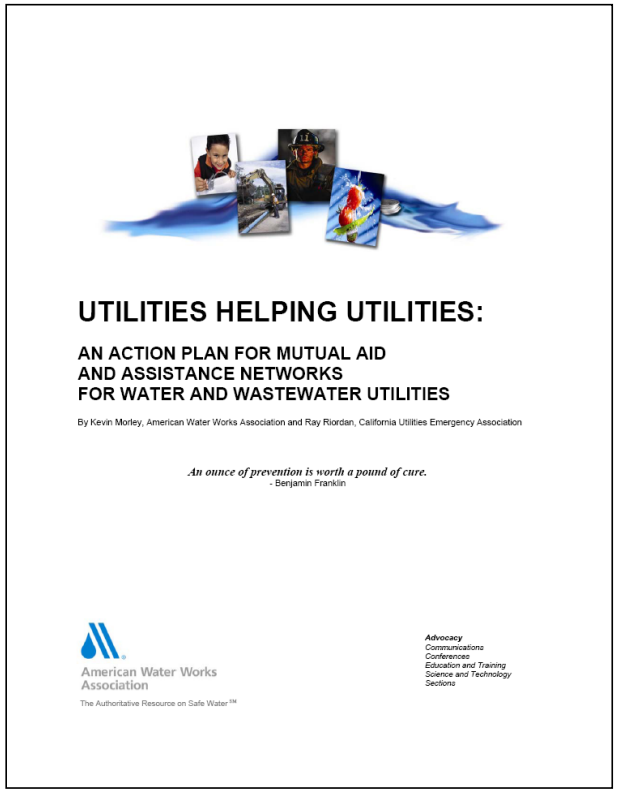
Partnerships – Utilities Helping Utilities



- **CalWARN (1992)** - Based on the 1991 East Bay Hills Firestorm, CalOES established the East Bay Hills Firestorm Blue Ribbon Panel whose report recommended establishment of a mutual aid program for water.
- **FlaWARN (2005)** – Established in response to impacts on multiple water system in 2004 hurricane season (Charlie, Frances, Jeanne, and Ivan) based on a CalWARN presentation at ACE24.
- Then in 2005 Katrina & Rita battered the Gulf Coast.

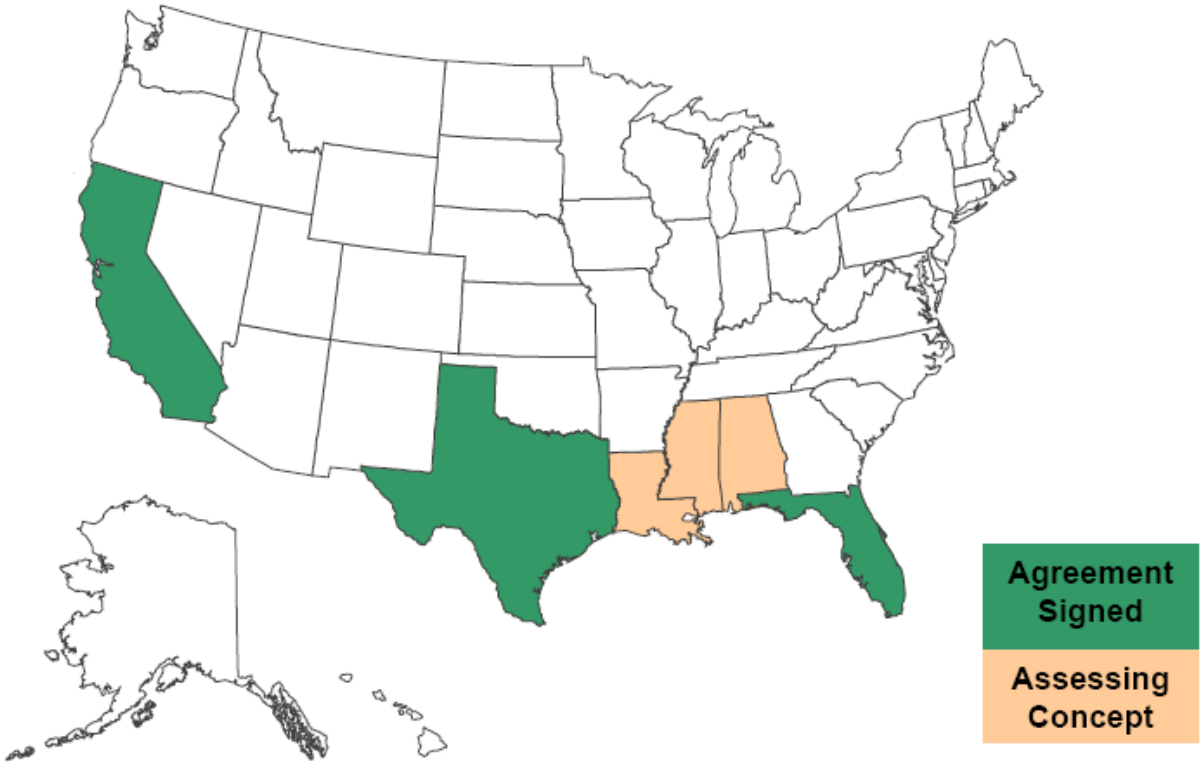
The WARN Action Plan - March 2006

- **WARN Agreement**
  - Voluntary
  - No Obligation
  - No cost to join
  - Liability/Workman's Comp
  - Reimbursement process
  - Element of NIMS
  - All-Hazards



www.NationalWARN.org

The Beginning (April 2006)



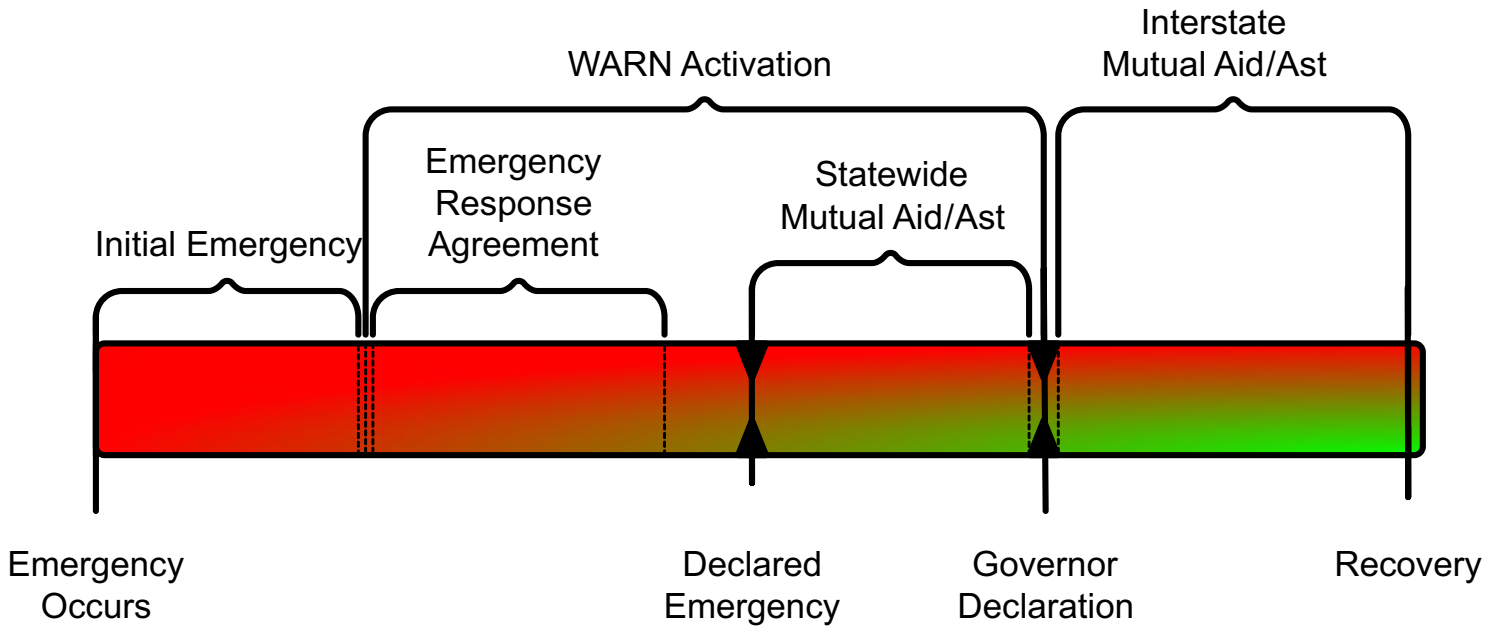
WATER /WASTEWATER AGENCY RESPONSE NETWORK

Today



WARN Bridges the Gap

- **WARN does not require state or federal declaration AND includes private utility resources.**



Kentucky 2022 Flood Example

Who Deployed?

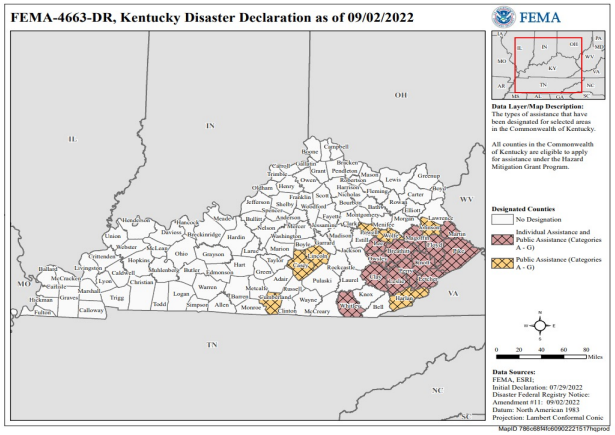
1. Ashland Water Works
2. Barbourville Water and Electric
3. Bowling Green Municipal Utilities
4. Cannonsburg Water District
5. City of Madisonville
6. City of Nicholasville
7. Corbin City Utilities Commission
8. Danville City Water Works
9. Frankfort Plant Board
10. Georgetown Municipal Water & Sewer
11. Hardin County Water District No. 2
12. Hyden-Leslie Co. Water District
13. Jackson County Water Association
14. LaGrange Utilities Commission
15. Laurel County Water District #2
16. London Utility Commission
17. Louisville Water Company
18. McCreary County Water District
19. Morehead Utility Plant Board
20. Morgan Co. Water District
21. Oldham Co. Water District
22. Owensboro Municipal Utilities
23. Owensboro Regional Water Resource Agency
24. Paintsville City Utilities
25. Prestonsburg City Utilities Commission

Who Got Help?

1. Letcher Co. WD
2. Knott Co WSD
3. Hindman
4. Hazard
5. Fleming-Neon
6. Breathitt Co. WD

What was Done?

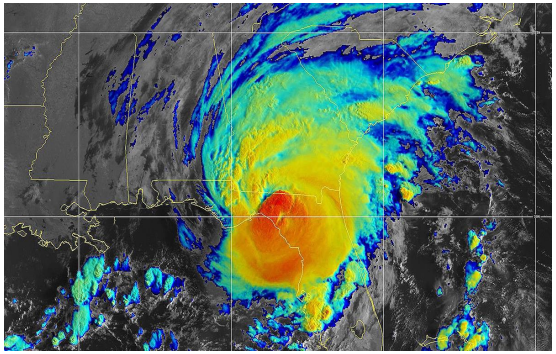
a. Damage Assessment
b. Cover Exposed Line
c. Repair / Replace Water Main
d. Repressurize Distribution System
e. Repair / Replace Customer Service
f. Sewer Line Jetting
g. Sewer Hydrovac
h. Provided Pipe & Repair Material
i. Provided Equipment

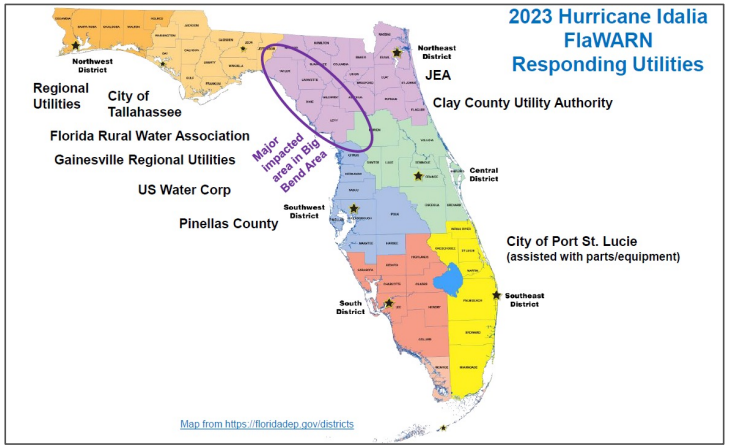


FlaWARN in Action - August 2023

- Hurricane Idalia
- Big Bend area most heavily impacted
- Generators, distribution repair teams



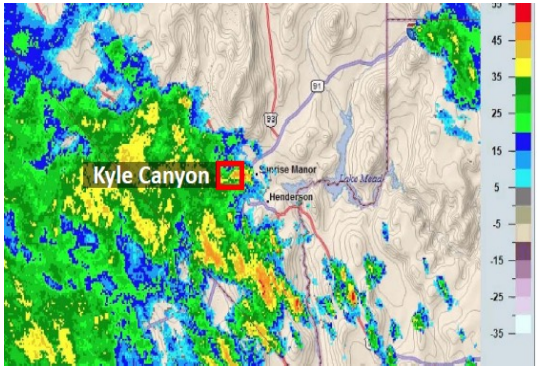




Images Courtesy of Kevin Carter, FlaWARN Chair (Broward County)

NVWARN in Action – Sept 2023

- TS Hilary flooding in Kyle Canyon
- Over 6 feet of soil displacement
- Emergency water, ROW issues, pipe repairs













Images Courtesy of Corey Ross, NVWARN Chair (LVVWD)

NCWaterWARN in Action – Sept 2024

- ***Crews from 16 utilities & NCRWA supporting 17 systems***
  57 missions completed
- Coordinated with FEMA, USEPA, USACE and State ongoing
- DC Water deployed Incident Management Team via EMAC
- September 30 to November 2 amount to **1,824 hours**

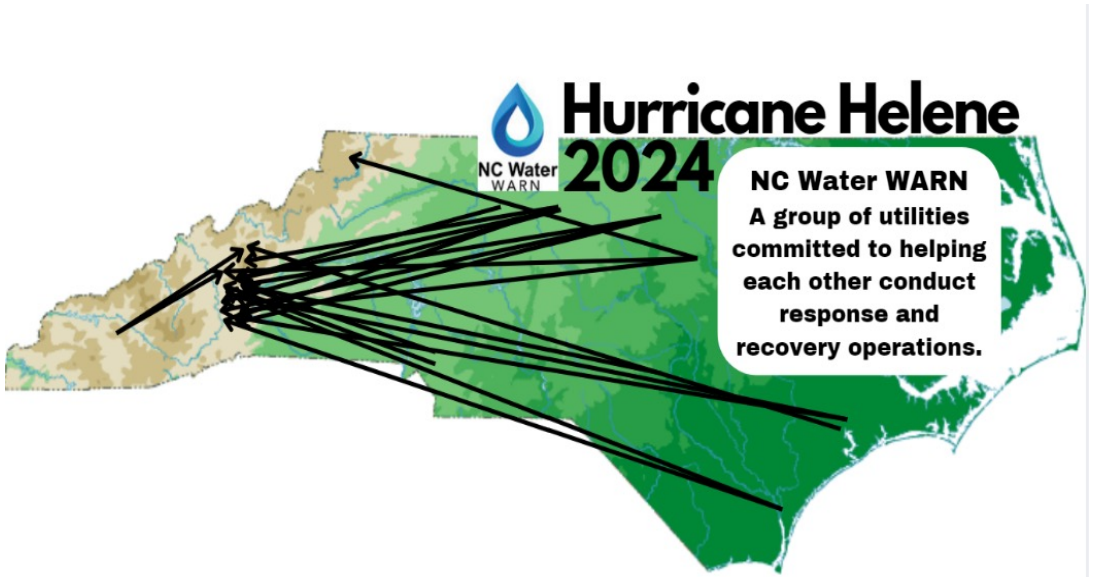


Image courtesy of Tara Arnette, CFPUA

Examples of WARN in Action

CalWARN
- Northridge Earthquake, 1994
- El Nino Storms, 1998
- Sonora Fires, 2001
- Southern California Fires, 2007
- Baja Earthquake, 2010
- Napa Earthquake, 2014
- Wildfires, 2015, 2018, 2021
- Hurricane Hilary, 2023
- LA Area Wildfire, 2025

UTWARN
- Diesel Fuel Contamination 2015

FlaWARN
- Hurricane Katrina, Wilma & Rita, 2005
- Tornadoes, 2007
- Hurricane Irma, 2017
- Hurricane Michael, 2018
- Hurricane Ian, 2022
- Hurricane Idalia, 2023
- Hurricane Helene & Milton, 2024
- Hurricane Isaias, 2026

NYWARN, NJWARN, PAWARN, MAWARN
- Hurricane Sandy, 2012

PAWARN
- Hurricane Irene, 2011
- Mt. Laurel Emergency, 2022

IDWARN
- Power Outage, 2015

NVWARN
- Wildfires, 2021
- TS Hilary, 2023

NCWaterWARN
- Hurricane Irene, 2011
- Hurricane Florence, 2018
- Hurricane Helene, 2024

KYWARN
- Hazard County Floods, 2022

VTWARN
- Flooding, 2023

IAWARN
- Tornado, 2025

SCWARN
- Hurricane Joaquin Flooding, 2015

TxWARN
- Hurricane Humberto, 2007
- Hurricane Dolly & Ike, 2008
- Drought, 2012
- Hurricane Harvey, 2017
- Winter Storm Uri, 2021

CoWARN
- Salmonella outbreak, 2008
- Flooding, 2013

TNWARN, INWARN, KYWARN
- Ice Storm, 2009

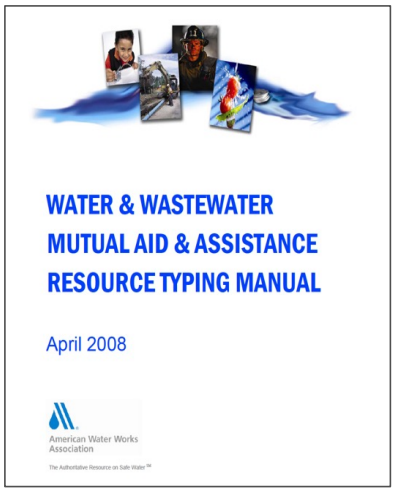
IAWARN, MNWARN
- Flooding 2010, 2011, 2014

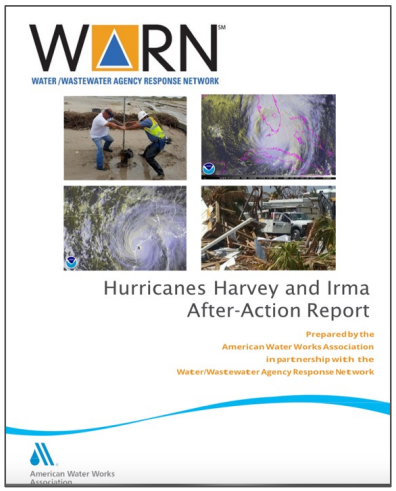
SDWARN
- Missouri River Flood, 2011
- City of Bison Water Outage, 2012

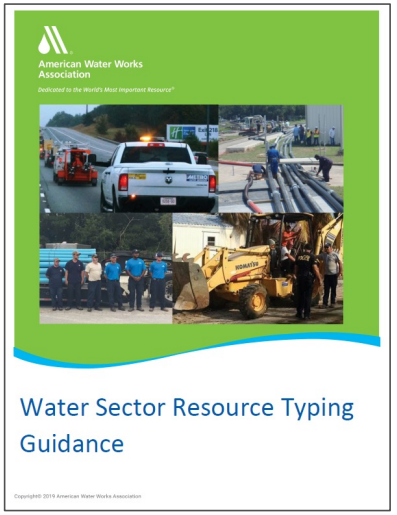


MAKING WARN WORK

- Resource Typing expedites mutual aid and assistance
- Supports Emergency Response provisions in AWIA §2013 calling on utility to identify *actions, procedures, and equipment that can obviate or lessen impact*
- **MOU with FEMA to manage and develop Water Sector Resource Typing**







Kevin M. Morley, PhD

Senior Manager, Federal Relations

AWWA – Government Affairs

kmorley@awwa.org

www.awwa.org/risk-resilience

www.NationalWARN.org

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