

# **OPTIMIZING COMMUNITY & BUSINESS RESILIENCE: PREPARING FOR NATURAL DISASTERS BY PRACTICING POLLUTION PREVENTION**

## **U.S. EPA REGION 1 - 2018**

Mary Dever-Putnam

U.S. Environmental Protection Agency

Region 1

Assistance & Pollution Prevention  
Office

# COVERED IN THIS PRESENTATION:

---

**Flooding Events** -- reminders of the ever-present threat of floods, flash floods and devastating impacts that come with such events

---

**Pollution Prevention** -- a common sense approach to preparing for natural disasters & resiliency planning

---

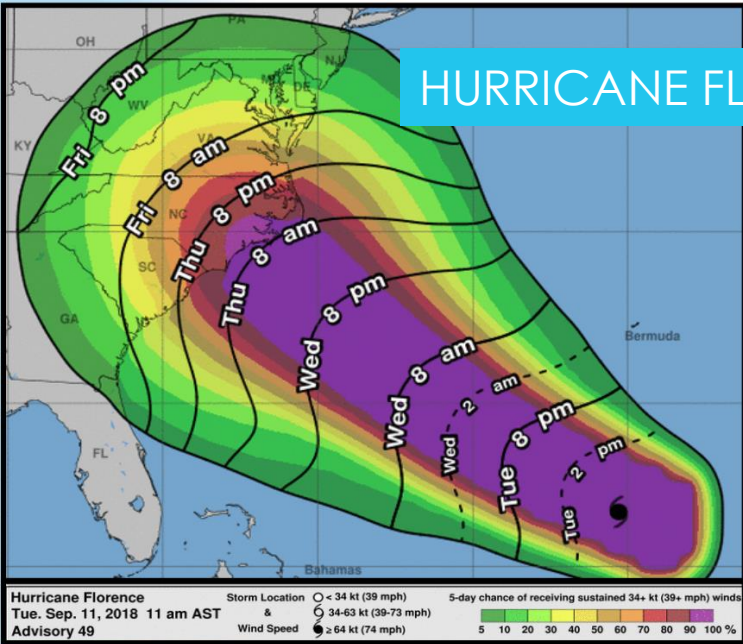
**Compliance with Environmental Regulations** -- intended to prevent risks to human health & the environment

---

**Resources** – where you can begin your planning or where you can get info to update your plans



# HURRICANE FLORENCE - Sept 2018



Source: Jason Miczek, Reuters

Source: National Weather Service

# HURRICANE MICHAEL - Oct 2018



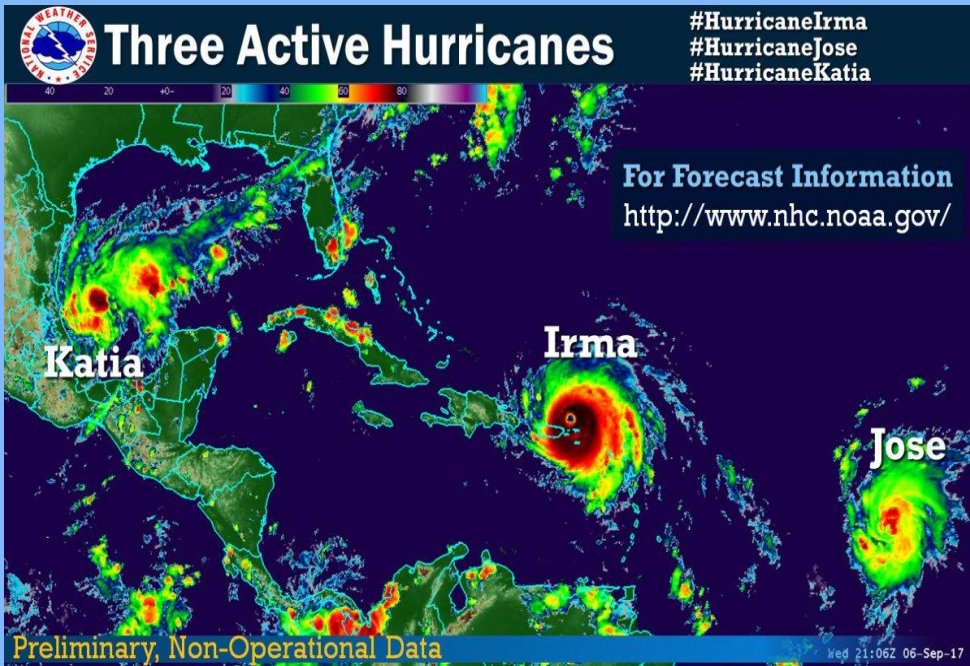
Source: NOAA NHC

Source: The Associated Press





# 2017 HURRICANE SEASON

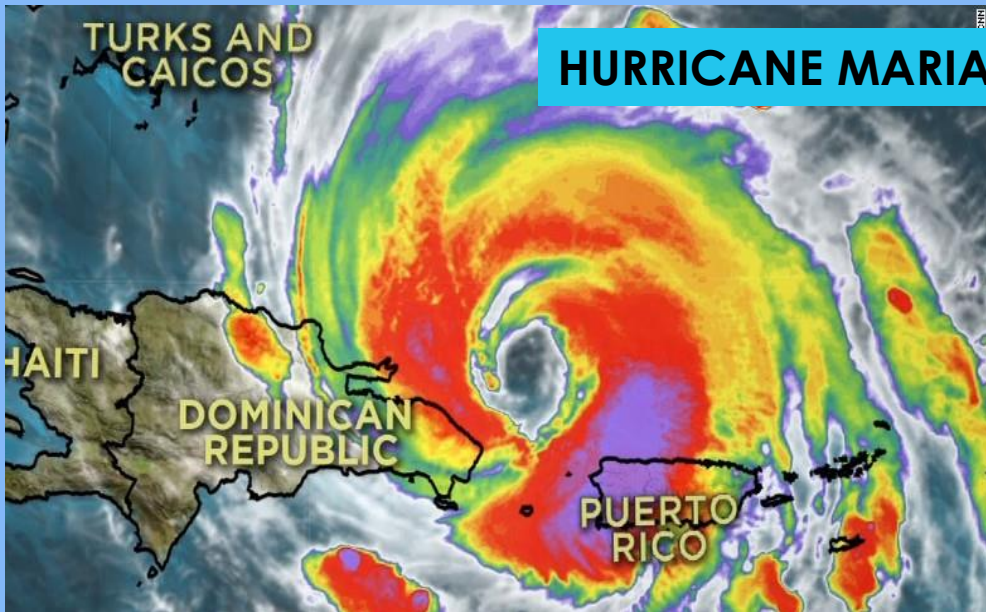


Irma: \$52B,  
97 deaths

Harvey: \$128B,  
89 deaths

Maria: \$92B,  
2981 deaths

Excerpted data from National Hurricane Center





# Hurricane Harvey: Houston's Floodwaters Are Tainted, Testing Shows

By SHEILA KAPLAN and JACK HEALY SEPT. 11, 2017 – [www.nytimes.com](http://www.nytimes.com)



Reduce chemical inventory, store properly, use less toxic materials to avoid creating toxic soup during storm events

Dr. Winifred Hamilton, director of the Environmental Health Service at the Baylor College of Medicine, collected water samples for testing in a flooded Houston neighborhood



# “Harvey Likely to Weigh on Houston’s Commercial Property Market for Months”

*City’s office market was already hurting from slump in energy sector – Esther Fung 08/30/17, wsj.com*



Businesses and cars are flooded near the Addicks Reservoir in Houston as floodwaters continue to rise Tuesday.

*PHOTO SOURCE: DAVID J. PHILLIP/ASSOCIATED PRESS*

# Historic Flooding Events in MA

**The Great Flood of 1936:** Devastating floods to much of the Bay State, particularly across the Merrimack and Connecticut valleys – **snow and ice melting.**

**The Great New England Hurricane of 1938:** Produced destructive storm surge over south coastal Massachusetts and Cape Cod. **Sections of Falmouth and New Bedford were submerged under as much as 8 feet of water.**

**1955 Floods from Connie and Diane:** 2 tropical storms converge in August; strong intense rainfall on saturated soil led to rapid rise of rivers. The rivers on coastal eastern MA (the Charles, Taunton, and Neponset) experienced dramatic, rapid rises. Rise of Blackstone and Thames Rivers south of Worcester led to many dam breaks, produced significant flooding and destruction downstream. In Connecticut River Valley, most significant floods from Chicopee and Westfield Rivers.



*The Connecticut River produced major flooding in Springfield, MA. (NOAA)*



## Hurricane Katrina:

"the single most catastrophic natural disaster in US history." According to FEMA, the total damage for Katrina is estimated at \$108 billion. This makes it the "costliest hurricane in US history."

-- FEMA Aug 28, 2017



**1,833: Deaths caused directly or indirectly by Katrina**



**The National Flood Insurance Program has paid out \$16.3 billion in claims over Katrina**

Photo Sources:

AP



# Blizzard of '78 – One Wicked Nor'easter!!

- **Astronomical high tides** occurred during the timeframe of the blizzard and a new moon.
- Storm center stalled just off the southern New England coast for 36 hours, and pumped continual onshore flow in the form of hurricane force wind gusts. Wind resulted in significant storm surge to coastal MA over 4 tide cycles over 2 days.
- **The storm brought waves >30 feet just offshore.**
- **Major coastal flooding** for Boston and the east facing coast of Massachusetts occurs when water levels reach 13.6 feet. This event equaled historic coastal flooding. Revere, Scituate and Hull experienced the most devastating effects of the storm. This storm resulted in a federal disaster declaration.





# More Recent Flooding Events: Mother's Day 2006



Aerial view of Lawrence MA, May 16, 2006 – Spicket River spilled into streets neighborhoods. *Source: Jim Daly for the Eagle Tribune*



# More Recent Flooding Events: March 2010 Floods

- 10 inches of rain + rapidly melting snow from earlier storms caused widespread urban flooding and forced rivers out of their banks across the state.
- Governor Deval Patrick declared a state of emergency, activated the National Guard to assist in the storm's aftermath.
- Flooding shut down sections of commuter rail lines heading into and out of Boston, and caused sewage to overflow from treatment plants and into Boston Harbor.



*Floodwaters from the Taunton River flood the junction of Route 44 and Route 104 in Taunton near the Raynham town line. Record flooding on the Taunton River at Bridgewater resulted in the first flood related shutdown of Route 44 in Taunton in over 40 years: source, NWS.*

# MORE RECENT EVENTS: FLOODS FROM HURRICANE ARTHUR – NEW BEDFORD MA JULY 4, 2014



12

Photo Source: National Weather Service





# 2012 HURRICANE SANDY, AKA "SUPERSTORM SANDY": DEADLIEST & MOST DESTRUCTIVE STORM SINCE HURRICANE KATRINA

- ❑ 117 deaths, primarily due to drowning
- ❑ \$75 Billion in assessed damages
- ❑ According to a 2014 New York Federal Reserve Bank survey of impacts on 950 impacted small businesses:

- 1/3 suffered financial losses.
- 1/2 used personal resources for financing recovery or increased business debt
- 1/3 had no insurance; only a few had business disruption or flood insurance.

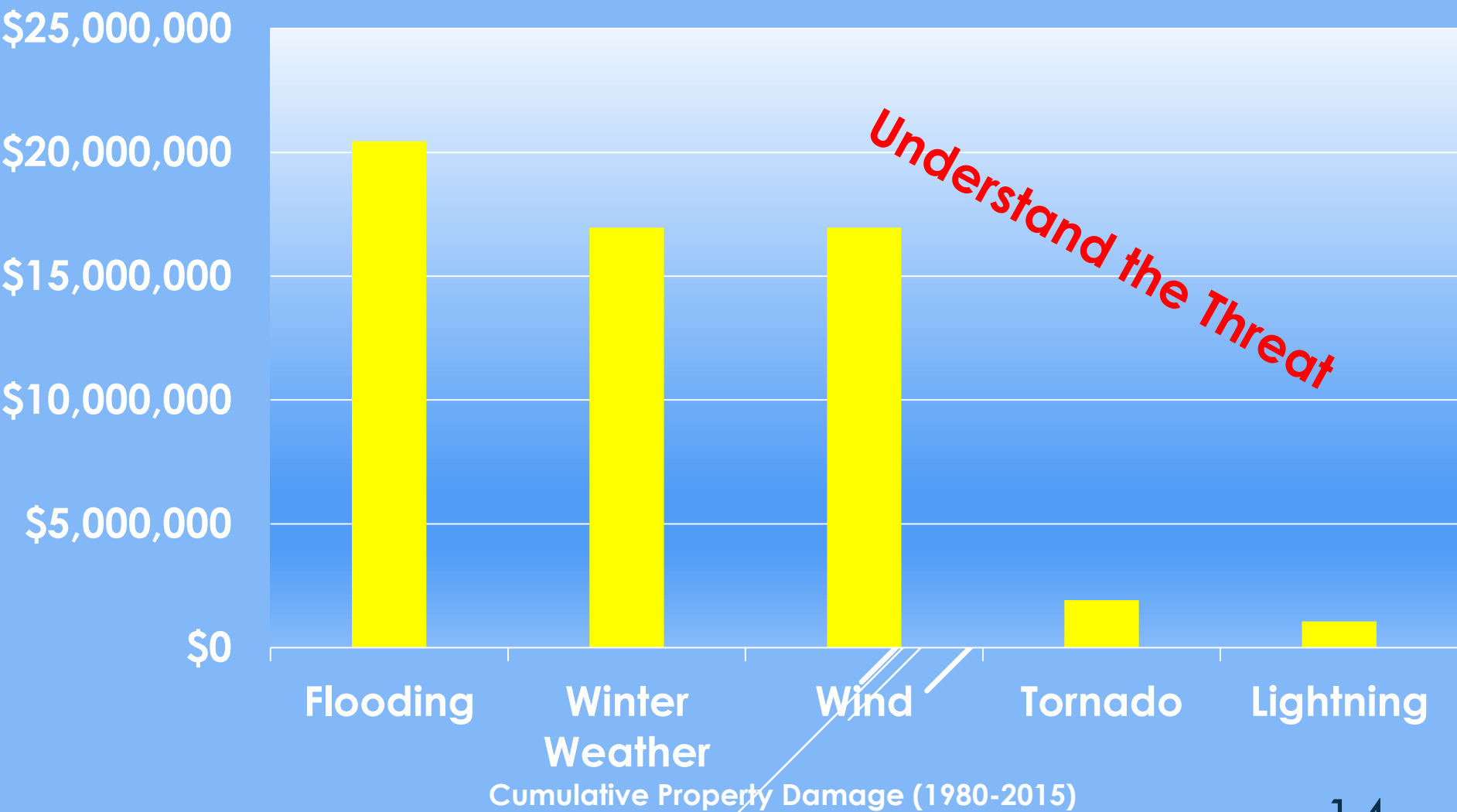
13

## Understand the Threat



Source: US Geological Survey Science Features, Featured Natural Hazards, Storm Surge Caused Major Damage During Hurricane Sandy, Battery Park Underpass New York City

# Impacts from Storm Events for Massachusetts 1980-2015





## Ways to Ensure Resilience: Insurance Information Institute (a nonprofit supported by the insurance industry)

Small businesses that suffer flood losses will have coverage under the federal government's National Flood Insurance Program (NFIP), if they purchased a flood insurance policy. The NFIP commercial policy provides up to \$500,000 on the structure and \$500,000 for contents. However, there are limits and business interruption insurance is not included. Private commercial flood policies, available through the standard insurance market, do cover these losses.

# POLLUTION PREVENTION (P2): A COMMON SENSE STRATEGY TO PREPARE FOR NATURAL DISASTERS

1. Prevent pollution at the source:
  - ▶ Use less toxic/hazardous chemicals; consider regulatory thresholds triggering compliance requirements
  - ▶ reduce risk of exposure to business owners, employees, clients, neighbors, community in flood events
  - ▶ Avoid excess inventory of chemicals
2. Understand and comply with **all** environmental regulations (federal, state and local)
3. Follow non-required best management practices, e.g. conservation, move HVAC to roof, move business inventory & client info to cloud
4. Integrate preparedness planning
5. Preparation = competitive advantage, optimized resiliency

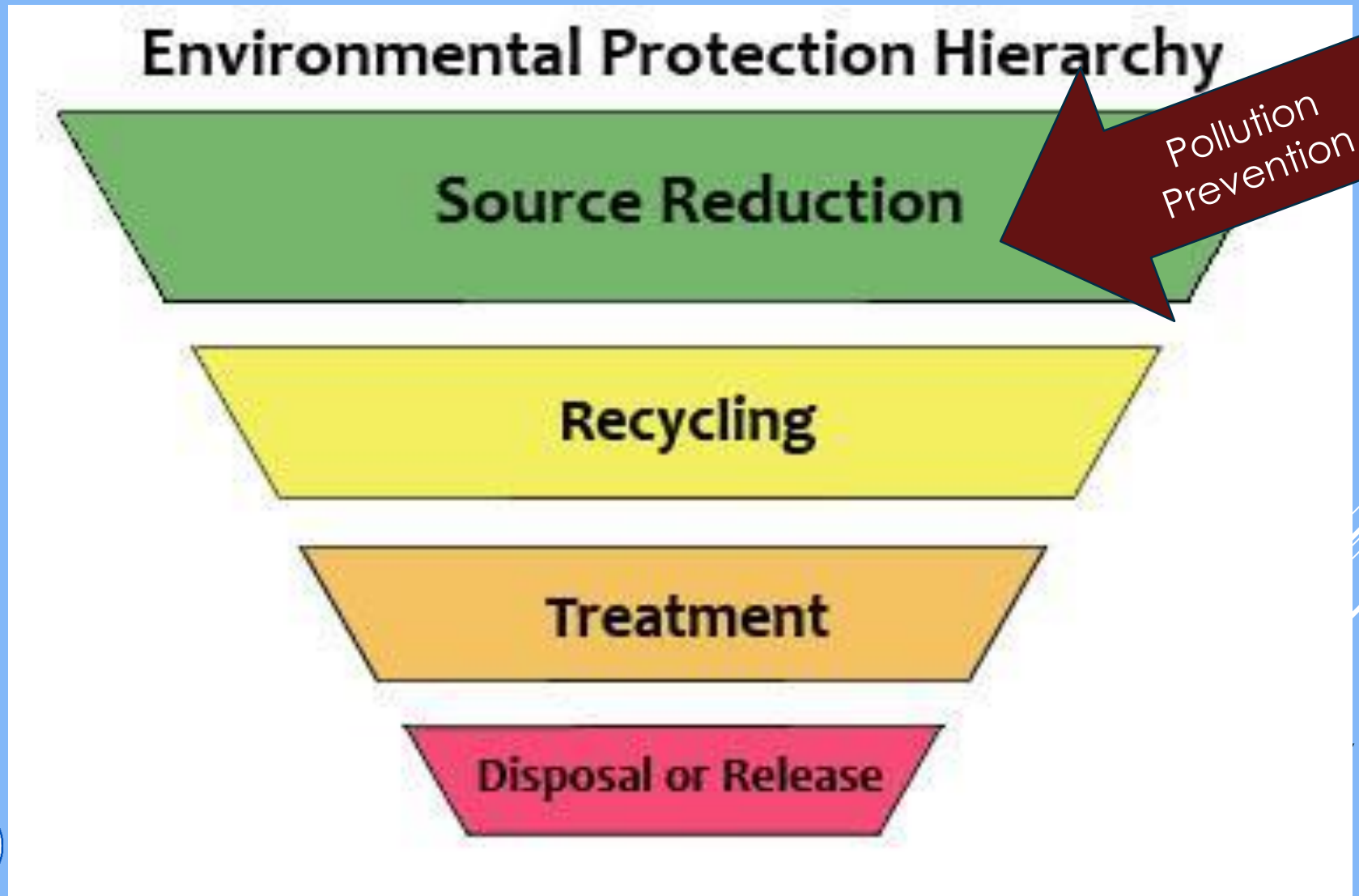


*Source: New Hampshire  
Department of Environmental  
Services Green Yards Program,  
2016*





# The Environmental Protection Hierarchy a.k.a Waste Management Hierarchy



# Communities Can Take Action to Reduce Pollution & Promote P2

- Communities can minimize waste and mitigate the hazards in their neighborhoods by updating building codes or retrofitting PCB transformers.
- Communities can limit the possible spread of contamination by sealing access points to the sewer or water system with drain covers.
- Communities can also promote P2 approaches to businesses, academia, institutions and citizenry.
- Local Emergency Planners can engage with businesses and know what toxics and hazards are present in businesses and institutions in their town/city, making them better able to respond to emergencies and avoid risks of exposure and improper response.
- Initial planning and preparation efforts communities take to minimize the amount and degree of toxic raw materials and waste reduce human health risks/exposures and have several environmental benefits.



# POLLUTION PREVENTION OPTIONS FOR BUSINESSES USING CHEMICALS

- ✓ Use least toxic products; discuss alternative products with suppliers/distributors
- ✓ Consider re-use and recycling options e.g. paint thinner
- ✓ Obtain training/refresher on tips for efficient use of material. Saves material and money.
- ✓ Look for & purchase eco-labeled products, e.g. EPA-certified Safer Choice products,
- ✓ Track material quantities used & waste amounts generated; set goals for reduction to conserve materials used
- ✓ Conserve water, raw materials & energy



# KNOW & COMPLY WITH ALL ENVIRONMENTAL REGULATIONS: SOME KEY FEDERAL REGULATORY REQUIREMENTS FOR DISASTER PREPARATION

## ➤ **Resource Conservation and Recovery Act (RCRA)**

- Creates framework for proper management of hazardous and non-hazardous solid waste. The law describes the waste management program mandated by Congress that gave EPA authority to develop the **RCRA** program.

## ➤ **Clean Air Act (CAA)** – ensuring clean, safe, breathable air

- Safe operation to prevent release - CAA 112(r) General Duty Clause
- Risk Management Plan (RMP) rule – CAA 112(r)
- Air Toxics Rules – including regulations pertaining to operating emergency generators
- **National & Region 1 Priority: Ammonia Refrigeration**

## ➤ **Clean Water Act (CWA)** – protection of water sources

- National Pollutant Discharge and Elimination System (NPDES) – discharges by industrial and municipal sources
- Spill Prevention Control and Countermeasure Plan (SPCC)
- Industrial stormwater pollution prevention plan (SWPP)
- **National & Region 1 Priority: Significant Noncompliance (SNC) w/NPDES**





# Know & Comply with All Environmental Regulations: Some Key Federal Regulatory Requirements For Disaster Preparation *(continued)*

- **Emergency Planning and Community Right To Know (EPCRA)**
  - requires reporting of oil spills and chemical releases and ensures transparency of types and quantities of chemicals to inform communities
  - “Tier II” chemical inventory reporting
  - **Region 1 Priority: EPCRA Tier 2 Reporting**
- **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**
  - Provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.
  - **National & Region 1 Priority: Accelerated Clean-ups/Ready for Redevelopment**

# Know & Comply with All Environmental Regulations: Some Key Federal Regulatory Requirements For Disaster Preparation

*(continued)*

- **Toxic Substances Control Act (TSCA 21 updated 2016)**
  - EPA authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics and pesticides.
  - TSCA addresses the production, importation, use, and disposal of specific chemicals including polychlorinated biphenyls (PCBs), asbestos, radon and lead-based paint.
  - National & Region 1 Priority: Share info re priority chemicals widely used and promote safer alternatives



# DIGGING IN DEEPER: HIGHLIGHTS ON CAA GENERAL DUTY CLAUSE – PREVENTING CHEMICAL ACCIDENTS

- ▶ Clean Air Act Amendments of 1990, Congress enacted Section 112(r)(1), also known as the General Duty Clause (GDC).
- ▶ Applies to any facility where extremely hazardous substances are present – all quantities!
- ▶ GDC is a performance-based authority recognizing that **owners and operators have a general duty and responsibility to prevent and mitigate the consequences of chemical accidents.**
- ▶ Response Management Plan – required for certain chemical/quantities e.g. 10,000lbs ammonia, other thresholds for chemical – rule may change



*Explosion at a fertilizer plant in West, Texas killed 15 people in 2013. Photo source: CNN*

# Digging in Deeper: A Few Highlights on RCRA Hazardous Waste Generator Requirements

- MA RCRA Program – MA DEP has delegation of the program
  - Allows amount of hazardous waste generated/month & on-site accumulation quantity & time limits that vary by type of generator category (LQG,SQG)
  - Labeling, proper storage, record keeping, transport, disposal of hazardous waste
  - Prohibits putting toxics in drains, flush them down toilets, or dump them outside
  - Provides framework for solid waste management
    - MA bans many waste streams from landfill including organics (food waste)





# DIGGING IN DEEPER: COMMON RCRA VIOLATIONS THAT CREATE ADDED RISK OF RELEASE DURING FLOODS

Source: Vermont Dept. of Environmental Conservation



- ▶ Failure to make waste determinations
- ▶ Storing incompatibles (acids & bases) together
- ▶ **Poor housekeeping**
- ▶ Uncovered outside storage, not securing containers
- ▶ Improper labeling and improper record keeping

# DIGGING IN DEEPER: EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

## ➤ Sections 301-303: **Emergency Planning**

➤ Local governments required to prepare chemical emergency response plans.

➤ **Region 1 Priority: LEPC Capacity Building**

## ➤ Section 304: **Emergency Notification**

➤ Facilities must report accidental releases of EHSs and “hazardous substances” defined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – see Reportable Quantities (RQs) and Emergency Planning & Community Right to Know Act (EPCRA).



# DIGGING IN DEEPER: EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT (CONTINUED)

- Sections 311 and 312: **Community Right to Know Requirements** - Facilities handling or storing hazardous chemicals above thresholds must submit Safety Data Sheets (SDSs) to state & local officials & local fire departments.
- Region 1 Priority: Facilities must submit Tier II inventory forms for these chemicals to state & local officials & fire departments by March 1 annually.
- Section 313. Toxics Release Inventory (TRI) - Facilities must submit toxic chemical release inventory form (Form R) annually for each TRI chemical manufactured or otherwise used above thresholds.



# Preparing for Natural Disasters – Make a Plan

Many resources for resiliency planning and pollution prevention information on the web. EPA does not endorse any company or organization's products or services except those created for or by Department of Homeland Security, FEMA, NOAA, and other federal agencies.

Note: FEMA grant programs; MEMA applies, can sub-award funds to cities/towns

[www.FloodSmart.gov](http://www.FloodSmart.gov)

[www.ready.gov](http://www.ready.gov) plan ahead for disasters

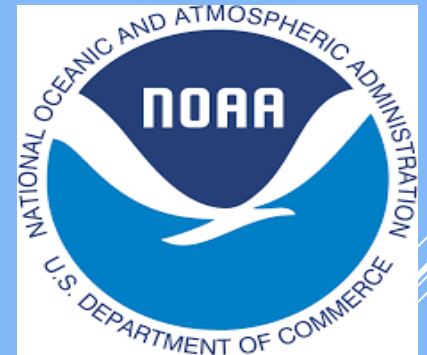
[www.noaa.gov](http://www.noaa.gov)

[www.usa.gov](http://www.usa.gov)

[www.epa.gov](http://www.epa.gov)



FEMA





# NATIONAL WEATHER SERVICE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

**Hurricane Preparedness Week**  
May 6-12, 2018



[HTTPS://WWW.WEATHER.GOV/WRN/HURRICANE-PREPAREDNESS](https://www.weather.gov/wrn/hurricane-preparedness)



# ASSESS YOUR RISK & VULNERABILITIES IN INCIDENTS OF FLOODING, POWER LOSS & OTHER EMERGENCIES

- ▶ Insurance Institute for Business and Home Safety Toolkit – zip code search tool for weather-related risks - [OFB-EZ Toolkit](#)
- ▶ FEMA online maps to help determine flood risk in your area - [FEMA flood maps](#)
- ▶ EPA Storm Surge Inundation Map to help determine flood risk in coastal areas – [EPA SSIM](#)
- ▶ Explore maps and graphs of historical and predicted climate trends in your area - [Climate Explorer](#)
- ▶ FEMA mobile app can help you stay safe - [FEMA mobile app](#)
- ▶ Power failure, snowstorms, hurricanes, flooded roads, transit system interruptions, etc. are also threats – note regulations for operating emergency and non-emergency generators under CAA)





# KNOW YOUR FLOOD EXPOSURE VULNERABILITIES

1. Check FEMA maps for the expected flood levels: Are you in the zone?
2. NOAA – National Weather Service [www.weather.gov](http://www.weather.gov)
3. Compare expected flood elevations to your building elevation:
  - Check building plans.
  - Use GPS devices.
  - Hire a surveyor.
4. Storm water drainage systems for municipalities are often designed only for the 25-year event.
5. For 100-yr event, the water has to go somewhere!
6. Look for local or state information on capacity of your local storm water drainage system; if renting, work with property owner.



# I CHECKED MAPS AND I AM LOCATED IN A FLOOD ZONE. NOW WHAT?

Move out of the flood zone if you can! If moving is not an option:

1. Raise equipment (including HVAC) and supplies
2. Protect facility openings – install flood protection equipment such as barrier flood doors, pumps, sand bags
3. Have a plan to respond to floods and other disasters
4. Practice your emergency response plan
5. Store maps, records and information on cloud



# CREATE & IMPLEMENT A BUSINESS CONTINUITY PLAN

- ▶ Easy-to-use model plans exist
  - ▶ See Agility Recovery's The Definitive Guide to Disaster Planning – 10-step plan
- ▶ Insurance Review
  - ▶ Insurance Institute for Business and Home Safety (IIBS) - OFB-EZ toolkit
  - ▶ Review insurance coverage & work with your carrier.
- ▶ Save customer, inventory, & business records in cloud; back up regularly.





# IN SUMMARY, CONSIDER THIS 6 STEP PLAN TO OPTIMIZE COMMUNITY & BUSINESS RESILIENCY

1. Understand potential impacts from extreme weather events on communities and businesses; **assess your risks, know your vulnerabilities**
2. Review current chemical inventory to identify P2 opportunities
  - ▶ **Reduce use of toxic/hazardous materials** & reduce hazardous waste
  - ▶ Discuss w/suppliers alternatives to products with toxic chemicals
3. **Understand & comply with regulations** emergency generators, managing & storing hazardous chemicals, hazardous and solid waste, operating emergency generators & preventing chemical releases (CAA, CWA, RCRA, SPCC, USTs, EPRA & TRI, etc.)
4. Engage with your community on emergency planning; coordinate with local emergency responders re chemicals on your site
5. Use best practices to conserve water, energy, raw materials including chemicals at your facility to use less, save more, protect the environment, reduce flood risks and community exposure
6. Implement a business continuity plan & work with your insurers



# RESOURCES FOR NATURAL DISASTER PREPARATION FOR COMMUNITIES, BUSINESSES AND RESIDENTS

- ▶ [Ready.gov](https://www.ready.gov)
- ▶ [www.weather.gov](https://www.weather.gov)
- ▶ [www.epa.gov](https://www.epa.gov)
- ▶ [www.epa.gov/natural-disasters](https://www.epa.gov/natural-disasters)
- ▶ [www.epa.gov/compliance](https://www.epa.gov/compliance)
- ▶ [www.mass.gov/eea/agencies/massdep/](https://www.mass.gov/eea/agencies/massdep/)
- ▶ [www.turi.org](https://www.turi.org)
- ▶ [www.turi.org/Our\\_Work/Grants/Small Business Grants](https://www.turi.org/Our_Work/Grants/Small_Business_Grants)

My Contact: Mary Dever-Putnam, US EPA Region 1

[Dever.mary@epa.gov](mailto:Dever.mary@epa.gov)

617.918.1717

