



## Solid Waste and Debris



## Introduction



- Generated waste in disaster events
- Roles for environmental health practitioner addressing solid and hazardous waste during disaster events
- Prioritization of response activities
- State and federal partners
- Elements needed to develop solid and hazardous waste plans



## Learning Objectives



By the end of this module participants will

- Increase understanding of solid and hazardous waste issues in disaster events
- Increase knowledge of roles of environmental health practitioners in addressing solid and hazardous waste issues
- Be able to identify key response partners
- Increase understanding of the basic elements of solid and hazardous waste planning, collection, and disposal



## Environmental Health Functions



- Ensure protection of public health from hazardous materials and solid waste.
- Assess and rectify waste issues with response partners
- Assure adequate collection, disposal, or treatment of waste products
- Provide information to the public on health risks associated with waste releases or debris
- Conduct interventions as needed



## Reasons for Concern



## Mission



- Protect human life
- Protect the environment
- Protect property



## Priority Activities



- Identify locations where solid and hazardous wastes are being generated
- Be aware of the possible health risks and safety hazards that can be present at a disaster incident
- Provide technical assistance to officials and implement assessment and mitigation procedures at disaster events
- Know whom to notify and refer events to appropriate agencies; advise response leadership
- Provide information and assistance to the public with regard to disposal of waste after an event



## Key Partners



- Local emergency management agencies
- Volunteer and community organizations
- Federal and State Emergency Support Functions
  - ESF 3 - Public Works
  - ESF 6 - Mass Care, Emergency Assistance, Housing
  - ESF 8 - Public Health and Medical Services
  - ESF10 - Oil and Hazardous Materials
- Industry
- Media



## Job #1 - Safety



- Personal sanitation
- Electrocution
- Carbon monoxide
- Musculoskeletal hazards
- Thermal stress
- Structural instability
- Hazardous materials
- Confrontations
- Fire
- Drowning, mechanical
- Personal protective equipment: use it!
- Driving, animals, insects, slips/falls
- Stress, fatigue
- Confined spaces - must be trained



## Solid Waste Planning in a Disaster



- Prepare
- Safety
- Protect
- Implement
- Evaluate/monitor



## Categories of Waste Generated



### Greenwaste/wood waste

- trees, brush, limbs



### Construction and demolition (C&D; building) materials

- paint, varnish, paint thinner, caulking, adhesives
- asbestos and lead

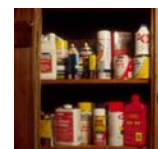


## Categories of Waste Generated



### Hazardous waste



- Household hazardous waste
  - Pesticides
  - Cleaning products
  - Gardening products
  - Automotive products
- Industrial chemicals
  - Oil and hazardous substances
  - School or private laboratory materials
  - Commercial cleaners, auto repair, etc.



 **Categories of Waste Generated** 

- Dead livestock
- Agricultural processors, Supermarkets and Food distributors
  - Farms, grain feed lots, grocery stores
- Household waste
  - White goods: refrigerators, freezers, air conditioners
  - E-goods: computers, televisions, etc.



 **Exercise** 

What household hazardous substances did you find in your home?

 **Household Waste** 

Video on Household Hazardous Waste Hazard Assessment



Click on camera to start video

 **Unplanned Occurrences** 



 **Cleaning Up** 



 **Community Collection** 



**CURBSIDE PICKUP AVAILABLE FOR HOUSEHOLD HAZARDOUS WASTE**

PLEASE SEPARATE THE FOLLOWING ITEMS IN FRONT OF YOUR DRIVE AND PLACE ALONGSIDE.

- HOUSEHOLD CHEMICALS (such as bleach, ammonia, other cleaning products)
- RODENT & OTHER PEST KILLERS\*
- PAINT & PAINTS SUPPLIES\*\*
- OIL, GASOLINE & PROPANE
- LAWN & GARDEN PRODUCTS\*\*
- FLUORESCENT LIGHTS
- THERMOSTATS
- BATTERIES
- ELECTRONIC GOODS (such as televisions, monitors, radios)

\*Toxic combinations of any of these products can be harmful with everyday discarded trash.

For more information on household hazardous waste collection, please call: (800) 401-1327

 **Segregated Waste** 

  For more information on household hazardous waste collection, please call (800) 401-1327

**PICKING UP THE PIECES**

Following these specific guidelines when hauling hurricane-related debris and household garbage to the curb will make for a smoother removal process.



**HOUSEHOLD LIQUIDS**

- Seal containers properly to prevent leaks.
- Use secondary containment (e.g., plastic bags) to contain any spills.
- Do not mix different types of liquids.
- Do not mix liquids with household waste.
- Do not mix liquids with hazardous materials.
- Do not mix liquids with flammable liquids.
- Do not mix liquids with volatile organic compounds (VOCs).
- Do not mix liquids with acids.
- Do not mix liquids with bases.
- Do not mix liquids with pesticides.
- Do not mix liquids with antifreeze.
- Do not mix liquids with oil.
- Do not mix liquids with paint.
- Do not mix liquids with solvents.
- Do not mix liquids with other hazardous materials.

**HAZARDOUS MATERIALS**



- Seal containers properly to prevent leaks.
- Use secondary containment (e.g., plastic bags) to contain any spills.
- Do not mix different types of hazardous materials.
- Do not mix hazardous materials with household waste.
- Do not mix hazardous materials with liquids.
- Do not mix hazardous materials with flammable liquids.
- Do not mix hazardous materials with volatile organic compounds (VOCs).
- Do not mix hazardous materials with acids.
- Do not mix hazardous materials with bases.
- Do not mix hazardous materials with pesticides.
- Do not mix hazardous materials with antifreeze.
- Do not mix hazardous materials with oil.
- Do not mix hazardous materials with paint.
- Do not mix hazardous materials with solvents.
- Do not mix hazardous materials with other hazardous materials.

**HOUSEHOLD WASTE**


- Use bags or boxes to contain household waste.
- Do not mix household waste with hazardous materials.
- Do not mix household waste with liquids.
- Do not mix household waste with flammable liquids.
- Do not mix household waste with volatile organic compounds (VOCs).
- Do not mix household waste with acids.
- Do not mix household waste with bases.
- Do not mix household waste with pesticides.
- Do not mix household waste with antifreeze.
- Do not mix household waste with oil.
- Do not mix household waste with paint.
- Do not mix household waste with solvents.
- Do not mix household waste with other hazardous materials.

**HOUSEHOLD APPLIANCES**



- Seal containers properly to prevent leaks.
- Use secondary containment (e.g., plastic bags) to contain any spills.
- Do not mix different types of household appliances.
- Do not mix household appliances with household waste.
- Do not mix household appliances with liquids.
- Do not mix household appliances with flammable liquids.
- Do not mix household appliances with volatile organic compounds (VOCs).
- Do not mix household appliances with acids.
- Do not mix household appliances with bases.
- Do not mix household appliances with pesticides.
- Do not mix household appliances with antifreeze.
- Do not mix household appliances with oil.
- Do not mix household appliances with paint.
- Do not mix household appliances with solvents.
- Do not mix household appliances with other hazardous materials.

 **Video Presentation** 

Video on Amnesty Days



Click on camera to start video

 **Exercise** 

- Scenario: A community in your district has been severely damaged by a tornado. Homes and businesses were damaged, creating massive amounts of debris.
  - You've been asked to develop a short public service announcement advising the community on waste handling, segregation, and disposal.

 **Sources of Household Hazardous Waste** 



 **Temporary Storage, Characterization, and Consolidation Site** 



 **Waste Pickup and Transport** 





## Sorting and Segregation



## Bulking



## Return to Owner



## Waste or Garbage?



## Video Presentations



White Goods Collection and Disposal



Food Locker and Supermarket Cleanup Operations



Click on cameras to start video





## Debris Management Alternatives




- Maintain debris segregation from collection through DMS to end outlets
- Recycle or reclaimed
- Composting, mulch, biomass fuel

Disposal methods of last resort:

- Landfill
- Incineration
- Land application
- Treatment facility

 **Burning of Green Waste (Wood Debris)** 

OPTION OF LAST RESORT IN MASSACHUSETTS





\* Allowed only under certain circumstances and prohibited during certain seasons of the year

 **Mulching of Wood Waste** 





 **Transportation, Storage, and Disposal Site** 





 **Site Planning** 

- Determine need for facilities
- Develop criteria to evaluate potential sites  
(Mass DEP Guidance (page 13) site worksheet available)  
<http://www.mass.gov/dep/recycle/laws/debrguid.pdf>
- Identify temporary storage sites
- Review emergency waiver of standards regulations  
(Mass DEP regional office does not require a solid waste facility permit **IF** it is temporary use due to a disaster)

 **Site Planning** 

- Identify permits or variances
- Perform environmental review of site
- Prepare a site development and operation plan
- Prepare inspection and site management guidelines
- Prepare a site restoration plan

 **Exercise: Background** 

- The river, aided by levee failure, overflowed its banks and submerged most of the municipality. Many homes, businesses, industries, and agricultural areas were underwater for 2 weeks. The municipal landfill was flooded and will not be accessible for 60 days. All of the county's heavy equipment and collection trucks have been damaged.
- The President has signed a Disaster Declaration, allowing federal assistance.



## Exercise: Task



- As part of a multiagency team of environmental health professionals, you have been asked to develop an action plan.
- State will need to determine what resources can be offered to assist the municipality and/or whether federal assets are needed.
- Develop your plan taking into consideration the types of waste, collection, disposal, and costs.
- Do not forget to prioritize your plan.



## Exercise



Flood Conditions Map



Original River Conditions Map



## Resource Material



- Environmental Health Emergency Response Guide  
[http://www.cdc.gov/nceh/ehs/Docs/EH\\_Emergency\\_Response\\_Guide.pdf](http://www.cdc.gov/nceh/ehs/Docs/EH_Emergency_Response_Guide.pdf)  
(Modified from the California Disaster Manual and the APC Environmental Health)
- Hurricane Katrina Disaster Debris Management: Lessons Learned from State and Local Governments: [http://www.swana.org/pdf/swana\\_pdf\\_358.pdf](http://www.swana.org/pdf/swana_pdf_358.pdf)  
Briefing report providing list of resource materials, lessons learned in the management of specific wastes, and best management practices
- The Application of HAZWOPER to Worksite Response and Cleanup Activities:  
[http://www.osha.gov/SLTC/hazardouswaste/application\\_worksiteresponse.html](http://www.osha.gov/SLTC/hazardouswaste/application_worksiteresponse.html)  
Decision tool for activity consideration under HAZWOPER
- Disaster Site Planning Checklist: Site planning checklist for temporary storage sites <http://www.ciwmb.ca.gov/Disaster/DisasterPlan/chp4ck.htm>
- Mass DEP guidance <http://www.mass.gov/dep/recycle/laws/policies.htm#disaster>



## Resource Material



- Mass State contracts summary information  
<http://www.mass.gov/dep/recycle/laws/policies.htm#disaster>
- U.S. EPA: Planning for Disaster Debris: <http://www.epa.gov/epaoswer/non-hw/muncpl/disaster/dstr-pdf.pdf>  
Site planning, collection, and disposal of waste after a disaster
- Disaster Site Planning Checklist:  
<http://www.ciwmb.ca.gov/Disaster/DisasterPlan/chp4ck.htm>  
Site planning checklist for temporary storage sites
- Modified from the California Disaster Manual and the APC Environmental Health Emergency Response Guide  
[http://www.cdc.gov/nceh/ehs/Docs/EH\\_Emergency\\_Response\\_Guide](http://www.cdc.gov/nceh/ehs/Docs/EH_Emergency_Response_Guide)
- The California Integrated Waste Management Board: Emergency Planning:  
<http://www.ciwmb.ca.gov/>  
Site planning, collection of waste after a disaster may not be applicable in Mass.



## Questions

