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## Environmental Health in Shelters

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## Objectives

- Describe the roles of environmental health professionals in shelter operations
- Describe key environmental health issues
- Present sanitation standards of shelters
- Provide educational resources on shelter operations
- Lessons Learned from Mega Shelters



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## Types of Shelter

- General Public Shelter-Self Sufficient
- Special Needs Shelters - minor medical/nursing needs
  - Physical, emotional, sensory or visual impairment
  - Extended Care Facilities
  - Mental Care Facilities
  - Populations requiring care
- Special Needs Shelter - definitions vary

<http://www.doh.state.fl.us/PHNursing/SpNS/SpecialNeedsShelter/SpecialNeedsShelter.html>



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# Shelter Classification

- Refuge of Last Resort
- Risk Shelter
- Host Shelter
- Recovery Shelter
- Special Needs Shelter
- Recovery Center



[http://www.iaam.org/members/Sec\\_pages/Mega-ShelterPlanning&Activation.pdf](http://www.iaam.org/members/Sec_pages/Mega-ShelterPlanning&Activation.pdf)



# Shelter Classification

Shelter Classification	Space Allocation	Operation Period
Refuge of Last Resort	10-15 ft <sup>2</sup>	end of event
Risk Shelter	20 ft <sup>2</sup>	24hrs prior to 72 hrs post event
Host Shelter	40 ft <sup>2</sup>	24hrs prior to 72 hrs post event
Recovery Shelter	40-60 ft <sup>2</sup>	72 hrs post event and beyond
Special Needs Shelter (SpNS)	60 ft <sup>2</sup>	24hrs prior to 72 hrs post event
•SpNS Host Shelter	60-100 ft <sup>2</sup>	24hrs prior to 72 hrs post event
•SpNS Recovery	60-120 ft <sup>2</sup>	24 hrs post event and beyond
Recovery Center	40 ft <sup>2</sup>	24 hrs post event and beyond

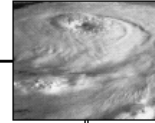




# Selecting a Shelter Site



- Size
  - Evacuation Shelter 40 ft<sup>2</sup>/Person
  - 40-50 ft<sup>3</sup> of air space/person
- Structural integrity
  - Hurricane rating
  - Earth quake protection
- Water facilities
  - 4-5 gallons per person per day
- Location
  - Flood Zones
  - Protected Areas – Inland
  - Accessible to population
- Adequate sanitation facilities
- Laundry facilities
- Well lighted
  - Stairs, walk ways
  - Auxiliary light sources
- Fire and Life Safety Code Compliant
- Handicap Accessibility



*Standards  
for  
Hurricane  
Evacuation  
Shelter  
Selection*



Publication # ARC 4496



# Help is available...just ask



## Environmental Health Support

- County and State Assistance
- EMAC – State to State
- Federal Support – ESF 8





# Mega Shelter Experience

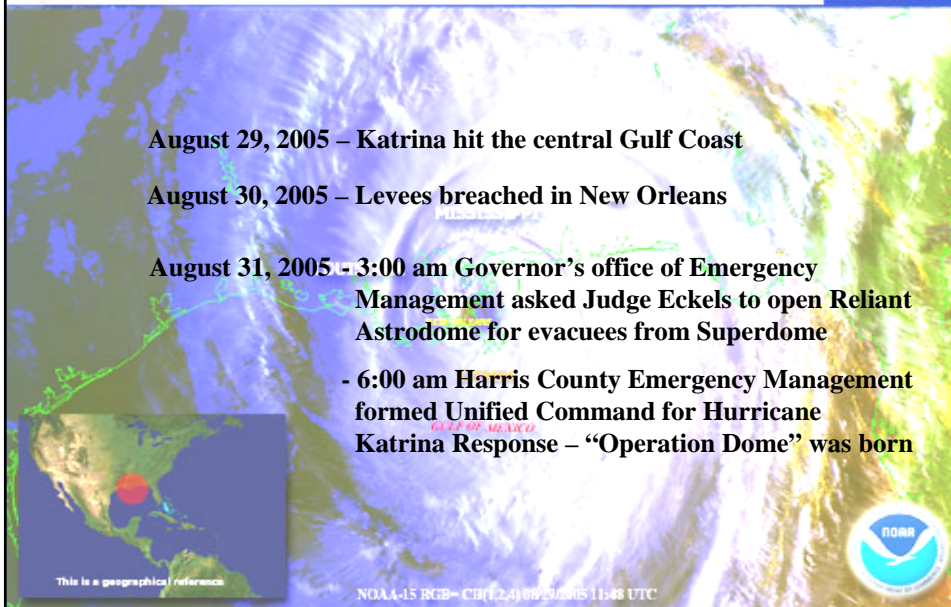


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Hurricane KATRINA has hit land and is moving north at 15mph. It has max sustained winds of 150mph and gust of 184mph.

Credit: NOAA





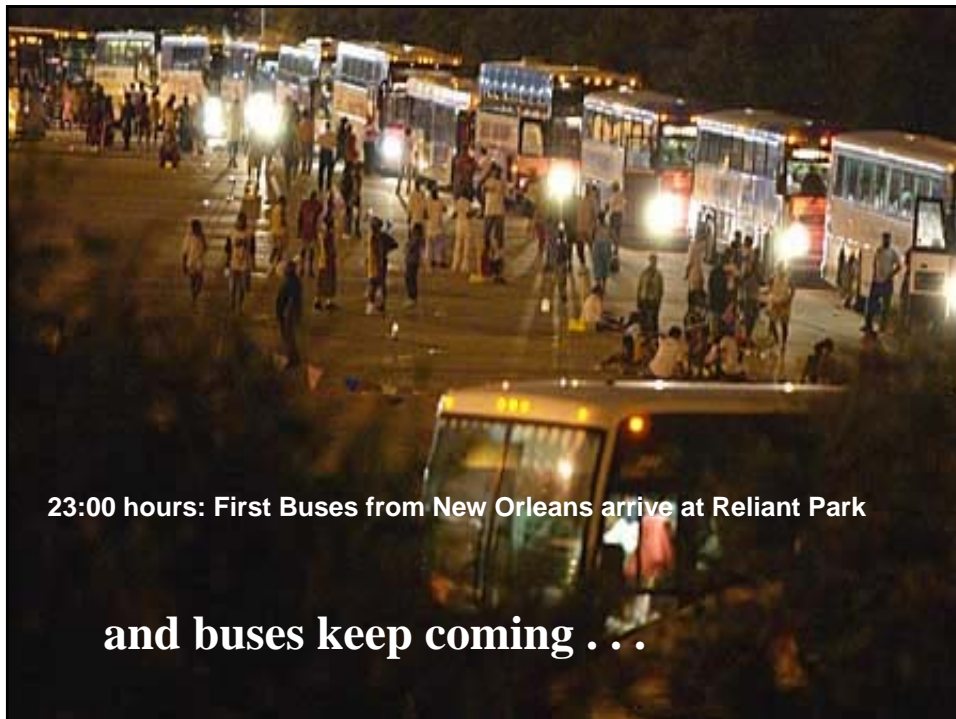
## Plans for Operation Dome are placed into action

- **Facilities:** Lights and A/C turned on immediately.  
Aug.31<sup>st</sup> : High was 97 deg. F with 70% humidity
- Reliant Park management and security teams prepared buildings and secured sensitive areas.
- Red Cross moved in with cots/blankets/comfort packs.
- Aramark had concession contract for the complex and hired additional food service personnel (800).
- Harris County Hospital District established a 100,000 square foot field hospital with full triage, electronic patient registration, lab, X-Ray & pharmacy.
- Doctors/medical professionals volunteered (2,700).



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23:00 hours: First Buses from New Orleans arrive at Reliant Park

and buses keep coming . . .



## **Sept. 1 – Next Day - Buses kept coming.....**

- ....and coming. Cars showed up. Not all were from the Superdome. More people were on the way.
- Hundreds of volunteers arrived, turned into thousands
- Increased number of law enforcement officers, EMS and fire safety personnel required to maintain controlled chaos.
- Approx. 500 police officers and 50 EMS/Fire personnel were on site each day.



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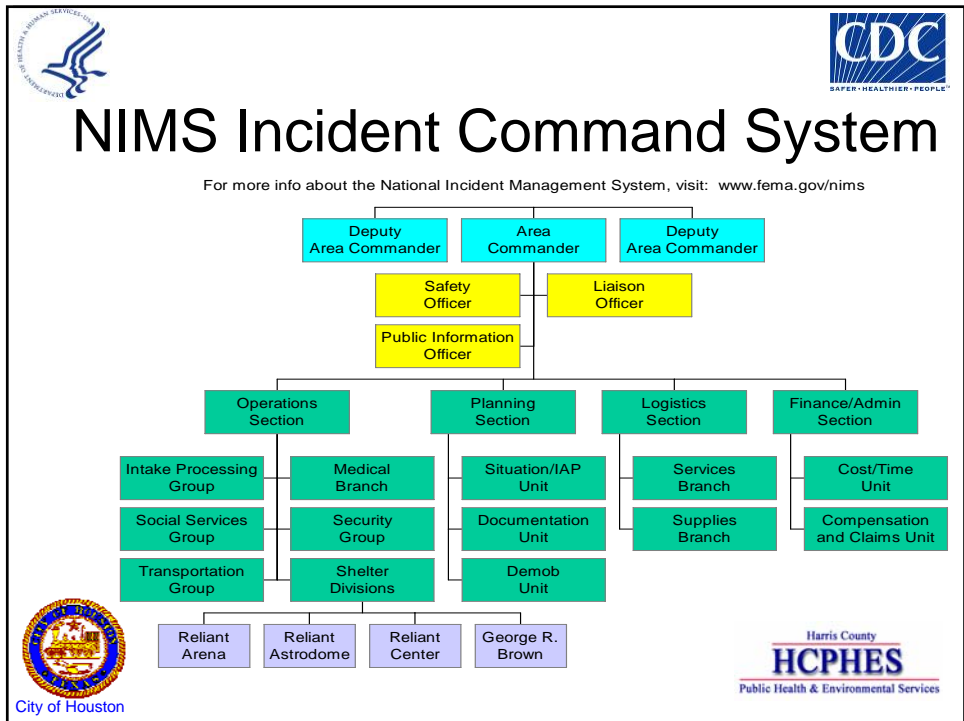
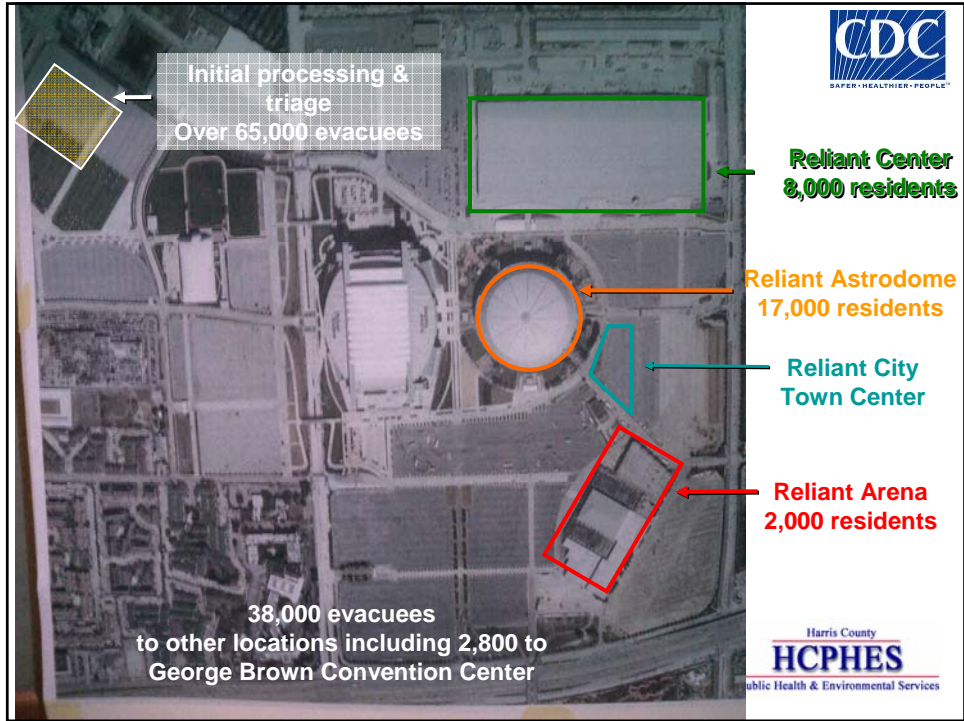
## **Sept. 2 - Expanding Situation**

- Reliant Astrodome was reaching capacity. City of Houston Fire Marshal ordered cap at 8,000.
- Arriving buses were asked to continue on to next county. Drivers refused, abandoned buses and left passengers .
- Houston's mayor overrode his fire marshal and authorized up to 12,000 evacuees inside Astrodome.
- Other complex facilities were opened.
- Smaller community shelters continued to open.



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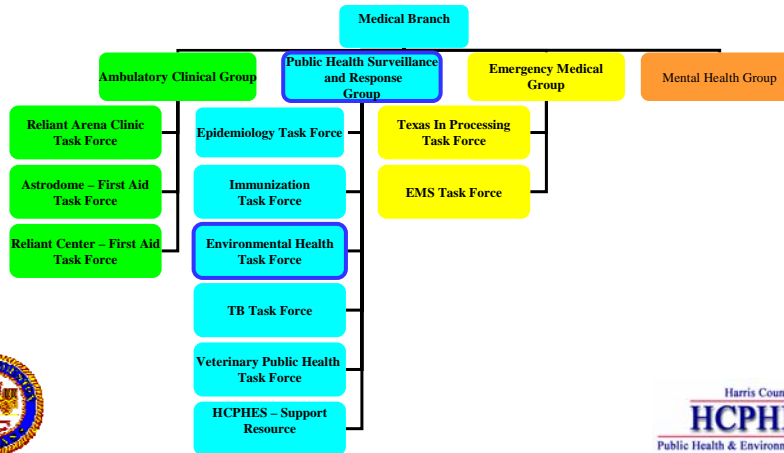








# Reliant Medical Branch



# Roles of Environmental Health in Shelters

- Shelter site selection
- Organization and layout of shelter
- Food safety
- General safety
- Water supplies and handling
- Wastewater
- Solid waste disposal
- Fixed and portable sanitary facilities (toilets, sinks, showers)
- Air quality/climate control
- Infection & disease control
- Oversight of housekeeping cleaning and sanitation
- Vector control
- Laundry (clothes and bedding)
- Barbershops
- Outside premises
- Daycare
- Playgrounds
- Long lines





# Food Safety

- Protection
  - Storage
  - Preparation
  - Service
- Control
  - Hoarding
  - Pests
  - Incorrect Temperatures



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# Food Issue Encountered

- Pooling water
- Suspected Food Borne Illness
- Condemnation of Product
  - Uncovered Potentially Contaminated Food
  - Incorrect Storage Temperature
- No self-service of foods excepted packaged and whole fruit
- Feeding People who are in Restricted Area of Shelter
- Donated Food
- *If in DOUBT Throw It OUT!*



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# Housekeeping

- Protect staff
- Protocol to Clean
- Identify areas needing cleaning that may transmit disease
  - Phone Bank
  - Hand Rails
  - Restrooms
- Laundry Services
  - Separate Sorting & Folding
  - Cleaning
  - Returning Cleaned Clothes



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# Cleaning Procedures

- Identify Area, Objects, or Sites to be Cleaned
- Procedures for Staff and Volunteers
- Education
  - How often do you make cleaning agents?
  - Where and when should people clean?



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# Chemical Sanitization

- Effective Chemicals
- Construction of Correct Chemical Concentration
- Frequency of Cleaning
- Disinfectants
  - Bleach
  - Registered EPA Norovirus Disinfection Agents: Vikron, Miikro-Bak III, Eco Tru
- Chemical Safety
  - Mixing
  - Food Safety



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# Children's Area Inspection

- Protocol
- Hand Sanitization
- Clean of Fomites
  - Toys
  - Commonly touches surfaces
  - Diaper changing
- Correct Sanitization
- Special needs children
- Observed toys in area
- Approved child care workers



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<http://nrc.uchsc.edu/CFOC/index.html>

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## Infection Control

- Gastrointestinal Illness
  - Viral
  - Bacteria
  - Parasites
- Respiratory Illness
  - Airborne droplets
  - Direct Contact
  - Fomites



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## Transmission Routes



- Airborne
- Droplet
- Contact
  - Direct –Person to Person
    - ✓ Blood Borne, STD
  - Indirect – Person to Object to Person
    - ✓ Fomites (objects, surfaces)



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## Outbreak Control



- Separate area for ill persons
  - Maintain separation until symptoms have ceased for 24 hours
- Hand washing/sanitizing stations at each entrance to isolation area
- Increased housekeeping
- Respiratory Hygiene
  - Cough/sneeze into sleeve
  - Use disposable tissues, dispose of immediately
  - Wash hands often and avoid close contact with others



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## Outbreak Control

- Maintain Adequate supplies
  - Tissues, Trash receptacles, hand sanitizer
- Provide paper towels to open restroom doors
- Increased restroom cleaning frequency
  - Hourly
- Sanitize surfaces with bleach or other disinfectant
- Handwashing, handwashing, handwashing



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## Pets Shelters and Human Shelters



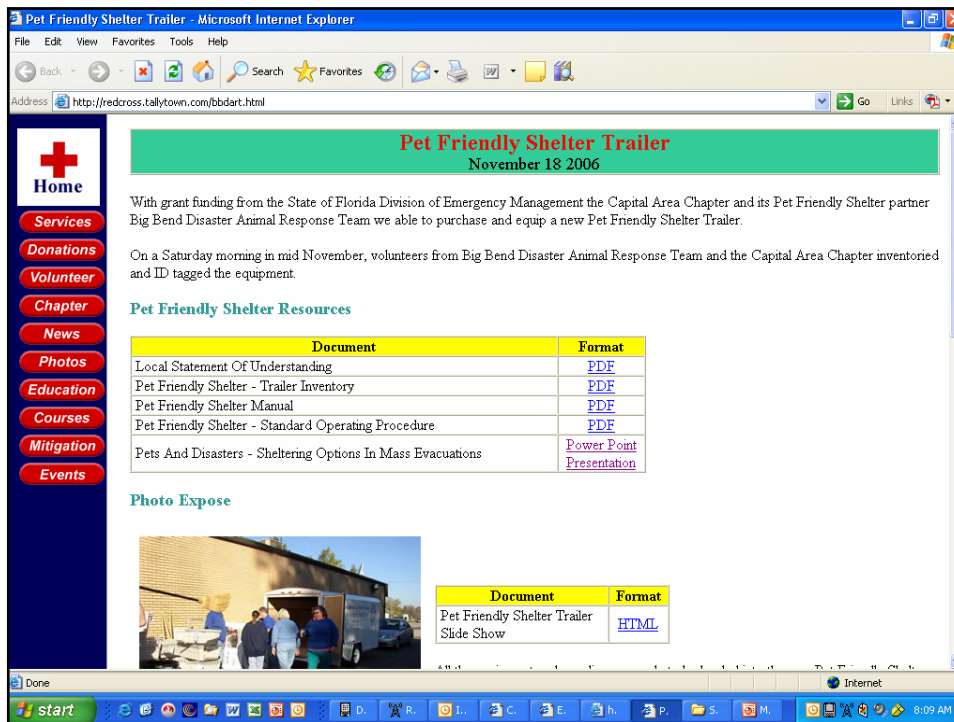
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<http://redcross.tallytown.com/bbdart.html>

<http://www.flsart.org>



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## Pet Shelters – Health Considerations

- Hand washing for pet owners & staff
- General cleaning and disinfection
- Allergies
- Air flow
- Worker protection
- Fecal management
- Animal food storage
- Biohazards/sharps

**Pet Friendly Shelter Manual**



**Big Bend Disaster Animal Response Team**  
Tallahassee Florida



## Options for Emergency Shelters

- People & pets in same room
- People & pets in separate spaces in same building
- Animal-only shelters
- Large animal/livestock facilities



## People & Pets in Same Room

- Least labor-intensive
- Owners feed, exercise & clean up after pets
- Rules about keeping pets in crates, waste disposal & so on



## People & Pets in Same Room

### Benefits

- Avoid separating people & pets
- Many pets do better with owners taking care of them



## People & Pets in Same Building

- Owners in same building, but separate area
  - Still care for pets
- Somewhat labor-intensive
  - Owners not immediately available
- Used in many Florida counties during 2004 hurricanes



## Animal-Only Shelter

- Often based at an existing animal shelter
- More labor intensive
  - Staff cares for animals
  - Sometimes expanded role for shelter staff




## Pet Shelter Requirements

- Meet safety standards
- Conducive to housing animals
  - Solid, non-porous floors
  - Good ventilation
- Free of other obligations during declared emergencies



## Potential Shelter Locations

- Fairgrounds 
- Restaurants
- Ball fields
- Vacant stores
- Pastures
- Schools (gyms)
- Warehouses
- Parking lots



## Marion County Preparing Building

Lining  
hallway  
with  
plastic



## Marion County Preparing Building

Placing  
rubber  
runner



State Agricultural Response Team

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## Marion County Registration

Fastening  
armbands  
on owners &  
neckbands  
on dogs



State Agricultural Response Team

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## Pet Owner Responsibilities



- Conduct pre-disaster training
  - *Pets & Disasters: Personal Planning*
- Provide crates or cages large enough to stand, sit & turn around
- Supply medications



## Marion County Floor Still Shiny





## Special Needs Individuals Encountered in Shelters



- Elderly
- Individuals with pre-existing medical conditions
  - Diabetes, Obesity, Hypertension, Handicapped, and Deafness
- Addicted Individuals
- Mothers
- Children with special needs
- Individuals with mental conditions
- Families
- Multiple Languages



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## Emergency Operations Management





- **Supervision of operations**
- **Wear many hats – planner, educator, communicator, coordinator, trouble shooter, developer of policies and procedures, staff advocate**
- **Delegate!**
- **Determine battles that can be lost, those that must be won**

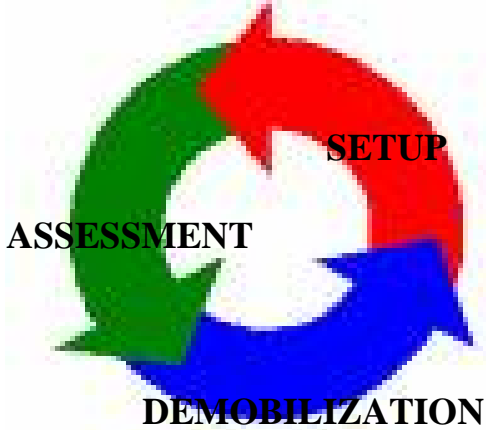


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# Environmental Health Involvement in Shelter Operations





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## Planning



- **Pre-event planning – location, procedures, checklists**
- **Know layout of facilities; obtain floor plan and blueprints**
- **Evaluate adequacy of food preparation and serving areas**
- **Assist in determining location of living quarters, rest rooms and showers**
- **Anticipate situations, human needs, establish procedures and “be prepared for the unexpected.”**



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## Communication



- **Communicate expectations of staff now.**
- **Build teams early on. (Don't forget the safety officer!)**
- **Identify and meet with other organizations that have overlapping responsibilities.**
- **Obtain agreement from IC for situations that won't require IC approval.**



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# Staffing



- Staff robustly – ask for help
  - Permanent staff
  - On-call staff
  - Staff from other entities
- Identify and utilize special skills of staff; guard against misuse of staff
- Location assignments, strike teams
- Work schedules, staff rhythm
- Consider staff needs (physical, emotional, safety)
- Staff must be **EASY TO IDENTIFY** up close and at a distance



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# Volunteers



- Meet with volunteer coordinator early on.
- Identify education and skills volunteers will need regarding Environmental Health issues.
- Screen volunteers.
- Provide just in time training.
- Provide self-inspection checklists, people in charge



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## Janet's Lessons Learned

- Environmental Health plays a significant role in preventing or decreasing the spread of disease in a disaster relief facility
- Prepare now – establish relationships and procedures
- Communicate importance of basic sanitation and get commitment from Incident Command
- Accept offers of help



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## Courtney's Lessons Learned

- More on-site inspectors with increased communication
  - Daily Correction
  - Volunteers
    - Organization
    - Food Service
    - Cleaning of Portable Restrooms
- Observe, Correct and Enforce Regulations to Protect Public Health
- It's not if but WHEN and WHERE will the next event Happen
- When in DOUBT THROW IT OUT!



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## Mark's Lessons Learned

- Robust Staff with Diversity of Skills
  - Food Safety
  - Institutional (infection control, cleaning, etc)
  - Occupational Health and Safety
  - Support staff
- Have a can do service attitude
- Be prevention minded
- Develop a daily schedule/rhythm
- Enforce the basics of public health



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# Questions ????



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