

# How to Design and Conduct a Successful Waste Characterization Audit

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# Agenda

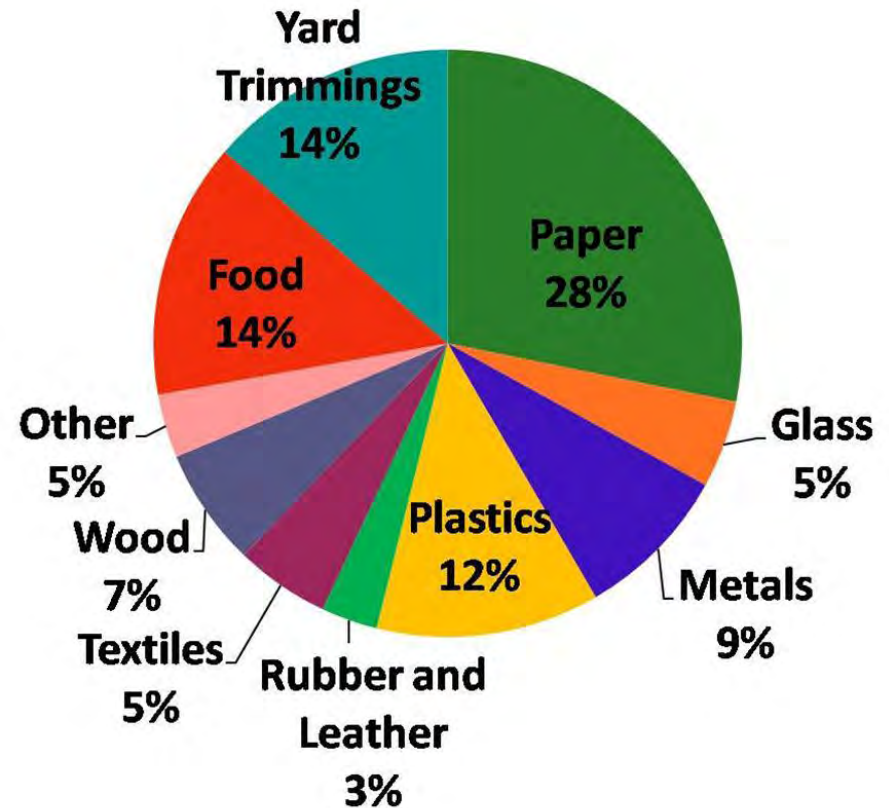
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- Define Municipal Solid Waste
- Define Waste Characterization Audit
- Why Conduct a Waste Characterization Audit?
- How to Conduct a Waste Characterization Audit:
  - Pre-audit
  - During audit
  - Post-audit
- Waste Characterization Audit Trainings
- Discussion and Questions

**Reduce Reuse Recycle**

# Municipal Solid Waste Generated in the U.S., 2009

Material Type	GENERATION	
	Total Tons Generated	% of Total Generation
Food	34.29 Million Tons	14.1%
Paper	68.43 Million Tons	28.2%
Plastic	29.83 Million Tons	12.3%
Yard Trimmings	33.20 Million Tons	13.7%



# What is Your Tribe's Municipal Solid Waste?

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Recyclable?



Compostable?



Reusable?

Dangerous?

Don't Know?



# What is a Waste Characterization Audit?

Hands-on Data Collection Study to Identify:

Waste Disposal Patterns

- Residents

- Businesses

- Institutions

- Industries

Types of Waste Disposed

- Municipal

- Hazardous

Types of Waste *Improperly* Disposed

- Recyclables

- Hazardous



# Why Conduct a Waste Characterization Audit?

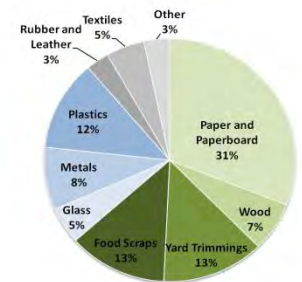
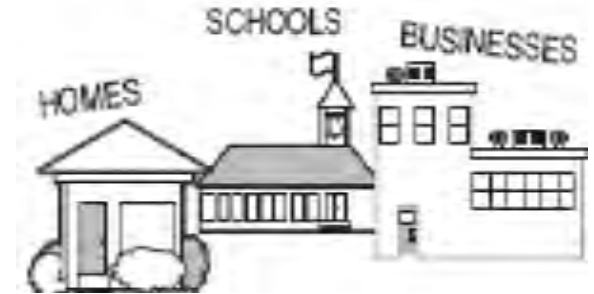
## Analysis from Waste Stream Audits:

- Are a foundation for developing Integrated Solid Waste Management Plan or Pollution Prevention Plan
- Provide better information to decision makers for how to treat waste:
  - Recycle
  - Compost
  - Reuse
  - Landfill
  - Special disposal  
(i.e. hazardous, electronic, medical wastes)



# Waste Characterization: Pre-Audit

- Develop Goals
  - Identify Waste Generators?
  - Identify Opportunities for Education and Outreach?
  - Identify Materials being Disposed of?



# Waste Characterization: Pre-Audit (cont)

## ■ Target Waste Stream Components

### ■ Recyclable Materials



### ■ Compostable Materials



### ■ Reusable Materials



### ■ Electronics



Waste Audit Data Recording Worksheet				
Audit Location & Date:		Weather:		
Materials	Materials & Container Weight Combined (lbs)	Tare = Empty Bin Weight (lbs)	Calculated Material Weight	Comments
<b>GLASS</b>				
exclude: plate glass, mirrors, ceramics, dishes & glassware, Pyrex, etc.				
GLASS BOTTLES & JARS				
Glass Subtotal				
<b>PLASTICS</b>				
exclude: bags, Styrofoam, Tupperware containers, rigid furniture & toys, etc.				
PLASTIC CONTAINERS #1-7				
Plastics Subtotal				
<b>METALS</b>				
ALUMINUM/TIN/STEEL CONTAINERS & FOIL				
Alum/Tin/Steel Foil Subtotal				
SCRAP METALS				
Scrap Metals Subtotal				

# Waste Characterization: Pre-Audit (cont)

- Target Waste Stream Components
  - Household Hazardous Wastes
  - Medical Wastes
  - Construction and Demolition Debris
  - Chemical Wastes
    - Pesticides
    - Banned Materials



# Waste Characterization: Pre-Audit (cont)

- Identify Location, what to consider:
  - Space (*enough to “tip” waste*)
  - Safety (*operating heavy equipment, insects*)
  - Accessibility (*heavy equipment, proximity to hospital*)
  - Weather (*windy, hot, humid*)



# Waste Characterization: Pre-Audit (cont)

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- Complete Pre-audit Questionnaire (Sample Questionnaire)
  - Background information to inform waste sort activities
    - Point of contact information of waste sort participants
    - Refuse and recycling contractors
    - Community demographics (*of waste to be sorted*)
    - Types of dumpsters to be tipped and audited
    - List of known wastes generated by community

# Waste Characterization: Pre-Audit (cont)

- Planning Audit Process
- Each audit is a “snapshot” in time
  - Weather seasons impact waste stream
- Select audit sorting method
  - Manual sorting of all targeted materials
  - Visual observation and estimation



# Waste Characterization: Pre-Audit (cont)

- Planning Audit Process
- Confirm Audit Logistics
  - Location
  - Participants (*all should have HAZWOPER training, and be physically able to sort 400+ pounds*)
  - Date
  - Coordinate with waste hauler



# Waste Characterization: Pre-Audit (cont)

- Planning Audit Process
- Develop and Distribute:
  - Standard Operating Procedures (Sample hand-out available)
  - Health and Safety Plan (Sample hand-out available)
  - Inclement weather contingency plan
  - Final audit schedule to all participants



# Waste Characterization: Audit

- Preparation of the sort area
  - Lay out tarp
  - Set Up Weighing station
  - Label and arrange Sorting bins
  - Set up fencing to keep blowing waste on site



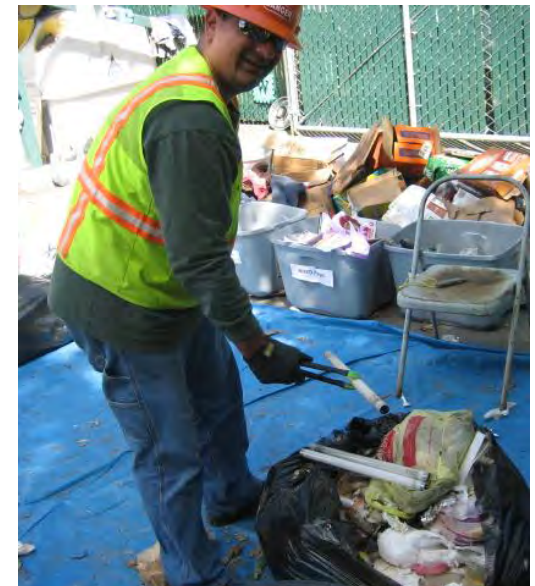
# Waste Characterization: Audit (cont)

- Review on-site safety
- Review Personal Protective Equipment (PPE):
  - Sturdy boots – (ideally steel-toed & shanked; no sandals or tennis shoes)
  - Heavy leather gloves with Nitrile glove liners over or underneath)
  - Safety glasses
  - Long sleeves and pants
  - and/or Tyvek jumpsuit



# Waste Characterization: Audit (cont)

- Sorting protocol
  - What are the targeted materials.
    - Recyclables
    - Compostables (visual tracking?)
  - What are questionable materials
    - Universal Waste
      - Lamps
      - Batteries
    - Bio hazards/Medical waste
    - Household Hazardous waste
      - Pesticides
      - Paints solvents
      - Used oil



# Waste Characterization: Audit (cont)

- Proper sorting tools
  - Rakes, Shovels, Tongs, and
    - Cutting tools
- Proper handling of bags
  - Move bags with shovels
  - Never hold bags near your body
  - Cut bags open assess waste
  - Use tongs to remove recyclables
  - Use shovel to handle remaining landfill



# Waste Characterization: Audit (cont)

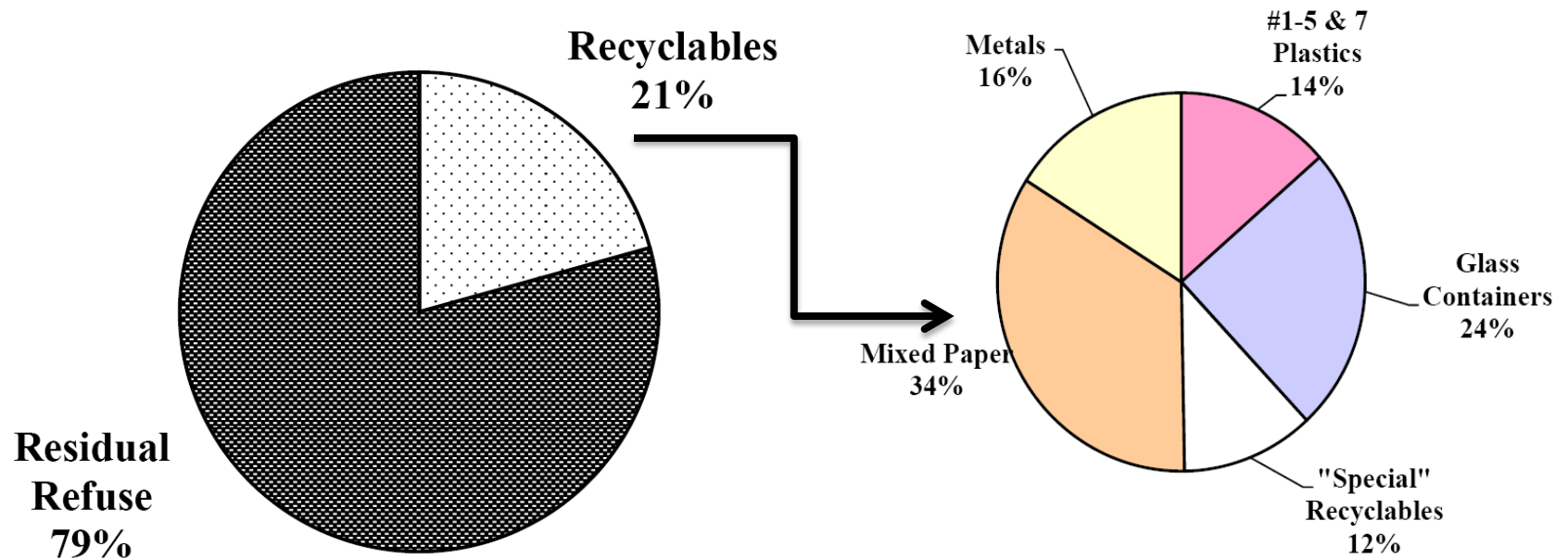
- Calculate the data collected
  - Subtract tare weights
  - Convert volumes to weights
  - Compute percentages for each sample

Materials	Materials & Container Weight Combined (lbs)	Tare = Empty Bin Weight (lbs)	Calculated Material Weight (lbs)	Comments
<b>GLASS</b>				
exclude: plate glass, mirrors, ceramics, dishes & glassware, Pyrex, etc.				
GLASS BOTTLES & JARS				
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<i>Alum/Tin/Steel/Foil Subtotal</i>				



# Analyze Audit Results

Analyze the data collected



# Analyze Audit Results

- Evaluate visual observations
  - Guesstimate amount of compostable waste
  - Document reusable items



# Develop Waste Characterization Report

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- Overview of Services for Refuse & Recycling Collection/Disposal
- Describe Audit Procedures .
  - Audit Logistics - Sampling and Sort Procedures, Staffing, Data Capture
- Describe Audit Discoveries and Post-Audit Comments
- Summarize Audit Results
- Create Recommendations

# THANK YOU!!

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