



# Solid Waste Characterization for Tribal Program Planning

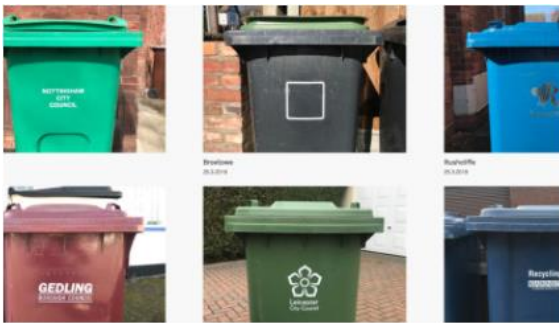
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Deirdre Nurre EPA Region 9



# Today's Waste Characterization Webinar for Tribes

- Our focus: waste characterization for tribal solid waste program planning
- Waste characterizations can look like a lot of different things.
- Let's find the right tool for the job.





# What is a waste characterization?

Or waste sort or waste audit?

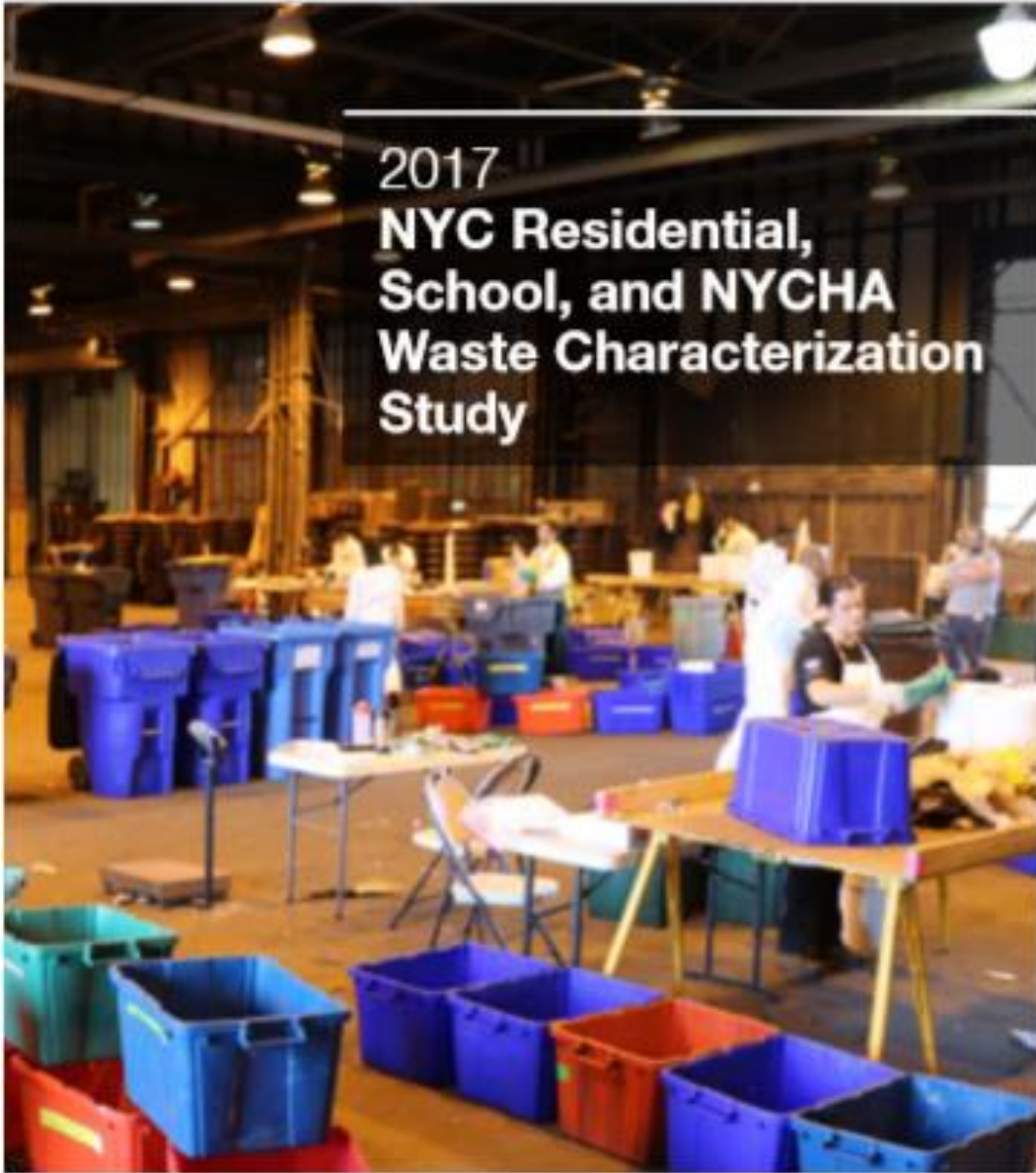


# Let's Think About

How much  
waste?

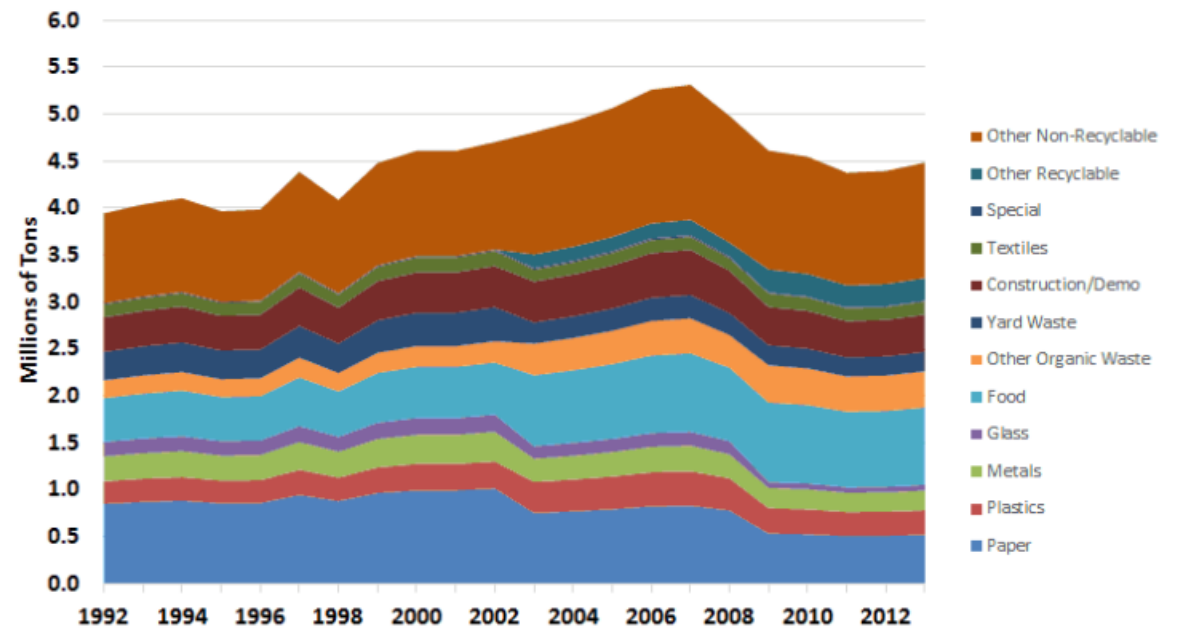
What's in  
it?

Compared to what?



# Complex.

Disposed Material in MSW in Washington: 1992-2013





Simple.



Occam's Razor:  
“the **simplest** solution is almost  
always the **best**.”

# Why Do A Waste Characterization?

- Get to know the program
- Assess: Is our program working?
- Decide what should we do next
- Develop or Update Integrated Waste Management Plan (IWMP)
- Involve our community in solid waste needs and goals
- Demonstrate capacity for additional IHS and EPA funding





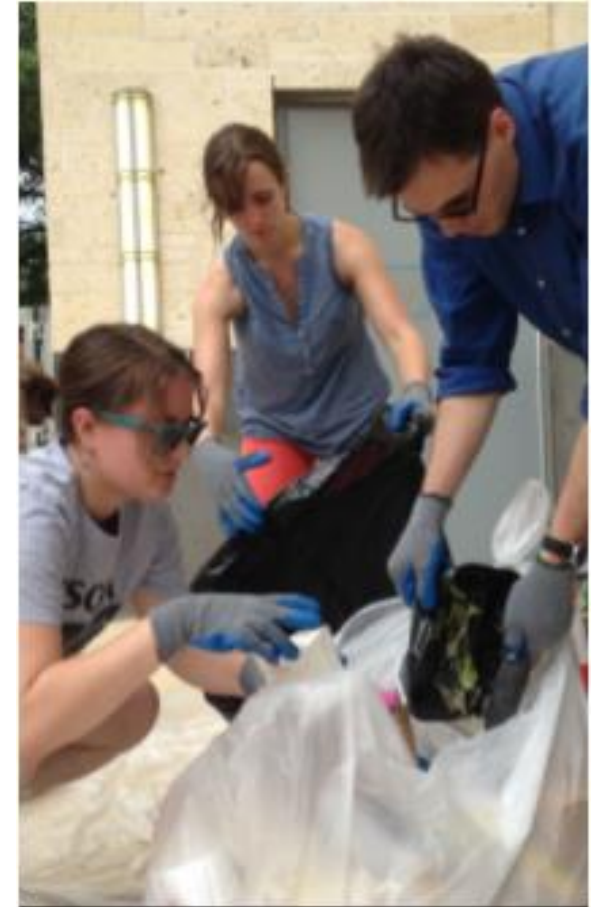
# More Detail & Precision, or Less Detail & Precision? Picking the Right Approach

Does the data need to depict with statistical confidence the composition of your waste over multiple time intervals?

To pick the best approach:

State the purpose of the waste characterization: why do you need the information?

Communicate with entity funding the waste characterization and decisionmaker(s) who use the results



Do you need approval from EPA Headquarters or from Indian Health Services to obtain funding for open dump cleanups?

## 6 prerequisites and associated indicators before closing open dumps

E.3.5 Tribe is conducting community education and outreach activities to assess community knowledge and interest in source reduction, alternatives for managing household hazardous waste, recycling, composting, and the use of green materials in tribal construction and to promote the use of such integrated solid waste management systems

E.3.6 Tribe has completed a waste assessment (e.g., a waste stream characterization study of the solid and hazardous waste management practices, facilities, and issues in the community; effectiveness of current waste management system(s); waste collection and disposal options; and associated costs).

E.3.7 Tribe has a tribally-approved Integrated Waste Management Plan (IWMP).

E.3.8 Tribe has established a program to provide waste minimization, recycling, household hazardous waste collection, used oil collection, junk vehicle removal, bulk waste/appliance/electronic waste collection, and/or composting.

E.3.17 Tribe has enacted waste management and/or UST laws, codes, and/or regulations with effective compliance assurance and enforcement mechanisms (including anti-littering provisions and protocols to address small-scale dumping/burning activities; siting/operating requirements for USTs that are at least as stringent as the federal program).

E.3.18 Tribe has established a compliance monitoring and enforcement strategy for the tribe's solid and hazardous waste management laws, codes, and/or regulations.

# What is the right tool for the job?

Purpose	Waste Stream/Categories	Possible Characterization Approach
<b>Assess feasibility of waste-to-energy facility</b>	All waste streams	Contractor-led
<b>Estimate size, scope and cost of potential future transfer station complex</b>	All waste streams	Contractor-led
<b>Evaluate program expense by tracking waste disposal costs</b>	All waste streams	Records analysis (no waste sort)
<b>Assess whether tribal offices are recycling office paper</b>	Tribal office waste stream	DIY Tribe-led

# What is the right tool for the job?

Purpose	Waste Stream/Categories	Possible Characterization Approach
<b>Propose goals and objectives for an ISWMP</b>	Selected waste streams for which tribe might want to focus future priorities (e.g., could be residential only, or residential plus office, or other choices)	DIY Tribe-led
<b>Inform tribal community of opportunities to reduce food waste</b>	Residential waste stream	DIY Tribe-led (ideally with community participation)
<b>Purchase of multiple recycling bins</b>	Waste streams for those categories of materials for which there are likely nearby recycling options	DIY Tribe-led
<b>Evaluation of dumping patterns at a single site</b>	Waste stream present at the dump site	Visual waste characterization over multiple dates (no waste sort)



# Planning a Waste Characterization

Let's get started!

# Waste Sort

**Step 1:** Develop Goals and Target Waste Stream

**Step 2:** Complete Pre-Assessment Questionnaire

**Step 3:** Plan Assessment Process

**Step 4:** Coordinate Logistics

**Step 5:** Conduct Waste Sort

**Step 6:** Collect and Review Data



# Start with a Records Search

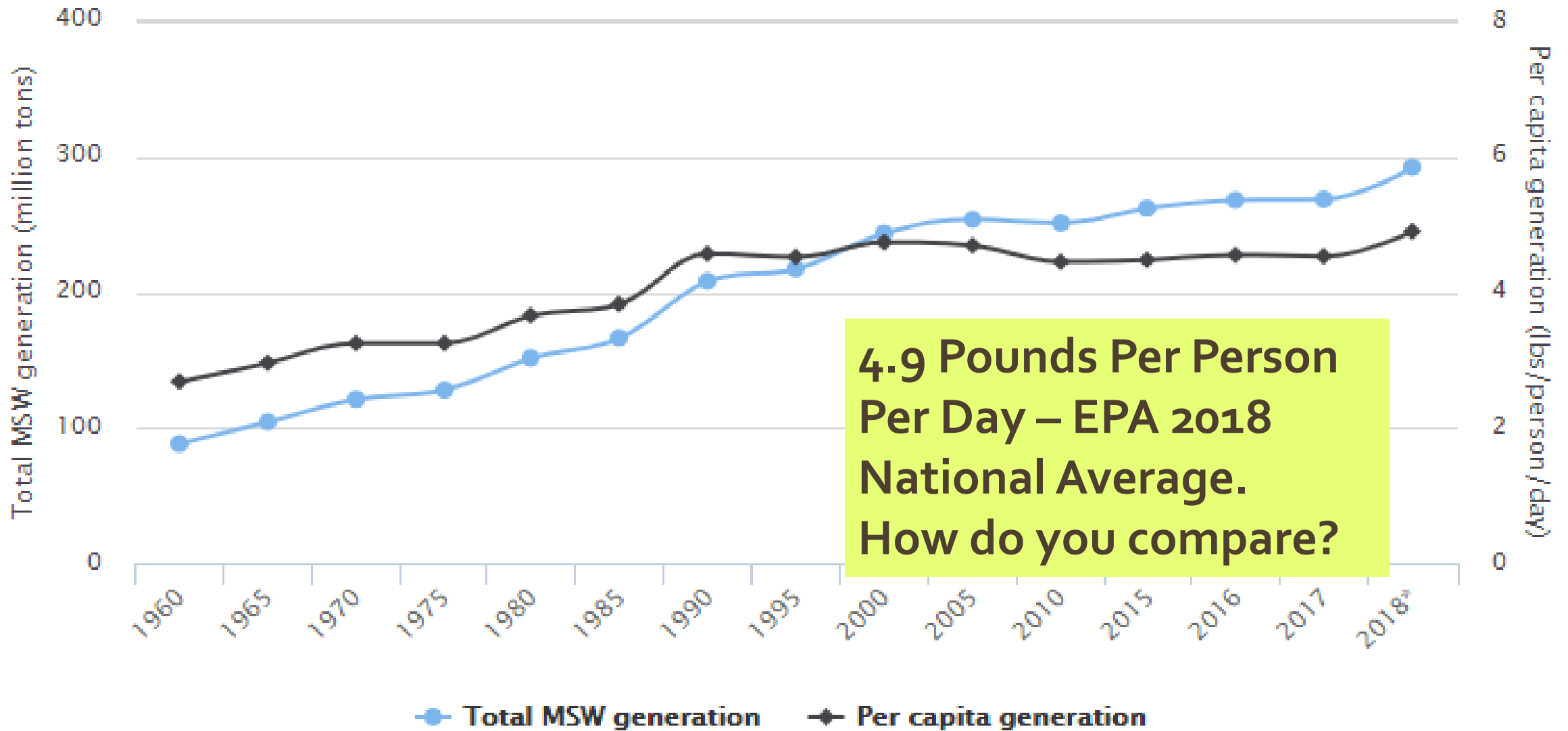
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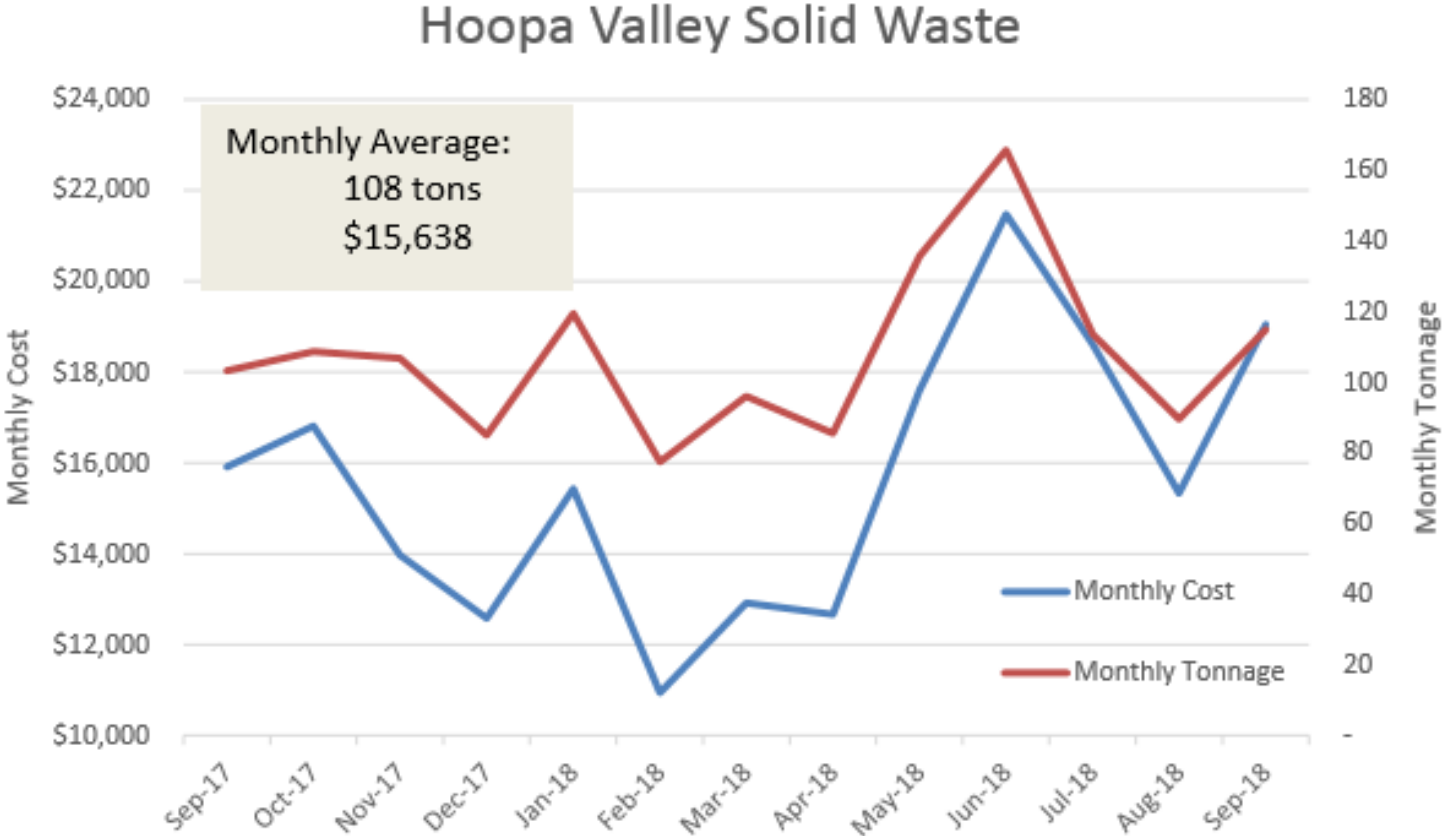
Compared to what?



# MSW Generation Rates, 1960-2018



# Start with a records search



# How much waste does your tribe generate?

Ask your Tribal Administrator for billing receipts

Even if your hauler charges a flat fee, they should still have tip records from landfill

Take total monthly tonnage, divide by household

Description	Qty	Auto Bill Months	Amount	User
DUMP & RETURN COMPACTOR DISPOSAL FEE	1.00		645.10	NNOCCO
	10.35		338.45	NNOCCO
			983.55	
COMPACTOR ONSITE # Days: 30	1.00			BILLING
COMPACTOR ONSITE # Days: 31	1.00			BILLING
COMPACTOR ONSITE # Days: 31	1.00			BILLING
DUMP & RETURN COMPACTOR DISPOSAL FEE	1.00		645.10	ESANCHEZSW
	9.46		309.34	ESANCHEZSW
			954.44	
COMPACTOR ONSITE # Days: 30	1.00			BILLING
DUMP & RETURN COMPACTOR DISPOSAL FEE	1.00		645.10	NNOCCO
	7.34		240.02	NNOCCO
			885.12	
COMPACTOR ONSITE # Days: 31	1.00			BILLING
COMPACTOR ONSITE # Days: 30	1.00			BILLING
DUMP & RETURN COMPACTOR DISPOSAL FEE	1.00		645.10	NNOCCO
	9.12		289.38	NNOCCO
			934.48	

# Selecting a Waste Stream

Think about your community -  
Where is waste being created?



Residences  
(include HUD housing and multifamily units)



Maintenance



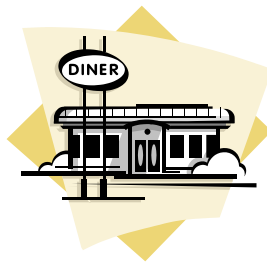
Tribal Administration  
Buildings/Offices



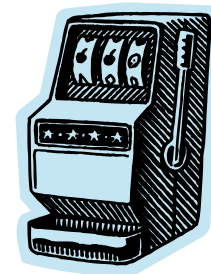
Elder Care / Kid's Day  
Care facilities



Gas Station/  
Travel Center/  
Smokeshop



Restaurant/  
Coffee Shop



Casino



Health Clinic

# Common Waste Sort Categories

- GLASS
- ALUMINUM
- CRV PLASTICS/GLASS/ALUMINUM
- METAL
- MIXED PAPER/PAPERBOARD
- REUSABLE AND DONATABLE ITEMS
- CORRUGATED CARDBOARD
- RECYCLABLE PLASTICS #1 – 7
- HAZARDOUS WASTE & E-WASTE
- ORGANICS
- DONATABLE FOOD/WASTED FOOD
- RESIDUAL WASTE (CATCH ALL CATEGORY FOR WHAT'S UNSORTABLE)

# Waste Categories for Sort

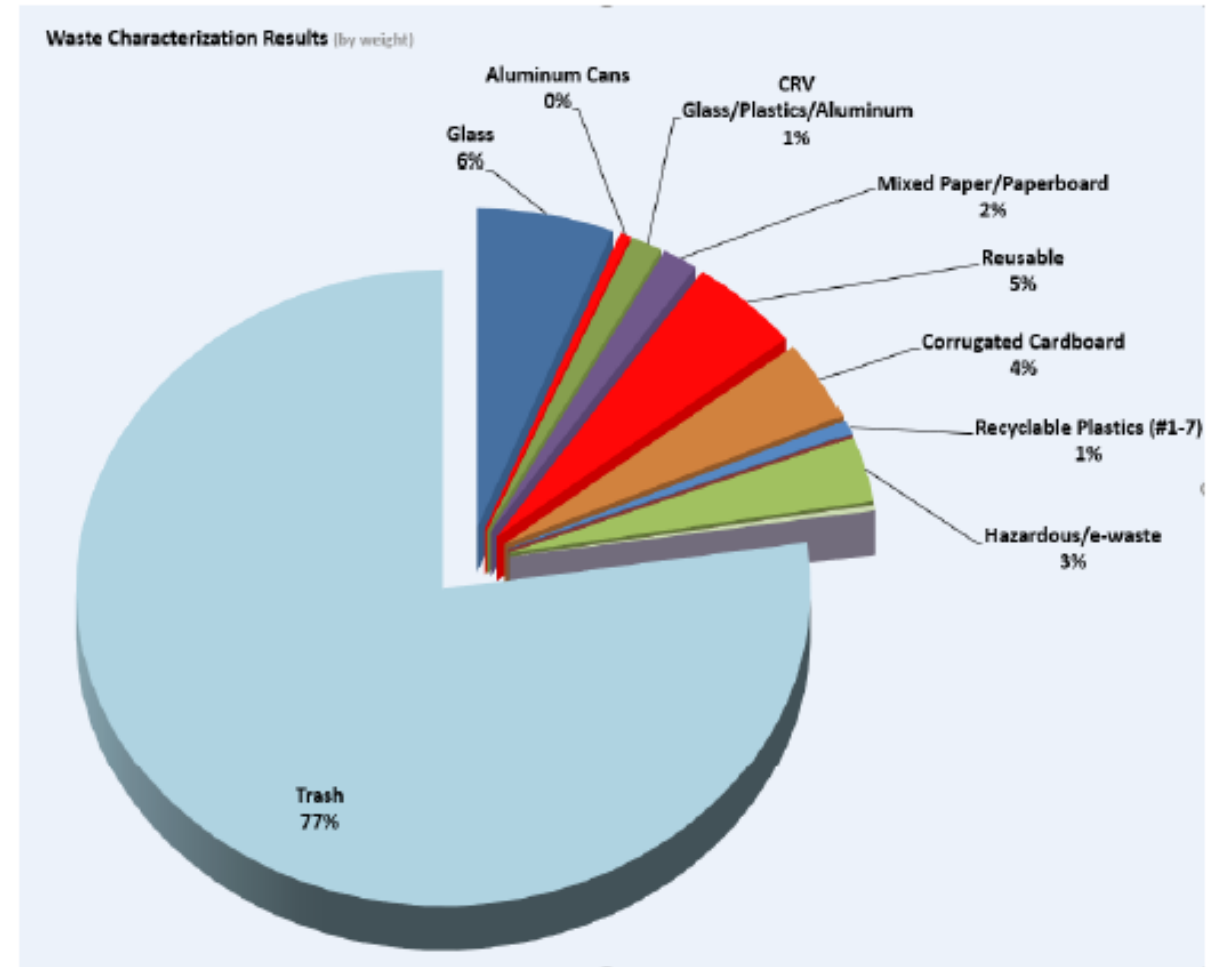
- What do you need to know?
- What are you curious about?
- What recycling options are now available?
- What recycling options possibly available in future?
- No need to sort categories of materials that you don't need information about



# Decide your sorting categories

What materials will be sorted ?

- The materials to be sorted should really support the Tribe's goals for the waste sort and the data they're hoping to get from it.
- What is considered recyclable depends on what is accepted by the recycling collection facility (MRF)
- What is considered compostable is dependent on what kind of composting the tribe is wanting to do or has – i.e. it's best to keep backyard compost to food waste and grass clippings, but organics going to a professional compost facility could include paper serving ware and perhaps even compostable plastics.



# Developing Goals: Who's With You?

Get consensus with your tribal leadership on

- Goals – Why are you doing this?
- Is there a basis of comparison?
- Community Buy-in – What can the community expect? Do they understand the goals?





# Planning Your Waste Sort: Gather a Team

- Recruit team: environmental staff, public utilities, council members, Americorps, US EPA staff, hourly wage labor
- Schedule call/meeting
- Go through pre-assessment questionnaire
- **Select a date (based on regular pickup)**
- Supplies List: inventory & purchase (see pre-assessment questionnaire)
- Contingency plan for heat/wind/precipitation





## Battle Mountain Band

### Waste Sort

On Wednesday, July 25<sup>th</sup>, the Battle Mountain Band Environmental Department will be conducting a residential waste sort. The data gathered from the waste sort will be used to inform the Colony's future recycling and composting efforts. By understanding how much of the trash could be kept out of a landfill and put to good use through recycling or composting, the Colony can work to reduce its environmental footprint.

The waste sort will be part of a training the Battle Mountain Band is hosting, with the US Environmental Protection Agency, for environmental staff from other Tribes to learn how to determine the types and amounts of wastes coming from their communities that need to be managed and identify opportunities to reduce harm to the environment by increasing recycling and composting.



On the morning of Wednesday, July 28<sup>th</sup>, the Battle Mountain Environmental Department will randomly pick up 30 household garbage bins which will be collectively dumped and sorted to separate out and measure recyclables. The garbage bins that were not picked up for the waste sort will be emptied by Hoss Disposal like usual.

If you do **not** want your household's garbage bin to be one that might be picked up by the Environmental Department for sorting, then please contact NAME (with phone number and email). If you opt-out, your garbage bin will still be picked up and emptied by Hoss Disposal, like usual on Wednesday, July 29<sup>th</sup>.

# Community Acceptance – Notification? Buy In or Opt Out?

Notify community via website, flyers that waste will be sorted on a certain date.

Or, tribal leadership may want people to opt in - door to door recruitment is one tool to boost participation.

# Waste Sort: Preparations

## Step 2: Complete Pre-Assessment Questionnaire

Establishes the baseline information

- Points of contact information
- Community demographics
- Collection containers
- Description of the waste stream
- Recycling and waste disposal costs
- Educational and promotional efforts

# Preassessment Questionnaire (sent to participants of today's training) contains Supply List and Safety Plan

**Waste Characterization Pre-Assessment Questionnaire**  
**NAME**

DATE

**Tribal Point of Contact for the Waste Assessment:**

Full name:

Mailing address:

Phone:

Email address:

**Address of where the waste sort will take place:**

**Date & time of the waste sort:**

# Observe more than weight alone



Only looking at WEIGHTS is not necessarily the best parameter for all categories!

Problematic waste can be light in weight but a big problem! Take notes on:

- Styrofoam
- Bubble wrap
- Cellophane

# Getting waste to the audit site



Determine with hauler:

- What is getting picked up? How much will be dumped to be sorted?
- At what time will the trash to be sorted be dumped?
- How will you get the weight of the total amount?
- Is there a large dumpster/roll off container that will be available to put the sorted trash in?

# Waste Sort: Preparations

## Step 3: Plan Assessment Process



# Deliver waste sample to the site

- Critical: getting a sufficient sample of waste to the sorting site at the right date and time, and plan to get it disposed of!
- Climbing into dumpsters for waste is HAZARDOUS.
- Working with haulers: they want to work with you
- How big a site:
  - Obvious or hidden
  - Driving access
  - Consider a visible location option for public education and outreach: people are interested!





# Waste Sort: Preparations

## Step 4: Coordinate Logistics



# Set Up Your Sort: Equipment & Supplies



Appendix A

**SUGGESTED EQUIPMENT LIST for 10 participants**

(8 sorters, 1 site/sort supervisor & 1 data manager)



ITEM	#	COMMENTS	*APPROX. \$ COST
20' by 30' impermeable tarp & ground pegs	1	for outdoor sort <u>locations</u> ; can be power-washed and re-used	\$50
Plastic "snow" fencing, fence posts, zip ties & <u>sledge hammer</u>	as needed if windy	for outdoor sort in windy locations (4'x 100' rolls + 10 T-posts)	\$100
Free-standing tent canopy	1	for outdoor sort locations needing a shaded resting area for participants (10'x10')	\$140
<u>Work table(s)</u>	1 (minimum)	4' - \$45; 6' - \$75	\$60
Folding chair(s)	4		\$60
Sorting bins	24 (minimum)		\$144
Sort bin signage	as needed		N/A
Packaging tape or Duct tape	1	for attaching signage to bins	\$6
Residual refuse garbage cans (32 gal)	4 (minimum)	used to weigh & dump residual garbage back into delivery container	\$60
Garden "bow" rakes	2 (minimum)	for initial spreading of refuse for better access	\$30
Utility knives (retractable)	4 (minimum)	for slicing open plastic bags of refuse	\$12
Tongs	1/person	for extracting recyclable materials from refuse	\$10

This list is in Preassessment Questionnaire

# Waste Sort: Set Up



- Get your supplies to the site
- Print out LARGE READABLE LABELS FOR BINS & Adhere with clear mailing tape
- Arrange a sorting area, weight spot (table/chair/clipboard/scale), rolloff or dumpster for weighed materials (dump it all back in, commingled in one common dumpster)

# Waste Sort – Lay out tarp



# Waste Sort



# Waste Sort



## To complete sort in one day (my estimate)

- Break the day up:  
2 hours for waste delivery  
and setup
- 30 minutes for training and  
orientation
- 3-4 hours of sort (this  
includes breaks)
- 1 hour cleanup
- 30 minutes post-sort  
meeting to record quick  
notes on key findings





# Waste Sort

## Step 5: Conduct Waste Sort



# Sorting the waste: identify items in the pile, sort in the right bin



# Largest Share of Waste is your “Residual Waste” Bin



Once all categories have been sorted, everything else gets dumped into the 'residual waste' bin and is weighed: spoiled food, bathroom trash, plastics that can't be recycled, etc. This will be your largest waste sort category by weight.

2010/09/09 19:02

# Check In: Talk about What's Going On

Stop the team to ask, "What are we noticing?  
What are we seeing?"

Ask how others are interpreting sort  
categories.

Stretch and drink water.

Rotate positions.

**LOOK FOR THE WEIRD.**

**KEEP TALKING.**

**KEEP IT FUN.**

**GIVE OUT PRIZES.**



# Sorting protocols: Food & containers



Food containers:  
weigh or toss?  
Donatable food  
Wrap – weigh or not?  
Broken glass

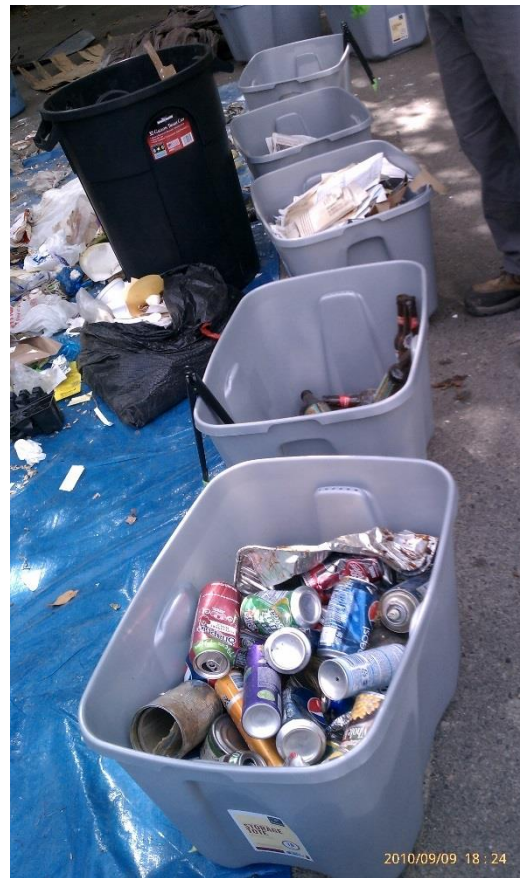
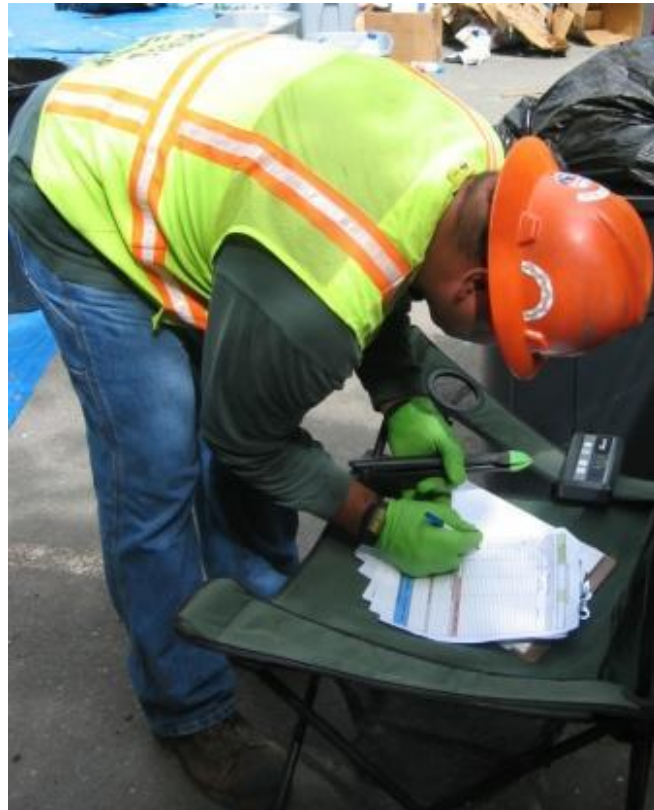
# Collect Data at your Weigh Station (postal scale)



# Waste Sort: Analysis

## Step 6: Collect and Review Data

Take notes on your observations – include in report



# Waste Sort: Analysis

## Step 6: Collect and Review Data

Analyze data collected

Assessment Location & Date: Site 1 - 4/25/13		Weather: Clear		
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.				
<b>GLASS BOTTLES &amp; JARS</b>				
Tote #1	37lbs 11oz	3lbs 13oz	33lbs 14oz	
Tote #2	26lbs 15oz	3lbs 13oz	23lbs 2oz	
<b>Glass Subtotal</b>	64lbs	7lbs 10oz	67lbs 7oz	



# Finished Waste Sort Report Elements

## 1) Summary of records search:

- Yearly waste totals or monthly averages; estimates of total waste per person or per household
- Current cost per ton for contract or for self haul

## 2) Description of the waste sort: goals, methods used, categories sorted

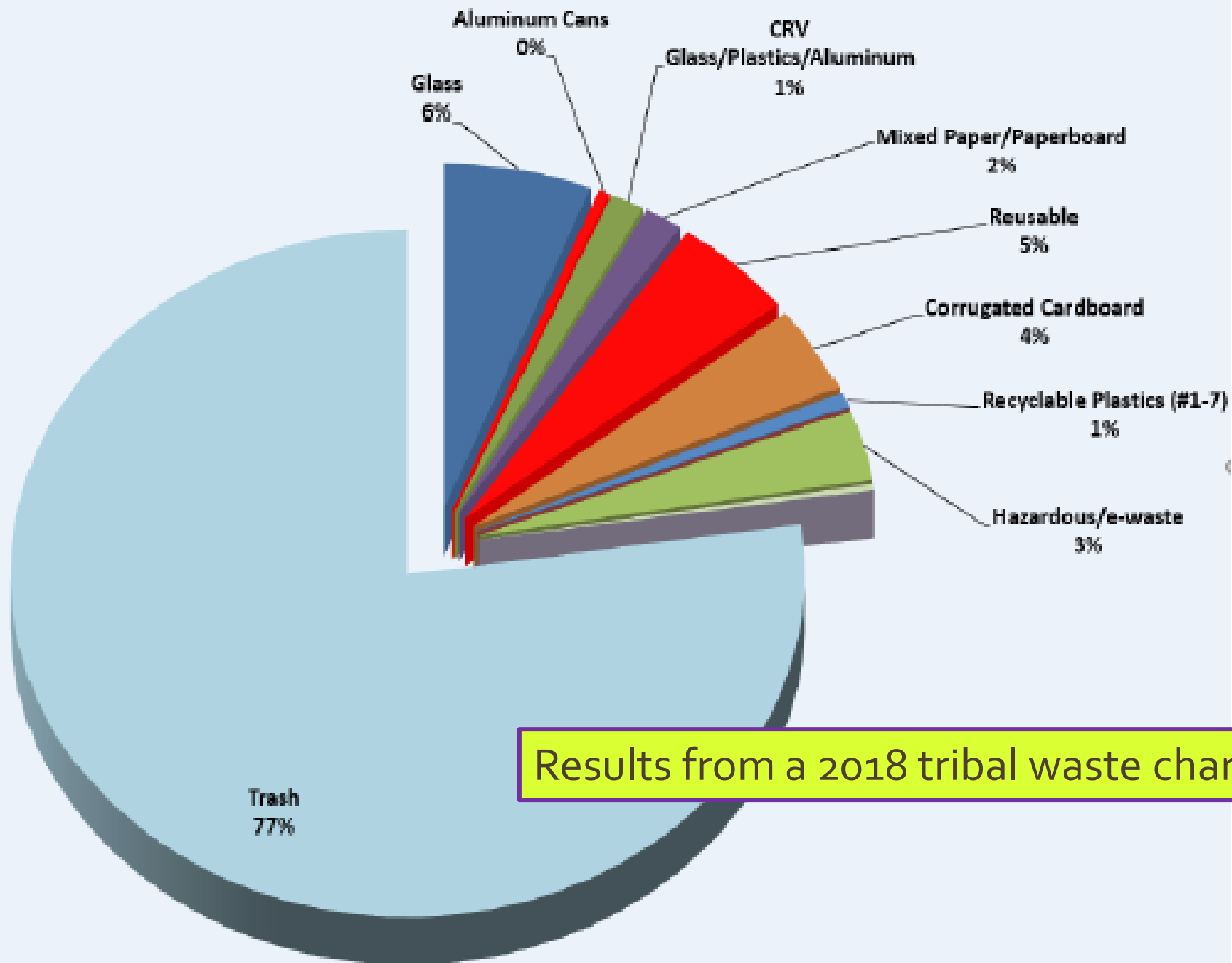
## 3) Results:

- Total amounts sorted by weight, and weights per category
- Useful to show via numbers and via pie chart
- Estimates by volume of any lightweight waste sorted (like styrofoam), plus photos

## 4) Recommendations for next steps: any waste streams to reduce, public outreach and education recommended (THESE GO INTO YOUR ISWMP!)

## 5) Photos of the waste sort process

Waste Characterization Results (by weight)



Results from a 2018 tribal waste characterization

# Examples of How Results Are Being Used



At Coyote Valley



# Records Evaluation

## Strengths

- Provides data on the weight or volume of waste/recyclables on a regular basis
- Tracks waste from the point of origin
- Identifies the most expensive or valuable components of an organization's waste
- Documents financial benefits of waste minimization/recycling
- Requires less time and effort than a waste sort

## Limitations

- Might not provide quantitative data about specific waste components
- Might require substantial effort upfront to gather the records
- Does not provide data on how or why wastes are generated

# Visual Assessment

## Strengths

- Requires less time and effort than waste sorts
- Allows first-hand examination of facility operations
- Provides qualitative information about major waste components and waste-generating processes
- Reveals waste reduction opportunities

## Limitations

- Relies on estimates of waste generation
- Needs to be repeated throughout the year to improve the reliability of the estimates
- Might not identify all wastes generated

# What happens if you think your waste characterization failed?

If you can obtain a sizable pile of waste, sort it into categories, weigh it or evaluate its volume, keep notes on your observations, and write up everything you did, you will have learned more about your waste stream than you knew yesterday.

Not everything will work perfectly.

Decide what you want to improve and do it again next year!

# Thank You!



Waste Characterization Training with Chemehuevi