Community Composting Success

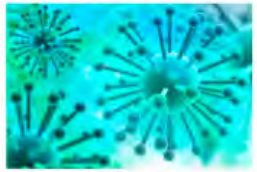
a two-part webinar series brought to you by the Northeast Recycling Council

PART 2: Best Management Practices for Community Composting

Today's Presenters

Natasha Duarte, Director
Composting Association of Vermont

Paige Wilson, Assistant Planner
Lakes Region Planning Commission



US Composting Council®

webinar series

COMPOSTING IN THE TIME OF COVID-19

Part 1: Reviewing Safe Procedures for Composting Feedstocks with Possible Coronavirus Contamination

Wednesday, April 1, 1 pm EDT

Pat Millner, PhD
US Dept of Agriculture
Microbiologist

Pat has worked with biological waste management since 1976 and was instrumental in the development of the Aerated Static Pile method of composting. She has expertise in microbiology of composting, compost products, food safety, and pathogen reduction. Pat has been an extraordinary advocate for organics recovery and composting for more than 20 years.

Jean Bonhotal,
Cornell University
Waste Management Institute

Jean has worked at the Institute in solid waste education for more than 20 years. Currently her time includes work on food scrap, manure and carcass & butcher waste compost education and research. She has also worked with US Forest and National Park Service, US EPA, NYS DEC and the landscape and greenhouse industry.

What Will Be Covered in Part 1:

What can science tell us about composting and the virus that causes COVID-19? What do we as composters need to know to control the disease and prevent it from spreading? In this webinar we will review safe handling procedures and meeting pathogen reduction standards (PFRP) at compost sites.

Register at: https://www.compostingcouncil.org/page/Composting-In-The-Time-of-COVID-19

Community Composting

- Produces compost for local use
- Promotes community connections
- Includes network of backyard composter
- Builds resident food waste management awareness & participation
- Can play an essential role in the evolution of food scrap diversion, especially in small town/rural areas

Photo: Abby Foulk with student volunteers at Charlotte Central School, Charlotte, VT. Cr.: VCGN

Community Composting

- Often volunteer run; some staffed
- Garden groups, neighborhoods, nonprofit organizations, public sector, farms, schools, businesses, housing complexes…
- Range of sizes: 10-20,000 sq.ft.
- Range of compost systems

Bakersfield Elementary Middle School
Bakersfield VT

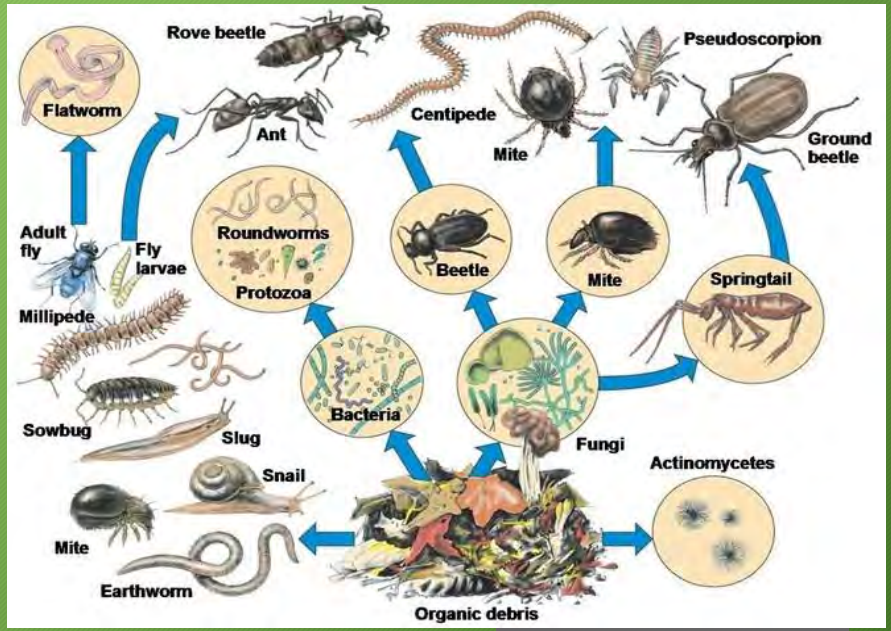
Composting Science: The Basics

OR - how to be a good decomposer manager…

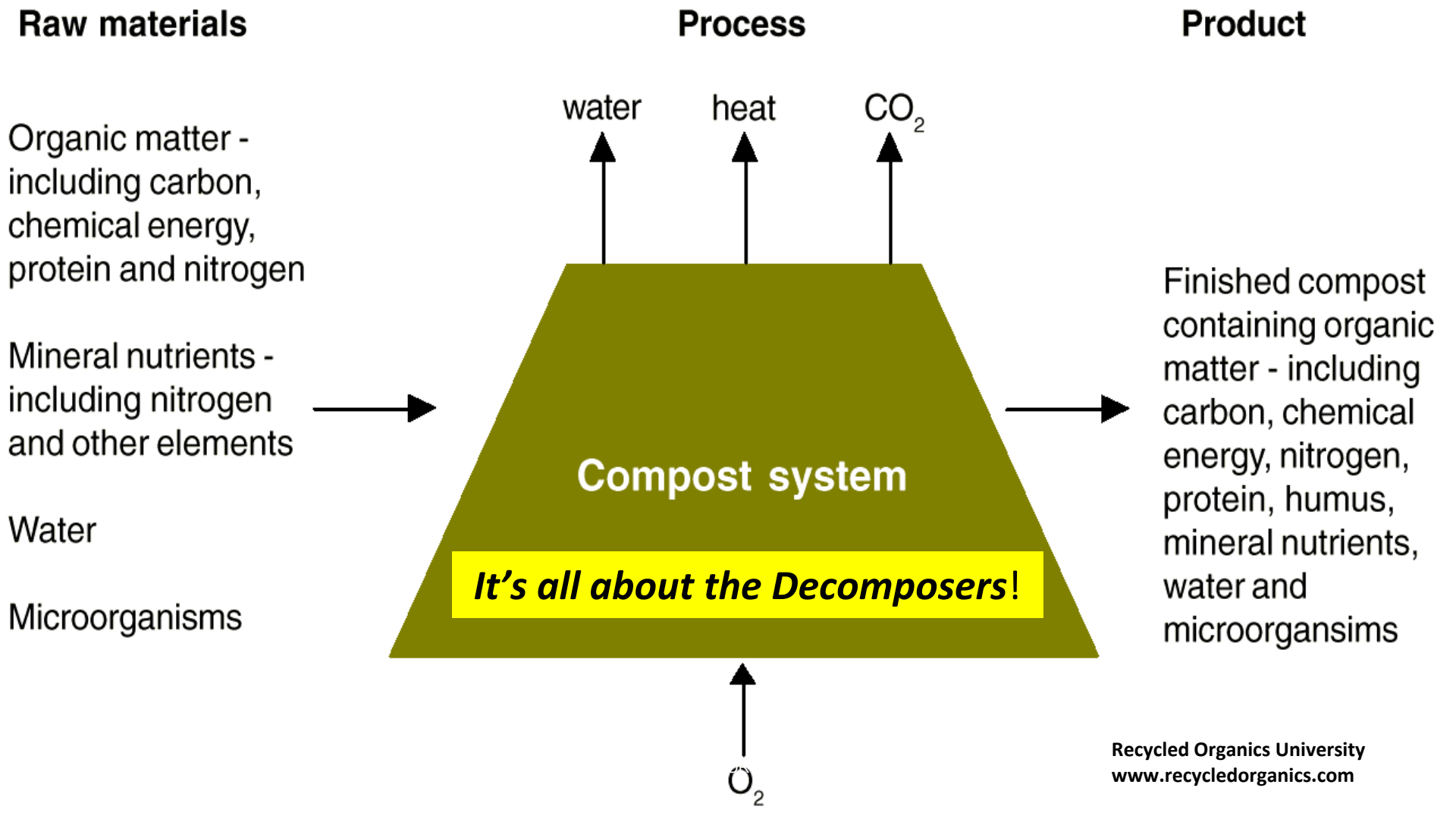
Regardless of scale, the composting process is the same

What is Composting?

- Controlled, aerobic biological process
- Microorganisms are the key
- Recycles organic matter
- Converts residue material into a valuable product rich in organic matter and organisms



Credit: Puzzle Permaculture


Raw materials
Process
Product
Organic matter - including carbon, chemical energy, protein and nitrogen
Mineral nutrients - including nitrogen and other elements
Water
Microorganisms
water
heat
CO_2
Compost system
It's all about the Decomposers!
O_2
Finished compost containing organic matter - including carbon, chemical energy, nitrogen, protein, humus, mineral nutrients, water and microorgansims
Recycled Organics University
www.recycledorganics.com

What is Compost?

- Stable, soil/humus-like material
- Rich in organic matter & organisms
- Free of unpleasant odors
- Easy to handle
- Can be stored for long periods
- Valuable soil & potting media amendment

Keeping Microbes Happy

Setting up the right environment and conditions is fundamental to the process:

- Carbon: "Brown" materials (wood shavings, leaves, soiled/shredded paper, straw, animal bedding)
- Nitrogen: "Green" materials (kitchen scraps, grass clippings, garden trimmings, manures)
- An initial boost: a little soil, finished compost, or horse manure
- Moisture: required to keep microorganisms alive & active, like a damp sponge
- Keep the material small: mowing, grinding, chipping, or shredding

Keeping Microbes Happy - the science

- Aeration: Oxygen concentrations: 10-14+%
- Carbon to Nitrogen (C:N) Ratio:
  - 20:1 - 60:1
  - Preferred 30:1-50:1
- Moisture: 40 to 65 percent (like a damp sponge)
- Optimum pH range: 5.5 to 8
- Temperature - 90°-150°F (32°-66°C)
  - If all is well with your pile, temperatures will rise!
  - Process to Further Reduce Pathogens: 131°F for 3-15 days (f of system)

Sample Carbon & Nitrogen Ratios of Various Organics

Carbon Sources	Carbon:Nitrogen Ratio
Yard wastes	50 - 90:1
Straw/hay	50 - 80:1
Wood chips/sawdust	250 - 500:1
Nitrogen Sources	**Carbon:Nitrogen Ratio**
Vegetable scraps	10 – 30:1
Fruit scraps	10 – 30:1
Grass & garden gleanings	10 – 20:1
Chicken manure	10 – 25:1
Cow manure	20 – 30:1
Horse manure	25 – 30:1

Adapted from Robert Rynk, "*On-Farm Composting Handbook*," Natural Resource, Agriculture, and Engineering Service, 1992.

Simple & “Slow” Method

- Follow the basic recipe (1 green to 3 browns)
- Turn occasionally
- Compost will be ready in 12-18 months

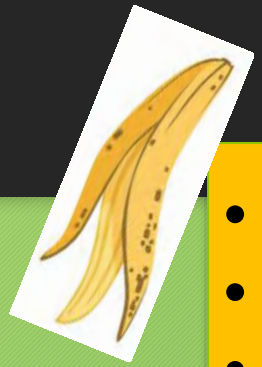
Active (“Hot” Compost) Method

- Enclosed containers
  - Insulate in winter
  - Use larger containers or tumblers/covered piles to insulate
- Proper “mix” of green & brown feedstocks (for system)
- Frequent turning of materials to achieve heat
  - 1-2 times per week
- Temperature should rise to 90-120°F for 3+ days - (131°F is goal)
- Finished compost in 6-8 months

Feedstocks & Recipe Development

What's your site goal?
How much volume can your site handle?
How much volume can your team handle?

Acceptable Materials



- Fruit & vegetable scraps, peels
- Bread/pastries, pasta, rice, beans
- Nuts & nut shells
- Coffee grounds/filters & tea bags
- Sawdust
- Leaves, yard/garden trimmings
- Napkins, paper towels
- Livestock bedding/manure
- Straw

GREENS Sourcing: Food Scraps

- Community gardeners
- Schools
- Businesses
- Residential complex
- Churches
- Community members
- Grocers** (be selective)

- Start collecting small volumes, grow from there
- Year-round, consistent supply of feedstocks

BROWNS Sourcing: Carbon

- Woodworkers, town, utility crews, landscapers - sawdust, wood shavings
- Neighborhood, landscapers - leaves
- Farmers - livestock bedding

- Year-round, consistent supply!
- 2-3 times volume than food scraps
- Keep dry

Farmer's Markets

Community garden bins

Farm-based collection

Image Cr.: Elements Mountain Compost

Community Collection…by bike!

Pedal People
Northampton, Massachusetts

BASIC RECIPE

High Carbon

3 volumes

High Nitrogen
1 volume

Site & System Considerations

(Before) Gathering Needed Materials

- Permitting & regulatory considerations
- Land: How much space do you need?
- People power: What's your capacity to collect and process materials?

(Before) Gathering Needed Materials

- Decide on types of feedstocks
- Assess volume of materials needed (Greens : Browns)
- Identify resources available
- Develop a plan

Photo: Cornwall School, Cornwall, VT

Site Plan: Going with the Flow

1. Organics Intake
2. Feedstock Preparation
3. Active Composting
4. Curing
5. Sifting
6. Finished Compost/Distribution

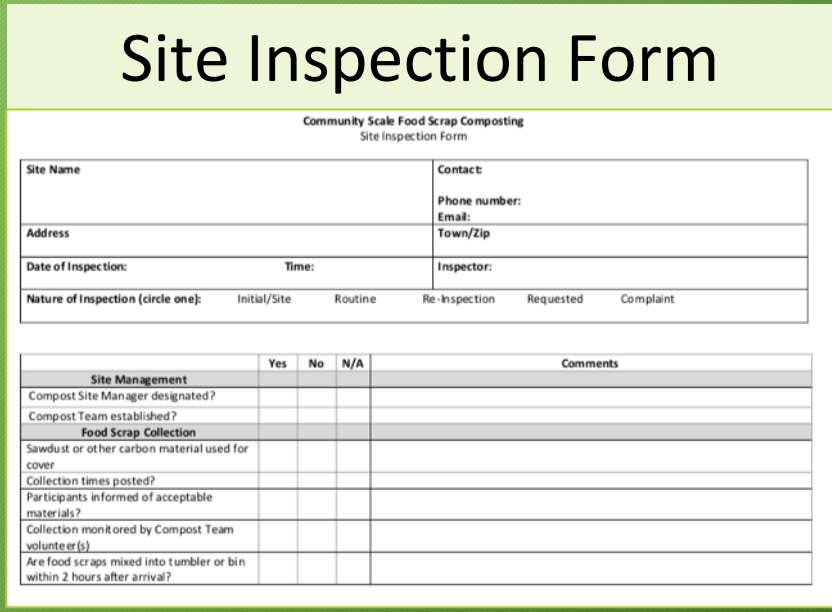
Site Considerations

- Year-round accessibility
- Shrubbery, fencing, or cover
  - ✓Blocks wind, insulation (for winter), & aesthetics
- Shady/partial sun is best
- Access to a water source

Site Considerations

- Buffer, swale, or filter around/behind piles
  - ✓Capture leachate
- Site bins/piles on ground, grass or vegetated area
- Slightly sloped (2-5%) for windrows & piles

Site Inspection Form



Community Scale Food Scrap Composting
Site Inspection Form

Site Name	**Contact:** **Phone number:** **Email:**
Address	**Town/Zip**
Date of Inspection: **Time:**	**Inspector:**
Nature of Inspection (circle one): Initial/Site Routine Re-Inspection Requested Complaint	

	Yes	No	N/A	Comments
Site Management				
Compost Site Manager designated?				
Compost Team established?				
Food Scrap Collection				
Sawdust or other carbon material used for cover				
Collection times posted?				
Participants informed of acceptable materials?				
Collection monitored by Compost Team volunteer(s)				
Are food scraps mixed into tumbler or bin within 2 hours after arrival?				

Set-Backs

- 3 ft. from side lot lines; 10 ft. from front lot line; 25 ft. from the back lot line
- Adequate distance from well, wetlands, surface water bodies & flood plains
- Operate to prevent drainage from compost piles into water or neighboring property
- Keep area visually appealing

Best Management Practices: Siting

- Operated to minimize odors, prevent run-off, and not harbor or attract wildlife
- Screened from view from public & adjacent neighbors using plants, trellis, or fencing
- A neat site appearance is important
- Have an adequate amount of carbon on hand
  - ✓ Always cover food scraps with carbon (sawdust/shavings) or soil

Best Management Practices: Animals

- Cover food scraps with adequate carbon or soil
- Line bins with hardware cloth (wire mesh)
- Cover with lime if issues with fruit flies & wildlife (rodents, bears)
- Enclose compost area if needed
- Repellents - noise, ammonia soaked rags
- Remove all food sources (bird feeders, trash cans) from area
- Stop incorporating food scraps in spring, if necessary

Community Compost Systems

What's right for your site?

Tumblers

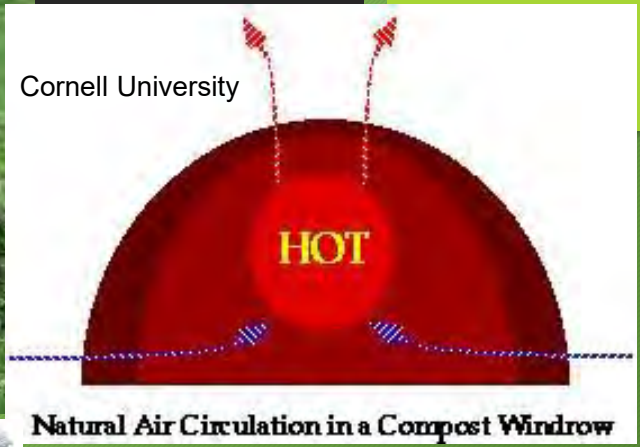
Bins

Bins


Photo Cr.: George McDonald, Maine DEP
Roof


ADD
HERE
COOKING
COMPOST

Piles & Windrows



In-Vessel

The Dirt Factory, University City, PA

Image Cr.: PlanPhily

Vermicompost (Worms)

Insulated Systems

Champlain Valley Cohousing, Charlotte, VT

Integrated Systems

Process Management

Local case study examples

Tuftonboro Community Garden, NH

Images: Athena Lee Bradley, WSWMD

Tuftonboro Community Garden - Con't

Fall/Winterized Compost Site

YMCA Camps (Tuftonboro)

2019 Pilot Program:

North Woods/Pleasant Valley Camp

- Kitchen scraps (pre-consumer)
- No meat or dairy

Initial setup at NW/PV camp

North Woods/Pleasant Valley Camps - Con't

Tuftonboro YMCA Camps Con't

FUTURE DEVELOPMENT GOALS:

- Use in-vessel composting to increase capacity
- Extend to larger Tuftonboro community
- Help the environment

Record Keeping Essentials

Why is it important to keep track of your compost program/system?

Log Book

Date	Time	Composter Name(s)	Moisture Rating	Odor Rating	Temp 1	Temp 2	Turned (Y/N)	Other Actions Taken

Compost Tumber Batch	Tumber Chamber	Date Added to Tumbler	Date Removed From Tumber	Volume of Kitchen Scraps	Volume of Manure	Volume of Shredded Leaves	Volume of Other Additions	Other Addition Type	Total Volume Added to Tumbler	Volume of Material Removed From Tumber	Comments
1	HF #1	6/19/2019	6/29/2019	10.0		5.0			28	17	
1	HF #1	6/22/2019				1.0					
1	HF #1	6/23/2019		3.0	2.0	1.0	1.0	Garden Loam			Transferred to HF #1 on 6/26
1	HF #1	6/26/2019		2.0	2.0	1.0					
2	HF #2	6/26/2019	7/7/2019	9.0	1.0	2.0			20.0	10	
2	HF#2	6/29/2019		2.0		2.5	0.5	wood ash			
2	HF #2	7/2/2019		1.0			1.0	Garden Loam			
2	HF#2	7/5/2019			1.0						
3	HF #1	6/29/2019	7/6/2019	8.0	2.5	2.5			18.0	10	
3	HF #1	7/2/2019		4.0			1.0	rden Loam and wood a			
4	HF #1	7/7/2019	7/20/2019	8.0	4.0	4.0			22.0	11	
4	HF #1	7/13/2019		2.0	2.0	2.0					
5	HF #2	7/13/2019	7/27/2019	10.0	2.0	2.0			18.0	10	
5	HF#2	7/21/2019		3.0		1.0					
6	HF #1	7/21/2019	8/4/2019	11.0	3.0	3.0			21.0	9	
6	HF #1	7/27/2019		4.0							
7	HF #2	7/27/2019	8/17/2019	10.0	2.0	2.0			17.0	8	5 gal transferred to Jora #1
7	HF#2	8/4/2019		2	1						3 gal transferred to Jora #2
8	HF #1	8/4/2019	8/16/2019	13	2	2			17	5	Transferred to Jora #1
9	Jora #1	8/9/2019		18	3	3					
9	Jora #1	8/17/2019	8/25/2019				5.0	from HF#2 (Batch #7)	34	15	first egg shells, compost steaming, temp over 120oF
9	Jora #1	8/16/2019					5.0	from HF#1 (Batch #8)			
10	Jora #2	8/17/2019	9/8/2019	20.5	5	2	3.0	from HF#2 Batch#7	50.5		Transfer from Batch #7
10	Jora #2	8/25/2019		4							mostly corn ears
10	Jora #2	8/31/2019						transfer from HF #1			
10	Jora #2	9/1/2019					5.0	Trans from HF Batch 11			
10	Jora #2	9/1/2019			7	4					
11	HF#1	8/17/2019	9/1/2019	8	2	2		transfer to Jora #2	12	5	transfer to Jora #2
12	Jora #1	8/25/2019		16.5	3.5	3.5			42.5	12	
12	Jora #1	9/1/2019		10	2	2					
12	Jora#1	9/5/2019			5						
13	Jora #2	9/8/2019	9/28/2019	17	3	3			31	12	from 9/7 kitchen scraps
13	Jora #2	9/16/2019					8.0	ranfered from batch 13			
14	HF #1	9/8/2019	9/16/2019	13	5	1			19	8	from 9/7 kitchen scraps/transferred to Jora #2 Batch 13
	Totals			209.0	60.0	51.5	29.5		350	132	

Log example:

NW/PV camp pilot inputs and outputs

Tracks…

- tumbler use
- quantity of material added
- volume reduction

Program Reporting/Record Keeping

Tables from 2019 NW/PV Pilot Report:

	Volume of Feedstock (gallons)	Ending Volume (gallons)	Change in Volumer (gallons)	Percent Change in Volume
Tumbler	350	132	218	62%
Earth Machine	224	76	148	66%
Combined	403	76	327	81%

Table Four: Reduction in Volume During Different Stages of Composting

Use of NW/PV Report:

- Grant funding
- Outlined success of pilot and partnerships

- NEGEF awarded $750 for compost equipment and materials

New England Grassroots Environment Fund

Date Added	Type of Material	Number of Gallons	Additons after Primary Composting	Comments
6/29/2019	stick and leave base	20	20	
	horse manure	2	2	
	shredded leaves	1	1	
	compost from run 1	17		
7/5/2019	compost from run 2	10		
	horse manure	3	3	
	shredded leaves	2	2	
7/7/2019	compost from run 3	10		
	shredded leaves	2	2	
	horse manure	2	2	
7/20/2019	compost from run 4	11		
	horse manure	2	2	
	shredded leaves	2	2	
	wood ash	0.5	0.5	
7/27/2019	compost from run 5	10		
	shredded leaves	2	2	
	horse manure	2	2	
8/4/2019	compost from run 6	9		
	horse manure	2	2	
	shredded leaves	2	2	
8/25/2019	compost from run 7, 8 and 9	15		
	shredded leaves	3	3	
	horse manure	3	3	
9/5/2019	horse manure		2	
9/7/2019	wood ash		0.2	
9/8/2019	compost from run #10 and #11	15		
9/25/2019	compost for batch #12	12		Earth Machine Completely Full
9/28/2019	compost from batch #13	12		only about 5 gallon would fit in Earth Machine
	totals	171.5	52.7	

Develop a Site plan

- Overview of the site & system
- Monitoring & record keeping
- Provisions for controlling odors
- Communication & training (internal & external)
  - ✓ Be a good neighbor!
- Animal control measures
- Safety & fire emergency plans
- Security & vandalism (if needed)
- Contingencies (including closure plans)

Health & Safety Recommendations

- Close or limit the number of people onsite at any one time
- There may be changes in volunteer/staff availability - make a plan!
- Consider changes to your collection/drop off procedures
  - Staggering drop-off times
  - Have people put their scraps directly in the system (training!)
  - Use certified compostable bags
  - Always have plenty of high C materials
- Practice social distancing (6+ feet away from others)
  - Mark 6-foot distances around drop-off or other compost system areas
  - no handshaking or hugging for greetings

Health & Safety Recommendations

- Choose the right tasks for everyone, particularly those with asthma, allergy or other health issues (or at higher risk)
- Wear disposable or washable gloves (consider face masks or shields)
- Wash your hands for 20-30 seconds (Happy Birthday x 2-3)
- Know if your temperatures are hitting 120^{+} F°

Health & Safety Recommendations

- Review proper tool use (in general)
- Tools/equipment for feedstock material should not be used for finished compost
  - If necessary, sanitize tools with household cleaners, bleach solutions (1/3 cup per 1 gallon water) or alcohol solutions of at least 70% alcohol
  - Tools should be set in the sun to dry as this helps to sanitize as well
- Regularly wipe down all parts of compost bins, storage bins, tools, and other surfaces which come in contact with food scraps and other feedstocks

Resources

- **Northeast Recycling Council** (nerc.org/nerc-resources/search-for-resources/)
- **Composting Association of Vermont** (CompostingVermont.org/community-food-scrap-composting-resources)
  - COMING SOON: Community Composting blog
- **US Composting Council** (compostingcouncil.org - Research/Educate)
- **Institute for Local Self-Reliance** (ilsr.org/composting/rg/composting)

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