On-Farm Aerated Static Pile Composting – You can do it!

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Cattleman’s Winter School, January 2021

Session outline

• Fundamentals of Aerated Static Pile Composting
• 4 case studies: 10, 18, 37 & 600 cubic yard systems
• Resources
• Questions and Discussion

Whatcom Conservation District
Since 1946, we have worked with landowners and farmers to foster a healthy, sustainable relationship between people and the environment.
Learn what opportunities exist in addition to our FREE and confidential Whatcom CD farm planning services.

**Equipment Share**
Rent our manure spreader and poultry processing equipment

**Manure Link**
Use our new online resource to find or share manure

**Grants and Rebates**
Fund your farm goals to improve animal health and chore efficiency

**Soil Testing**
Improve pasture health with sample assistance and interpretation

**Free Manure Tarp**
Protect your nutrients from runoff and improve composting

**Workshops & Events**
Learn from local professionals and your peers

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**FIND YOUR LOCAL CONSERVATION DISTRICT**

Conservation Districts are one of America’s best kept secrets. As locally-led special-purpose districts, there are 12 trusted agencies throughout Puget Sound who will help you find solutions for your backyard, farm, forest, or community – and all for free!

Click your district area on the map below to learn more about your local conservation district.

betterground.org
Thank you!

Best Management Practices

Healthy Animals. Healthy Pastures. Healthy Resources.
Why aerate?

Among other reasons...

- Speeds up primary composting time frame to roughly one month.
- Insures temperatures to kill parasite eggs, larvae, and weed seeds.
- Insures temperatures and quick action to compost butcher waste and animal mortalities
- Reduces moisture therefore reduces danger of environmental runoff.

Composting is the biological decomposition of organic material under controlled aerobic conditions.

Aerated Static Pile (ASP) Composting

Means we leave the pile right where it is.
### The Blower/Timer Setup 1.0

<table>
<thead>
<tr>
<th>Item</th>
<th>Source</th>
<th>Est. Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Koala KP-680 Inflatable Blower</td>
<td>Amazon.com</td>
<td>$116</td>
</tr>
<tr>
<td>Timer Outlet, Nearthow Multifunctional 7-Day Cycle Programmable Plug-in Digital Time</td>
<td>Amazon.com</td>
<td>$17</td>
</tr>
<tr>
<td>Extension cord</td>
<td>local hardware store</td>
<td>$30</td>
</tr>
<tr>
<td>4” drain pipe (x4), solid pipe (x1), cap, flexible rubber coupler with hose clamps</td>
<td>local irrigation supply store (e.g. HD Fowler)</td>
<td>$70</td>
</tr>
<tr>
<td>50’ x 30’ tarp</td>
<td>local hardware store</td>
<td>$100</td>
</tr>
<tr>
<td>Materials for “doghouse”</td>
<td>Scrap</td>
<td>$0</td>
</tr>
</tbody>
</table>

**Total:** $333
What are we trying to accomplish by composting?

- Create a stable humus material to improve soil tilth and fertility
- Stabilize the carbon and nitrogen in the compost
- Reduce the initial materials (feedstocks) volume and weight
- Reduce pathogens and weed seeds
- Seed our soil with beneficial microbes and create soil conditions conducive to microbial health.

One day at 50°C (122°F) is a time and temperature combination yielding total pathogen death for common disease organisms that can be transmitted by humanure. Lower temperatures require longer retention times. Pathogen death boundaries shown include those for intestinal (enteric) viruses, Shigella, Taenia (tapeworm), Vibrio cholera, Ascaris (roundworm), Salmonella and Entamoeba histolytica. [Source: Fishern, et al., 1980]
Temperature Control in an ASP system

Brilliance of an ASP system is the ease of temperature control (assuming adequate blower capacity)

With no air (blower off), very slow or no rise in temperature

With the blower on, temperatures rise quickly at first, normally, and then eventually cool slowly
Cloud Mountain Compost 2013

Item Source Est. Cost
Ethernet Tag Manager wirelessstag.net $40
Outdoor Probe Basic with DS18B20 waterproof temperature probe wirelessstag.net $54
Reotemp Compost Thermometer Amazon.com $21

Total: $115

Ethernet Tag Manager

Outdoor Probe: IP68 rated*, 5 year battery, wireless temperature logger for extreme conditions.

*Contact vendor for details on specific temperature ranges.
Feedstocks

• Carbon to Nitrogen ratios 20:1 to 40:1
• Available carbon- big pieces don't count

• Avoid feedstocks that might have persistent herbicides
Strategies for Porosity

• “Free air space” in the range of 30-65%, alternatively
• ”Bulk density” 16 – 24 lbs. for a five gallon bucket
Moisture content 50 – 70% (65%) with an aerated static pile.
Higher initial moisture is important because the air drives off the moisture as the composting progresses.

ASP Systems need more water!

Case Studies ; four farms

- Site 1: 10 cubic yards
- Site 2: 18 cubic yards
- Site 3: 37 cubic yards (& windrow)
- Site 4: 600 cubic yards
Site 1:
• 10 cubic yards
• 1 horse & 1 pony.
Site 2:
- 18 cubic yards
- 5 llamas, 2 goats
- Boarding 4 horses & three oxen.
Site 5: Aerated Manure Storage

- 5 llamas, 4 horses, 2 goats
Site 3:
- 37 cubic yard, 4 bay composting shed
- ~60 cubic yards windrow
- Intensive 2 acre organic market farm, ~1 animal unit grazing, flock of layers.
Small Acres Windrow system
Small Acres Shed system
Site 4:
- 600 cubic feet in bunkers.
- WSDA licensed composting facility for Lopez Island
- Small scale commercial beef and pork

Midnight’s Farm
Lopez Island
- Compost & Wood Chips
- Beef
- Pork
- A Farm Stay
- Yoga Studio
- big homestead garden
Midnight’s Farm Compost Facility

- 2004 Built the “heavy use area” for the cattle and “compost facility” with NRCS EQIP funding
- 2013 Applied for an Agricultural Composting Facility Exemption from Washington Department of Ecology
- 2013 Built the 54 x 30 Aerated Bin, runoff catchment basin, bought the tub grinder

Department of Ecology
“exempt” on-farm compost facility

- More intentionality – approved design and procedures
- Allows us to accept Yard Debris (which is regulated as a solid waste – and if transported, must go to a “solid waste facility”)
- Allows us to sell compost
- Requires yearly testing and reporting to Ecology
- Requires that 50% of feedstocks are agricultural
Modified ASP with multiple turns

Bin 0 – mixing, wetting

Main aeration details for bin 1, 2, and 3.

Blower
Inverter converts single phase to three phase allowing for blower speed control.

Inside the blower control panel

What's under the concrete?
Feedstocks

- Community Yard Debris
- Cattle and pig manure/bedding and left-over hay
- Animal Offal and Mortalities
Mixing and watering down Bin 0

Goals:
- Meet PFRP in each bin (at each stage) (above 131 degrees F for three days)
- Stay below 150 degrees F
- Fastest composting reportedly happening around 110 degrees F
Resources

Compost Facility Operators Training Yearly, week-long

Also, see USDA Natural Resources Conservation Service (NRCS) Environmental Quality Incentive Program (EQIP)

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Thank you!

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