Food to Flowers

Food Waste Composting at Goshen College
Successes & Challenges

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Goshen, IN

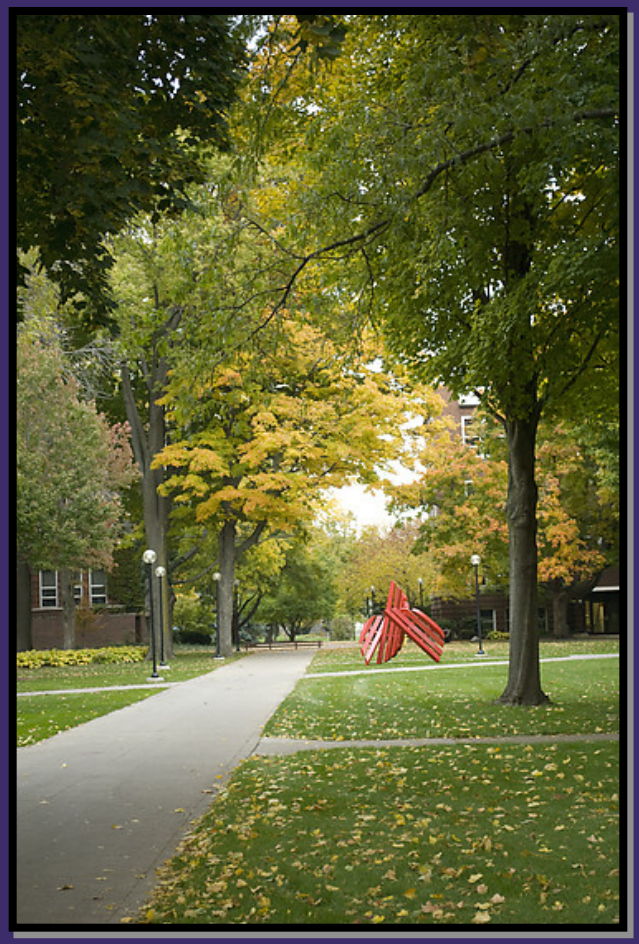
GOSHEN COLLEGE

HEALING THE WORLD PEACE BY PEACE

Geographical Location

Goshen College at a Glance

- Small, Christian-Mennonite, liberal arts college.
- 900 undergraduate & graduate students
- 135 acres, 19 buildings
- 36 majors + international Study Service Term
- 13:1 student-to-faculty
- Four year residency



Composting Program Components

- Compost Postconsumer & Preconsumer Food Waste
- Highly motivated student volunteers
- Food service leadership - AVI Fresh
- Physical Plant support & labor
- Faculty technical oversight

Beginning Stages

- Faculty & Staff Support
  - Lew Naylor
    - Adjunct Professor of Chemistry
    - Environmental Engineer
  - Glenn Gilbert
    - Sustainability Coordinator
    - Utility & Energy Conservation
  - Jeremy Corson + Bob Rombach (now Garrett Tyk)
    - Dining Hall Staff

Compost Program Requirements

- Cost
  - Must be self-sustaining (cost no more than current practice - dumpster to the landfill)
- Care
  - Must not require more labor than current program (dumping food waste into a dumpster adjacent to kitchen receiving door)
- Choice
  - Must be supported by volunteer labor (students, staff, faculty)
- Creation
  - Finished product quality must be appropriate for campus use

Initial Use & Preliminary Design

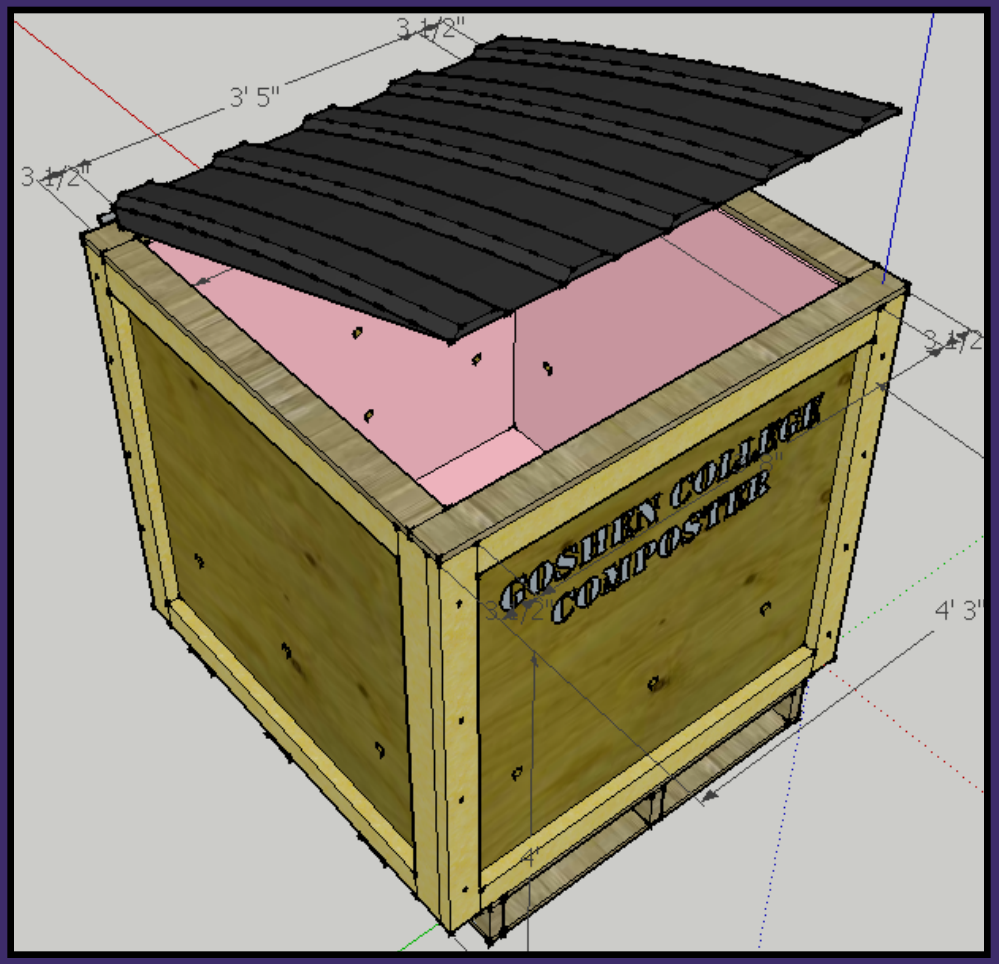
Manage oily residue from biodiesel program

Oily residue mixed with mulch loaded into composter

First composter constructed of 2 in. pink insulation board, duct tape & cardboard

Engineered Construction
The Goshen College Composter

- 4x4x4 plywood box
- Styrofoam lining
- Underlying trays to collect drainage



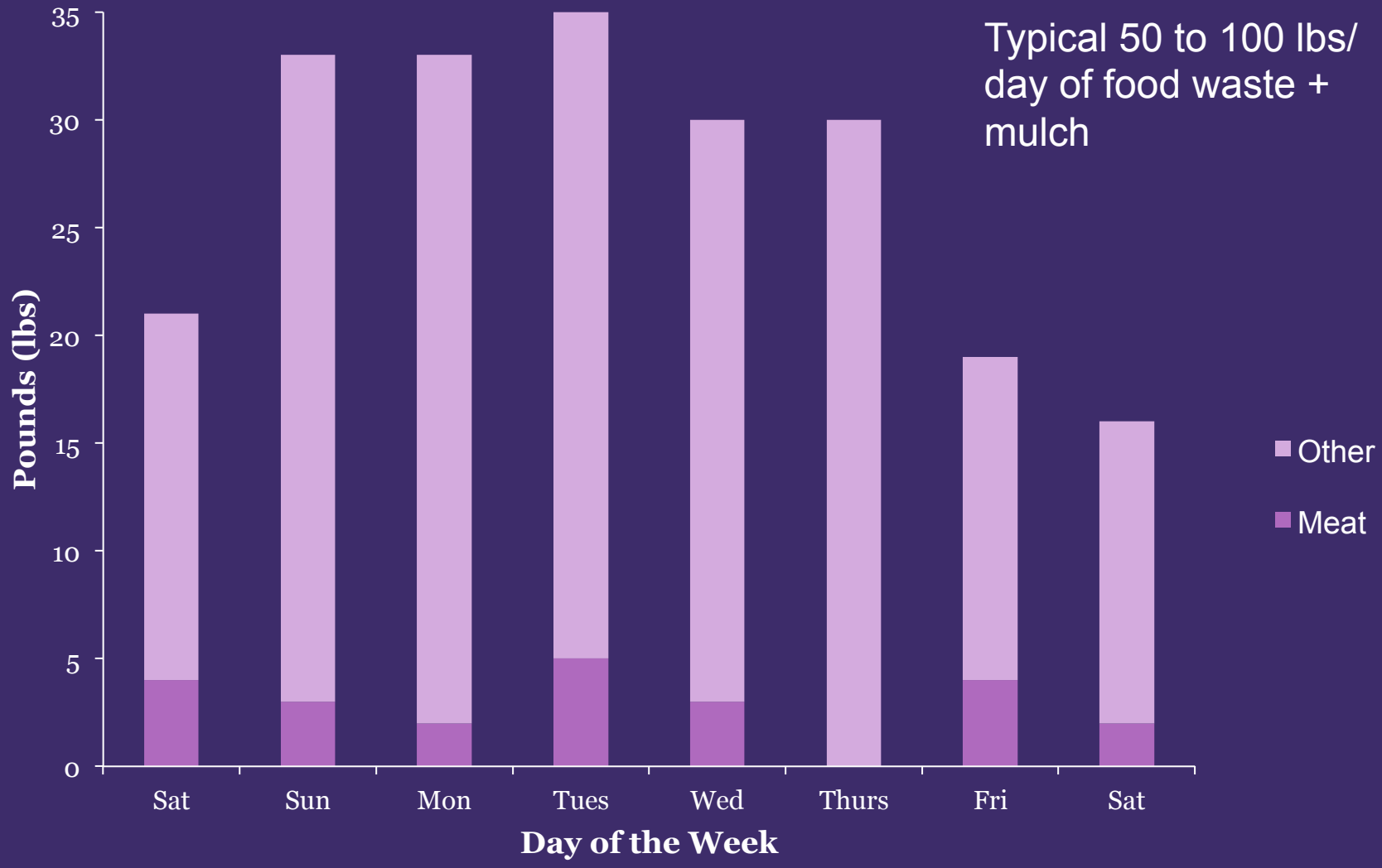
Operational Simplicity

The Goshen College Composter

Located adjacent to kitchen receiving door, out of sight.

Post-Consumer Food Waste

Post Consumer Waste, aka plate scrapings - 2011



Compostable Materials

- Preconsumer waste - kitchen prep scraps
- Postconsumer waste - student plate scraps
- Fruit, veggies, dairy, meat, paper
- Mulch added 2:1 by volume with food waste

Finished Product

Finished Compost Composition

	Screened 2011	Screened 2010
% Moisture	63	49
% Dry Matter	37	51
% Total Nitrogen	2.3	1.5
% Organic Matter	73	73
% Calcium	7.4	5.7
% Phosphorus	0.5	0.4
% Potassium	1.7	1.5
% Sodium	0.4	0.1
pH	8.4	8.4
C:N	18	27
Germination, %	0	0

Sustainability - Economics

- Construction costs of The Goshen College Composter

Startup Costs			**Composter**	
Box Materials	**Qty**	**Cost**	**1**	**3**
4x8x3/4" treated plywood	2	$28.99	$57.98	$173.94
4x8x2" pink foam insulation	3	$26.77	$80.31	$240.93
4' 1x4" treated lumber	2	$3.72	$7.44	$22.32
4' 1x3" lumber (or equivalent)	3	$3.59	$10.77	$32.31
4' 1x8" lumber	2	$6.00	$12.00	$36.00
pallet	1	free		$0.00
3" exterior grade screw	30	$0.06	$1.74	$5.22
1-1/2" exterior grade screw	30	$0.06	$1.74	$5.22
Lid unit	1	$50.00	$50.00	$150.00
Step stair-ladder	1	$10.00	$10.00	$10.00
Shovel	1	$8.00	$8.00	$8.00
Compost tea pump	1	$50.00	$50.00	$50.00
			$289.98	$733.93
Box Labor				
Student Labor (hrs)	10	$72.50	$72.50	$217.50
			$362.48	$951.43

Payback period:

All volunteers

- 0.6 years

Paid labor

- 2.7 years

Principal savings avoided costs:

Dumpster removal
$135 per month

Garbage bags
$62 per month

Project Challenges

- Challenges
  - Coordination of volunteers with kitchen staff
  - Winter complications due to snow, rain, frozen mulch
  - Screening of compost required excessive time & volunteer labor

Project Successes

- Successes
  - Improved communication of volunteers with kitchen staff
  - Lids/covers installed on composters to avoid snow, rain & freezing compost
  - Design and construction of new screening technology - human powered, efficient

Previous Screening Techniques

Screening challenges

Original design:

- 5’ x2.5’ screen
  - ½ grid at 45°
- 3 problems:
  1)Collection
  2)Technique
  3)Ease of operation

- “ Our Product is not good enough”

Discovering a New Method

- Main concern: elevation for collection
  - Before: finished product fell into grass below
- Wanted a vibrating motion
  - Looked at other models, mostly motorized
  - Ours needed to stay low-tech
- Start with sawhorses
  - Added a cinder block for slope
  - Pivoting action discovered

Pivot Screener

- Low slope
- Pivot action
- Collection

In Review

Goshen College Composting …

- In 3rd year of operation!
- Is Cost effective
  - Volunteer/enthusiasm based
  - Cut down waste
- Solves challenges
  - Lids, screen, communication
- Uses final product on campus
  - Cafeteria Garden

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To request History or Construction tutorials, please contact: ,

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Switching to a Screen !