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July 2025

# 2025 UNBC Compost Report


Soiled green bins
Please keep lids closed.
Drop off your home and office compostables here!
No plastic bags or "compostable" plastic.
Please keep lid closed.
Thank you for composting!
Compost
Prevent pests and odours by keeping the bin closed

# Executive Summary

The implementation of the new composting program has been both successful and an invaluable learning experience. During the summer break, the rotation rate on the composter is being gradually reduced to accommodate the anticipated decline in input volumes.

From September 2024 to June 2025, the program has diverted over 16.5 metric tons of food waste from the landfill. The composter typically receives between 600 and 700 kg of food waste per week, supplemented by bulking materials at a 10:3 weight ratio. A bulk tote of immature compost is removed from the composter outlet approximately every five days.

The immature compost is transferred to a designated curing area north of the Teaching and Learning Building, where it is heaped under a tarp. Active decomposition continues at the core of the pile, with internal temperatures remaining in the high 20s Celsius even when outdoor temperatures fall below freezing. To promote even decomposition, the pile should be turned periodically to introduce oxygen, ideally on mild, low-wind days to minimize heat loss. Watering is also essential, particularly during prolonged drought conditions, to maintain appropriate moisture levels for decomposition.

Throughout the program's rollout, several challenges have been encountered. Some issues have been resolved, while others remain ongoing. Odor concerns were largely addressed following the installation of door closers in the recycling room. Considerable trial and error was required to calibrate the composter settings and maintain optimal temperatures despite fluctuating feedstock inputs. Since November 6, temperatures have remained within the desired range. Feedstock contamination persists, though progress has been made through collaboration with Food Services. Additional improvements are still needed in how food service staff manage waste in the recycling room. Operational efficiency remains a key focus, with efforts underway to streamline processes and expand program capacity.

Public response to the composting program has been positive. Outreach efforts have included signage, web and social media communications, collaboration with Student Recruitment and Student Life, as well as educational talks and facility tours. In 2025, public engagement and awareness will continue to be a priority.

Opportunities to generate revenue are also being explored. One promising option—successfully implemented elsewhere—is a paid food scrap collection service. With campus food waste expected to decline during the summer months, this presents a timely opportunity to pilot off-campus collection, increase organic waste diversion across Prince George, and enhance the financial sustainability of the composting program.

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# Summer break management plan

Prior to this, Maintenance Assistants received training on compost operations from the outgoing Compost Operator. However, due to snow persisting until late April, comprehensive training on post-tote-emptying procedures in the curing area was not feasible which resulted in gaps in what work needed to be done to the outdoor compost pile.

Since April 22, 2025, the compost program has ceased accepting food waste from community bins located at Degrees T & L, Degrees by the bus loop, the Thirsty Moose Pub, and the bin outside the Sustainability Office. This decision was influenced by two primary factors:

1. The Thirsty Moose is closed during the spring/summer semesters, resulting in reduced foot traffic.
2. A general decrease in campus population during these semesters leads to diminished food waste generation, making the maintenance of these bins less efficient.

Consequently, the average feedstock volume has decreased to approximately one-fifth of that during regular semesters. This reduction prompted a decrease in rotation frequency—from every 12 hours to once every 24 hours. On May 22, 2025, compost temperatures fell below the optimal range of 55–70°C and have not recovered since. It is anticipated that as more food waste is introduced into the composter allowing time for microbial activity, conditions will improve.

**Curing Area Observations**

The unfinished compost in the outdoor curing area contains materials such as bones, paper fragments, and wooden cutlery that have not fully decomposed, necessitating sifting. Additionally, the compost pile is notably dry. To allow the decomposition process to continue efficiently, it is recommended to water the pile to achieve adequate moisture content and subsequently mix it to ensure even distribution and oxygen exposure. Currently, there is insufficient capacity to perform these tasks effectively.

The dryness of the unfinished compost can be attributed to the fume hood's operation and heat generated from the thermophilic process, which, while essential for odour control and decomposition, extracts moisture from the compost. This dryness, however, results in lighter totes, making it easier for the skid steer to transport to the curing site.

# Compost Operator Hours Breakdown

The student compost operator contract was for 30 hours per week. Basic operations required 15+ hours per week. This included:

- Monitoring compost temperatures (daily in-vessel and once a week outside)
- Sorting out contaminants

- Weighing, loading and washing green bins
- Calculating and loading bulking materials
- Pulling insufficiently decomposed pieces (mostly pineapple tops) from the bulk tote and putting them back in the composter
- Keeping the area around the composter clean (sweeping, mopping, spot cleaning)
- Data entry, analysis and adjustments to composter settings
- Coordinating with MAs and Distributions to maintain the supply of bulker materials
- Coordinating with MAs to have the bulk tote of immature compost taken out

The allocation of the remaining hours varied throughout the semester. At the beginning of the fall semester, the compost operator supported the Sustainability Office's engagement with Orientation to increase student awareness of our programs. The operator continued to provide support to other Sustainability initiatives as needed, e.g., grant writing, creating social media content, answering student questions. Throughout the semester, research was conducted on how to improve our composting process, the Compost Operation SOP was refined, and public engagement and education were conducted to support the compost program. Work hours were also allocated to professional development and knowledge sharing through the Compost Council of Canada and through compost organizations in Northern BC.

Since the Compost Operator position ended on March 31, 2025, Facilities Maintenance assistants have taken over the operations, while UNBC Sustainability continues to track the data. During the academic term, Maintenance assistants dedicate approximately 20 hours per week to these operations, which decreases to about 5 hours per week during the summer months.

# Inputs

## Organic waste

From January 2 to March 31, 2025, 7.3 metric tons of food waste were diverted from the landfill through the in-vessel composting program. This equates to over $700 in saved landfill tipping fees and will be converted into approximately 2.4 metric tons of finished compost.

The breakdown of feedstock types is shown in Figure 1. Between the kitchen and post-consumer food waste categories, about 86% of feedstock comes from the dining hall. The "Community +" category is the sum of inputs from the community green bin outside the Sustainability Office, the Thirsty Moose Pub and a few one-off contributions. The remaining 5.5% is coffee grounds from Degrees Coffee. The actual percentage of coffee grounds entering the compost system is higher, but coffee from the dining hall is counted under kitchen cafeteria food waste.

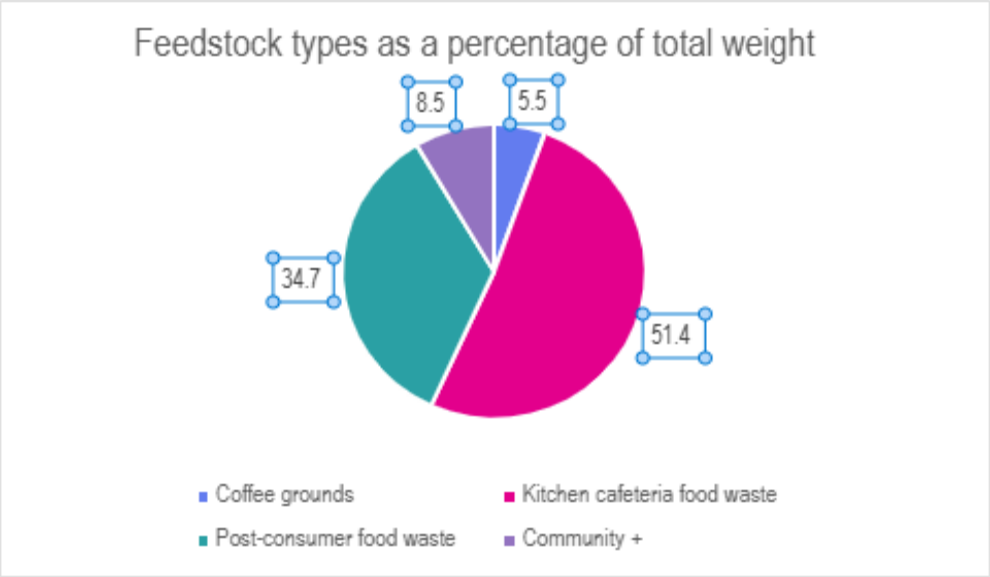


Figure 1: Percentage breakdown by weight of organic waste inputs to UNBC's in-vessel composter between January 2 and March 31, 2025.

## Bulking material

Dry, carbon-rich bulking materials are added to compost at a 3:10 ratio to the weight of organic waste inputs. The purpose of the bulking material is to balance the moisture content and the carbon to nitrogen ratio of the composter contents, which is necessary for efficient, low-odor aerobic decomposition.

The total weight of bulking materials used from January 2 to March 31 was 2117 kg. The main bulking materials used were wood pellets (73.3%) and shredded paper (23.1%), with the remaining 3.5% consisting of paper towels and rodent bedding from pilot projects that semester. The rodent bedding from the animal care and use program could have continued to grow as a source of waste diversion, but upon the ending of the compost operator's contract, the inclusion of this material was discontinued. This was mainly due to a lack of capacity and comfort in handling the material on the part of the MAs.

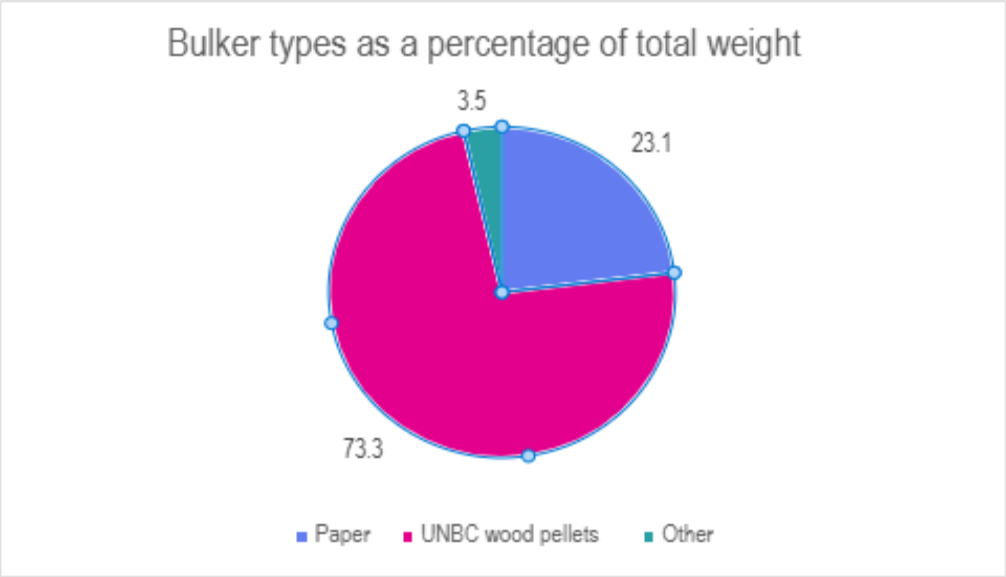


Figure 2: Percentage breakdown by weight of bulking material inputs to UNBC's in-vessel composter between January 2 and March 31, 2025.

Shredded paper is obtained for free through Distributions confidential document shredding. Because of the low density of shredded paper, the volume of the composter limits the proportion that can be loaded at one time without overfilling it. Once it soaks up moisture from food waste, its volume quickly decreases. Although it is a minor component of the bulking material, it is still an important component of the compost recipe. If wood pellets were to be used exclusively as a bulking material, the C:N ratio of the mixture would be too high, which would slow down decomposition.

## Rate of inputs

The rate of inputs to the composter fluctuates from week to week due to catering events, holidays and stochasticity (Figure 3). There were fewer students on the meal plan in the winter 2025 semester compared to the fall 2024 semester, so weekly inputs were slightly lower overall despite increased diversion through the Community + stream. The average weight of food waste per week over the 12-week period shown in Figure 3 was 591 kg/week, with a standard deviation of 101 kg.

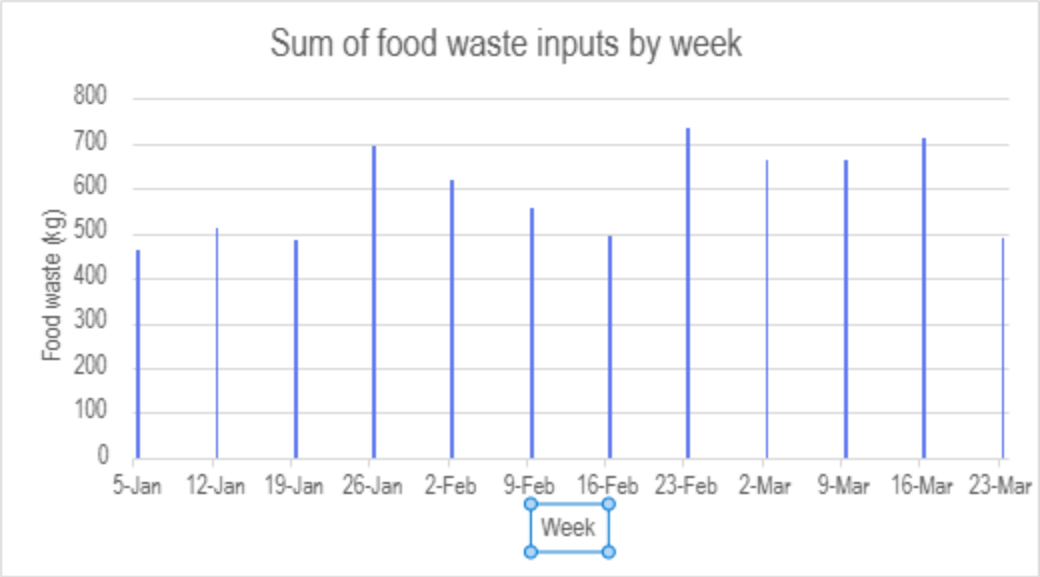


Figure 3: The rate of organic waste inputs in kg per week to UNBC's in-vessel composter from January through March 2025.

The settings of the composter can be adjusted to accommodate varying rates of inputs. Through consultation with the manufacturer, review of relevant literature and trial and error, best practices are being determined. Troubleshooting procedures are detailed in the UNBC Compost Standard Operating Procedures.

# Outputs

From January through March 2025, about 16m$^3$ of immature compost was taken out to the curing area north of Building 10 to mature and stabilize. This material will undergo further volume reduction of up to 50% as it continues to decompose. This material was previously covered with a heavy-duty tarp based on the rationale of wanting to prevent the formation of leachate. However, because the partial compost continues to generate heat through microbial activity, the addition of water is needed to maintain the optimal moisture content. Therefore, the tarp has been removed. Monitoring of moisture content and addition of water as necessary to the outdoor are recommended.

Figure 4: The outdoor compost pile of February 26, 2025.

During this period, the bulk tote was emptied approximately every four days. The bulk tote has a volume of a little under 1 $m^3$ but is usually emptied when it is 50 to 80% full depending on the density of the immature compost, timing and availability of the skid steer. Sometimes it is necessary to take it out at a lower fill level before a long weekend to avoid showing up to an overflowing tote the following workday.

## Compost curing and use

Compost operator duties with respect to the curing area included monitoring and recording temperatures inside the pile and advising maintenance assistants when turning was required and determining when the compost is finished.

One indicator of compost stability is the drop in temperature that occurs when microbes have finished decomposing the easily broken-down fractions of the material and therefore become less active. However, temperature drops can also occur due to anaerobic or excessively dry conditions developing in the pile, which inhibit microbial activity. These conditions can be resolved by turning the pile and mixing in water, respectively.

A temperature rise of 8°C or less over ambient temperature (ruling out a temperature drop due to other aforementioned factors) indicates that the compost may be stable. The next step is to perform a bioassay with quick germinating seeds (radish is commonly used). The germination rate of seeds moistened with water is compared to their germination rate with compost tea. If the germination rate in the compost tea is similar or better than the germination rate in the control samples, the compost has matured to an extent that it does not contain phytotoxic decomposition biproducts. At this point, it can be considered relatively safe for general use on lawns and gardens. Once a pile of compost reaches this stage, it should be communicated to the Facilities grounds crew, PGPIRG and SGU.

Lab testing provides more detailed insights into compost quality. Typical compost testing packages include nutrient content, trace element content, pathogens (fecal coliforms and *Salmonella*), foreign matter content, pH, EC and more. It may be worth reaching out to Introduction to Soil Science senior lab instructor Chris Jackson and to students in the Prince George chapter of the Pacific Region Soil Science Society (PRSSS) to assess interest in compost research and see if lab testing can be performed with research funding.

Different materials decompose at different rates. At maturity, the compost will still contain a portion of relatively large pieces such as bamboo cutlery, fruit pits, pineapple tops and bones. Finished compost is typically screened to ½" or ¼" and the overs (large pieces that are screened out) can be recycled as structuring agents in future compost production. The previous compost operator, Keaton Freel, built a rotating trommel out of hardware cloth, bicycle rims and lumber for use in his worm compost business (Figure 5). This trommel could be loaned or another one built and sold for use in the UNBC compost operation. The use of the hand-turned trommel is labour intensive but could be a simple and satisfying task for volunteers.

Figure 5: DIY trommel sifter for separating oversized pieces from finished compost.

# Challenges and solutions

## Recycling room challenges

Dana Hospitality food staff are currently responsible for disposing of grease, cardboard, and recyclables from their operations in the recycling room, as well as transporting green bins to the composter. While most food staff generally perform these tasks well, some individuals have not consistently taken responsibility.

Repeated observations have noted grease spills on the floor and on green bins, boxes left scattered on the floor for extended periods before being loaded into the cardboard compactor, and improper sorting of materials (see Figures 6 to 10). These concerns have been communicated to food managers, and ongoing efforts are being made to improve staff practices. It took several months of reminders to reduce

instances of gloves and plastic wrap being placed in green bins with organic waste, although this issue has since improved.

Facilities Management aspires to have food staff eventually handle loading the composter. While this approach makes financial sense and is a reasonable goal, careful consideration is urged regarding the food staff's capacity and motivation to undertake this task, given the fast-paced nature and low wages of their work. Additionally, the green bins can be quite heavy (Figure 9); even individuals accustomed to lifting weights find loading full bins challenging, as they often exceed 50 pounds. While there has been an overall improvement these issues still persist.


Figure 6: Boxes strewn on the floor in the Recycling Room. Sometimes the boxes overflow to the extent that it becomes difficult to maneuver a trolley in and out of the room.


Figure 7: Grease spilled on a green bin next to the grease collection tote.


Figure 8: Grease spilled and covered with dry rite instead of cleaning it up.


Figure 9: Example of an over-filled green bin weighing over 50 lbs. While we have got the message across to food staff that they must not fill the bins to the extent that the lid can't be closed, I still encounter bins weighing over 50 lbs almost daily.

Figure 10: Numerous expired but unopened food containers that were thrown into a green bin, likely by a food worker.

Without proper training, compensation and accountability, imposing the loading of the composter on food staff could result in:

- A large increase in the rate of contaminants entering the composter, as food staff do not have time to sort them out.

- Improper tracking of inputs, which could throw off the compost recipe, resulting in improper decomposition, increased odors and possibly unsafe compost if pathogen-reducing temperatures cannot be maintained.
- Organic waste being spilled and not cleaned up promptly, leading to odor and pest problems.
- Injuries to workers from heavy lifting.

Solutions:

Discussions have been facilitated between the Maintenance crew and Dana Hospitality to provide training for food service staff on how to properly operate the compactor. One key issue has been that when the compactor is full, cardboard boxes are left on the floor, which recently led to an injury from slipping on the cardboard. Providing training to Food Services staff will enable them to manage the compactor more effectively, creating space for additional cardboard and preventing such hazards.

Additional signage has been installed on the compactor to clearly communicate proper cardboard disposal procedures.

## Contamination

Contamination poses a challenge for virtually every compost facility, and this facility is no exception. When the new composting program was launched, kitchen staff were engaged in discussions, and signage was placed in the dining hall dish return room to indicate which materials are acceptable in the green bins. Initial contamination rates were high. The most frequent contaminants originating from the kitchen included plastic wrap and nitrile gloves, while post-consumer contamination primarily consisted of condiment packaging (such as mustard, mayonnaise, cream packets, butter), coffee lids, and metal cutlery.

Ongoing communication with Dana Hospitality food managers and staff has led to a significant reduction in contaminants within kitchen scraps. Although contamination on the post-consumer side remains an issue, the rate of contaminants has also declined. This improvement is believed to be partly due to a reduction in the dispensing of disposable items in the dining hall and partly because the compost program has become more visible. Although washing green bins in the women's bathroom adjacent to the dining hall is not ideal, moving the bins into the hallway each day has increased awareness of the compost program and the labor involved among dining hall users. In the coming year, collaboration with G-Force volunteers is planned to launch a public awareness campaign aimed at further reducing contamination rates from the dish return room.

Post-consumer contamination frequently involves dishware—mostly cutlery but also plates, bowls, and cups. While no formal data has been collected on the volume of dishware recovered for the dining hall, anecdotal evidence suggests that about a dozen items are returned weekly. The recovery of these items has strengthened rapport with kitchen staff and represents an additional environmental benefit of the program.

## Maintaining temperatures

It has been a learning curve to be able to maintain the temperature inside the composter in the optimum range for active thermophilic composting (55 to 70°C). Maintaining temperatures in this range is necessary for efficient decomposition and for the reduction of pathogens that may be present in compost feedstocks, particularly when they contain animal products.

In addition to tracking inputs and balancing the compost recipe to maintain the appropriate moisture level (55-65%) and C:N ratio (25 to 35), sustaining temperatures in the composter requires frequent adjustment to the rotation interval to keep the composter at a fill level of approximately 60% percent.

The quantity and composition of feedstocks varies from day to day with catering events, menu changes and holidays. Therefore, there is no true steady state. However, the student compost operator eventually developed an understanding of how to stabilize temperatures in the optimal range.

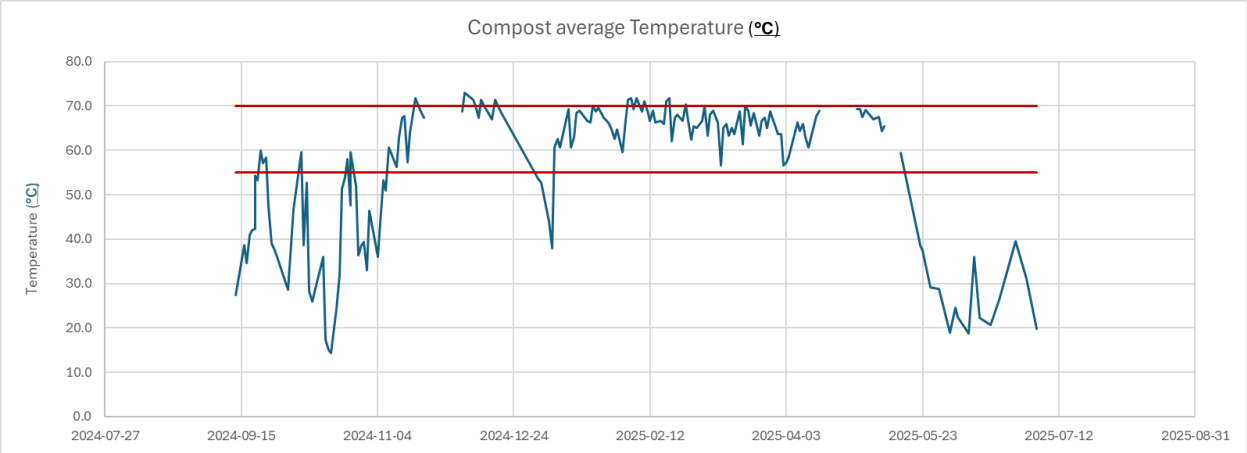


Figure 11. Compost temperature in degrees Celsius over time. The area between the two red bars represents the optimum range (between 55 to 70°C). Temperatures are taken from the loading door at a depth of 3ft and are the average of 3 readings.

Since May 22, 2025, the internal temperature of the composter has dropped below the optimal range of 55 to 70°C, indicating that effective decomposition was not occurring. This may have been due to the composter rotating too frequently—every 3.5 hours during the semester when feedstock volumes were higher. With reduced material input, the frequent rotation likely slowed microbial activity.

To address this, the rotation frequency was gradually adjusted:

- **Every 6 hours**, which showed slow improvement (changes typically take about a week to assess)
- **Every 12 hours**, resulting in a temperature increase to 40°C by June 26
- **Every 24 hours**, implemented on July 2
- **Every 30 hours** implemented on July 16

- **Every 50 hours** implemented on July 22

The former compost operator also advised to experiment with a lower bulker ratio during the summer to account for the moisture lost over the course of longer in-vessel residence time.

These adjustments aim to restore effective composting conditions as microbial activity stabilizes.

# Public engagement

Public engagement for the new compost program has included:

- Redesigned compost signage and labels with pictographs of which materials are accepted.
- Infographics in the dining hall dish return room and in front of the Sustainability Office explaining how the composter works.
- Filming and promotion of the "Compost is Hot" music video, which was used to introduce new students and residents to the compost program during Orientation.
- Giveaway of 23 (and counting) small compost collection containers for UNBC community members wishing to participate in our community green bin program.
- Student Recruitment now features the composter in their talks and tours.
- Updates to UNBC Sustainability web page and creation of social media content.
- Showings of the composter to G-Force and Pacific Region Soil Science Society (PRSSS) members
- Compost presentation at ENVS 408 Sustainability Seminar.
- The survey of Sustainability programs included questions about compost.
- Meeting with University of Fraser Valley Facilities/Sustainability team to discuss our compost system and the potential development of theirs.
- Networking and knowledge sharing with other composters in the region (RDFFG/NorGrow, Making Agriculture Sustainable in the Hazeltons (MASH), REAPS, Cariboo Compost).
- Networking and professional development through attendance of the Compost Council of Canada's annual conference and completion of Compost Facility Operator Certificate by the former student operator.
- Partnership with Adopting Vermicompost Worms as Pets green grant project to expand the availability of composting to the UNBC Community.
- Tour for the Indigenous Zero Waste Technical Advisory Group (IZWTAG) in June 25, 2025
- Tour for the Fraser Basin Council Youth program

## Potential Partnership with Costco

Costco has expressed interest in diverting their organic waste to UNBC's composting facility and is willing to pay for this service. The UNBC Sustainability Office is currently working to build broader support within the university community to advance this initiative.

## Paper Composting Pilot

A paper towel composting pilot ran from January 13 to March 21, 2025. The project was initiated by Cher Mazo and Mackenzie Vandale Roode, with the goal of diverting paper towel waste from the women's washroom near the First Nations Centre. Cher and Mackenzie managed the collection, using a stick to compress the paper towels to reduce volume. The contents were placed in a green bin and recorded as bulker material. Over the course of the pilot, 40 kg of paper towel waste was successfully diverted.

However, challenges emerged due to the paper towels being composted without shredding, causing them to clump into dense balls that were slow to break down. As a result, the program was discontinued shortly after the Compost Operator's term ended, due to a lack of capacity to manage the additional processing needs.

## Vermicompost Worms as Pets

The workshops have been highly successful, with three sessions held and over 50 worm bins sold. We will continue collaborating with the group to promote the Compost Program at UNBC. Increasing internal engagement is recommended to further support this initiative.