

# APPENDIX B CAMPUS WASTE AUDIT

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# 1.0 INTRODUCTION AND BACKGROUND

In 2014, the University of Alaska Fairbanks (UAF) began the process of developing a Sustainability Master Plan (SMP). Through conversations and goal-setting exercises with UAF's SMP Steering Committee, one of the goals developed in the SMP is for the University to achieve "zero waste", a 90 percent diversion rate, by 2035. As part of this process UAF conducted a waste audit to identify the strengths and challenges related to accomplishing this goal.

Objectives of the waste audit included determining the current percentage of waste being diverted from landfills, identifying barriers to waste reduction and diversion, and targeting opportunities for waste reduction and increased diversion. Additionally, UAF was interested in identifying cost-saving opportunities associated with increased waste diversion, and exploring the possibility of becoming a zero waste campus.

UAF received a Gold rating under the Association for the Advancement of Sustainability in Higher Education's (AASHE's) Sustainability Tracking, Assessment & Rating System (STARS) in 2011. The STARS system is a transparent, self-reporting framework for colleges and universities to measure their sustainability performance. The STARS report covers a university's performance across multiple performance areas including education, energy, water, waste, and others. UAF scored 5.79 points out of a possible 12.50 points within the waste category.

A waste audit was conducted by the Brendle Group consultant team in April 2014; sixteen buildings were sampled (see list below). During the audit, the team interviewed building coordinators, Office of Sustainability (OoS) recycling staff, and various members of the campus community. Walk-throughs of all 16 buildings were conducted with a focus on a) identifying gaps and barriers to increasing UAF's diversion rates and b) identifying opportunities to increase UAF's total diversion rate. The following report contains opportunities for UAF to pursue greater waste reduction and diversion, creating a solid foundation for the SMP's goal of ultimately achieving zero waste by 2035.

The following buildings were strategically selected to represent a subset of UAF buildings:

1. Administrative Services (Administrative)
2. Butrovich (Administrative)
3. Central Receiving (Administrative/Operations)
4. Cutler Apartment Complex (Student Residence)
5. Duckering (Academic/Research)
6. Gruening (Academic)
7. Lola Tilly Commons (Dining Services)
8. Margret Murie (Academic/Research)
9. Moore-Bartlett-Skarland Complex (Student Residence)
10. Nerland (Student Residence)
11. Physical Plant/ Facility services (Operations)
12. Rasmuson Library (Academic)
13. Reichardt (Academic/Administrative/Research)
14. Student Recreation Center (Athletics)
15. West Ridge Research Building (Academic/Administrative/Research)
16. Wood Center (Dining Services)

### *KEY TERMS*

**Waste:** Materials, substances, or byproducts discarded as no longer useful or required by a user.

**Waste Management:** Waste prevention, reuse, material recycling, composting, and landfilling.

**Gaps:** Missing elements within existing university operations.

**Barriers:** Circumstances or obstacles currently preventing UAF from advancing its waste minimization and reduction efforts.

**Opportunities:** Chances for advancement or progress of waste reduction or diversion.

**Source Reduction:** Reducing use of non-recyclable materials by replacing disposable materials with reusable materials, eliminating or reducing packaging, or using other similar means.

**Waste Diversion:** Prevention and reduction of generated waste through source reduction, recycling, reuse, or composting.

**Zero Waste:** Diverting 90 percent or more of waste from the landfill.

## Waste Management Trends Across Universities

Because UAF is unique to most universities in its geographic location and circumpolar north climate, it is difficult to find universities facing such distinctive challenges in waste management. As a result, benchmarking UAF's waste management practices against peer universities proved challenging. Though it was difficult to find universities with similar characteristics, waste management case studies and campus practices from across the nation were explored. Despite the challenges UAF is facing the University is already touching on many of the prominent waste management practices seen across the nation. Trends in university waste management include:

- Zero waste events and housing
- Water bottle bans
- Campus-wide composting
- Paperless campus initiatives
- Sustainable purchasing policies
- Electronic waste recycling programs
- Educational campaigns
- Surplus and reuse exchanges

To increase recycling rates, Universities have transitioned from source-separated to co-mingled recycling collection. Though implementation costs for switching to co-mingled recycling programs can be high, institutions such as the University of New Hampshire have seen great success with co-mingled recycling. Many institutions face budgetary challenges when trying to expand waste management services. To fund waste management and diversion programs universities are increasingly seeking outside funding sources such as government funding, corporate sponsorship, or partnerships with local businesses or

government to expand services outside of campus operations. Examples of university waste management efforts can be found throughout this report.

## 2.0 CURRENT CONDITIONS

### 2.1 Existing Practices

Currently, UAF disposes of non-hazardous waste using four primary methods: landfilling, recycling, composting, and reuse. The University is taking a number of steps to divert materials from landfills including recycling paper, cardboard, glass, aluminum, tin, ink cartridges, and batteries. Additional practices include shipping electronic waste (e-waste) through the Interior Alaska Green Star program to Total Reclaim, where it is responsibly processed and separated into various raw materials such as plastic, glass, steel, copper, and aluminum, and then sold as commodities. The Department of Facilities Services (Facilities) recycles scrap metals locally at C&R Metal Recycling, coal ash from the UAF power plant is used for paving University roads, and yard waste and pre-chop scraps from Dining Services are composted on campus.

In addition to recycling and composting UAF offers a number of reuse programs. Property and Central Receiving have established a surplus warehouse for the inter-departmental reutilization of unneeded furniture and electronics. Surplus items that go unused by University employees are periodically auctioned to the public. Residence Life offers on-going student exchanges for clothing and materials. The University holds the Really Free Market, an annual yard-sale style summer event that allows Residence Life, UAF, and Fairbanks community members to drop-off and pick-up items for free. Finally, the Athletic Department donates used, functional equipment to local schools and sports teams, and it auctions old weight machines to the public.

Throughout campus, buildings are outfitted with waste and paper-only recycling bins. Recycling bins for glass, aluminum, tin, ink cartridges, and batteries are marked with the Office of Sustainability (OoS) logo and placed in roughly 40 campus buildings. While UAF encourages environmentally preferable purchasing<sup>1</sup> (EPP), no formal tracking systems were identified that monitor or enforce EPP purchasing.

In the summer of 2014, UAF launched its first zero waste pilot program in the Margaret Murie building. This program will be a valuable learning tool and will help the University evaluate its capacity to manage a zero waste building and identify opportunities for future improvements.

#### STARS REPORT OPPORTUNITIES AND AREAS OF EFFICIENCY

UAF's current waste reduction and diversion efforts provide a foundation on which to build. The University scored an overall Gold rating on its 2011 ASHEE STAR's report. In the STARS report's waste category, UAF scored 5.79 points out of a possible 12.50 points. The highest points were achieved in the STARS category of Hazardous Materials Management. The greatest opportunities for improvement were in the categories of Waste Reduction; Waste Diversion; and Construction Demolition and Waste

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<sup>1</sup> <http://www.epa.gov/epp/>

Diversion. No construction sites were included in the April 2014 audit and this report does not make recommendations specific to the Construction Demolition and Waste Diversion STARS report category. The University, however, may wish to evaluate these opportunities as part of potential updates to its sustainable design and construction guidelines.

Table 1 UAF’s AASHE STARS Waste Ratings

Category	Credit Points
<b>OP-17: Waste Reduction</b>	0.77 / 5.00
<b>OP-18: Waste Diversion</b>	1.32 / 3.00
<b>OP-19: Construction and Demolition Waste Diversion</b>	0.20 / 1.00
<b>OP-20: Electronic Waste Recycling Program</b>	1.00 / 1.00
<b>OP-21: Hazardous Waste Management</b>	1.00 / 1.00
<b>Tier2-1: Materials Exchange</b>	0.25 / 0.25
<b>Tier2-2: Limiting Printing</b>	0.25 / 0.25
<b>Tier2-3: Materials Online</b>	0.25 / 0.25
<b>Tier2-4: Chemical Reuse Inventory</b>	0.25 / 0.25
<b>Tier2-5: Move-in Waste Reduction</b>	0.25 / 0.25
<b>Tier2-6: Move-out Waste Reduction</b>	0.25 / 0.25

## 2.2 Collection Process

The University has a multi-party collection processes whereby three major parties are responsible for various stages of collecting and hauling waste and recyclables. The University contracts custodial services with ABM Industries<sup>2</sup>. The existing service contract is through June 2016 with the opportunity for two one-year extensions. As part of its contract, ABM is responsible for collecting waste and paper/cardboard recycling from campus buildings. The custodial team deposits materials into front-loading dumpsters (typically 8- or 10-yard bins) that are designated as waste and paper only recycling. As part of ABM’s contracted services with UAF, waste and paper recycling bins are emptied according to the cleaning schedule below:

- Restrooms are sanitized and stocked once a day campus-wide.
- Classrooms are cleaned each evening before they are to be used.
- High-traffic reception office areas are cleaned daily.
- Public areas such as auditoriums, hallways, stairs, lobbies, locker rooms, showers, laundry rooms, kitchenettes, break rooms, and conference rooms are cleaned daily.
- Offices and research laboratories are scheduled for cleaning once a week.

<sup>2</sup> <https://www.abm.com/pages/janitorial-industries-served.aspx>

Facilities collects waste from UAF dumpsters and hauls the refuse to the Fairbanks North Star Borough landfill on a daily basis. Dumpsters from housing services are emptied daily, while most administrative and academics building dumpsters are emptied on a rotating weekly schedule. Additionally, Facilities hauls paper to local company K & K Recycling once per week.

Facilities Services manages UAF composting as well. Pre-chop compost is collected from Dining Services twice a week and hauled to UAF's "eco dump." Yard waste, leaves, and grass clippings are taken to the eco dump as well. In addition to producing compost for grounds maintenance, Facilities purchases compost from a local farmer to produce compost tea – a natural fertilizer for spraying campus grounds.

The Office of Sustainability provides two student employees to collect (glass, aluminum, 1 & 2 plastics, tin, ink cartridges, and batteries) from University buildings. Materials are transported in an electric cart (during warmer months) or an OoS vehicle (during cold months) and deposited in containers at Taku Parking Lot, where K & K Recycling collects the materials and hauls them to an off-site location. Students collect recyclables two to five times per week in addition to emptying bins on an on-call basis.

## 2.3 Purchasing Practices

Current UAF EPP practices include purchasing paper made of recycled content and Green Seal-certified cleaning products. University departments are able to order Forest Stewardship Council-certified paper from Printing Services, and Dining Services has removed Styrofoam containers and encourages purchasing locally-sourced products when feasible. Due to individual department budgets, academic and administrative departments that are housed in the same building often purchase office supplies in small batches on an as-needed basis from local stores. While vendor take-back has been discussed there are currently no known UAF contracts that include language about packaging take-back or delivering materials in reusable shipping containers.

Section 7 of UAF's purchasing policy does encourage EPP practices. Below are related guidelines found in UAF's Procurement Manual:

- *Section 7.3 Bidder/Offeror & Product Preferences:* (a) AS 36.30 requires that the following preferences be applied to the award of formal solicitations: (4) Recycled products - 5 percent.
- *Section 7.4 Recycled Paper Products:* In addition to the monetary preference for recycled products contained above, whenever the university purchases paper products, including cut stock, printing stock, envelopes, towels, tissues, computer stock, or other paper products, at least 25 percent of the quantity purchased shall be classified as recycled unless the responsible procurement officer determines that recycled paper is not available or that recycled paper, after application of the 5 percent preference, is more expensive than non-recycled paper for the purchase in question.
- *7.5 Preferences in Specifications:* (a) Specifications shall not unnecessarily discriminate against the use of recycled materials. (b) Product minimum content guidelines and definitions are adopted by the Environmental Protection Agency (EPA) and can be found in 40 CFR 248 -253. (c) University departments should consider the following steps when preparing purchase requisitions that include recycled products: (1) Include sources that specifically provide recycled products. (2) Allow for alternative use of recycled products in specifications. (3) Specify use of recycled products and allow recycling in performance of service contracts and lease agreements. (4) Specify double-sided printing whenever possible as required by AS 44.99.020. Specify self-mailers (fold, staple, and address) to limit envelope use. Limit number of copies. (5) Allow both

recycled and virgin materials in solicitation provisions. (6) Allow users to specify certain items as 100 percent recycled products.

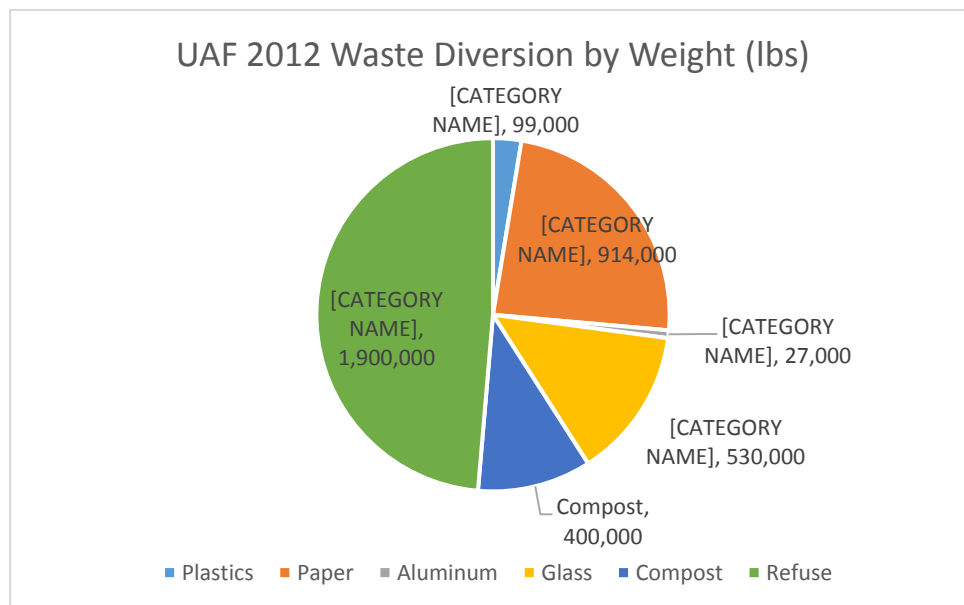
## 2.4 Waste and Recycling Data

UAF does not have a waste data tracking system in place. Total waste composition and breakdown by material were estimated based on the waste, recycling, and composting volumes compiled by OoS and Facilities. The most robust data set available was from 2012, thus the data represented below represents 2012 solid waste generation. Additionally, it should be noted that plastics are no longer accepted by K & K Recycling<sup>3</sup>. Plastics 1 and 2 are being collected as part of the Murie Zero Waste Pilot Program and are taken to the Rescue Mission for recycling. A similar program will be implemented in the MBS dorm complex in the Fall of 2014. Plastics 3-7 and plastics collected from other buildings are being landfilled.

### PERCENTAGE WASTE BEING DIVERTED

The waste diversion rate is the percentage of waste materials diverted from landfill due to UAF's recycling, reuse, and composting initiatives versus the total amount of waste generated. Through existing recycling, reuse, and composting programs, UAF diverted approximately 51 percent of its waste, or roughly 1,970,000 pounds of materials. Figure 1 (below) shows the amount of waste, by material, generated by UAF in 2012. Because UAF is no longer able to recycle most plastics, it can be assumed that UAF's percentage of waste landfilled has increased to include plastics, thereby decreasing UAF's total diversion rate.

Figure 1. UAF Waste Stream Composition



<sup>3</sup> Recycling data are based on data collected during UAF's participation in RecycleMania, a two-month recycling competition for universities across the nation.

## RELIABILITY OF DIVERSION DATA

The depiction of UAF's waste diversion rate (Figure 1 above) should be considered with a degree of caution due to limited data availability. The diversion rate represented above is not a highly accurate portrayal of the University's waste diversion for the following reasons:

- Recycling data solely reflects recyclables collected from student housing during an eight-week period of Recyclemania.
- Recycling data is from the year 2012 when UAF collected plastic recyclables, the University has since limited plastic collection and only accepts plastics 1 & 2 on a limited basis.
- Compost data was provided as an approximate estimate.
- The information above does not include hazardous waste or construction materials.

In order for UAF to provide a more robust portrayal of its diversion rate, it is recommended that the University begins to consistently track waste volumes generated across all sources. Additionally, UAF could undertake a week, or month-long waste sort that would allow a deeper dive into the actual composition of waste generated on campus.

## 2.5 Cost Data

Because multiple parties are responsible for collecting UAF's waste, recycling, and compost, multiple cost factors fall into the waste management process. Based on costs the University was able to provide, it is estimated that UAF spends \$44,000 per year hauling paper and waste off campus. This cost excludes building-level paper and waste collection provided by ABM. The University is currently paying ABM \$3 million per year for its cleaning services, which includes paper and waste collection. The annual operating cost for OoS's recycling collection is \$30,000, and Facilities reported composting labor and collection costs of \$500 annually. In 2012, UAF paid a total of \$100,000 in tipping fees. Excluding ABM's collection services, UAF's annual waste management services total \$174,500.

Table 2. Waste Management Cost by Service

Service	Cost
<b>Tipping Fees</b>	\$100,000
<b>OoS</b>	\$ 30,000
<b>Facilities</b>	\$44,000
<b>Composting</b>	\$500
<b>Total <sup>4</sup></b>	<b>\$175,500</b>

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<sup>4</sup> Excluding building-level paper and waste collection.



## 3.0 GAPS AND BARRIERS TO WASTE DIVERSION AND REDUCTION

For the purposes of this analysis, gaps are defined as missing elements within existing University waste management operations. Barriers are defined as circumstances or obstacles currently preventing UAF from advancing its waste minimization and reduction efforts. For example, UAF's limited collection of waste data is identified as a gap because UAF collects recycling data during RecycleMania but is not fully utilizing its ability to track data year round. Building infrastructure is identified as a barrier because some of the University's existing buildings are not optimally designed for strategic placement of recycling bins.

### 3.1 Gaps

An important part of improving waste management and increasing diversion rates is addressing current gaps in UAF's waste management and associated operations. The University can use identified gaps to craft strategies for improving current shortcomings in its waste management practices.

#### TRACKING

An important part of any program is establishing goals and measuring progress and milestones as an institution moves towards goals, such as the SMP goal of becoming a zero waste campus by 2035. Each year, UAF participates in RecycleMania, an 8-week competition where colleges and universities track the amount of trash and recycling collected each week and benchmark their progress against other participating schools. Beyond this 8-week competition, UAF does not have formal tracking systems in place for monitoring waste generation, diversion rates, or purchasing trends. Improving data collection (e.g., extending data collection throughout the year) will allow UAF to better monitor its performance year to year, identify related opportunities, and analyze long-term progress relative to its goals (e.g., zero waste)

#### SOURCE REDUCTION AND PURCHASING POLICIES

While there has been general encouragement of source reduction and EPP practices, UAF does not provide its employees with formal tools or guidelines to enable and enforce EPP. During waste audit interviews with building coordinators, individuals were not able to point to EPP evaluation tools or resources for suggested EPP products<sup>5</sup>.

The team identified a number of gaps between institutional purchasing, targeting purchasing toward recyclable materials, and product users. As opposed to an interconnected system that collaborates across departments, buildings, and daily operations to manage material sourcing and consumption in the most efficient way possible, material flows largely remain siloed within a single department's operations. Given UAF's location and lack of recycling infrastructure, source reduction is an important opportunity to address for overall waste reduction.

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<sup>5</sup> Purchasing paper products from recycled content is an exception to this comment, and was mentioned on a few occasions.

## WASTE COLLECTION PROCESS

There are many inefficiencies in UAF's current building-level waste and recycling collection process. The custodial service, ABM, collects waste and paper recyclables in the same buildings where OoS collects recyclables, duplicating collection efforts and increasing time and labor costs. Waste bins are emptied on a schedule independent of actual need. Often bins were reported to be less than 75 percent full when emptied by custodial staff, providing another opportunity for reducing pick-up frequency to increase overall collection efficiency.

## EDUCATION AND AWARENESS

An imperative key to the success of a university waste management program is education that leads to action. The University offers a large number of sustainability-related courses and OoS has a great number of students passionate about sustainability. Through these avenues many important programs are already in place at UAF, although there remains a large number of student, faculty, and staff unaware of current waste management opportunities or best practices. Furthermore, there seems to be a high level of confusion around proper disposal methods. Noticeable indicators of inconsistent practices included contaminated waste and recycling bins, building coordinators without knowledge of recycling bin locations or pick-up operations, reports of employees communicating confusion about recycling opportunities, and apathy toward proper disposal methods. Additionally, some waste and paper recycling bins lacked clear signage, resulting in receptacles being used interchangeably in a number of facilities.

## 3.2 Barriers

While UAF is taking a number of steps to manage discarded materials, including a campus-wide mixed paper and cardboard recycling program and recycling oil from Dining Services into biofuels, it still faces some challenging barriers. Many of UAF's challenges, such as lack of recycling infrastructure, are influenced by its relatively remote location. Below are some identified barriers that will require UAF to continue to explore innovative methods to further increase its diversion rates and reduce influx of materials.

### LOCATION

The University is located in a region with few options in the way of established recycling infrastructure. This has created ongoing challenges for finding recycling outlets for both common materials, such as plastic, and innovative recycling or repurposing outlets that are more regularly available to universities in the lower 48 states. Purchasing and transporting goods, such as bulk office supplies and seasonal food, is often a more sustainable option because of the need for fewer deliveries and or significant packaging. This, however, is also sometimes challenging for UAF because of its remote location in the Circumpolar North.

### CAPITAL INVESTMENT

Establishing infrastructure around a well-managed waste program requires both time and financial investment. For a state-funded university, finding funding for additional resources is always challenging. In the long term, decreasing UAF's diversion rate will generate cost savings from avoided tipping fees and decreased purchases, for example. To achieve these savings, however, UAF will have to invest some up-front capital to implement projects and build infrastructure around its waste management system. During a time of budget cuts and uncertainty around state funding, targeted efforts will be necessary to prioritize waste management in planning conversations.

## CAMPUS CULTURE

Implementing behavioral shifts on a cultural level is often a difficult endeavor. Though UAF does have an established recycling and reuse program, there is still a need for a culture shift that generates widespread support for source reduction and proper disposal methods. This shift will require changing ingrained practices that have developed over many years.

## INFRASTRUCTURE

Strategic placement of waste and recycling receptacles plays a large part in active waste management participation. Because UAF is working with existing buildings, fire codes and safety regulations can prohibit the use of space for receptacle placement, preventing some ideal waste station setups. UAF's source-separated recycling system also means that ideal waste station setups require a fair amount of space.

# 4.0 IDENTIFIED OPPORTUNITIES FOR WASTE REDUCTION AND INCREASED DIVERSION RATES

Although UAF's location provides some challenges, such as a limited market for recyclables and fewer options for local, sustainably sourced materials, there are also many opportunities. For example, there are benefits to UAF's location such as large amounts of land. Currently, UAF is only composting a portion of materials, such as post-consumer food waste, that it could be diverting. Because of the large amount of land available for expanding UAF's established composting programs and limited local regulations and fees related to composting, there is great opportunity for UAF to increase its diversion rate through expanded composting services. Opportunities are discussed in more detail below.

## 4.1 Low Hanging Fruit

Low hanging fruit are opportunities identified during the waste audit that will typically require a lower time investment, a smaller number of accountable parties, and/or a lower amount of up-front capital investment.

## DINING SERVICES FACILITIES

As shown in Table 3 (below) UAF Dining Services offers ten dining options across six locations on campus.

Table 3. Dining Services Locations

Hess Commons	Wood Center	Ramunson Library	Arctic Health Research building	Murie Building	UA Museum of the North
<ul style="list-style-type: none"><li>• Subway</li><li>• Campus Cache</li></ul>	<ul style="list-style-type: none"><li>• Dine 49</li><li>• Arctic Java</li><li>• Pita Place</li><li>• Southern</li></ul>	<ul style="list-style-type: none"><li>• Book &amp; Brew</li></ul>	<ul style="list-style-type: none"><li>• West Ridge Café</li></ul>	<ul style="list-style-type: none"><li>• M<sup>3</sup></li></ul>	<ul style="list-style-type: none"><li>• Alaska Coffee Roasting Co.</li></ul>

	Tsunami				
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Though each dining facility on campus has its own unique waste management practices, as a whole, Dining Services has a host of sustainable waste management practices including:

- Trayless dining halls
- Composting pre-consumer food scraps and partnerships with local mushers recycle protein scraps to fuel Alaskan sled dogs.
- Partnering with Denali Bio-fuel to converting used cooking oil into biodiesel
- Providing napkins made from 90 percent post-consumer recycled paper
- Offering reusable plastic to-go containers.
- Bulk condiment dispensers
- Reusable china

Table 4 (below) identifies additional practices UAF can implement to further increase Dining Service’s contribution to UAF’s diversion rate. It should be noted that waste management practices vary among individual dining facilities and some recommendations below might already be an existing practice in select locations.

Table 4. Additional Dining Services Waste Diversion Opportunities

Type of Waste	How it is currently diverted	Alternative methods of diversion
<b>Pre-consumer food waste</b>	Composted	Maintain practice – implement in all dining areas
<b>Post-consumer food waste</b>	Thrown away	Compost
<b>Cardboard packaging</b>	Majority thrown away	Bailed and recycled or resold
<b>Tin, aluminum, glass</b>	Majority thrown away	Recycled
<b>Napkins</b>	Majority thrown away	Recycle or compost
<b>Packaging</b>		Reduce use

DECREASE KITCHEN WASTE SCHEDULED PICK-UPS

Currently UAF’s Dining Services contracts services through NMS Food Services (NMS). As part of this contract, NMS subcontracts out Lola Tilly Commons’ waste collection separately through Alaska Waste. During the school year, Alaska Waste picks up a 20-yard dumpster twice a week for a fee of \$608 per pickup. Pickups are reduced to one time per week during the summer. The University pays over \$58,000 for Alaska Wastes’ collection services annually.

During waste audit interviews, Dining Services reported that the dumpster is not typically full when emptied by Alaska Waste. Dining Services should regularly monitor the trash dumpster and if it is consistently less than 100 percent full when emptied, it should reduce scheduled waste pickups to either an on-call basis or single weekly pick-up year round. This is particularly important following changes or improvements to existing recycling and composting programs. For example, if the dumpster is 50

percent full when picked up during the semester and Dining Services reduced waste pickup frequency from twice a week to weekly pickups, the result would be almost \$26,000 in cost savings annually.

#### COMPOST POST-CONSUMER FOOD WASTE

Dining Services currently composts pre-chop organic materials but does not compost post-consumer food waste because UAF does not have the equipment to handle these materials. Specifically, UAF could obtain a topsoil shredder, which would cost the university roughly \$20,000<sup>6</sup>. If UAF were to decrease scheduled waste pick-ups at Lola Tilly Commons, for example, it could apply the \$26,000 annual cost savings toward purchasing a top-soil shredder and expanding composting services. Furthermore, increasing post-consumer composting in dining areas will decrease the volume of waste generated, further reducing the need/frequency of waste pickups and associated costs.

#### CONTINUE TRAYLESS DINING IN CAMPUS FACILITIES

Trayless dining facilities reduce food waste and help conserve water and energy as a result of reduced washing needs. Currently, UAF offers trayless dining in campus dining facilities, although during the waste audit there was mention of returning trays to dining centers when Lola Tilly is moved to the Wood Center. It is recommended that UAF avoids this reinstatement. Assuming UAF dining halls serve 150,000 meals annually and each student throws away 0.36 pound of food per meal<sup>7</sup>, UAF currently is reducing food waste by roughly 75 tons and avoiding \$6,900 in tipping fees annually.

#### RECYCLE ALUMINUM AND TIN IN KITCHENS

Aluminum foil and tin cans are commonly used in UAF kitchens and there were no identified tin or aluminum recycling receptacles in the Wood Center or Lola Tilly Commons. Dining Services should install bins for all recyclable materials and educate employees on proper use. This includes setting up well-labeled, conveniently located recycling, educating kitchen staff through trainings, and working with staff members to meet their challenges in integrating recycling into other job responsibilities.

#### INCORPORATE COMPOSTABLE PRODUCTS INTO PURCHASING POLICY

Should UAF expand composting services, it is recommended that the University work with the Purchasing Department to phase out disposable plastic, single-use items (to-go silverware, pre-packaged food containers, condiment cups, etc.) and replace them with compostable bioplastics or compostable paper products when possible. Because UAF is currently unable to recycle plastics, bioplastics are an ideal alternative for pre-packed foods, such as the grab-and-go meals sold in the Murie Building café (Figure 2).



Figure 2. To-go selection in Murie Cafe

- US COMPOSTING COUNCIL: <http://www.compostingcouncil.org/>

<sup>6</sup> Quote for Royer Model 182, Honda Gas Engine. Direct from Royer Industries.

<sup>7</sup> Western Michigan University Composting Review and Assessment of Food Waste Composting

- SPI BIOPLASTICS COUNCIL: <http://www.plasticsindustry.org/BPC/>
- BIODEGRADABLE PRODUCTS INSTITUTE: <http://www.bpiworld.org/>

## ACADEMIC AND ADMINISTRATIVE FACILITIES

### REDUCE SMALL, FREQUENT OFFICE SUPPLY ORDERS

During the waste audit, many building coordinators and administrative personnel said office supplies were often purchased in small batches on an as-needed basis. Many of UAF's buildings house multiple departments, and within shared buildings there are few to no shared purchases. It is recommended that UAF establish a tool that allows departments to collaborate on bulk supply orders to reduce the frequency of small office supply orders. This will reduce the amount of waste generated by product packing and save costs related to transportation/delivery fees. Additionally, bulk ordered products tend to cost less than smaller purchases.

### CONTINUE PAPER REDUCTION

The University encourages double-sided printing, leverages electronic communication, and has reduced the amount of materials printed, such as its class schedule. It also requires that 25 percent of purchased paper be comprised of recycled content when possible. The University is making great strides in paper reduction; however, there was still a large amount of paper identified in both recycling and waste bins during the audit. Each month, UAF hauls an average of 23 tons of paper to be recycled, indicating that reducing paper use lends itself to a significant opportunity for source reduction.

The University should continue its shift toward electronic and other paperless forms of communication, information dissemination, and documentation when possible. This includes continued transitioning toward using electronic and web-based formats for all University materials (catalogs, promotional materials, and planning documents). In addition, UAF should create office standards and guidelines for what qualifies as essential printing content (e.g., official records that require signatures, items that must be sent via mail, etc.) and what materials should remain electronic (e.g., memos, agendas, and electronic reports). For example, increasing requirements for the percentage of paper purchased from recycled content by 5 percent annually would result in 90 percent of paper being sourced from recycled content by 2027.

### EXPAND SURPLUS'S SERVICES TO STORE REUSABLE BOXES

Building coordinators reported boxes being thrown away due to lack of space to store them for reuse in the office as well as confusion over responsibility for taking boxes out to the recycling dumpster. Because there are not dedicated areas for large cardboard recyclables, UAF staff are reportedly leaving boxes near waste bins. Simultaneously, there is often a need for boxes in departments, for moving offices, or for shipping materials. Establishing a known location for exchanging reusable boxes would greatly increase the opportunity for reuse and reduce the chance of improper cardboard disposal.

### RECYCLE OR COMPOST PAPER TOWELS IN RESTROOMS

Paper towels are an easy, low-cost opportunity to increase UAF's diversion rate. In 2013, the University consumed 2,700 cases of paper towels from hand dispensers. During the waste audit, trash receptacles were the only identified disposal option in University restrooms, so it is assumed all contents are thrown away. Replacing current waste receptacles with recycling bins will divert a large portion of paper currently being landfilled. Alternatively, composting is another opportunity for disposing of paper towels. Should the University expand its composting practices, compost bins would be another viable option for replacing current waste bins in restrooms.

There was not enough data to provide an accurate hypothesis of the cost for UAF to swap paper towels for hand dryers however a similar study conducted by Portland State University (PSU) examined the cost benefit analysis of paper towel use<sup>8</sup> versus installing 350 hand dryers across the University's restrooms. Annually, PSU orders 2,600 cases of rolled paper towels, 185 cases of single-fold, and 265 cases of multifold at a cost of \$74,000. The University estimated that hand dryer installation in all 245 restrooms would cost roughly \$118,000, and electricity used by the dryers would cost between \$3,100 and \$5,800 annually. PSU estimated hand dryers would save about \$70,000 each year with a 2-year payback.

#### REPLACE PLASTIC VENDING MACHINES WITH ALUMINUM VENDING MACHINES

There are roughly 60 beverage vending machines on campus, most of which sell beverages in 20-ounce plastic containers. Because UAF is currently unable to recycle plastics, it is recommended that the University work with Aurora Vending to phase out machines that sell beverages in plastic bottles. Replacing plastics with aluminum will allow UAF to further increase diversion rates and avoid landfilling plastics.

## UNIVERSITY EVENTS

#### OFFER ZERO WASTE EVENT SERVICES

The University hosts roughly 1,060 events annually, serving about 52,000 patrons. The University should consider using UAF-catered events as another net zero waste pilot program. Integrating zero waste management practices into events is an achievable goal that would continue to establish a solid footing for University-wide zero waste practices. For a small fee to the event hosts, the OoS can rent out zero waste stations. Zero waste events would require a low-cost set-up and teardown if labor is provided by OoS student employees. Working with catering services, UAF can require that food for zero waste events is delivered in reusable containers, and reusable or compostable flatware is provided.

#### *CASE STUDY: OHIO STATE UNIVERSITY*

Since Ohio State University launched a zero waste event service program in 2010, it has hosted numerous events with more than 6,600 attendees and averaged a 96 percent diversion rate.

[Read more here.](#)

## STUDENT LIFE

#### PROMOTE WASTE MINIMIZATION AND RECYCLING DURING MOVE-IN AND MOVE-OUT

The University has a well-established system for reducing student move-out waste through repurposing materials at the Really Free Market. During high volumes of waste generation such as during move-in and move-out activities, UAF should increase the number of recycling bins available in student residencies. Student move-in is an excellent period to connect with individuals and educate them on best practices and material management. Select volunteer Student Life representatives can be on

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<sup>8</sup> Source: Billings, Jacob; O'Flaherty, Rachel; Wissman, Dave. [Hand Dryers or Paper Towels?](#)



premises during move-in, educating students about proper disposal methods. Students can be provided with reusable cups as a tool and reminder for them to actively participate in source reduction.

## ORGANIZATIONAL

### CONVENE WASTE REDUCTION COMMITTEE

To ensure that UAF sets goals, organizes efforts, and monitors and tracks progress around diversion rates and materials management, OoS could convene an official waste reduction committee responsible for continually moving efforts forward and monitoring progress. The committee could be comprised of administrators, staff, and students working across campus to build on and improve UAF's diversion rate. It is recommended that the committee take on larger waste goals outlined by the UAF SMP and lead the charge in implementing waste-related strategies and tracking UAF's path to zero waste.

### IMPROVE WASTE/RECYCLING/COMPOST TRACKING TOOLS AND MONITORING TOOLS

The University tracks recyclable materials during an 8-week competition each year called RecycleMania for which colleges and universities benchmark their recycling rates by volume against participating schools across the nation. Aside from RecycleMania, UAF has limited tracking tools to monitor and analyze the campus waste stream. To gain a solid understanding of waste flow and to benchmark progress as the University implements steps to increase its diversion rate, it is recommended that UAF create tracking systems for recycling, composting, waste, and purchasing activities. Building on source reduction, EPP policies, and education recommendations, UAF could use this opportunity to integrate efforts into the classroom and have students build a customized tool to track waste by building. Alternatively, there are many existing tools, such as the EPA's [WasteWise](#) tracking tool, that UAF could use for this purpose.

### CENTRALIZE AND STREAMLINE WASTE RECEPTACLES

The location of waste and recycling bins varies in UAF buildings. Some offices provide side-by-side waste and paper recycling bins at every desk, while other offices only provide desk-side waste bins, with paper recycling bins irregularly placed throughout work areas. Additionally, building coordinators reported that the custodial team occasionally misses bins during collection, likely because there are so many bins placed throughout offices and buildings. The University should centralize points of disposal in campus buildings. Central waste stations will increase proper disposal methods and collection efficiency. Custodial services will no longer be forced to stop and empty waste and paper bins at each desk in an office, but will make fewer stops with larger loads of waste and recycling, effectively reducing the amount of total time spent collecting materials.

Aluminum recycling containers are often placed by soda machines or in hallways with high traffic volumes. Glass, tin, battery, and aluminum recycling receptacles are placed intermittently throughout buildings as well. To increase proper disposal of materials, it is recommended that desk-side waste bins be removed and central waste and recycling stations set up throughout offices and buildings.

#### *CASE STUDY: NEW YORK UNIVERSITY*

New York University piloted a centralized collection system in which all existing trash cans and recycling bins were removed from one of the building's floors and 8 centrally located pairs of trash and recycling receptacles were placed in common areas throughout the floors. The weight of recycled materials was measured for 1 month before and after. The results showed the average weight of recycled material increased by 178 percent with the consolidated bin arrangement. [Read more here.](#)

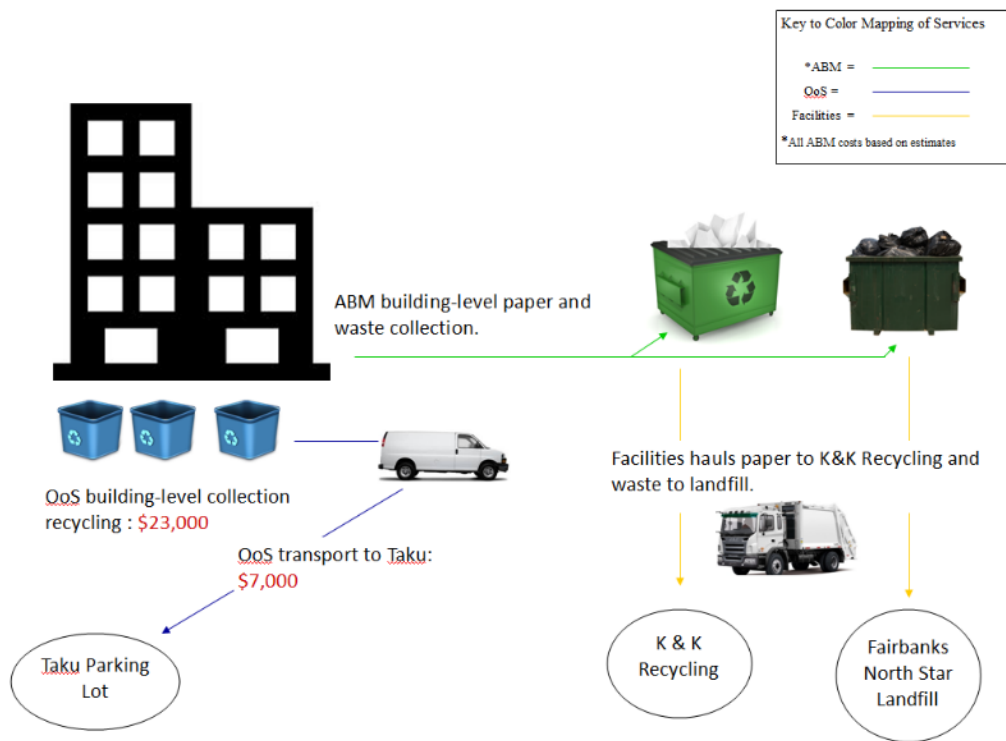


Strategically located points of disposal will consolidate the number of pickups the custodial team will have to conduct, increasing efficiency and ensuring collection of all bins. Additionally, this will provide clear options for faculty, students, staff, and visitors to properly dispose of materials. Many building occupants cited convenience as the reason for throwing recyclables in the trash bins at their desk. With centralized, clearly labeled bins, individuals will have to make little effort to properly dispose of materials, thereby increasing waste diversion. Furthermore, this recommendation will aid in achieving increased collection efficiencies by a single waste pick-up provider as noted the recommendation below.

#### Consolidate Recycling Collection Services with Custodial Collection Services

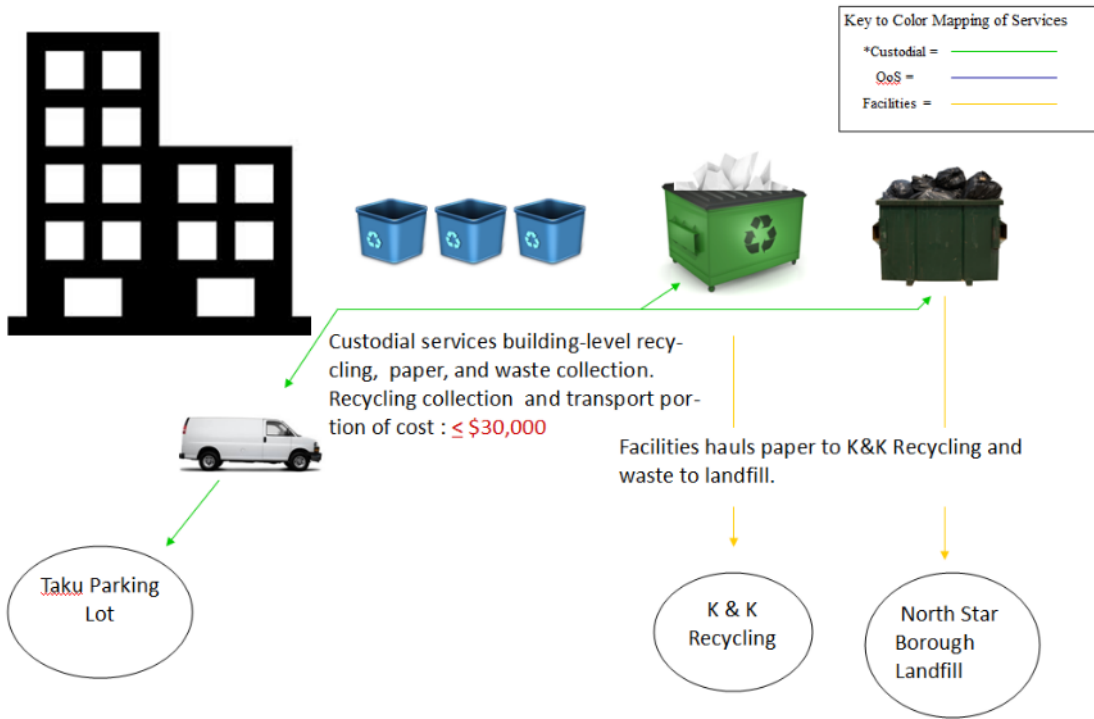
Currently, OoS student employees collect all recyclable items (glass, tin, aluminum, etc.) from campus buildings with the exception of paper. Given the cost data OoS provided for student employee labor hours, wages, and the recycling collection schedule, it is estimated that employees are spending 40 hours per week collecting materials from 40 buildings, resulting in an annual labor cost of \$23,000, with an additional \$7,000 spent on transportation and supplies. UAF’s custodial service, ABM, is responsible for collecting waste and paper recyclables and UAF Facilities hauls the waste and paper recyclables off campus. The image below (Illustration 1) exemplifies UAF’s current collection process.

Illustration 1. Current Materials Collection Flowchart



To streamline this currently duplicative process, UAF should seek a single service provider (AMB or another) that will collect all materials (waste, paper, and recycling) from campus buildings. The image below (Illustration 2) illustrates the recommended pick-up flow.

Illustration 2. Proposed Waste Collection Flowchart



For it to be economically feasible for UAF to integrate recycling collection into a single provider’s collection services, UAF should negotiate a not-to-exceed amount of \$30,000 for recycling pick-up and transportation to Taku parking lot and should include buildings that currently are excluded from collection services , such as Administrative Services and the Hutchinson Career Center.

This increased efficiency assumes custodians would spend 30 hours per week for recycling collection and transportation to the Taku parking lot at the hourly rate of \$13.48<sup>9</sup>. Because the contracted service provider will already be working in campus buildings, it could potentially reduce recycling collection time by 25% compared to OoS’ practices.

## 4.2 High-level Platforms and Strategies

High-level platforms and opportunities will likely require a long-term investment and collaborative efforts across multiple UAF departments as opposed to the low hanging fruit opportunities. These recommendations will also require larger investment of both time and capital to achieve savings or reach cost neutrality.

### SOURCE REDUCTION

Source reduction emphasizes the interconnections between purchasing and disposal. Reducing the volume of materials that enter UAF’s campus requires analysis of materials entering and exiting campus. Though it can be overshadowed by recycling and reuse efforts, source reduction is integral to any waste

<sup>9</sup>Assuming Bureau of Labor Statistic’s occupational employee wages, the average hourly wage for University Custodial services is \$13.48: <http://www.bls.gov/oes/current/oes372011.htm>.

reduction program, especially given UAF's limited regional capacity. Source reduction should be pursued aggressively in all aspects of campus operation and should be seen as a long-term venture that will generate cost savings by reducing the amount of materials purchased and disposed. At the moment, UAF does not have formal, University-wide source reduction tracking systems or implementation tools.

Reducing the amount of materials UAF consumes automatically decreases the volume of materials that can enter the waste stream. Implementing a source reduction program will help UAF prevent unnecessary waste from entering the university's campus, and ultimately its waste stream.

### Implementation Steps

The following are recommendations for developing and implementing a source reduction program:

1. **Conduct a procurement and packaging inventory.** Work with Procurement and Central Receiving to develop a tracking system to record and analyze incoming materials with an eye toward identifying unnecessary materials/packaging. Analyze procurement records to identify long-term purchasing trends.
2. **Phase out excess materials.** After tracking and identifying materials coming into the University, begin phasing out materials identified as excess or avoidable.
3. **Revise contract language to include packaging specifications.** When entering into new contracts with vendors, include language that specifies requirements for orders to be delivered in reusable containers, or for vendors to take back packaging. Contact suppliers with existing contracts and make efforts to revise current agreements.
4. **Train building-level materials management champions.** Work with building coordinators and department heads to identify volunteer, building-level procurement champions. Champions will be responsible for monitoring building-level purchases and encouraging bulk purchases among building inhabitants and surplus material swaps.

#### *ADDITIONAL OPPORTUNITIES IDENTIFIED DURING WASTE AUDIT*

- **Increase interdepartmental purchases:** There is opportunity to better integrate sustainability considerations into smaller purchases for which purchasing orders are not necessary. For example, many building coordinators claimed to purchase small office supply orders directly from local stores, such as Office Max, without consulting other departments in the building that could potentially share in the order. Departments housed in the same building should work with local suppliers to split costs between invoices and allow combined orders. Purchasing bulk orders with less frequency will reduce the amount of packaging and waste generated.
- **Leverage purchasing power to reduce waste:** Research students working in labs, such as the Margaret Murie Building's facilities, reported purchasing lab equipment on an individual basis, separate from the needs of lab mates. Research departments and facilities should be encouraged to purchase in bulk, which is often less expensive and would reduce the amount of packaging brought in with multiple, small orders. Additionally, with combined purchasing power, students could lobby vendors to take back packaging or deliver supplies in reusable containers.

## ENVIRONMENTALLY PREFERABLE PURCHASING GUIDELINES

Although Section 7 of UAF's Purchasing Policy addresses EPP practices, building coordinators and those responsible for department-level purchasing did not indicate familiarity with these policies. It is recommended that UAF increase promotion of EPPs and provide individuals with readily available tools and guidelines to which they can refer when making purchases. The University should expand its EPP policies to encourage communication and coordination among departments and ensure that the campus community is trained on EPP expectations and best practices.

Furthermore, it is recommended that UAF increase the percentage of purchasing preference given to recycled content and incorporate specific language that encourages individuals to exceed recycled content thresholds composition if possible. To support individuals with purchasing responsibilities and create efficient processes and procedures for purchasing and contracting, guidelines should be developed providing specific materials and vendors supplying materials that meet EPP requirements.

### Implementation Steps

The following are recommendations for enhancing and expanding EPP:

1. **Conduct a procurement inventory.** Build on source reduction tracking methods to record and analyze incoming materials with an eye toward identifying purchases that should be reevaluated to identify more environmentally friendly choices.
2. **Expand on EPP guidelines and develop "quick reference" guidelines.** Based on best practices as well as the procurement and packaging inventory and existing procurement policies, expand procurement guidelines to increase recycled content requirements. Develop a "quick reference" decision making tool, including guidelines and criteria for giving preference to environmentally responsible products, made from recycled content when possible.
3. **Develop an EPP purchasing tracking tool.** Connect the "quick reference" decision making tool with an associated tracking method for determining percent of EPP materials purchased (Certified Recycled Content, Forest Stewardship Council Certification, Biodegradable, Organic, etc.). This will keep individuals accountable as well as build on UAF's overall waste tracking efforts.
4. **Actively implement EPP guidelines and monitor progress.** Work with building coordinators and department heads to identify volunteers responsible for building-level implementation, education, and tracking progress.

### *SAMPLE ENVIRONMENTALLY PREFERRED PURCHASING POLICY (EPP)*

The University of Oregon's Purchasing and Contracting Services Department supports EPP practices and encourages the purchase of products and services that effectively minimize negative environmental impacts through their material composition, manufacturing, transport, packaging, energy, consumption, maintenance, and recycling or disposal. [Read more here.](#)

## EXPAND COMPOSTING SERVICES

Organic waste includes coffee grounds, food waste, paper towels, low-grade paper products, yard waste, and compostable flatware. Composting is a controlled, natural, low-impact process that turns organic waste into a soil amendment that provides plants with nutrients and is a safe sustainable alternative to chemical fertilizers. The University already composts yard waste and pre-consumer food waste; however, a significant portion of organic materials is still thrown away.

In addition to collecting organic materials on campus, UAF purchases compost from a local farm to make a compost tea – a natural fertilizer used on campus grounds. Because of the large amount of land available to UAF, quantity of compostable materials that are currently landfilled, and the demand for composting byproducts (bedding for campus grounds and compost tea) at UAF, the University should consider expanding composting services.

### IDENTIFIED COMPOSTING OPPORTUNITIES

- Dining facilities (post-consumer food waste, napkins)
- Kitchenettes in administrative and academic buildings (paper towels, coffee grounds and filters, food scraps)
- High traffic areas in academic and administrative buildings (food scraps)
- Student residency common areas and kitchens (paper towels, coffee grounds and filters, food scraps)
- Restrooms (paper towels)
- Student Recreation Center (paper towels, occasional food scraps)
- Rasmuson Library (food scraps)
- Retail dining, such as the Campus Cache, West Ridge Café, M3 Café, etc. (napkins, coffee grounds, stir sticks)
- Shift to compostable single-use materials in retail dining (food packaging and disposable silverware)

The University has a large amount of land available to physically accommodate increased compost volume. Additionally, as an educational institution, UAF could use expanded composting operations as a teaching opportunity by partnering with the Agriculture and Horticulture Department to offer a credit-based composting course. Increasing student involvement would decrease operational labor costs and provide valuable field experience for students, which would increase UAF's portfolio of sustainability-related courses.

While UAF could feasibly expand composting services with minimal additional costs associated with labor or land use, it would require an upfront investment in equipment. Additional disposal bins would need to be purchased and distributed throughout campus. To accommodate post-consumer food scraps, paper, and/or bioplastics, UAF would need to invest in a topsoil shredder. Below is an estimated capital cost for expanding UAF's composting program.

Table 6. Costs of expanding UAF Composting Program

Investment	Cost
Capital cost	\$20,000
Annual Operation and Maintenance	\$3,000

### Implementation Steps

1. Procure funding to purchase a topsoil shredder.
2. Partner with Agriculture and Horticulture Department to develop undergraduate composting course.
3. Expand boundaries of UAF's eco-dump to accommodate additional organic material.
4. Phase 1: Building off lessons learned in the current zero waste pilot building (Margaret Murie), roll out compost collection bins and educational materials in dining halls.
5. Phase 2: Incorporate composting bins for University catered events.
6. Phase 3: Expand composting services to academic and administrative buildings.

#### *CASE STUDIES: KEAN UNIVERSITY AND UNIVERSITY OF ARIZONA*

- Kean University began an extensive on-campus food scraps composting program that incorporated student participation and education. In just over a year, the campus of 15,000 diverted over 141 tons of food and saved \$20,000.  
[Read more here.](#)
- The University of Arizona's Compost Cats program has transformed composting into a successful business model. The student-run program initially offset composting expenses through compost sales, avoided tipping fees, and community compost sales. Compost cats eventually expanded operations to a commercial business composting program for the City of Tucson and increased Compost Cats' operational efficiency by having the city take over most waste transport. Compost Cats was then freed to focus on making, marketing, and selling compost and conducting community education.  
[Read more here.](#)

### EDUCATION

By nature, universities aim to engage their communities (students, staff, and faculty) through education and involvement. Improving UAF's waste management practices is another opportunity to leverage UAF's institutional strength and engage the campus community on the benefits of waste management and proper disposal methods. An effective communication campaign is key to determining the quantity and quality of material being diverted from landfill. Because education and action were identified as a gap, it is recommended that UAF actively promote principles of responsible waste management practices through educating and engaging students, faculty, and staff. It is recommended that the University target education and engagement efforts to both illustrate the value of responsible waste management practices and teach UAF students, faculty, staff, and visitors which materials are recyclable and compostable.

### Implementation steps

1. Convene waste management leaders and develop an interdisciplinary approach to waste management campaigns so that it can be integrated across all University departments.
2. Develop targeted Reduce, Reuse, and Recycling campaigns for students, faculty, and staff.

3. Develop standardized signage and receptacles for waste, recyclables, and compost across campus. Make sure signs are clearly visible and detail what can and cannot be placed in each bin.
4. Train staff and students annually on proper disposal methods (leverage student move-ins as an opportunity to have staff educate students on proper disposal methods).
5. Consider incentives and friendly competitions for proper waste disposal and increased diversion, such as linking building-level diversion rates to increased funding for departments.

#### *ADDITIONAL OPPORTUNITIES IDENTIFIED DURING WASTE AUDIT: COMMUNICATIONS*

During the waste audit, many questions and doubts were raised concerning the impact of recycling common items, such as office paper and aluminum cans. For daily campus activities, point-of-disposal is an effective time to provide information about recycling and increased costs in waste disposal. Posters on information boards reinforce the importance of recycling. To increase confidence that these actions are making a difference, effectively communicate why recycling is important and what happens to the materials when they are appropriately disposed. If UAF begins to regularly track waste and diversion data, it can leverage existing mediums to communicate results, such as the OoS website and the many display screens throughout campus showing energy and water savings.

## 5.0 REGIONAL COLLABORATION

To explore the possibility of expanding UAF's recycling capabilities, the University should conduct a regional study to identify local demand for recycling, capacity for collection and storage, economic feasibility, and potential partners and funding sources. Building on exploration of the local market for recycling, it is recommended that UAF evaluate potential partnerships and opportunities for collaboration with local entities such as Fort Wainwright, the North Borough, and the Rescue Mission.

For example, the local army base, Fort Wainwright, recently ended its contract with K & K Recycling and is actively exploring alternative options for its internal recycling operations. There is a potentially significant opportunity for UAF to combine resources with the military to expand recycling operations through leveraging each organization's strengths - such as UAF's established hauling services, the military's capacity for hosting a sorting facility on base, and the Rescue Mission's growing plastics recycling program. Additionally, Fort Wainwright has expressed interest in composting on base, creating another opportunity for collaboration and sharing costs related to composting.

#### *CASE STUDY: BRIGHAM YOUNG UNIVERSITY*

Brigham Young University-Idaho had an established recycling program for its campus with a processing facility to sort recyclables, but there was no available recycling operation for the City of Rexburg in which the University is located. The University's head of facilities management saw an opportunity to help the City and the University at the same time by letting the City use the University's processing facilities, while the city would provide recycling bins to its residents for free. This in turn would create jobs for students trying to get through college as well as provide the first recycling service to the residents of Rexburg, which would save the City of Rexburg thousands of dollars each year in landfill fees. [Read more here.](#)

## 6.0 CONCLUSION

This waste audit is aligned with the larger framework of UAF's SMP, and one of the Plan's long-term goals of becoming a zero waste campus by 2035. The platforms and opportunities recommended in this audit are meant to act as a catalyst for increased waste reduction and diversion on UAF's campus. The path to becoming a zero waste campus requires a large investment of time, resources, and funding. However the University has already taken an important first step by examining its current status, setting goals, and now has a list of strategies and implementation steps to further its progress towards being a zero waste institution.

Prioritizing recycling and integrating waste and materials management throughout UAF is a key piece of UAF's mission to incorporate sustainability into every facet of research, curriculum, operations, and campus life. The University's path to achieving cost-neutral waste management solutions, or eventually cost-positive operations, will largely depend on its ability to increase efficiencies, promote responsible purchasing and disposal practices among the community, and leverage leveraging local partnerships to share infrastructure and operational costs when possible.

It is recommended that UAF focus efforts on source reduction, and examines the materials it consumes and identifies opportunities for reducing the amount of disposable goods currently being purchased and ultimately thrown away. Source reduction is a key opportunity for UAF to reduce the volume of waste generated on campus each year.

To continue to increase the University's diversion rate, UAF should focus on leveraging the resources it currently has. As was previously mentioned, the University is in a unique climate and has fewer recycling resources than many campuses in the lower 48. Though UAF has implemented a number of measures, it can still fine-tune and expand upon its existing practices such as increasing composting services and increasing recycling rates of materials that are currently recycled on campus.