

Oregon Wasted Food Study: Institutional and
Commercial Sector Case Studies

Case 8

Preparing food on-site to reduce waste at catered events



This report was prepared for
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Introduction

This is a report on the methods and results of one of 15 food service business case studies, as part of the institutional and commercial (IC) sector portion of the Oregon Wasted Food Study. This study is funded by the Oregon Department of Environmental Quality and conducted by Community Environmental Services (CES) at Portland State University.

The research objectives for the IC portion of this study are to:

- Understand components of wasted food in IC sector
- Highlight causes of commercial wasted food and key opportunities for waste prevention
- Test wasted food reduction best practices and quantify their effectiveness
- Promote wasted food reduction best practices for application at commercial food service institutions

Focus of study

This study focused on assessing causes of wasted food and one strategy of reducing food loss using on-site preparation practices in a catering food service business. Two years of event attendance data were analyzed to uncover trends that could better inform caterers about expected attendance for events of different sizes and types. It was found that:

- **47% of under-attended events, 42% of events with accurate attendance, and 30% of over-attended events had leftovers that were recorded.**
- **Of the 226 events recorded, only 2 events, or less than 1% of all events, were noted to have had less food than needed.**
- At the remaining events, no records were found of either running out or overproducing. This does not mean that the amount of food prepared exactly met needs at all of these events. For example, staff may have simply forgotten to record leftovers (or shortages) or the amount of leftovers may have been deemed “too small” to record.

This data, on balance, suggests that this catering business routinely overproduces food for events, regardless of attendance, and the fear of running out is rarely realized.

The practice of constructing or preparing food on-site as needed was recommended to reduce overproduction. Two events were compared, one with preparation done entirely off-site and another with partial on-site preparation.

Business context

The business participant in this case study is a mid-sized catering business operating throughout the Portland metropolitan area. The business caters a few hundred events a year, ranging from small business lunches to large weddings and government events or community festivals.

Methods

Study design

The study was conducted over a seven month period from October 2017 to April 2018. It included employee interviews, waste assessments and event attendance analysis in order to (1) identify types of wasted food and key causes of waste, (2) analyze attendance dynamics across catering events, and (3) document a source reduction best practice.

Interviews

Employees voluntarily participated in one-on-one interviews, on site but in a private location. Five employees including the business owner, the executive chef, an event manager and two assistant chefs/event staff were interviewed. The interviews were all conducted in November 2017, were recorded, and took between 15 and 25 minutes each, except for the interview with the business owner which was 45 minutes. The interviews were semi-structured; standard interview questions were asked of each employee with additional questions asked that either responded to employee answers or pertained to their specific role.

Waste assessments

Researchers conducted waste assessments for two events, one in January 2018 and the second in April 2018. These events were similar in size (150 and 120 expected guests respectively) and both were casual gatherings with similar menus. At the first event, all of the food was prepared off-site and brought ready to serve. Plate waste, buffet waste and unserved food was sorted at the first event. At the second event, some of the food was brought pre-prepared while some was prepared on-site and only unserved food was sorted, because only unserved food could be repurposed.

Event attendance analysis

The business recorded and retained printed post-event evaluation forms that included information about event attendance (expected and actual), and food quality and quantity. Researchers evaluated two years' worth of records, totaling 247 events, focusing specifically on attendance, as food quantity information was recorded inconsistently. Events were coded into three event types: business events (e.g., luncheons, business meetings or presentations), weddings, and casual events (e.g., holiday parties, picnics or birthday celebrations). Events were also grouped by anticipated event attendance (fewer than 50 people, between 50 and 200 people and more than 200 people). For each event, the percent turnout was calculated by dividing actual attendance by expected attendance. Statistical tests (one-way ANOVA) were also run to compare event turnout by both event type and size.

Recommended practice

Constructing or preparing food on-site as needed was tested as a practice to reduce overproduction. The business sometimes used this practice, and the case study offered an opportunity to evaluate it in events where the business wouldn't have ordinarily have done on-site construction. Other strategies were discussed with management, like expanding sustainable catering offerings to discourage overproduction, for example, by setting client expectations to serve only the number of guests anticipated with agreed upon portioning and back-up options that could be brought in reserve and saved if unused. An additional suggestion was

to revise data collection practices to include more relevant information around overproduction and event attendance. However, these alternatives were not pursued by the business because the duration of the case study was too short to create, offer, and conduct new catering offerings, and because the owner was hesitant to request that staff record new information and require them to digitize what were previously only paper records.

Limitations

The analysis of the impact of preparation-on-site practices was based only on two events and may be considered anecdotal. While the amount of food that may be repurposed may differ from event to event, this data suggests this practice has a strong ability to promote source reduction. We suggest more research be done to quantify the positive impact of this practice with more accuracy.

The consistency and accuracy of the data collected cannot be assured, and may be questionable because various catering staff collected event attendance data, visually estimating attendance for medium to large events. The high prevalence of 100% attendance events, which was unexpected, might be due to observation bias, or the tendency for people to see what they expect to see. This may also be the case for leftover food records.

Results

Waste assessments

For the first event in January both unserved and buffet waste were assessed, along with plate waste. For the second event, in April, only the unserved waste was assessed because this waste was the only waste that could be repurposed (since served food must be disposed of for health reasons). Results related to the unserved food is discussed in detail below. All results can be seen in the appendix.

Interviews

Sources and causes

Interviews uncovered a variety of sources and causes of wasted food. First and foremost, employees cited **overproduction or leftover food** as the primary cause of waste. They said this was mostly caused by under-attendance. However, staff also noted that waste was caused at every step of the process, because everyone involved in planning “hedges their bets” to ensure enough food is served. Attendees overcommit to attend an event. Event coordinators always plan for extra people, and then the caterer plans a buffer, just in case.

Along the same lines, employees expressed that they always operate from a place of **fear of running out**. The owner said this translates into a routine practice of making and bringing extra food -- he estimated they bring at least 5-10% extra for each event. This is consistent with an **expectation of abundance**, a norm set by the owner. Both the owner and executive chef said that they plan to never run out of food, even if they have already served the expected number of people.

Another primary driver of wasted food was **event cancellations**, particularly because of adverse weather, most common during the winter. The owner said that the previous winter, which saw worse-than-average

winter storms, had at least a dozen event cancellations, some of large corporate events. He said they will try to save food that has already been ordered to use in other events, but food that is already cooked has to be donated or composted. Since some dishes are prepared days in advance, a last minute event cancellation often leads to significant waste. The business did donate leftover unserved food on occasion, according to the owner, but the regularity of donation was not able to be verified.

Even if events go on as planned, employees routinely cited how **variable appetites** complicated quantity planning. The owner, executive chef and event manager all mentioned the difficulty of planning for events with different attendee characteristics. For example, events with mostly men will require significantly more food than events with primarily women or children, they said. Furthermore, they said events that serve alcohol need 10% less food than events that do not serve alcohol.

Finally, **customer expectations**, the owner said, were common barriers to source reduction. The owner said that they rarely re-purpose unserved but previously cooked food. He said customers do not want to be served leftovers from previous events - they have an expectation that their food was purchased and made for them and them alone. It is unclear to researchers how customers would know how and where their food was sourced from and whether the owner's concern was real or perceived.

Existing prevention strategies

Records maintenance

Event evaluation forms are filed for each event. Forms include attendance and information about whether the amount of food served was the adequate. For annual or routine events, the owner said, they will often consult previous records to gauge the attendees appetite and expected attendance rate.

Construction on-site

The event manager said that, depending on the event and meal type, and the infrastructure on site, they would bring some of the food to be served uncooked or unconstructed. They then would prepare the food on-site, as needed, with extra unprepared food brought back to the kitchen for future use or repurposing. While repurposing does not exclusively happen during events where construction on site occurs, the owner said it was more likely during these events because individual ingredients were more able to be repurposed than prepared foods. The owner said they try to bring portable kitchen set-ups (like propane ovens) to locations without kitchens, but this only works for some locations with enough space outside and during amenable weather. Construction on site practices may have implications for labor needs, likely reducing overall preparation time, because the amount of food produced is more aligned with the amount of food needed. However, this practice may shift the timing of labor requirements, requiring more staff capacity during events and less before events.

Event attendance analysis

A total of 247 paper event records were photographed, input into a spreadsheet, and refined to exclude events with impartial attendance information. This process was highly time intensive, and would likely not have been performed by the business on their own volition.

Analysis of the results suggest there was a statistically significant difference between the average event turnout across event sizes ($F= 6.48$, $p= 0.002$). Smaller events, those with fewer than 50 people, had an average attendance of 98.00%, though they were over-attended 17.65% of the time. Medium-sized events, those ranging from 50-200 people, had an average attendance of 87.21%, with only 12.61% of events over-attended. Large events had the lowest average attendance, 84.73%, with only 8.51% of events over-attended.

Records show that different event types vary in their average attendance rates, ranging from 87.18% for casual events to 96.09% for weddings. However, there was no statistically significant difference in rates.

Event data was also analyzed using handwritten comments on the post-event evaluation sheets. These comments most commonly referred to the amount of food leftover after the event. Of the 226 events with attendance data (out of a total of 247 event records), 97 had comments referencing leftover food. It was found that 47% of under-attended events, 42% of events with accurate attendance, and 30% of over-attended events had leftovers, but this is based on optional hand-written comments and leftovers may be underreported. Under-attendance led to leftovers only 5% more of the time than perfectly attended events. Of the 226 events recorded, only 2 (less than 1%) had comments indicating more food was necessary. This does not mean, however, that the events without records necessarily had the perfect amount of food, it just means that no records were made. Accordingly, these results suggest that the percent of events with recorded leftovers likely represent the minimum portion of events where leftovers were present.

Preparation on-site practice analysis

First event: all preparation off-site

The first catered event evaluated, a holiday party for a moderate-sized non-profit, took place on January 6th and was booked for 150 guests, though only 75 were estimated to have attended. Dinner and appetizers were served, including vegetable and cheese plates, BBQ pulled pork sliders, smoked salmon, thai salad wraps, teriyaki chicken skewers and assorted small desserts. Alcohol also was served.

Second event: some preparation on site

The second event evaluated, on April 5th, had an expected attendance of 120 people, but only 80 people were estimated to have attended. The event featured heavy appetizers including crostinis, Mexican filo cups and bacon wrapped dates, all of which were passed around. It also included stationed appetizers including cheese plates, fresh fruit, tortellini caprese skewers, BBQ pulled pork sliders and chicken skewers. Finally, assorted small desserts were served. The crostinis and filo cups were constructed on site, and the BBQ sauce was added to the pulled pork upon serving. Deserts were brought packaged and plated as needed. Alcohol was also served.

Unserviced food assessment

Unserviced food from both events was weighed and recorded, and its final disposition was noted (i.e. compost or intended repurposing). Repurposing included use for employee meals, direct repurposing for upcoming events or preservation techniques like smoking or sauce-making for future events. Table A4 in the appendix shows the amounts of unserved food and details the amount composted or repurposed. Both events produced similar amounts of total unserved food, even though the first event had a 25% higher expected attendance than the second event. However, the first event had a repurposing rate of only 21.38% (meaning 21.38% of unserved food was kept for intended repurposing), while the second event had a repurposing rate of 70.93%, or 49.55% higher.

Analysis and Conclusion

Key causes and barriers to full food utilization

This study suggests that a cause of wasted food is **over-estimated attendance**. The analysis of event attendance showed that events are rarely over-attended (of 226 documented events, only 13.3% were over-attended). In reality, caterers are bringing extra to every event, planning for the few events that are over-attended. Multiple parties are to blame, and each play a role in preventing wasted food. Caterers should set more firm agreements with clients and only bring the amount of food for the people they are contracted to bring, though this would not help in cases of under-attendance. Clients could better utilize RSVP systems and communicate with caterers in a timely fashion to better inform actual attendance numbers. This is especially pertinent considering market research done by the Natural Resources Defense Council for the Save the Food campaign which suggests event hosts feel social pressure to please their guests and provide abundant food, supporting wasteful planning and serving practices¹.

While over-estimated attendance from all parties is an important factor, this study also suggests that **overproduction through overly generous portion sizes** is another, perhaps more important factor. The evaluation of post-event evaluation forms makes a significant case for this argument, as leftovers were common at both over-attended and perfectly attended events, and were only slightly (5%) more common at under attended events than perfectly attended events. This data suggests that leftovers at events are ubiquitous for this business, and often caused by over-generous production planning and portioning.

Fear of running out

Clients contribute to a culture of fear of running out in this catering institution and across many of the case studies. This fear of running out, regardless of who is at fault, sets a norm around overproduction. Instead of deploying practical solutions, like bringing reserves of less-perishable, easily prepared on-site meals, this business seeks to avoid customer dissatisfaction by bringing extra amounts of every menu item offered.

Lack of dynamic re-utilization

There appears to be a pervasive understanding at the business that re-utilization of unserved food is not always possible, would sacrifice the quality of food served, and would be unacceptable to clients. Though food is often repurposed for staff meals, less is re-utilized for clients. Event waste assessment data suggests, though, that some food is saved for intended use for clients.

Preparation-on-site

The waste assessment data for the two catering events analyzed in the study corroborated what catering staff suggested, that preparation-on-site practices can significantly increase the ability to repurpose unserved food product. Across these events of comparable sizes (150 and 120 estimated guests), **the use of preparation on-site practices increased potential repurposing of unserved food by 49.5%**.

Repurposing food has the potential to reduce wasted food, but also offers potential cost savings for the business. The practice of repurposing at the second event in particular represented \$114.21 in food cost

¹ Market research conducted by Natural Resources Defense Council for the Save the Food campaign. Retrieved from: https://www.epa.gov/sites/production/files/2016-05/documents/gunders_and_wedel_april_2016.pdf

savings alone (see appendix). When extrapolated to represent the business' annual average number of events and average event size, this suggests these practices could reduce food costs by \$14,540 dollars per year, saving 7,520 pounds of food from being thrown away. In addition, repurposing may offer the potential for savings in labor as well.

The environmental impacts of this practice are also significant, detailed in full in the appendix. The same yearly estimated **repurposed food represents 24.86 metric tons of carbon dioxide equivalents that could be avoided, the same as five passenger vehicles a year or 2,800 gallons of gasoline burned.** Additionally, it represents 88.81 million BTUs worth of energy use, **equivalent to more than the energy used by one average US household.**

While the second event had more unserved leftover food per person, staff indicated that some extra items were brought for this event because they knew they could be brought back and repurposed. Furthermore, the wasted food per person for the second event was significantly lower, because intended repurposing was so high.

This study did uncover some limitations and potential complications of preparation-on-site practices. The practice works best when a business has frequent events, reducing the likelihood that leftover food spoils between events. This means that during slow seasons fewer opportunities for repurposing are present. Furthermore, businesses that offer large menu selections limit repurposing potential across events. Finally, the best deployment of this practice requires more dynamic planning and ordering/purchasing, that allows for quick and responsive re-utilization.

Caterers should explore more changes to practices and purchasing that enable better construction-on-site. For example, this particular caterer routinely had pre-prepared cheese boards leftover, which they rarely re-utilized. Had they brought extra blocked or pre-cut cheese and arranged new boards as needed, they could have **avoided wasting multiple boards per event, with an estimated cost of \$11 per board.**

Conclusions and additional opportunities

This case study suggests that at this business overproduction, caused both by catering staff and event coordinators, leads to significant preventable wasted food. Analysis of the business' event attendance records shows that **event over-attendance is rare, especially for large events, and more could be done to tailor food quantity to actual attendance.** Furthermore, **overproduction was common at events of all attendance levels suggesting portions and PARs² are exaggerated, causing wasted food.**

Intended repurposing for unserved food items increased 49.5% when the preparation-on-site practice was used. While further research should be done to confirm this effect, it is likely that such practice has the potential for significant cost savings, reduction in labor requirements and environmental benefits. **Cost savings analysis suggest that the business could save food costs of \$14,540 per year.** This represents **potential greenhouse gas emissions reduction equivalent to five passenger vehicles or the combustion of almost 2,800 gallons of gasoline.**

More **research** should be done to better explain how attendee demographics, seasonality, alcohol serving and event type may affect attendance for catered events.

² PARs, or periodic automatic replenishment, are set production amounts that are generally set by management and followed by preparation staff. Some businesses have standard PARs across days or menu items, while others adjust their PARs according to anticipated customer demand.

Caterers should explore options for more **cross-utilization across events**. Use routine business lunches with long-standing clients to serve re-utilized unserved leftovers. This could mean offering reduced price “lunch special” to customers who are willing to relinquish their ability to choose exactly what they will be served.

Expand sustainable catering service options that move beyond preferable waste management practices, such as composting, and include waste prevention practices. This could mean working closely with clients to set more realistic attendance estimates, with extra construct-on-site options brought for reserve. The business could work with clients to market this sustainable alternative and, when necessary, enlist the client’s help to explain to guests why they being are served menu items not originally planned.

This particular catering business could benefit from **shifting from paper records to electronic records**, to both support easier access to event histories and expand options for analysis. Records could also be kept for primary entree menu items, including amount produced, and amount leftover, to help chefs conduct periodic **PAR re-evaluation**. Researchers recommend PARs be evaluated based on events with close to 100% attendance, using normalized leftover food amounts (like ounces per person).

Appendix

Attendance record analyses

Table A1: Analysis of catering event attendance by expected event attendance size				
		200+	50-200	0-50
	Average Turnout (%)	84.73	87.21	98
	Number of Events	47	111	68
Gross number	Over-attended	4	14	12
	100%	13	34	32
	Under-attended	30	63	24
Percentage	Over-attended	8.51%	12.61%	17.65%
	100%	27.66%	30.63%	47.06%
	Under-attended	63.83%	56.76%	35.29%

Table A2: Analysis of event records by event type				
		Casual	Business Meeting	Wedding
	Average turnout (%)	87.18	94.80	96.09
	Number of Events	127	35	22
Gross number	Over-attended	15	3	4
	100%	42	19	7
	Under-attended	70	13	11
Percentage	Over-attended	11.81%	8.57%	18.18%
	100%	33.07%	54.29%	31.82%
	Under-attended	55.12%	37.14%	50%

Table A3: Analysis of evaluation forms indicating leftover food			
	Number of events	Number of events with leftovers	Percent of events with leftovers
Events Over 100%	30	9	30%
Events at 100%	79	33	41.77%
Events under 100%	117	55	47.01%
Total	226	97	42.29%

Waste collection and sorting

Results: Event One

Plate waste from the catered event weighed a total 10.27 pounds. Of all the categories assessed, fruit and vegetable and prepared food contained the most amount of waste. Raw vegetables from crudité, roasted vegetable platter components, vegetable garnishes such as kale leaves, carved squash and carrots and maraschino cocktail cherries were among the foods discovered and weighed a total of 4.63 pounds (53% of total wasted edible food). The prepared category weighed 3.4 pounds (38.9% of total wasted edible food), consisted of noodle salad, and pre-made partially eaten cocktail sandwiches and salad rolls.

Buffet waste weighed a total of 54.3 pounds and was identified as uneaten food returned from the buffet to the staged kitchen area of the venue. The top two categories were the meat & fish and fruit & vegetable. Meat & fish weighed 19.31 pounds (35.5% of total wasted edible food) and fruit & vegetables weighed 8.1 pounds (14.9% of total wasted edible food). Items returned from the self-serve buffet are considered production waste and when combined with the previously mentioned sorted plate waste, totaled 63.1 pounds (47% of total wasted edible food).

Prepped back-up platters and bowls of foods kept in the staged kitchen area of the venue to replenish the buffet totaled 79.97 pounds. The leading waste categories from these back-up dishes were prepared food and meat & fish. Prepared foods weighed 35.56 (44.2% of total wasted edible food) and were noodle salad and salad rolls. Meat & fish weighed 31 pounds (38.8% of total wasted edible food) and consisted of smoked salmon, shredded pork and chicken skewers. Of this, 10.9 pounds of salmon was saved for repurposing, as was 2.1 pounds of unopened frozen assorted desserts and 4.1 pounds of unopened bags of pita bread.

Results: Event Two

Only unserved food, brought back to the business' kitchen after the event, was assessed in the follow-up assessment. In total, unserved food weighed 83.28 pounds. It was comprised mostly of pulled pork (24.21 pounds), which was intended to be repurposed for future events. Other major contributors included chicken skewers (9.25 pounds), which were not saved for repurposing, and cut mixed fruit (7.81 pounds) which also was composted. Examples of additional items saved for repurposing included bread rolls (6.72 pounds), cheese (5.42 pounds), and kale spread (2.02 pounds). Additional items that were composted were appetizer skewers (2.68 pounds), black bean salsa (2.05 pounds) and an opened box of crackers (1.58 pounds).

Table A4: Comparison of events 1 and 2

	Event 1		Event 2		Difference	
	Weight (lb)	% of total	Weight (lb)	% of total	Weight (lb)	% of total
Repurposed	17.10	21.38%	59.07	70.93%	+41.975	+49.55%
Composted	62.88	78.62%	24.21	29.07%	-38.67	-49.55%
Total	79.98		83.28		3.31	

Cost savings estimate methodology

Recommendation analysis

Cost savings estimates were calculated using ReFED’s value estimates for wholesale food costs, as outlined in their *Technical Appendix* to the *Roadmap to Reduce US Food Waste by 20%*³. The food cost assumptions are seen in Table A5 below.

Table A5: Costs per pound of retail and wholesale food groups, drawn from ReFED’s *Technical Appendix* to the *Roadmap to Reduce US Food Waste by 20%*

	Grain products	Meat	Fruit and Vegetables	Seafood	Milk and Dairy
Retail	\$1.21	\$5.73	\$1.51	\$8.04	\$1.21
Wholesale	\$0.97	\$3.24	\$0.74	\$4.88	\$1.17

To calculate average event attendance and annual yearly food costs, records from the second event were consulted, with the amount of each food category (grain, meat, fruit and vegetable, seafood, or milk and dairy) in each recorded item estimated by researchers and totaled. The sample event data was weighted to reflect the average event size (number of guests planned) calculated from the event records analysis of actual events over a two-year period. Yearly total weights and costs were extrapolated from this weighted sample data, using the average number of yearly events found in the same analysis (n=113). Results can be seen in the table below. These results may overestimate food costs because the second event had a large quantity of meat leftovers, which have significant cost. It may also be inaccurate because it assumes waste scales with number of guests (i.e. the waste is directly proportional to guest number). However, the data might underestimate yearly savings potential because the number of events were only those with recorded attendance data (both planned and attended), which was not the case for all of the event records collected from the business.

Table A6: Food weight and food cost estimates extrapolated from the repurposing tracking results at the second event

	Sampled Event		Average event		Yearly Estimate	
	Pounds	Costs	Pounds	Costs	Pounds	Costs
Grain	19.57	\$18.98	22.05	\$21.39	2491.52	\$2,416.78
Meat	24.21	\$78.44	27.28	\$88.38	3082.26	\$9,986.51
Fruit & Veg	2.56	\$1.89	2.88	\$2.13	325.92	\$241.18
Milk & Dairy	12.73	\$14.89	14.34	\$16.78	1620.70	\$1,896.22
Total	59.07	\$114.21	66.55	\$128.68	7520.40	\$14,540.68
Events per year	113					
Average attendance	135.2					

³ ReFed. (2016). *A Roadmap to Reduce US Food Waste by 20%: Technical Appendix*. Retrieved from https://www.refed.com/downloads/ReFED_Technical_Appendix.pdf

Carbon emissions analysis methodology

Carbon emissions and energy use reductions were calculated using version 14 of the EPA’s Waste Reduction Model (WARM)⁴. Repurposing was considered source reduction and calculated using the same researcher estimates of meal composition used for the cost savings analysis based on the data provided by the business. The full results of the WARM analysis can be seen in Table A7 below.

Table A7: Results from the WARM analysis of repurposed food, reported by category, with total reductions and their equivalents included

	Tons source reduced	Change in MTCO2E (compared to composting)	Change in Million BTU (compared to composting)
Grain	1.2458	-0.55	-7.76
Meat	1.5411	-23	-68.1
Fruit & Veg	0.1630	-0.04	-0.92
Milk & Dairy	0.8103	-1.27	-12.03
Total	3.7602	-24.86	-88.81

Equivalencies

<i>Passenger vehicles</i>	5
<i>Gallons of gasoline</i>	2,797
<i>Household annual energy use</i>	1
<i>Barrels of oil</i>	15

⁴ U.S. Environmental Protection Agency. (2016). **Waste Reduction Model (WARM) version 14**. Retrieved from <https://www.epa.gov/warm>

Conformance to Food Loss and Waste Reporting Standard

[The Food Loss & Waste Protocol](#)⁵ is a multi-stakeholder partnership, which has developed the global Food Loss and Waste Accounting and Reporting Standard – also known simply as the FLW Standard. Launched in 2013, the Food Loss & Waste Protocol’s mission is to ensure wide adoption of the FLW Standard so companies, governments, cities and others are better informed about food loss and waste and motivated to curb this inefficiency.

The graphic below describes the scope of Case Study 8 of the institutional and commercial sector assessment of the Oregon Wasted Food Study using the FLW Standard.

Food loss + waste protocol

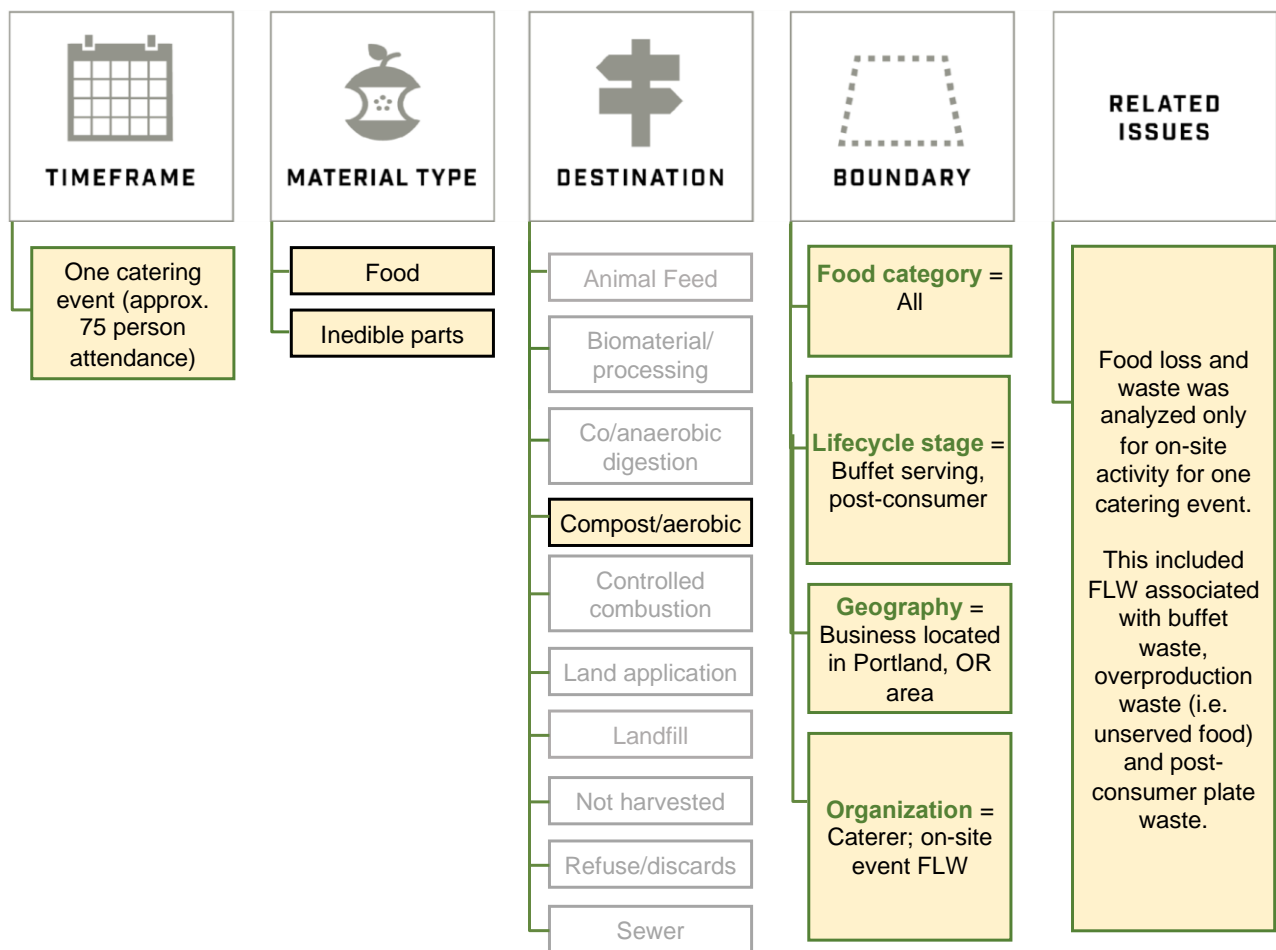


Figure A1: Scope of Case Study 8 as it relates to the Food Loss and Waste Reporting Standard

⁵ See, <http://flwprotocol.org>