MAINE STATE LEGISLATURE

"WASTE IS NOT THE MAINE WAY"

LD 1534 Stakeholder Working Group
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FINAL REPORT

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UNIVERSITY OF MAINE

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Executive Summary

In recent years, concerns about food waste have risen in the public consciousness. Several federal agencies, including the US Department of Agriculture and the US Environmental Protection Agency have placed increased priority on addressing food waste, and for good reason. We now understand that, across the United States, approximately 30-40% of the food we produce each year is wasted (Leib et. al. 2016, Buzby et al 2014). This loss comes with significant economic, environmental and social costs. Nationally, Americans spend about $218 billion each year to plant, grow, process, transport and then dispose of food that is never eaten (ReFed 2016).

Food is not the only thing that is wasted. Natural resources and energy are wasted too. Estimates suggest that it takes about 300 million barrels of oil and 20% of the nation's fresh water supply, agricultural land and fertilizers to produce the food that ends up going to waste each year (Hall 2009, Leib et al. 2016). The vast majority of wasted food ends up in landfills. Indeed, uneaten food is the single largest contributor to municipal solid waste in US landfills (Gunders 2012), helping to explain why they account for 18% of all US methane emissions - a greenhouse gas with about 30 times more global warming potential than CO_2 (EPA 2014).

The social cost of food waste is also increasingly apparent. We produce an abundance of food in the United States, yet nearly 12% of the population is food insecure, including more than 6 million children (USDA ERS 2017). How can this be when we throw away more than 50 million tons of food each year? Scientists have estimated that we could feed 25 million Americans each year by recovering and redistributing just 15% of the food lost annually in the US (Foley et al 2011).

These problems and the questions they raise have also received significant attention here in Maine, a state well known for its "waste not" mentality and historical leadership in waste management policy (Isenhour et al. 2016). In 2016 a diverse group of more than 100 waste management professionals, industry representatives, municipalities, legislators, and regulators from across the state came together to discuss their shared visions for a more sustainable materials management system in Maine. One of the strongest areas of consensus to emerge from this process was the sentiment that taking food and organic waste out of landfills and putting it to better use was a necessary step toward supporting the waste hierarchy, state-level recycling goals and shared visions for the future (Isenhour & Blackmer 2016).

In 2016 the Joint Standing Committee for Environment and Natural Resources (ENR Committee) considered LD1578 (Sen. Saviello) "An Act to Update Maine's Solid Waste Management Laws" which originally included, among other things, a commercial food waste composting requirement as well as a grant and loan program for composting initiatives. More recently, in 2017, State Representative Craig Hickman sponsored LD1534 "An Act to Address Hunger, Support Farmers and Reduce Waste" which included liability protections and tax incentives for food waste donation. The ENR committee unanimously voted to carry LD1534 over to this legislative session to allow time for stakeholders to consider the proposals contained within.

This report, submitted at the request of the ENR committee, is intended to contribute to discussions about food waste and insecurity by drawing on stakeholder expertise to: *estimate the food waste problem in Maine, outline food waste recovery and redistribution potential, and provide a preliminary, stakeholder-informed assessment of several state-level policies that might help to reduce and recover wasted food*.

The Senator George J. Mitchell Center for Sustainability Solutions at the University of Maine takes full responsibility for the content of this report (and any mistakes contained therein), but gratefully acknowledges that it is the product of the collective efforts of the stakeholder working group formed in response to LD1534. The working group was composed with the intention of balancing representation from municipal officials, farmers and food producers, grocers and restaurateurs, environmental organizations, waste management industries, waste haulers, food recovery and non-profit hunger relief organizations, food safety experts, composters and anaerobic digesters and institutions such as hospitals and schools (see APPENDIX I_Participants). Beginning with a working meeting in August 2017, the working group continued throughout the fall with sub-committee work conducted via conference calls, electronic communication, and collaborative documents.

The **Data Sub-Committee** collected data on food disposal, processing and redistribution from various sources across the state. They estimated that Mainer's produced between 231,000 and 236,500 tons of food waste in 2017, pointing to the need for food waste reduction efforts. Approximately 72-74% of this food waste was disposed of, another 21-24% was processed by composting or digestion facilities, and only about 5% of Mainers' food waste was diverted to hunger relief organization, again drawing our attention to the importance of prioritizing waste reduction through redistribution, prior to disposing of food. The data committee also estimated that Maine's food waste processing capacity has grown by approximately four times since 2014. Using historical reporting data, unused facility permits and present-day industry activity, the data group assumes that 2017 processing capacity is near 90,000 tons, or approximately 39% of total food waste generated in Maine. While capacity is geographically uneven and additional processing would be necessary if all Maine food waste were to be diverted, the data group noted significant potential to improve recovery.

The **Food Donation Sub-Committee** noted that approximately 16% of Mainers are food insecure. They outlined proposals for improved liability protections and tax incentives for food producers and retailers included in LD1534. While the sub-committee members agreed that all the proposals are advantageous, they raised several issues to consider, to ensure successful implementation.

The **Diversion Sub-Committee** explored the transformative potential of organic waste landfill prohibitions and recycling laws. Data from states that have enacted such policies suggest that, despite challenges, they have the potential to yield significant economic and social benefits. The committee also noted the potential benefits associated with on-farm processing in Maine and suggest that policies to maximize diversion are most successful when matched with incentives to encourage compliance.

The **Education Sub-Committee** noted the significant economic, social, economic and educational benefits of food waste reduction efforts in K-12 schools and examined the potential to implement these programs in Maine. Given that education efforts were seen as a top priority by the larger working group, the sub-committee outlined several barriers that must be overcome to ensure successful implementation.

Food Waste & Recovery in Maine

DATA WORKING GROUP

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Introduction

There is no centralized storehouse for food waste data in Maine. In this section, we draw on stakeholder-reported accounting from a broad range of sectors, and attempt to generate a preliminary picture of the state of food waste in Maine. Much of the work to divert food from the waste stream and reduce hunger in Maine is distributed across several sectors, including non-profit food recovery organizations, state government, and institutions of higher education. This section will attempt to quantify the amount of food waste in Maine based on best estimates, anecdotal evidence, and expert opinions. We also identify gaps in the data that limit our ability to quantify some aspects of the problem. For example, there are numerous actors with diverse operations and interests involved in Maine's food waste systems that make quantification difficult (see APPENDIX II for a flow diagram of key players).

Estimates of Food Waste Generation

We do not have exact measurements of the amount of food discarded as waste in Maine. The two best estimates to derive this value are: the 2011 Maine Waste Composition Study and Environmental Protection Agency (EPA) nationwide estimates. The Maine Waste Characterization Study focused on "household baggable waste" and found that food waste comprised 27.9% of the household waste stream (Criner & Blackmer, 2012). The EPA estimates that, nationwide, food makes up 14.9% of all materials discarded (EPA, 2014). Using these two values, we can generate a broad estimate that the level of food waste in Maine is between 110,000 tons and 210,000 tons of the 755,085 tons of municipal solid waste generated by households and businesses in Maine in 2015. There has been a dynamic change in food scrap management since the 2011 Waste Characterization Study. Given this, data in this section assume that food scrap diversion in Maine has increased by at least 10,000 tons since 2011. However, because the bulk of the new tonnage diverted is by restaurants, grocery stores, institutions, etc., and not by households, the percentage calculated for the 2011 Waste Characterization Study is still likely an accurate depiction of household activity.

Estimates of Food Scraps Processed[1]

Current and historical data on food scrap processing activities can be derived from the Commercial Composting Data collected through the Department of Environmental Protection (DEP), direct contact with food scrap processors, and the expertise of professionals and regulators in the

[1] Some values in this section are displayed as ranges to ensure confidentiality for individual data providers

composting industry. For the period between 2011-2015, 34 different entities reported processing fish (including shellfish) and/or food scraps to the DEP per rules of Chapter 410 (please note that many entities are exempted from reporting, see APPENDIX III). Regulators' expert opinions are that these data include 80% of all "commercial composting activity." An additional 20% of composted materials are not reported because it is carried out by exempted entities. On average, each of the 34 entities reported three times during this five-year period indicating that either: a) entities' activities vary drastically from year to year; or b) there are reporting gaps. historical data can be used to derive fish/food processing potential.

In 2015, the DEP *commercial compost database* reports indicate that 8,800 tons of fish/food waste was composted in Maine (this figure is missing several historically active processors). Given historical reporting records from 2011-2015, it is likely that closer to 24,000 tons of fish/food was composted in the state. For the years 2016 and 2017, the level of diverted fish/food materials is expected to increase several-fold due to expansions in the commercial composting industry and the introduction of an anaerobic digester in Exeter, ME. Initial projected estimates of fish/food to be processed in Maine in 2017 is expected to be between 75,000-90,000 tons.

- Present and Historical Capacity by Commercial Composters and Anaerobic Digesters:
- Maximum Historical Activity 2011-2014 in Maine: 24,000 Tons of Fish/Food
- Maximum Present Capacity for Processing of Fish/Food in Maine (given historical activity, unused permits, and present industry activity): 90,000 Tons/year for 2017
- Realistic Activity for Processing of Fish/Food in Maine in 2017: 80,000 Tons/ Year

In a separate database, the DEP collects and reports *composting of fish/food combined with leaf/yard waste* in the annual "Maine Solid Waste Generation and Disposal Capacity Report." The leaf/yard numbers are not thought to be highly accurate due to a lack of staff hours to allow for site visits. It can be inferred that most of the changes in activity are due exclusively to changes in fish/food processing because leaf/yard composting in Maine is an established activity across Maine Transfer Stations that has not undergone much transition.

- Organics Composted in "Maine Solid Waste Generation and Disposal Capacity Report" (leaf and yard waste included):
- 2013: 12,674 Tons (fish, food, leaf, & yard) (thought to be abnormal and low by experts)
- 2014: 23,627 Tons (fish, food, leaf, & yard) (increase of 10,953 Tons)
- 2015: 39,659 Tons (fish, food, leaf, & yard) (increase of 16,032 Tons)

The following estimates are derived using the commercial composting data obtained by the DEP and direct reporting from numerous large entities on their specific characteristics.

- Fish/Food Scraps Processed (composted or digested) by Generators:
- Total tons processed in Maine: >75,000
- Present Fish/Food Processed by Source Geography (estimate):
    - Maine: 50,000-55,000 Tons
    - Other Geographies: 25,000-30,000 Tons (Massachusetts: >20,000 Tons)
- Present Fish/Food Processed by Source Generator (estimate):
    - Residential: 1-2%
    - Restaurant/Hospitality: 11-13%
    - Commercial: 40-50%
    - Institutional: 8-12%
    - Industrial: 30-35%

During the period between 2010 to 2015, the state of Massachusetts increased their composting processing capacity by eight times. Much of this was due to heightened expectations of the impending food waste ban that officially went into place on October 1, 2014. Maine has increased their processing capacity and activity by approximately four times since 2014 and the materials diverted from Maine generators by 2.5 times.

Source Generator (estimated 2017 tons)	Residential	Restaurant/ Hospitality	Commercial	Institutional	Industrial	Total
Tons Processed in Maine (all sources)	1,301	9,560	34,855	7,516	25,601	78,833
% of Category Total	1.70%	12.10%	44.20%	9.50%	32.50%	100%
Tons Processed and Generated in Maine	500-2,000	6,000-7,000	19,000-21,000	4,000-5,000	18,000-20,000	47,500-55,000
% of Category Total	1-4%	10-15%	36-42%	8-10%	35-41%	
Tons Processed in Maine Generated Out-of-State	<1,000	3,000-4,000	12,000-16,000	2,500-4,000	5,000-7,500	23,500-32,500
% of Category Total	0-1%	10-15%	45-55%	10-15%	18-25%	

Continued expansion of processing capacity will be important as public interest in food waste recycling expands. In the United States, there are now over 5 million people with access to curbside or drop off organic waste services, and demand continues to grow.

Estimates of Residential Recovery Potential: Scarborough and South Portland Pilots

Two Maine municipalities, South Portland and Scarborough, recently implemented pilot curbside food waste collection programs. The two cities adopted different collection approaches but both sought to avoid charging a fee to households.

Scarborough's pilot program ran from May 2017 until September 2017 and included curbside collection of food waste for 251 households and food waste drop-off at three locations outside of the neighborhood. Prior to the pilot, the curbside collection program collected recyclables and trash in separate carts on a weekly basis. The city does not use unit-based pricing (PAYT). For the pilot, the waste collection schedule was altered: a smaller cart was added for food waste, which was collected on a weekly basis, while trash and recycling were collected every other week. During the pilot period 10.32 tons of food waste was collected. The average weight of food waste collected per participating household was 16.2 lbs. Participation rates varied, but the mean weekly set-out rate was 43.7% ranging from a high of 68.9% to a low of 29.5%. Scarborough has also maintained three food waste drop-off locations that collected 16 tons of food waste during the pilot.

South Portland's pilot program started on May 10, 2017, with 599 homes, maintaining every week collection and providing an additional 6-gallon bucket to every house in the pilot area for weekly collection of food waste. The city also does not have PAYT. Over the pilot program, as of October 1, 2017, the diversion/recovery rate, which includes food waste, increased from 29% to 38%. For food waste, the average set-out rate was 37.2%. In the five months between May and October, 21.8 tons food waste was diverted. In addition, 2.5 tons of food waste was collected at the city's transfer station.

Households reported that their top two reasons for participating in these pilots were: 1) that it would be better for Maine's environment, and 2) that it would help to reduce the city's solid waste

management costs. While located in population dense areas, these programs suggest that there is interest in organic waste recycling and potential to capture a larger percentage of the residential organic waste stream.

Estimates of Food Diverted for Hunger Relief

Maine has made robust efforts to divert edible, nutritious food from the waste stream, with a goal of reducing hunger. These efforts have been undertaken by a variety of actors, ranging from gleaning groups to food banks, food pantries, and more.

- The Good Shepherd Food bank reported that they divert 20.6 million pounds of food from disposal annually. For 2016: 18 million pounds came directly from national/regional retailers such as Walmart or Hannaford; 860,000 pounds came from farms making unplanned surplus produce donations; 1.5 million pounds was donated from retailers that exclusively operate in Maine
- The Maine Harvest for Hunger program has donated over 2 million pounds of produce, worth $4 million to food insecure households since 2000.
- In 2016 Feeding the 5000 was carried out in Portland, Maine to provide 5,000 meals from 4,193 pounds of 13 different crops gleaned from 17 farms.
- In 2016, 127 Master Gardeners were trained, bringing the active total to 952. Collectively, they donated 35,000 hours to food security education and supported 80 community, 86 school, 103 demonstration gardens, programs that involved 1,579 youth.
- In 2014 the first Hunger Dialogue was held. With the 4th event held in October of 2017, the event brings together hundreds of college students, stakeholders, farmers, food service providers, and others to discuss hunger and solutions across the state of Maine.
- In 2011 a public/private partnership between Idexx laboratories and the University of Maine's Harvest for Hunger program resulted in 114 employees growing and donating 500 pounds of produce. By the second year participation and food donations doubled.
- According to the Maine Food Atlas there are presently 24 Gleaning Groups, 15 Local Food Councils and 6 School Backpack Programs in Maine.

Estimates of Total Food Waste Activity

Given the available data and industry experts' opinions, the following table is a broad range for food that is disposed of as waste, processed through anaerobic digestion or composting, and recovered through donation.

Food Estimate for 2017 (tons)	Low Est.	High Est.	Experts Est.	*Maine Only
Food Waste Disposed of	110,000	210,000	170,000 (65%)	170,000 (72-74%)
Food Composted/Digested	70,000	90,000	78,833 (30%)	50-55,000 (21-24%)
Food Rescued/Donated	11,000	13,000	11,500 (4%)	11,500 (5%)
Total Food Generated	196,000	313,000	260,333	231-236,500

Putting Unwanted Food to Good Use

A. POLICY TO ENCOURAGE FOOD DONATION & HUNGER RELIEF

Donation Sub-Committee Report

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Introduction

Food waste and food insecurity are intersecting issues, both symptoms of a food system that is simultaneously overabundant while still underperforming in its basic goal to feed more people. In Maine nearly 16% of households are food insecure, meaning they lack access to enough food to live a healthy, active lifestyle (Coleman-Jensen et al 2016). Despite this need, nationally only about 1.7% of products considered unsellable after the manufacturer's determined date label were recovered for human consumption (Food Waste Alliance 2016). Our estimations suggest that only about 5% of food waste generated in Maine is currently being diverted in the interest of food security and hunger alleviation. While our sub-committee was tasked with considering the tax incentives and liability protections included in LD1534, we note that these are not the only policies which can work to increase food waste recovery for hunger relief. Policies that prohibit food waste in landfills or require organic waste recycling can also significantly increase donations. After implementing the Universal Recycling Law in Vermont, for example, food donations increased by 40% in the first year of the program alone.

Other policies to promote food donation address the issues of food loss on farms and food excess along the rest of the supply chain, diverting second, third, and fourth harvests, as well as edible products from hospitality and retail sectors from the waste stream and back into the food system. Critically, all food donations are not equal. The social benefits of food donations are drastically reduced when the food donated is high in calories and sugar, *and* low in nutrients. Attention to the types of food donated is essential, and policies should not encourage the donation of food that will be harmful to recipients.

Much of this available food can be made accessible to non-profit organizations addressing food insecurity, avoiding food loss on farms, while simultaneously reducing the amount of food that is landfilled or incinerated. LD 1534 contains four provisions to support food donations in the state of Maine: incentivizing farmers' donations of second, third and fourth harvest crops through a food producer donation tax credit, extending liability protections to food donors who provide food directly to end-users, extending liability protections for food that is sold for a nominal cost to end-users, and establishing clear guidelines for food donation. The following pages summarize the potential barriers and opportunities of each of these policies within the state of Maine based on the experiences of stakeholders from a wide range of fields, including hunger-relief organizations,

gleaners, food recovery efforts, grocers, and hospitals, as well as limited surveys, interviews, and literature reviews.

Food Producer Donation Tax Credit

While farmers in Maine already donate some of their unmarketable crops to hunger-relief organizations, doing so can be prohibitively expensive due to the costs associated with harvesting, cleaning, and transporting this food. Providing a state-level tax credit to assist food producers to donate food can eliminate some of the barriers associated with donation. This is particularly advantageous for Maine farms, which often operate with small margins. LD 1534 establishes a tax credit for food producers. The credit provides 50% of the fair market value of donated food, with total cap of $150,000 for the state. Credits would be distributed pro rata if the total participation exceeds the $150,000 cap.

The Harvard Food Law and Policy Clinic suggests that tax credits offer advantages to both small and large businesses, unlike tax deductions, which tend to benefit large businesses disproportionately (Leib et al 2016), yet some of the Maine farmers surveyed for this report acknowledged that their low tax liability means that their potential to benefit from the tax credit in LD 1534 may be limited. Nonetheless, as one respondent noted, "Our state tax liability is not terribly high but every little bit counts." Allowing for a refundable tax credit might have the potential to ameliorate some of the farmers' concerns. Another barrier associated with maximizing donations through the tax credit is the $150,000 cap. Farmers, gleaners, and hunger-relief organizations noted that for farmers to take the time to meet reporting and record-keeping obligations, their expected benefit from the tax credit would need to be worth their while. Raising the $150,000 cap might encourage more farmers to donate surplus food, as would streamlining the reporting to match federal requirements. Finally, there was widespread agreement that the final version of this tax incentive should be clearly written and easily accessible to allow food producers without tax and law backgrounds the opportunity to take advantage of the benefits it offers.

Liability Protections

Federal liability protections under the Bill Emerson Good Samaritan Act provide a baseline of security for food donors. However, within this protection are some barriers that can make it difficult for organizations to donate food. LD 1534 presents state-level liability protections that aim to fill some of the gaps within the federal legislation. The first component of the state-level liability protection is to provide liability protection for organizations that donate directly to end-users rather than to a non-profit or charitable organization. Stakeholders agreed that facilitating the donation of food directly to end-users would circumvent some of the challenges presented by Maine's highly rural geography. When organizations and businesses can donate directly to individuals, rather than only going through non-profit organizations, it eliminates some of the logistical challenges associated with food donations.

The second piece of liability protections laid out in LD 1534 involves extending liability protections for food that is distributed to end-users for a nominal fee. Under the Good Samaritan Act, donors are only protected if food is given to end-users for free. Allowing organizations to charge for overhead and transportation costs has the potential to facilitate new food distribution structures, including "social supermarkets." These organizations are common in Europe, where they work alongside food banks to increase access to food. Although social supermarkets are thought to decrease the stigma associated with receiving food from food pantries, there is little research documenting this because these organizations are relatively new, having emerged in Austria in the late 1990's (Holweg et al 2010). Fourteen states in the United States have laws that

provide liability protection for instances when the end-user is charged for donated food. Still, only one social supermarket has emerged: The Daily Table, in Massachusetts. While providing liability protection for donation instances where the end-user is charged for donated food has the potential to build a new food distribution sector in Maine, the conditions under which this might arise are unclear.

Guidelines for Food Donation

Even when liability protection and donation incentives exist, organizations may struggle to donate food because it can be difficult to understand the regulations concerning food safety for donation. This issue emerged as a top priority for stakeholders at the August 2017 Stakeholder Working Group Meeting at the University of Maine. In a limited survey of members of the Maine Grocers and Food Producers Association, participants viewed favorably the idea of providing guidance on food safety for donations *and* integrating food donation and food safety language in the same food code. This, along with other information from potential food donors, indicates that more information on how to donate food safely, and in accordance with established regulations, would be welcomed and might increase food donations.

When Maine General was interested in donating surplus food from its cafeteria, concerns about labeling requirements in the Maine Food Code presented barriers that nearly prevented the effort from moving forward. While health inspectors are trained to enforce the Maine Food Code, there is often less clarity around the Maine Food Salvage Code, which determines food safety for surplus and salvaged food. Providing clear and easily accessible guidance on food safety and protections for food donation is one opportunity to strengthen food donation practices in the state. These efforts can be supported by digital tools that are widely used by food banks across the country, including Food Keeper, a mobile application developed by Cornell University, the United States Department of Agriculture, and the Food Marketing Institute. There are opportunities to use best-available knowledge regarding food safety and food donations to overcome some of the present barriers that exist in Maine today.

Resources

FoodKeeper
https://www.foodsafety.gov/keep/foodkeeperapp/
Developed by the USDA's Food Safety and Inspection Service, with Cornell University and the Food Marketing Institute, FoodKeeper provides guidance on food safety and quality. This mobile application and website is widely used by non-profit hunger-relief organizations to determine food safety.

Iowa's Farm to Food Donation Tax Credit
https://tax.iowa.gov/farm-food-donation-tax-credit
Provides clear, simple language describing the Iowa tax credit for farmers who donate surplus food.

Social Supermarkets
https://www.nrdc.org/resources/daily-table-rescuing-food-and-creating-better-alternatives-low-income-families
This link provides details on the Daily Table, the only social supermarket currently operating in the United States, including descriptions of its mission, impact, and business strategy.

B. POLICY TO MAXIMIZE FOOD WASTE DIVERSION

Diversion Sub-Committee Working Group

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Overview

In the United States, where 40% of the food produced each year is never eaten, wasted food is the single largest component of the municipal solid waste stream found in landfills. This loss of economic investment, labor, energy and nutrition comes at great economic, environmental and social cost. Recognizing this, many states have implemented policies designed to maximize diversion through composting, agricultural use and energy recovery. These policies include prohibitions on the disposal of food waste in landfills, organic waste recycling requirements, and/or incentives for alternatives such as waste reduction programs, food donation, composting, and anaerobic digestion.

Maine stakeholders participating in the Mitchell Center's LD1534 engagement workshop in August 2017 communicated broad consensus on these policies, largely agreeing that organics recycling laws and landfill prohibitions have the most potential to significantly transform the food waste landscape and increase food donations. In this subcommittee report we review three interrelated and potentially complementary state-level policies designed to reduce food waste. These policies include: 1) organic waste landfill bans and recycling laws; 2) on farm processing; and 3) incentivizing landfill alternatives. Members of the committee have noted that these policies are within the purview of the ENR committee, that the DEP reports sufficient existing capacity to oversee implementation and, if successful, these policies would constitute a significant step toward supporting the State's waste management hierarchy (38 MRSA §2101, adopted 1989), food waste hierarchy (38 MRS §2101-B, adopted 2015) and recycling goal (38 MRS §2132) which states, "It is the goal of the State to recycle or compost, by January 1, 2021, 50% of the municipal solid waste tonnage generated each year within the State."

Organic waste landfill prohibitions & recycling laws

Five states have implemented organic waste landfill bans or organic waste recycling laws. Landfill bans prohibit certain waste generators from landfilling organic wastes, including foods (VT, MA, RI, CT). Recycling laws require organic waste generators to divert or recycle these materials through donation programs, composting or digestion (e.g. CA). Both recycling laws and landfill bans are "outcome oriented" rather than "process oriented," meaning that the government allows waste generators and municipalities to choose how to divert their food waste. Stakeholders note that this outcome orientation is essential to allay concerns that, given home rule, organic waste recycling laws or landfill bans could be read as a mandate, in which case the state would become financially responsible for implementation.

New England has become recognized as a national leader in organic waste policy. Massachusetts, Connecticut, Rhode Island and Vermont have already established partial or graduated universal organic waste landfill bans, though the programs vary between these states. Arguably the most comprehensive, Vermont's Universal recycling law lays out a graduated organics management plan which went into effect in 2014, starting with largest generators; those producing more than

104 tons of organic waste per year. By 2020, the plan will exclude all organic waste from disposal, including household generation. States and provinces in other regions have implemented similar measures, including the state of California which has an organic waste recycling law, and Nova Scotia which banned organics from landfills more than two decades ago (Jones, 2017).

Initial research suggests that these policies have had positive economic, social and environmental effects. In Massachusetts, a study conducted by an independent research group (ICF 2017) found that the state's ban of commercial organic waste contributed to the creation of 900 jobs, $46 million in labor revenue, $77 million in gross state product and $5 million in state and local tax revenue. In Vermont, food donations increased by 40% in the first year of the program, far exceeding expectations. The program also generated environmental benefits. In the first year alone, more than 53,254 tons of organic waste were diverted from landfills. Chittenden Solid Waste District, the most populous area in the state, has reported a 10-15% increase in composting each year since the program went into effect (VT DEC 2017). Overall, as of the end of 2016, the program has resulted in a 5% overall drop in disposal tonnage (VT DEC 2016, NRDC 2017).

Potential Barriers to Implementation

With the advantage of insights from other states and, considering Maine's unique context, stakeholders have noted that it is important that these programs are well designed to ensure that adequate capacity exists, that entities are financially and geographically able to comply to prevent the need for excessive exceptions, and that adequate incentives and enforcement exist. Stakeholders therefore identified several barriers that would need to be addressed before successfully implementing an organic waste recycling law or a landfill disposal ban in Maine. First, experiences in other New England states suggest that while policy certainty will likely spur private and public investments in organic waste recovery and processing capacity, it is essential to understand:

1) <u>How much food and organic waste will likely be generated.</u> The data working group provided rough estimations of the food waste problem in Maine but the diversion working group recommends gathering more geographically targeted data to understand where capacity is sufficient and where additional options would be necessary. Stakeholders point to Vermont's program where, as it expands to include smaller food waste producing businesses, there is a "legitimate concern" that small businesses in rural areas will be unable to comply.
2) <u>Our current, geographically-distributed capacities to haul, handle, receive and process these materials.</u> Composting and anaerobic digestion capacity is important, but so are other processes including transportation, storage space, refrigeration capacity at food redistribution facilities and processing technologies. One stakeholder noted that when MA implemented their commercial organics ban they provided incentives for compost and AD technologies, but no incentives for pre-processing (e.g. grinding, depackaging). This oversight led to an initial bottleneck that could have been overcome with greater understanding of existing capacity - all along the chain of recovery.
3) <u>State-wide or geographically specific capacity gaps that might present a challenge to compliance</u>. The data working group has managed to gather a significant portion of this data but additional research is required to fully account for and map waste generation and to estimate the additional capacity required in specific locales. Other states created baseline datasets for both generators and facilities, and utilized a ‘maximum hauling distance’ to a facility, in starting their organic bans. We recommend more in-depth analysis, including life-cycle analyses of various options to determine the impact of food waste collection in various distance/volume scenarios. If this work is completed and it is determined that organic waste generation and geographic capacity don't match, which is likely given Maine's uneven

settlement patterns and rural expanses, Maine might consider implementing a graduated ban that provides time for markets and municipalities to build capacity. Other states have provided temporary exemptions for impacted entities that are beyond the 20-mile maximum established radius of a donation or organic waste processing facility.

Stakeholders point out that if these programs were to be implemented in Maine, it would also be necessary to ensure that there are adequate investments in promoting and educating the public and commercial and institutional sectors, as well as in technological capacity-building to ensure cost-effective collection without increased transport costs and to prevent contamination of separated organics.

Maine-Based Opportunities for Implementation

Several stakeholders have noted that the "waste-not" mentality is deeply engrained in Maine culture, perhaps lending popular support for "good sense" measures to eliminate wastefulness. Several pilots and experiments throughout the state indicate that Mainers show interest in composting, when given the opportunity. A waste management organization in Southern Maine, ecomaine, recently became a collection point for food waste being sent to an anaerobic digester, diverting more than 2,700 tons of food in fiscal year 2017. This food waste constituted a large percentage of recyclables diverted by weight at the facility (6%), higher than glass (5%) and cans and plastics combined (4%). Similarly, two organics waste collection pilots, based on voluntary participation in Southern Maine have noted significant participation rates and report collecting more than 40,000 tons of food waste in 2016.

Several stakeholders argue that Maine already has a relatively robust capacity to receive and process food waste, perhaps even greater than the capacity in other states when their organic waste landfill bans were passed (though we have been unable to verify that claim). Maine is fortunate to have three companies actively and competitively seeking organics diversion practices from residents, businesses and institutions: Garbage to Garden; We Compost It; and, Agri-Cycle. The success of these private sector enterprises is noted by a few stakeholders who question whether state-level intervention is necessary to enhance organics recovery. Other stakeholders note how far Maine has to go to realize waste reduction and diversion goals, as well as the positive effects of landfill bans in other states, including significant private sector investments, expansion and capacity. Municipalities, institutions, farms and schools have also adopted food scrap recovery and composting projects, providing for a wide web of success stories and models for others to emulate. There are also many smaller organic waste processors. The Maine DEP has compiled a list of 96 permitted composting facilities around the state, 20 of which accept food residuals. Stakeholders also note an exceptional opportunity to leverage Maine's robust and growing agricultural sector to participate in waste recovery and prevention efforts.

On-Farm Processing

Organic food waste recovery makes good sense, but it requires investments of time and capital to build the recovery infrastructures necessary to support food donation, composting or digestion organizations. These investments can be capital intensive and many states have struggled to build capacity fast enough to ensure compliance with organic waste landfill bans or recycling laws. As noted above, transportation costs can be prohibitive where capacity does not exist, limiting participation, in the short term. In these cases, stakeholders and organizations working on food waste policy (Leib et al 2016) suggests that there is significant potential to encourage more localized, on-farm processing of organic wastes, through composting or small-scale digestion operations.

Potential Barriers to Implementation

Distributed farm-based systems for organic waste processing may help to address transportation barriers, minimize atmospheric pollution, help farms to diversify income streams and capture nutrients for use as fertilizer. Nonetheless, stakeholders have identified several potential barriers to implementation in Maine. Most notably, stakeholders question whether farms have the capacity to deliver solutions on the scale necessary to ensure compliance with state-wide diversion requirements. In order to attract framers, on-site processing would need to make financial sense and would likely require resources to build capacity (training, marketing, equipment, certification).

Maine-Based Opportunities for Implementation

With more than 8,000 farms already in Maine (USDA 2016) and notable growth in the number of young farmers and land under cultivation in recent years (USDA 2012), there are substantial opportunities to mobilize a distributed and mutually beneficial network for food waste recycling in Maine. Farms can save money on fertilizers by circulating nutrients in local food systems and can diversify their income streams with sales of byproducts including animal bedding, compost and fertilizers. A farm considering adding food scraps or food processing discards into their composting efforts is required by the Department of Agriculture, Conservation and Forestry (DACF) to first develop a Compost Management Plan. Approximately three dozen farms currently have compost management plans, but only a handful are currently including food scraps or food processing discards into their composting efforts. Farms may accept up to sixty cubic yards of food scraps a month for composting, without requiring a license from DEP. When combined with state-level and private sector investments in building capacity for food waste processing through centralized systems, support for on-farm processing recognizes that "one size does not fit all" - especially in a state with an uneven population distribution.

Incentivizing alternatives

Reviews of effective state-level policies to reduce food waste suggest that the most effective policies are those that combine recycling laws or landfill bans with educational efforts and financial incentives for compliance. However, when organic and food waste recycling laws or landfill bans are politically infeasible, gains can also be achieved through financial incentives and disincentives for food waste diversion and recovery. Unfortunately, it is often much cheaper and easier to send unwanted and wasted food to the landfill than it is to invest in its recovery as a source of food, fertilizer or energy. By shifting financial incentive structures, policy makers, municipalities and waste management organizations in Maine have an opportunity to significantly reduce food waste by making its disposal in a landfill more expensive relative to more sustainable alternatives. Several options discussed by stakeholders include unit-based pricing for disposal (also referred to as "pay as you throw" or PAYT) which can encourage generators to reduce volumes through food waste diversion, variable pricing which makes landfilling more expensive relative to food waste recovery and surcharges for those who don't comply.

Unit-based pricing, or “pay as you throw” systems are attractive to encourage customers to reduce costs by diverting food waste. By charging per unit of waste, these systems provide an economic incentive for food waste diversion. In addition, by asking those who generate waste to pay for its disposal, many see the ‘polluter-pays’ principle as a better, more fair alternative. Several states have implemented state-wide PAYT programs including Iowa and Oregon (US EPA, 2015) and some local communities have reported as much as a 50 percent decline in municipal solid waste after implementing PAYT (Broaddus, 2015). These programs are particularly effective when recycling and composting services are less expensive than disposal.

Landfill surcharges can incentivize programs to improve recovery rates. In order to meet their Climate Action Plan requirement of a 75 percent reduction in waste by 2020, the Colorado Legislature passed the Recycling Resources Economic Opportunity Act in 2007, which now adds a 14-cent tipping fee/cubic yard landfilled (CDPHE 2017). These fees fund programs designed to prevent waste and increase waste recovery rates. Fees levied on waste generators who do not comply can also be effective. Metro Vancouver's program, which issues surcharges to violators, saw an 8% drop in the organic content of landfilled materials in the first year of the program.

Potential Barriers to Implementation

Some communities have faced public and municipal resistance to increased fees for waste disposal, which some see as a public service, already funded by tax payer dollars. Municipalities have also expressed concerns about increased landfill fees without additional resources to ensure economically feasible food waste diversion programs. However, many Maine communities have already implemented unit-based pricing, with very few challenges. Several states have higher landfill fees that are utilized to discourage disposal and encourage waste reduction and recovery. Empirical data suggests that the savings associated with these programs are substantial. A challenge is therefore to educate the public about the lost value that can be recovered from food wastes as well as long-term costs associated with disposal that can be avoided with incentives for waste reduction, like disposal fees and unit-based pricing.

Another barrier is the potential use of 'flow control' (38 MRS §1304-B), to ensure that a municipality's solid waste tonnage which is committed to a disposal facility, is not reduced by the weight of food scraps removed. Municipalities with this tool are able to stop efforts that would reduce the tonnage of waste that has been guaranteed, or contracted, to a disposal facility. This provision ensures a predictable flow of revenue and waste to a disposal facility, but could, if utilized by a municipality, stop a generator from separating its food scraps and diverting them elsewhere. If the legislature were to require the separation and recovery of food scraps, this concern would need to be addressed, so as to ensure that a municipality would be protected from potential fines levied by the disposal facility for not meeting their contracted waste tonnage.

Maine-Based Opportunities for Implementation

In 2015, the Maine State Legislature amended the solid waste management hierarchy, adding the food recovery hierarchy (38 MRS §2101-B). The policy says that it is the policy of the state to support the hierarchy by "preventing and diverting surplus food and food scraps from land disposal and incineration." The legislature resolved to follow the following order of priority: a) reduction of food waste at the source; b) donation of surplus food to feed hungry people; c) diversion of food scraps for animal feed; d) utilization for energy generation and e) land disposal or incineration. The legislation requires that these priorities should guide decisions related to solid waste and organic materials management.

Several communities have demonstrated the positive effects of financial incentives. South Portland and Scarborough, the state's first municipal food waste collection pilots, were incentivized by a reduced ecomaine organics tipping fee rate of $55/ton instead of the standard $70.50/ton paid to dispose of trash. South Portland incentivized customers with free dedicated food waste collection and Scarborough opted to keep food waste collection program cost-neutral through co-collection with trash and recyclables. These programs are not only testing alternative incentives for residential customers and the most effective methods for collection but they are demonstrating a strong willingness to participate.

C. Policy to Reduce Food Waste in Schools

Education Sub-Committee Working Group

Prepared by: Jean MacRae
Working group members: Tania Ferrante, Karen Fussell, Melanie Loyzim, Renee Page, Ryan Parker, Owen Richmond, Alisa Roman, Susan Webster, Lisa Wolff

Overview

Programs designed to reduce food waste in schools have significant environmental, educational, financial, and social benefits. These wide-ranging benefits help to explain why stakeholders at the working meeting in August nearly universally identified this area as the top priority for Maine. A recent pilot study in Maine schools (NRCM 2017) showed that 75,000 pounds of food waste is produced each year for a population of 2000 students. This works out to approximately 36.5 pounds of wasted food per student, per year. This is incredibly expensive and reducing the amount of food waste can result in substantial savings. Maine is likely generating more than 7 million pounds of food waste from school cafeterias each year. The savings associated with removing this from transportation and waste streams would likely be substantial at the local level (property tax and school budget relief) and in most cases, would more than offset the cost of establishing food waste reduction programs like share tables and on-site composting. RSU 16, for instance, has moved to zero sort recycling and began separating food waste for diversion to compost, producing a $10,000 savings on waste hauling in the first year of the program. Interventions that focus higher on Maine's food recovery hierarchy, including share table programs, which get food to students who face food insecurity, produce more diverse, higher returns than programs that rely only on waste management. However, in school settings, when integrated into the curriculum, programs at every level of the food recovery hierarchy can provide long-lasting educational and nutritional benefits while saving money. Promoting food waste reduction policies and programs in schools produces health and environmental benefits, reduced food insecurity and reduced costs with very little down-side. Everyone, students, staff, and the wider community, benefit from an improved understanding of the scale of the problem and potential solutions that can be implemented more widely to fight hunger, help the environment, and save thousands of dollars for taxpayers.

The working group recognized that a legislative mandate, by itself, could be unpopular due to the many existing mandates and competing interests that schools need to balance. Such a mandate could be incredibly effective if a focused campaign were developed to raise awareness of the benefits and provide support for school administrators, teachers, other staff, and students to develop programs that will work locally. The support would need to provide clear guidance on what is allowed and what is not, as well as access to videos, educational materials and Maine-based success stories that could help overcome some of the initial resistance to change. Maine is fortunate to already have a strong network of non-governmental organizations working on and willing to contribute to the development of educational materials including the Maine Resource Recovery Association, the Natural Resource Council of Maine, the New England Environmental Finance Center and ecomaine. Members of the group also stressed that these materials would need to carry a consistent message, should be found where school administrators, teachers and community members are likely to look for them, should address the constraints and challenges experienced throughout the state, and should be easy to emulate and use.

Overcoming Potential Hurdles

There might be a political cost as well as an apparent cost in local control if food waste reduction were mandated, and certainly if techniques or specific benchmarks were dictated or centralized.

However, the committee thought that the cost savings benefits would likely encourage schools to choose to implement waste reduction strategies if appropriately framed and accompanied by support, and expertise. Support is needed to overcome several challenges faced by communities trying to establish new programs. The primary barriers to the establishment of food waste reduction programs were identified as: (a) lack of clear, consistent guidance on rules; (b) resistance to change – mustering the energy and enthusiasm to build a new program without causing burnout; (c) lack of understanding of the low cost of establishment of programs and lack of support for those initial program costs and training, however minimal; (d) lack of well-publicized success stories that can be drawn upon to trouble-shoot locally-relevant difficulties and obstacles to success; and (e) lack of awareness of the benefits.

An initial investment in a campaign to raise awareness and the production of clear, engaging, consistent and informative materials and videos about successful and effective programs would help jump start programs in schools that currently do not have them. Clear guidance on record keeping will help schools quantify the benefits of their programs and help justify investment in them over time. The establishment of a new program requires work and enthusiasm to overcome resistance, but once established, programs that are well integrated – that have become second-nature – can continue even if the person who spearheaded it leaves. This is particularly true when programs are driven by students with staff acting only as facilitators. Schools are likely to need some help (and inspiration) to achieve this. The sub-committee identified several ways to support the implementation of successful programs as described below.

Create clear, consistent guidelines:
Schools trying to establish food waste reduction programs have had difficulty finding clear guidance on best practices to ensure the safety of food diverted to hungry students as well as other food waste reduction strategies. Old information and conflicting advice from different sources causes confusion.

- A single clearinghouse of information specifically designed for schools implementing food waste diversion programs and housed on a website where administrators, staff and students will be looking for it would answer this problem. Wisconsin has a good example of such a site at https://dpi.wi.gov/school-nutrition. Support would be needed to construct a similar website to house these materials for Maine. School personnel would be looking for this information across several state agencies including, but not necessarily limited to, the Maine Department of Education, The Maine Department of Agriculture, Conservation, and Forestry, and the Maine Centers for Disease Control. All agencies should have clear links to a single site, which could be housed and maintained by one agency.
- This website would require collection of information from, and agreement among, staff from different agencies to ensure that a consistent message is being shared.
- Once the rules are clear, they must be written in a way that makes sense to the people trying to develop programs (administrators, staff, and students), and addresses conditions in the schools, while remaining an accurate reflection of agreed-upon messaging.
- These initiatives might not need legislation, but would require support for people who can clarify the rules, provide guidelines and promote best practices from each of the relevant agencies. Without legislative guidance and support, that is likely to be difficult to achieve.
- There is a willingness among the participants in this working group to form a committee to work with staff from the relevant agencies to collect the information and get agreement and approval. Some time will be needed for everyone to talk through the concerns and potential solutions that are relevant to schools in particular.

- Harvard, WI and VT have great guidelines which can act as a starting point. We just need all interested arms of government (health, education, environment) to give the same message and make the guidelines clear, concise, understandable and specific to schools.

Overcoming inertia:
Most schools are just getting started down the road to reduce food waste, so they are not clear on the magnitude of the problem (or potential benefits of solving it). There are several reasons that administrators may be reluctant to establish new programs to reduce food waste and improve student nutrition. There are fears about over-regulation surrounding the safety of food (particularly concerning Share Tables and donating leftover food scraps to feed livestock), confusion about the rules and how to comply with them, expectations (often inaccurate in scope) that the programs will cost money and time or require resources that are not currently available at the school.

- There would be less resistance if the benefits were more widely known (see awareness and support for program costs and training).
- There would be less resistance if there were clear roadmaps to successful programs (see role models and success stories)
- There would be less resistance and more enthusiasm to put in the extra work of establishing a new program if there were more funding and technical support earmarked for this work (see support for program costs and training). If our estimations of average food waste generated per student per year holds true, Maine is likely generating more than 7 million pounds of food waste from school cafeterias each year. The potential savings associated with removing this waste from transportation and waste streams would likely be substantial at the local level (property tax and school budget relief) and in most cases, would more than offset the cost of establishing food waste reduction programs like Share Tables and on-site composting. There are also significant hunger relief benefits if food can be redistributed to children in need. However, these benefits are not widely known.

Help realizing long-term cost savings:
Especially in the early stages, when food diversion and waste reduction programs are established, there will be a need for programs to offset the costs of equipment and training. Even though the costs of establishment and maintenance are minimal, schools often operate under tight budget constraints. In these circumstances gut reactions about an inability to find even a few hundred dollars to build a compost bin or purchase buckets and effective signage for new separation regimens, may stymie interest.

- Support for pilot programs in different regions and spanning different demographics would demonstrate feasibility under different constraints relevant in Maine
- Waste analyses need to be done to show where purchasing and food choices can be improved (USDA has good guidance on these analyses), support for data collection and guidance on how to do this in a consistent way would be very helpful. NRCM has some data they are willing to share, but additional data should be collected and used.
- Curriculum change, particularly in terms of flexibility, to incorporate food waste related activities in academic programing requires work and support. There are differences in the flexibility of the curriculum at the primary and middle school levels compared to high school. Curriculum materials created with these constraints in mind should be funded and effective materials should be shared. Ecomaine has developed some materials they are willing to share and NRCM is currently designing materials specifically aimed at schools. The clearinghouse of information should have capacity to accept new materials, which would require that someone curate the materials.

- Development of effective videos and workshops to identify and present best practices should be supported so they can be made available to schools attempting to establish new programs. Some schools working on food waste reduction also have videography and photography curricula. It might make sense for video pilot programs to take advantage of this synergy and may require cooperation between different state agencies.
- Ongoing programs will still need support. This could come in the form of regional coordinators (joint position shared among districts or funded through the Department of Education) who provide advice and support and share best practices and make them available on the website. People in these positions could even help with negotiating contracts with haulers to ensure cost savings.

Highlighting role models and success stories:
Once more programs are operating, best practices and lessons learned can be developed for a variety of settings. Role models and success stories that show the benefits of food diversion and waste reduction programs can provide powerful inspiration and enthusiasm to establish such programs more broadly. They can also allay the fears of administrators who are reluctant to investigate initiatives due to assumptions about the investments in time and money required to get a new program going.

- Videos and educational materials featuring success stories and effective programs should be made available where school officials are likely to look. Many materials already exist, meaning research and time by involved state agencies would be minimal.
- Examples of curriculum changes that has incorporated food waste related activities in academic programing should be shared.
- In addition to what already exists, materials could emerge from the recipients of funding in support of curriculum change surrounding food recovery and waste diversion efforts. Videos could also be produced by student groups through competitions, service learning projects, or as class assignments.

Building awareness:
The benefits of these programs are not broadly known. As with any complex societal problem, the solutions and challenges can't be addressed from a single angle. A clear message is needed to increase the profile of the issue in communities.

- Support is needed to develop a clear and effective communication strategy and a central clearinghouse of information, presumably housed on a website hosted by the most appropriate government agency or agencies. The site should then be linked widely to reach as many constituents as possible.
- Contacts who can provide support when barriers need to be overcome should be identified.
- An effective campaign will require cooperation and collaboration among state agencies that share an interest in this issue to ensure that all aspects (social, health, economic, environmental, and educational) of the issue are included and given priority. Cooperation between state and non-governmental organizations would also be important.
- The campaign should provide information on the benefits of food waste diversion programs as well as how to access support for local programs.

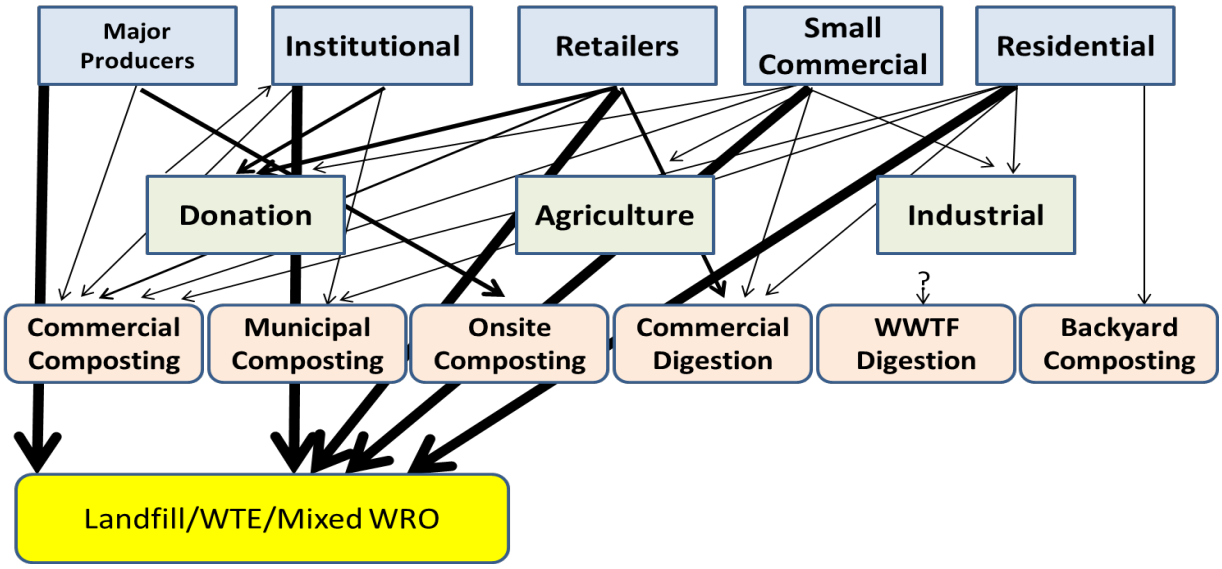
Investments in communications campaigns, a website, minimal start-up funding and ongoing technical and logistical support would help to legitimize and support state level organic waste reduction and recovery legislation and reduce the barriers to establishing school-based food waste reduction programs that save money and improve health and environmental outcomes for schools across entire state.

APPENDICES

APPENDIX I: Working Group Participants

First Name	Last Name	Organization
Daniel	Bell	Agri-Cycle
Kourtney	Collum	College of the Atlantic
Bill	Crawford	We Compost It
Christine	Cummings	Maine Grocers & Food Producers Association
Greg	Dugal	Maine Restaurant Association
Jessica	Fay	Maine Legislature
Tania	Ferrante	South Portland School Department
Shelley	Goraj	MaineGeneral Medical
Kasey	Harris	Hannaford Supermarkets / Delhaize America
Karen	Hutchins-Bieluch	Dartmouth College
Cindy	Isenhour	Mitchell Center, University of Maine
John	Leslie	Casella Organics
Greg	Lounder	Municipal Review Committee/Fiberight
Melanie	Loyzim	Maine DEP
George	MacDonald	Maine Department of Environmental Protection
Jean	MacRae	Mitchell Center, University of Maine
Sam	Michaud	Good Shepherd Food Bank
Renee	Page	Healthy Communities of the Capital Area
Ryan	Parker	Natural Resources Council of Maine
Dean	Richmond	Pleasant River Farms
Owen	Richmond	Pleasant River Farms
Debbie	Saber	Mitchell Center, University of Maine
Becky	Secrest	AVCOG
Ralph	Tucker	Maine Legislature
Mary	Turner	Midcoast Hunger Prevention Program
Travis	Wagner	University of Southern Maine
Susan	Webster	New England Environmental Finance Center
Lisa	Wolff	ecomaine
Paige	Zeigler	Maine Legislature
Kevin	Roche	ecomaine
Alisa	Roman	Lewiston Public Schools
Karen	Fussell	City of Brewer
Troy	Moon	City of Portland
Stacy	Linehan	Treats
Frank	Wertheim	University of Maine Cooperative Extension
Hannah	Semler	Healthy Acadia

APPENDIX II: Food System Flow Diagram & Entity Outline



Food Waste Generators[1]

a. Major Producers (Industrial): Potato, Chicken, Seafood, Large Farms, Large Aquaculture
b. Institutions: Schools, School Administrative Districts (SADs), Colleges, Prisons, Hospitals, Company Cafeterias, Hotels, Airports, Senior Living Centers, Tourism (large resorts)
c. Retailers: Grocers, Convenience Stores, Pharmacies
d. Small Commercial: Private/Chain Restaurants, Small Farms, Breweries, Summer Camps, Daycares, Farmers' Markets, Food Trucks, Caterers, Small Aquaculture, Tourism (small-scale)
e. Residential: Single-Family Homes, Multi-Family Units

Recovery/Reuse Entities

f. Donation Centers: Food Banks, Food Pantries, Meal Centers, Shelters, Gleaning, Schools
g. Agriculture: Hog, Poultry, Vegetable (till under)
h. Industrial: Biodiesel, Biogas, Cellulose, Glycerin

Processors

a. Commercial Composting
b. Municipal Composting
c. Onsite Composting
d. Commercial Digestion
e. Waste-Water Treatment Facilities
f. Backyard Composting

Disposal

a. Landfill
b. Waste-to-Energy
c. Mixed-Waste Processing

Geographies Sourcing Materials to be Processed in Maine

a. Maine
b. Massachusetts
c. New Hampshire
d. Vermont
e. Canada

[1] Note that these initial definitions do not match up perfectly with how the data was collected. Restaurants/Hospitality were split out of Small Commercial and the Grocers/Small Commercial were combined

APPENDIX III
Maine Solid Waste Management Rules Chapter 410 Composting Facilities

- **Facilities Subject to the Requirements of this Chapter.** A composting facility is any land area, structure, equipment, machine, device, system, or combination thereof that is operated to biologically decompose organic residuals under predominantly aerobic conditions and controlled temperatures between 110° and 160° F.

- **Facilities Not Subject to the Requirements of this Chapter.** In addition to the facilities listed in 06-096 CMR ch. 400(2)(I), the following facilities conducting only the specified activities listed are exempt from the requirements of this Chapter:
  - Facilities that, in any thirty (30) consecutive day period, receive for composting less than:
    - Ten (10) cubic yards of Type IA residuals; or
    - Five (5) cubic yards of either Type IB or IC residuals;
  - Facilities that compost domestic animal and poultry carcasses from routine events pursuant to the Maine Department of Agriculture, Conservation and Forestry *Rules and Regulations Relating to Disease Control of Domestic Animals and Poultry*, 01-001 CMR ch. 211;
  - Facilities that compost 10,000 cubic yards or less of animal manure per year;
  - Agricultural Composting Operations that, in any thirty (30) consecutive day period, compost a total of between five (5) and sixty (60) cubic yards of Type IB and IC residuals, and are operated in accordance with a Compost Management Plan approved by the Maine Department of Agriculture, Conservation and Forestry;
  - Agricultural Composting Operations that compost any volume of Type IA, Type IB or Type IC waste provided that at least 70% of the finished compost product is used at appropriate agronomic rates on the farm that produced the compost within two (2) years after it is produced, and provided that the facility is operated in accordance with a Compost Management Plan approved by the Maine Department of Agriculture, Conservation and Forestry;
  - Agricultural Composting Operations that use leaves as an amendment to compost manure provided that the facility is operated in accordance a Compost Management Plan approved by the Maine Department of Agriculture, Conservation and Forestry;
  - Agricultural Composting Operations that compost offal provided that the facility is operated in accordance with a Compost Management Plan approved by the Maine Department of Agriculture, Conservation and Forestry;
  - The composting of solid waste during a Department-supervised remediation, emergency response, or research project; and
  - Composting toilets as defined in the *Maine Subsurface Wastewater Disposal Rules*, 10-144 CMR ch. 241(4)(N).

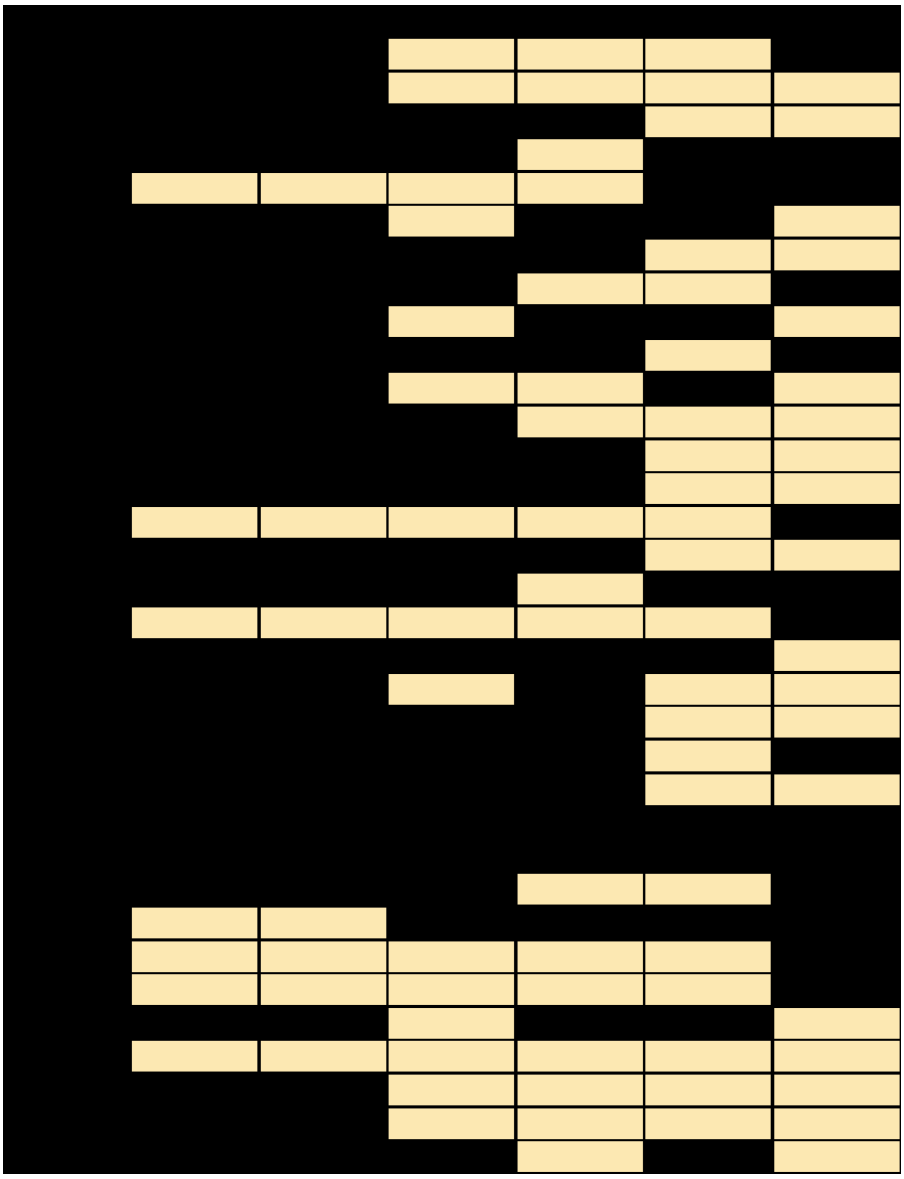
APPENDIX IV

Summary of Results from the Massachusetts Commercial Food Waste Ban Economic Impact Study (ICF, 2016)

In 2014, the state of Massachusetts implemented a Commercial Organic Ban for entities that generate more than one ton of food scraps per week. The following is a summary of key findings from the Economic Impact Study commissioned by the Massachusetts Department of Environmental Protection and carried out by ICF.

- Payroll growth from 2010 2016: 150% w/ 50% planned growth in coming year
- Average planned facility and equipment investments for 2016 2017 were $1,240,100 for facilities and $778,600 for equipment.
- Rescue organizations employment growth from 2.7 to 5.9 employees on average from 2010 2016, planned employment growth to 9.8 on average in the coming year (2017)
    - 2010) 2.7 employees per entity
    - 2016) 5.9 employees per entity
    - 2017 planned) 9.8 employees per entity
- Organic waste processors employment growth
    - 2010) 1.2 employees per business
    - 2016) 3.3 employees per business
    - 2017 planned) 5.0 employees per business
- Haulers increased transport of organics by 6 8 times from 2010 2015
- Food rescue reported 193 tons
- 185,000 total tons estimated to be received by organics processors in 2015 (206k est. in 2016) up from 22,528 in 2010
- Food donation groups noted that the ban has made some aspects of their work harder as composting streams have been added to organizations the groups treat the two methods of diversion as equitable
- Job creation
    - Haulers created 500 jobs (261 direct)
    - Organics waste processors created 290 jobs (150 direct)
    - Rescue organizations created 130 jobs (90 direct)
- $175 million in total economic activity
- Added $76.8 million in value added activity
- $50.5 million in planned Capital Investments for 2017

APPENDIX V: Organics Processing Entity Data Reporting History



APPENDIX IV: 2017 MAINE GLEANING WEEK CONTRIBUTORS

Maine Gleaning Network Members:

Northern Maine Area Gleaners
Penobscot County Master Gardener Volunteers

Downeast Maine Area Gleaners
Washington County Gleaning Initiative
Hancock County Master Gardener Volunteers
Hancock County Gleaning Initiative

Central Maine Area Gleaners
Healthy Waterville Food Recovery Group
Healthy Communities of the Capital Area
Central Maine Gleaners Group
Western Waldo County Gleaners

Midcoast Maine Area Gleaners
Lincoln County Gleaners
Merrymeeting Gleaners
Androscoggin County Master Gardener Volunteers

Portland Maine Area Gleaners
Cumberland County Gleaning Initiative
Cumberland County Master Gardener Volunteers
Food Recovery Coalition

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