Commercial Food Waste Reduction in Alameda County

Opportunities for Preventing and Recovering Wasted Food from Businesses and Institutions

Prepared for the Northern California Recycling Association
with support from StopWaste
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The many individuals we interviewed working in the food industry, the food assistance and food recovery programs, and the public agencies who took the time to provide invaluable information and perspectives.

Executive Summary

This report provides an overview of the wasted food ecosystem[1] in Alameda County, with a primary focus on food for people and a secondary focus on food for animals, in line with the US EPA's Food Recovery Hierarchy. Prepared for the Northern California Recycling Association (NCRA), its purpose is to lay the groundwork for future efforts by all interested parties.

Highlights include over 50 policy and program solutions that could be implemented locally and a series of infographics that put our food waste prevention and food recovery challenges and opportunities into focus.

Businesses and institutions in Alameda County are discarding approximately **72 to 115 million pounds of potentially edible food each year**, mostly to local landfills.

Coincidentally, this amount of wasted food **equals,** by weight (if not nutritional composition), **one additional meal per day for every food insecure county resident**.[2] Wasting edible food while county residents go hungry is troubling, and the potential to address the problems together is promising.

Producing, processing and distributing this food consumes some 5 billion gallons of water

Food Each Year in Alameda County:

Wasted: 72-115 million pounds

Needed: 113 million pounds

Recovered: 6 million pounds

New mandate: 17 million pounds

New state law Senate Bill 1383 may require a doubling or tripling of current prevention and recovery efforts by 2025

[1] This report addresses the commercial sector which, according to CalRecycle estimates, accounts for approximately 67 percent of the total amount of wasted food in Alameda County and does not address food wasted by the residential sector.

[2] In 2015, the Alameda County Community Food Bank identified a strategic goal of providing 1 additional meal per day, or 1.25 pounds of food per day using the standard conversion factor from Feeding America's National Meal Cost Calculator, to the county's 90 million food insecure residents.

(or 9% of the county's household water use). And the roughly 56 to 87 million pounds which ends up in local landfills rather than being eaten, composted or otherwise recycled, generates over 38,000 tons of greenhouse gas emissions, or the equivalent of a year's worth of driving for over 7,000 passenger cars.

Recovering the wasted food in Alameda County is estimated to cost about $51 million ($0.72 per pound), and could generate about $286 million ($4 per pound) in societal economic benefits, calculated as the present value over 10 years of the combined financial benefit to consumers, businesses, governments, and other stakeholders minus all investment and costs.[3]

An **estimated 6 million pounds per year of surplus food from businesses and institutions is currently being donated to food assistance organizations in Alameda County,** a practice known as food recovery. Over half of this food recovery is coordinated by the Alameda County Food Bank and its member agencies through its Grocery Rescue Program.

ALAMEDA COUNTY COMMUNITY FOOD BANK

At the same time, new measurement and tracking suggest that as much as **20 million pounds of potentially wasted food could be preventable** in food service operations in the county.[4]

Senate Bill 1383, signed by Governor Brown in September 2016, requires local jurisdictions to **reduce or recover for human consumption 20 percent of edible food that is currently sent to landfills and incinerators** by 2025, translating to 11 to 17 million pounds in Alameda County using 56 to 87 million pounds as an estimated baseline. Based on these estimates, the scale of current prevention and recovery efforts would need to double or triple by 2025.

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[3] These estimates come from a national solution set modeled by ReFED and may not have a high level of accuracy for different solutions or conditions in Alameda County, but is a starting point for understanding the scale of the effort that might be involved.
[4] Based on internal estimates prepared for StopWaste by LeanPath.

Observations & Findings

We interviewed many key players working to address wasted food in Alameda County, including government agencies, food recovery intermediaries, food assistance organizations, and animal feeding operations. We also conducted research and interviewed some of the major generators of discarded food in the county, including, schools, institutions, restaurants and caterers and made the following 10 observations:

I. **Surplus Food Generation** - Surplus food generators face barriers and lack sufficient incentives to prevent and recover wasted edible food.

II. **Prepared Food** - Effective prevention and recovery strategies vary by type of food; prepared food is hardest to recover.

III. **Data** - Accurate and granular local data on the amount, type and generators of surplus food is limited.

IV. **Food Recovery Challenges** - Implementing food recovery programs is challenging, even though there are many good models.

V. **SB 1383 Implementation** - Implementing and complying with SB 1383 will require new approaches and resources.

VI. **Technology** - Technology supporting food waste reduction is evolving quickly.

VII. **Secondary Markets** - Secondary markets for and value-added processing of surplus food at present is limited.

VIII. **Animal Feeding** - Surplus food not suitable for humans can be fed to animals but currently opportunities are limited.

IX. **Schools** - School nutrition services directors would like to reduce wasted food and provide more nutritious food to their students and families.

X. **Policy** - New policies have the potential to address market problems, silos and competing priorities.

Menu of Recommendations

Based on our observations and research, we identified over 50 potential policy and program solutions that could be implemented locally summarized in our "menu of recommendations." They are categorized into three areas: education and data; policy; and logistics and infrastructure and further sub-divided into short-term (1 to 3 years), medium-term (3 to 5 years) and long-term (5+ years) based on their ease of implementation and the countdown to the SB 1383 deadline of 2025.

Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
I. Surplus Food Generation						
1. Create, maintain, distribute and publicize a donation and prevention guide, highlighting information and resources. Leverage business improvement districts, merchant associations, farmers' markets, small business assistance centers, service providers and site inspectors to reach food generators.	●			●		
2. Distribute guides and contacts to food service operations when they get their new or renewed business licenses or food safety inspections. Include descriptions of practices that reduce plate waste, such as discounted selling, smaller portion sizes and trayless dining.	●			●		
3. Promote program and grant resources offered through the Altamont Education Advisory Board, CalRecycle and StopWaste to support generators seeking to do more prevention and recovery.	●			●		
4. Create, maintain, distribute and publicize an interactive centralized, and possibly crowd-sourced resource to include all players and information on prevention and recovery.	●				●	
5. Develop curriculum, certification and professional development materials in partnership with community colleges on food waste prevention, recovery, recycling and composting, focused on culinary training and existing culinary and custodial professionals. Evaluate whether to subsidize the training.	●					●
6. Evaluate the feasibility of incentive pay schemes for employees trained and certified in food waste prevention, recovery, recycling and composting.	●					●

Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
7. Promote a local TV show on food rescue, like UK's The Big Food Rescue on BBC One to raise awareness of the problem and local actions taking place.	●					●
8. Create and distribute model language for catering contracts specifying donation after events.		●		●		
9. Leverage Alameda County Green Business Program to require caterers to offer food donation in their contracts and require other food service operations to engage in food waste prevention and recovery		●			●	
10. Create a clearinghouse of technical assistance providers and resources for food assistance organizations for: website development and maintenance, grant writing, off-hours volunteers, equipment, cold storage space, etc.		●				●
II. Prepared Food						
11. Support AB 1219, the California Good Samaritan Food Donation Act, to expand liability protections to include the donation of food directly to end recipients.		●		●		
12. Encourage food service brokers and distributors operating in the county to adopt LA & SF Specialty's Chefs to End Hunger model, leveraging existing refrigerated transit routes to expand food recovery.			●	●		
13. Promote tools, apps and markets that create alternate paths to donations for prepared food that is not matched to nutritional needs of food assistance organizations, or not otherwise well-suited to donation.			●	●		
14. Explore leveraging new equipment and technologies such as FreshRealm Vessels to support food recovery.			●	●		
15. Create more stationary or mobile outlets for direct feeding of bulk prepared foods (building on the Food Not Bombs model), keeping foods at controlled temperatures and eliminating the need for intermediate distribution stages and storage facilities.			●		●	
16. Develop more capacity (prep space, SafeServ training) within food pantries to handle bulk prepared foods.			●		●	

Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
17. Tap local businesses that may be assets in providing support and resources to food waste reduction, such as ride sharing (Lyft, Uber), food delivery (DoorDash, GrubHub), vehicle sharing (Zipcar), cold storage (7-Eleven), and commercial kitchen space for repackaging bulk prepared foods (Oakland Kitchener, Alameda Point Collaborative, FoodShift Kitchen).			●	●		
18. Expand refrigerated transit capacity to allow for efficient routing of donation collection and delivery, possibly shared among food assistance organizations or serving a "surplus food hub."			●			●
19. Develop one or more physical "surplus food hubs" regionally, modeled on Hope 4 the Heart, with the capacity to sort donations and distribute them to their highest value and/or create value-added products.			●			●
III. Data						
20. Conduct generator-based waste characterization studies by jurisdiction in Alameda County, including estimates of edible food (pre- and post-consumer) to support compliance with SB 1383.	●				●	
21. Support local or statewide studies on edible food (pre- and post-consumer) by sector.	●				●	
22. Develop food recovery metrics to include in local climate action plans.		●			●	
23. Conduct targeted sector pilots that can develop granular, local data while testing the effectiveness of prevention and recovery programs.			●		●	
IV. Food Recovery Challenges						
24. Create a resource of animal feeding operations and procedures for food recovery and food assistance organizations to reallocate food that is not appropriate for human consumption.	●			●		
25. Incentivize innovation of new direct donor-to-diner food recovery models to alleviate pressures on existing food assistance organizations with limited capacity and operational restrictions.		●		●		

Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
V. SB 1383 Implementation						
26. Participate in the SB 1383 stakeholder process to shape implementation.		●		●		
27. Support CalRecycle in the development of statewide standards for measuring the prevention and recovery of edible food that are feasible for local jurisdictions to implement.	●				●	
28. Create an Alameda County Food System Alliance, a non-profit or county level program to facilitate interaction and coordination between agencies, modeled on Waste Not OC Coalition. ALL IN may represent the beginning of such an alliance.		●				●
29. Add a food recovery requirement to local organics collection contracts such as LA City's Zero Waste franchise agreement (which requires food recovery, education, diversion rates with potential financial penalties).		●				●
30. Incentivize paid food recovery innovation by leveraging the potential to create more robust funding for recovery from donor tax and disposal cost savings.		●				●
31. Pilot a publicly funded and regulated food recovery services sector. Analyze the feasibility of developing the pilot as a social enterprise public or non-profit business and prepare a business plan. Local jurisdictions would issue Request for Proposals for food recovery services, which will generate employment and rapidly scale up food recovery (modeled on the planned ALL IN pilot).			●			●
VI. Technology						
32. Publicize the various food sharing apps that are available locally, potentially providing user reviews.	●			●		
33. Pilot a county-wide (or Bay Area-wide), open source virtual clearinghouse (online platform) for food donors and recipients, including food assistance organizations, food recovery intermediaries, and animal feeding operations to create a transparent system to easily claim, trade and allocate surplus food (Montgomery County model).			●			●

Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
VII. Secondary Markets						
34. Incentivize social food entrepreneurs, such as Nom!Nom! members (an on-line community featuring food entrepreneurs with pickup locations in downtown Oakland), commercial kitchen incubator users (such as at Kitchener Oakland and Forage Kitchen), and home cooks selling their meals on Josephine.com to repurpose more surplus food for sale. Incentivize/encourage operations like DC Central Kitchen, FoodShift Kitchen and Daily Table.		●		●		
35. Engage with food system incubators and accelerators (such as Food System 6), to promote wasted food prevention and recovery in the county.		●		●		
36. Adopt policies that allow/encourage non-profits to re-purpose recovered food and sell it for cash to subsidize their operations.		●			●	
VIII. Animal Feeding						
37. Identify solutions for connecting in county urban and backyard animal husbandry to surplus food sources.	●				●	
38. Identify and analyze regulatory barriers of recovery for animal feedstock and recommend how to overcome them.		●			●	
39. Explore the feasibility of an in-county aggregation of food discards for animals to reduce the expense of transport to out-of- county processors.			●	●		
IX. Schools						
40. Create and distribute model language for school boards supporting food recovery, modeled on Oakland Unified.		●		●		
41. Create Alameda County-wide coalition of School Nutrition Services Directors to meet quarterly and share best practices and apply for grants to expand wasted food prevention and recovery efforts.		●		●		
42. Create language for schools to address custodial labor union agreements to support food share, donation and composting.		●			●	
43. Advocate for “offer vs. serve” for school food distribution in state and federal guidelines.		●			●	

Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
X. Policy						
44. Enlist support of Food Policy Councils in Alameda County.		●		●		
45. Encourage local jurisdictions to adopt food recovery resolutions modeled on Rosemead City Council Resolution.		●		●		
46. Support state legislation and industry initiatives on date labeling.		●		●		
47. Require surplus edible food plans for large food generators, for special events requiring an event permit, and for public facilities.		●			●	
48. Ban edible food from compost or landfill (and make sure this policy has “teeth”/enforcement mechanism).		●				●
49. Raise landfill and organics collection fees to better reflect true/full cost of disposal.		●				●
50. Require food service operations to donate surplus food.		●				●
51. Advocate for eliminating subsidies in US Farm Bill that result in the generation of surplus edible food and unhealthy food (corn and soybean-based).		●				●
52. Advocate for eliminating tax benefits for donating non-nutritious food (e.g., soda and pastries).		●				●

Background

Context for Reducing Wasted Food

Wasted food is not a new phenomenon, but rather a unique and complex challenge inherent to the supply chain of perishable products. In recent years, attention has been coalescing on the critical problem, with a spate of new funding, research, data initiatives, industry alliances, government agencies and business/non-profit initiatives emerging. Appendix 1 provides a summary of relevant research and reports on which this report relies.

Wasted food is a global problem. The Food and Agriculture Organization of the United Nations estimates that one-third of all food produced for human consumption worldwide is lost or wasted. If wasted food were a country, it would be the third highest emitter of carbon dioxide equivalents after the U.S. and China. Worldwide, wasted food uses 28 percent of the world's agricultural area, and has direct economic consequences of at least $750 billion[5].

In the U.S., the Natural Resources Defense Council (NRDC) cites alarming statistics. Overall, 40 percent of all food goes uneaten. Producing the wasted food consumes 10 percent of the total U.S. energy budget, 50 percent of U.S. land, 80 percent of all freshwater consumed, equal to $165 billion annually. NRDC also points to the human cost of food loss, citing that "reducing food losses by just 15 percent would be enough food to feed more than 25 million Americans every year at a time when one in six Americans lack a secure supply of food to their tables."[6]

In 2015, the UN established a Sustainable Development Goal of halving food loss and waste by 2030, and the US Department of Agriculture (USDA) and US Environmental Protection Agency (US EPA) followed suit.

In the US, the federal Bill Emerson Good Samaritan Food Donation Act (1996)[7] was put into place decades ago to encourage the donation of food and grocery products to non-profit organizations by providing protection and standardizing exposure across states from civil and criminal liability for good-faith donations.

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[5] http://www.fao.org/docrep/018/i3347e/i3347e.pdf
[6] https://www.nrdc.org/sites/default/files/wasted-food-IP.pdf
[7] https://www.gpo.gov/fdsys/pkg/PLAW-104publ210/pdf/PLAW-104publ210.pdf

However, contrary to the law's intent and 20 years on, despite no public record of lawsuits related to donated food[8], liability concerns continue to inhibit the donation of surplus food.

Federal tax provisions also incentivize food donation. Since 1976, the IRS has allowed C corporations to earn an enhanced tax deduction for donating food. The 2015 Protecting Americans from Tax Hikes (PATH) Act[9] extends the same benefits to all companies, increases the contributions cap from 10% to 15% of income, and allows favorable methods of valuing the donations.

In an attempt to address the problem of misleading expiration dates, most of which are not regulated by federal law, manufacturer and retailer industry associations adopted a voluntary industry standardized data labeling program in early 2017, calling for a "BEST If Used By" label to describe product quality and a "USE By" label to flag potential food safety concerns.[10]

California is a national leader in food production,[11] and leads on climate policy and organics recycling, shaping the landscape for discarded and wasted food in and beyond the state.

- In 2006, the state established the world's first comprehensive program to achieve measurable greenhouse gas reductions under AB 32.[12]
- In 2014, Governor Brown signed AB 1826,[13] requiring businesses to recycle their organic materials and local jurisdictions to implement commercial organics diversion programs beginning in 2016, tied directly to greenhouse gas reduction goals.
- In 2016, SB 1383[14] was adopted which addresses short-lived climate pollutants and further prioritizes the state's commitment to reducing landfilling of organics, setting a goal of 75% reduction by 2025. SB 1383 requires 20 percent of edible food that is currently disposed in landfills and incinerators be recovered for human consumption by 2025.

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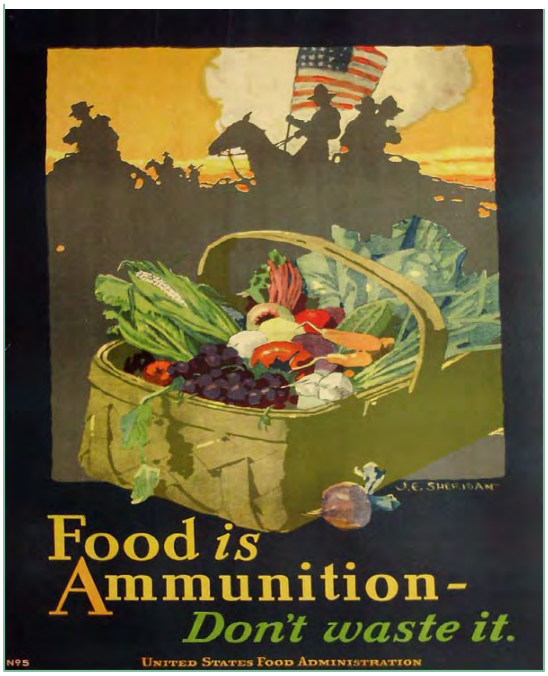
[8] "Food Recovery: a Legal Guide," University of Arkansas School of Law, page 3 https://law.uark.edu/documents/2013/06/Legal-Guide-To-Food-Recovery.pdf
[9] https://www.pwc.com/us/en/tax-services/publications/insights/assets/pwc-enhanced-deduction-for-charitable-contributions-of-food-inventory.pdf
[10] http://www.gmaonline.org/news-events/newsroom/grocery-industry-launches-new-initiative-to-reduce-consumer-confusion-on-pr/
[11] https://www.cdfa.ca.gov/statistics/
[12] https://www.arb.ca.gov/cc/ab32/ab32.htm
[13] http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB1826
[14] https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1383

Rulemaking is underway to clarify how this law will be implemented and enforced.

State law [15] allows food facilities to donate food to nonprofit charitable organizations as long as it is fit for human consumption at the time of the donation. The legislature is currently considering legislation, AB 1219 The California Good Samaritan Food Donation Act[16] that would encourage surplus food generators to donate food directly to food insecure people as well.

Wasted Food Then and Now - WWII and 2016



As Dana Gunders, author of the widely distributed Natural Resources Defense Council (NRDC) report *Wasted: How America is Losing Up to 40% of its Food From Farm to Fork to Landfill,*[17] reminds us, "the average American consumer wastes 10 times as much food as someone in Southeast Asia, up 50 percent from Americans in the 1970s. This means there was once a time when we wasted far less, and we can get back there again."[18]

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[15] California Civil Code § 1714.25; California Food & Agriculture Code § 58505
[16] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB1219
[17] https://www.nrdc.org/sites/default/files/wasted-food-IP.pdf
[18] "Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill", p. 4.

Unique Dynamics of Wasted Food

The problem is shaped by a variety of complex and changing factors, including:

- Cultural norms, like consumer expectations regarding cosmetic perfection.
- Confusing information like expiration date labeling.
- Public policies such as donation liability, tax treatment and climate policy.
- Logistical challenges, like matching supply and demand for food donations in terms of time and geography.

Marketplace realities also contribute to wasted food, where the diversity of supply and demand raises transaction costs and creates market development challenges.

- Food supply chains are volatile.
- Surplus food that often gets wasted is highly differentiated, ranging from perishable milk to shelf-stable flour, from bulk prepared foods to pre-packaged salads, from ready-to-eat bread to peels which could be made edible with processing, from sugary pastries to nutrient dense meat and vegetables.
- Demand for surplus food also varies, from food assistance organizations seeking nutritious items but often lacking handling and storage capacity, to resellers like Grocery Outlet buying overstock of shelf-stable products, to value-added processors like Regrained[19] buying spent brewery grain.

The broader environment of artificially cheap food, in which prices do not reflect the true costs of side effects such as pollution and resource depletion, reduce incentives to avoid waste. Cheap landfill fees also make the costs of discarding food less significant, and other costs of wasting food, such as greenhouse gas emissions of food in landfills and the loss of nutrition/calories for people, are not fully borne by surplus food generators. Wasted food increases the demand for food production and distribution services, lowering industry incentives to conserve. In other words, by wasting food we are creating a demand for more food.

[19] https://www.regrained.com

Often front-line workers discarding food don't have the knowledge, training or incentives to reduce waste. There is also a chronic underestimation of wasted food in self-reported data. Food service organizations (chefs, caterers, school nutrition directors) often do not believe that they are wasting food until they actually measure it.

Ugly Fruit & Veg – endfoodwaste.org

In the mind of consumers, cosmetic perfection is perceived as a proxy for safe or high quality food. This perception greatly limits opportunities to sell, recover or use imperfect produce. Generators of wasted food have liability and reputation concerns about their surplus food being reallocated to secondary markets. And this stigma affects the donated food, as well as the broader food assistance environment.

In recognition of the challenges, the US EPA has developed a food recovery hierarchy to provide a framework for prioritizing solutions and investment.

Context for Reducing Wasted Food in Alameda County

Alameda County has unique features that support opportunities for solutions to the problem of wasted food.

Economy

Alameda County is the seventh most populous county in California and one of the fastest growing areas of the state, with over 1.6 million residents, one in five

of whom is food insecure.[20] Population density, food insecurity and food assistance organizations vary widely throughout the county's 14 incorporated cities and several unincorporated communities.

Alameda County's total annual payroll was over $39 billion in 2014 with nearly 40,000 private sector employers[21] including a large and diverse base of commercial surplus food generators and potential donors. The county is part of the larger Bay Area economy, with a strong technology focus driven by proximity to Silicon Valley. Businesses such as caterers may generate surplus food in Berkeley and donate it in San Francisco or visa-versa. Food recovery intermediaries operate in multiple cities and counties. Technology-based social enterprises tackling the wasted food problem, such as Copia[22] and Re-Plate[23] reflect the broader Bay Area culture of technology and social entrepreneurship.

Large-scale gleaning and opportunities to direct surplus food to animal feed are limited. There are only approximately 500 acres of food crops under production[24] and the few large animal feeding operations are concentrated in the most eastern parts of the county.

The following map, *Wasted Food, Food Insecurity, and Food Assistance Service Providers*, uses information prepared by Feeding America[25] and CalRecycle, and depicts the rate of food insecurity in Alameda County. The darker areas of color represent the higher percentages of food insecure people in that area. This information is mapped against the number and location of food assistance organizations and the amount of discarded food in each jurisdiction. The "food waste bins" for each community illustrate the top three commercial sectors that are landfilling potentially recoverable food, scaled by percent of total wasted food.

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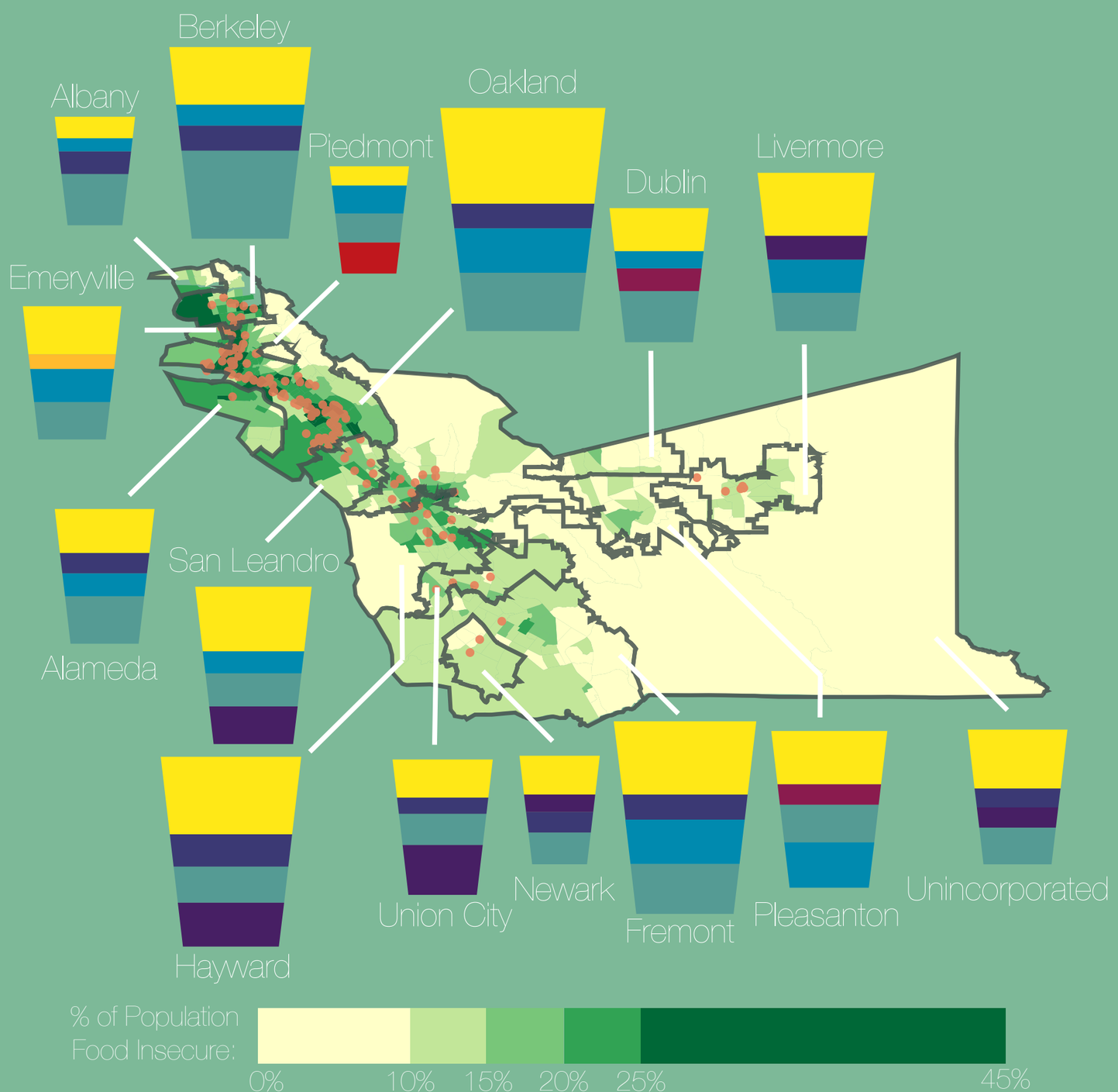
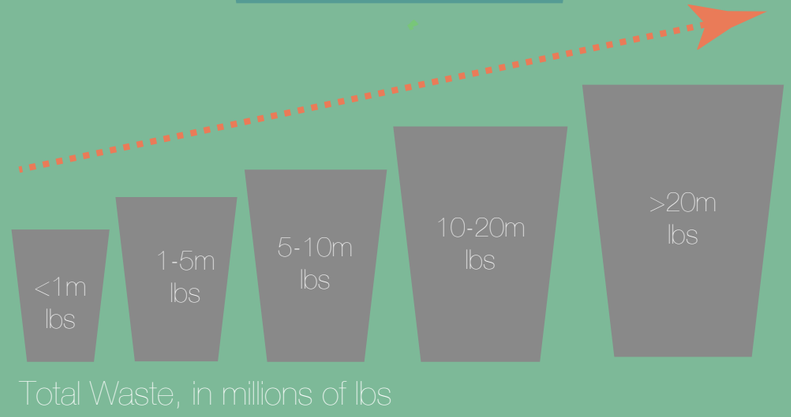
[20] Gundersen, C., A. Dewey, A. Crumbaugh, M. Kato & E. Engelhard. *Map the Meal Gap 2016: Food Insecurity and Child Food Insecurity Estimates at the County Level.* Feeding America, 2016.
[21] https://www.census.gov/programs-surveys/cbp.html
[22] https://www.gocopia.com
[23] http://www.re-plate.org
[24] https://www.acgov.org/cda/awm/resources/2015cropreport.pdf. Most of the crops grown in the county are grapes for wine and animal feed.
[25] Gundersen, *Map the Meal Gap 2016.*

WASTED FOOD, FOOD INSECURITY & FOOD ASSISTANCE PROVIDERS IN ALAMEDA COUNTY



Each bin displays the top three sectors contributing to potentially recoverable food, scaled by percent of total food waste



One dot ● represents one agency (a shelter, food bank, or kitchen) providing food assistance

For details and assumptions, please see Appendix 6, ***Commercial Food Waste Reduction in Alameda County: Opportunities for Preventing and Recovering Wasted Food from Businesses and Institutions***, Northern California Recycling Association, June 2017

Special thanks to the UC Berkeley Geospatial Innovation Facility for assistance with food insecurity mapping.

Food and Sustainability

The county places a high value on sustainability. As early as 1990, the voters passed the Alameda County Waste Reduction and Recycling Initiative which established a goal of 75 percent recycling and placed a $6 per ton fee on materials disposed in landfills. The fees are used to fund municipal and countywide waste prevention and recycling programs. The initiative also established the Alameda County Recycling Board, now part of StopWaste,[26] a unique public agency dedicated to reducing waste in Alameda County.

The county also hosts a vibrant movement to transform food systems, expand access to healthy, affordable food and promote sustainable and equitable food production. Iconic Chez Panisse restaurant, founded in 1971, pioneered farm-to-table cooking and inspired the organic food movement locally and around the world. In 2015 Alameda County Supervisor Wilma Chan founded ALL IN to End Hunger 2020, the new war on poverty.

Edible School Yard, King Middle School - Berkeley

Food/Sustainability Initiatives

1971 Chez Panisse founded in Berkeley

1990 voters passed the Alameda County Waste Reduction and Recycling Act

1996 Chez Panisse Foundation establishes Edible Schoolyard, becoming a national model
Alameda County Green Business Program established, first in the U.S.

2003 Michael Pollan joins U.C. Berkeley School of Journalism
2006 publishes *Omnivore's Dilemma*

2003+ growing urban food movement social enterprises to address food injustice: People's Grocery, Mandela Marketplace, Phat Beet Produce, Planting Justice, Food Shift

2009 David Brower Center established as a space to "inspire and nurture current and future generations of leaders, with the goal of making sustainable thinking and practices mainstream"

2010+ growth in urban farms to increase residents' access to fresh healthy produce and skills including: City Slicker Farms, Dig Deep Farms, Urban Adamah

2014 first international Zero Food Waste Forum held in Berkeley hosted by NCRA
Berkeley Food Institute founded at U. C. Berkeley
Sustainable Economies Law Center established in Oakland

2015 ALL IN to End Hunger in Alameda County founded by Supervisor Wilma Chan
U. C. Berkeley Haas School of Business launches Food Venture Lab

[26] http://www.stopwaste.org

Leadership in Organics Management

Alameda County is a leader in diverting compostable organics from landfill. Since the 1990s, StopWaste has supported the 17 jurisdictions in the county (14 cities, two sanitary districts and the unincorporated areas of the county) in developing programs for the collection and processing of food scraps. Alameda County was ahead of California, adopting a Mandatory Recycling Ordinance[27] making organics collection mandatory for all commercial generators and multifamily complexes that "opt-in" to the ordinance in 2012; AB 1826 made organics recycling mandatory for the state in 2014.

StopWaste has launched several initiatives to reduce the generation of wasted food:

The Smart Kitchen Initiative

to reduce pre-consumer wasted food using automated tracking systems to save on food purchases

K-12 School Food Share/Food Donation

supporting schools to expand share tables in the cafeterias and donate surplus food to food recovery organizations

Stop Food Waste Campaign

to reduce wasted food in households by pairing local media with on-the-ground outreach tactics and community events

[27] http://www.recyclingrulesac.org

Zero Food Waste Forum

NCRA hosted the Zero Food Waste Forum[28] in Berkeley, California on World Food Day October 16, 2014. Experts and implementers came from 16 states and 7 countries to elevate the dialogue around wasted food. Participants included government representatives, materials management haulers, consultants, associations, non-profits, food rescue groups, students, grocers, restaurants, academics, and volunteers, all with the goal of zero food waste.

Inspired by the forum, NCRA members undertook this research project to understand the opportunities and barriers to recovering wasted food in Alameda County.

Known as the "Woodstock of Food Waste Prevention," the forum featured:

- Tristram Stuart, author of *Waste: Uncovering the Global Food Scandal* and Founder of the international food waste campaign organization Feeding the 5000 and Feedback Global.[29]
- Jonathan Bloom, author of *American Wasteland: How America Throws Away Nearly Half of its Food (and What We Can Do About It)* and creator of WastedFood.com.[30]
- Dana Gunders, author of the widely distributed NRDC report *Wasted: How America is Losing Up to 40% of its Food From Farm to Fork to Landfill*.[31]
- Jenny Rustemeyer and Grant Baldwin, filmmakers and creators of the award-winning documentary Just Eat It[32] (which had its U.S. premier at the forum).

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[28] http://ncrarecycles.org/activities/zero-food-waste-forum/
[29] http://feedbackglobal.org
[30] http://www.wastedfood.com
[31] https://www.nrdc.org/sites/default/files/wasted-food-IP.pdf
[32] http://www.foodwastemovie.com/

A Brief History of Food Waste Prevention and Recovery in Alameda County

1905

Garbage collection began in Oakland. Italian immigrants collected discarded food using horses and wagons.

1915

Disputes among garbage companies prompted a co-op, which became the Oakland Scavenger Company. Materials were sorted and recycled, with organics going to company-owned hog farms, numbering 13,000 hogs at the peak.

1968

Black Panther Party established one of the first organized school breakfast programs in the country in Oakland, supported by donations from local stores and churches.

1975

Federally funded School Breakfast Program began.

1976

St. Vincent de Paul began free dining room program.

1983

Daily Bread, founded by Carolyn North in Berkeley, began recovering food and delivering it to feeding organizations.

1984

Mother Mary Wright began feeding hungry people at Jefferson Park in downtown Oakland, paying for the food with her social security checks. She soon began receiving food and financial donations.

1985

Alameda County Community Food Bank established. It is now a member of the Feeding America program and serves over 240 agencies in the county.

Oakland Potluck begun by Florence Jurs recovered food in Oakland and beyond, motivated by a desire not to waste food and to feed the hungry.

1991

East Bay Food Not Bombs set up, based on the model established in 1981 in Boston.

2009

2009 StopWaste adopts countywide year 2020 strategic target to reduce the amount of wasted food sent to landfill through ***food waste prevention*** and the ***recovery of food to feed people*** in institutional kitchens and high volume food service operations by 25% over an established baseline.

2012

FoodShift established in Oakland and active in recovering food 2013-14. Now focused on the FoodShift Kitchen in Alameda creating products from wasted food.

2016

ALL IN to End Hunger established a food recovery stakeholder group for Alameda County.

1986

Oakland Scavenger Company was sold to Waste Management.

Mid-1970s

Black Panther Party Program ended with the dissolution of the Party.

2009

Mother Mary Wright died. The foundation, formed in her name, operated with support from local grocers, churches and community group and feeds more than 450 people per day.

2017

St. Vincent de Paul serves about 600 meals per day using purchased, donated and recovered food.

Daily Bread serves Oakland, Berkeley, Kensington, and Richmond, picks up food from about 3 dozen food businesses and delivers to about 3 dozen food assistance organizations.

2003

Oakland Potluck served Oakland and south to Hayward. Closed down due to financial difficulties. Many relationships set up between donors and recipients are still in place.

Oakland Potluck donated food to about 35 different organizations. In 1994 it had more than 100 regular and sporadic donors. Pickups ranged from 200 to 700 per month.

2017

East Bay Food Not Bombs still in operation serving large-scale hot community meals six days per week in parks from donated, recovered and scavenged food.

2014

Zero Food Waste Forum hosted by Northern California Recycling Association, October 16, 2014.

2017

ALL IN pursuing pilot projects to test paid and unpaid food recovery concepts.

Daily Bread & Oakland Potluck Models

Volunteers pick up & deliver food.

Material: prepared, packaged and perishable edible food.

Donors: bakeries, shops, grocery stores, caterers, restaurants, cafes, farmers markets, gardens, city agencies, schools, national chains, special events (parties, weddings, etc.), people moving out, etc.

Recipients: faith-based organizations, low-income housing, shelters, soup kitchens, senior centers, & food pantries.

Delivery: pre-arranged and regular recipients or contacts to potential recipients by phone to assess willingness to accept donations.

Observations and Findings

The goal of this report is to describe the state of commercial food waste reduction in Alameda County, as well as to identify key challenges, opportunities and recommendations. Our report is as current and comprehensive as possible, against the backdrop of a veritable "gold rush" of new food waste reduction initiatives regularly coming online as well as the diverse food recovery economy of the county.

We conducted research on and interviews with some of the major generators of discarded food in the county in most of the commercial sectors. We also gathered information on government initiatives, food recovery intermediaries, food assistance organizations, value-added processing ventures and animal feeding operations.

The list of all interviews conducted for this report is included in Appendix 2, a synopsis of the interviews can be found in Appendix 3, and models and best practices from outside of Alameda County are included in Appendix 4.

This report puts three different lenses on characterizing the current state of food waste reduction efforts in Alameda County and identifying opportunities that exist for expansion.

1. The Wasted Food Ecosystem in Alameda County – an ecosystem graphic depicting key players, dynamics and metrics.
2. Status of ReFED Solutions in Alameda County – a table of activities, programs and initiatives plotted against the best practice recommendations from the recent *Roadmap to Reduce U.S. Food Waste* from ReFED (Rethink Food Waste Through Economics and Data).[33]
3. Observations and Findings – a narrative of observations and key findings based on interviews.

[33] http://www.refed.com/about

The Wasted Food Ecosystem in Alameda County

The following graphic depicts the ecosystem of commercially generated wasted food, food waste prevention and food recovery in Alameda County. The ecosystem graphic does not include haulers and organics processing facilities or other forms of organics recycling such as biofuel or anaerobic digestion, since the material they process is not intended for human or animal consumption. Likewise, the key players depicted are representative and do not constitute an exhaustive list.

Refer to the glossary in Appendix 5 for definitions of key terms and definitions.

WASTED FOOD ECOSYSTEM IN ALAMEDA COUNTY

~5 billion gallons of water could be saved

~40,000 tons CO2e could be saved

~$51 million Economic Cost

~$286 million Economic Benefits

LANDFILL 77%

- **0.5m lbs -** Public Administration - Federal, State and Local Gov Agencies
- **2m lbs -** Hotels and Lodging - Hotel Restaurants
- **5m lbs -** Agriculture and Transport - Animal and Crop Production
- **5m lbs -** Arts and Entertainment - Venues, Amusement and Recreation
- **6m lbs -** Education - K-12 and Higher Education
- **6m lbs -** Medical and Health - Hospitals and Residential Facilities
- **10m lbs** Other Retail — Pharmacies, Gas Stations and Vending Machines
- **13m lbs** Manufacturing and Food/ Nondurable Wholesale
- **15m lbs** Food and Beverage Retail
- **21m lbs** Corporate Cafeterias
- **30m lbs** Restaurants, Caterers and Foodtrucks

COMPOST/OTHER 23%

EDIBLE FOOD **72-115m** LBS

TOTAL FOOD DISCARDS **220-345m** LBS

GOVERNMENT

- Dept of Environmental Health
- StopWaste
- All-in to End Hunger

SB1383: 11-17m LBS/YR FROM LANDFILL TO TABLE BY 2025

TOTAL RECOVERED FOOD **5.7m** LBS

FOOD RECOVERY INTERMEDIARIES

GLEANERS
- Alameda Backyard Growers
- Forage Oakland
- North Berkeley Harvest

RECOVERY BROKERS
- ACCFB Grocery 3.6m lbs
- Food Donation Connection 116k lbs

RECOVERY SERVICES
- Imperfect Produce
- Daily Bread 120k lbs
- Grocery Outlet
- Re-Plate 30k lbs
- Chefs to End Hunger 800k lbs
- COPIA 830k lbs

VALUE ADDED PROCESSING ?

PREVENTION ~20m lbs
- LeanPath

ANIMAL FEED
- O2 Scraps to Feed
- Olivera Livestock
- PFI Aquaponics 3.5k lbs
- Tiny Farms
- Urban Homesteaders

FOOD ASSISTANCE ORGANIZATIONS
- St. Vincent De Paul 98k lbs
- Berkeley Food Pantry
- Hope 4 the Heart 94k lbs
- ECAP 20k lbs
- City Team
- City of Alameda Food Bank
- Tri Valley Food Haven
- East Bay Food Not Bombs
- Midway Shelter of Alameda
- Berkeley Food and Housing

Infographic was produced by Ming Wei Low

Credit to: Anbileru Adaleru, Miguel Carraca, Creative Stall, Nicholas DeForest, Andrew Doane, H Alberto Gongora, Lloyd Humphreys, Thomas Le Bas, Hea Poh Lin, Made by Made, Mikicon1, Federico Panzano, Gira Park, Joe Pictos, Nick Remis, Rockicon, Aldric Rodriguez, Ralf Schmitzer, Shmidt Sergey, Stock Image Folio, Oliviu Stoian, Valery, Felix Westphal and Kirby Wu from the Noun Project.

See Appendix 6 for all data used and assumptions made

Estimation Sources and Methods

The data included in the ecosystem graphic for Alameda County was developed using the sources summarized below, with primary sources listed first in bold and secondary sources listed second. Detailed calculations, assumptions and source references appear in Appendix 6.

Every attempt has been made to verify the estimates presented and compare them to other studies and local data as available, but many are based on imperfect or incomplete data and sources. As such, these rough estimates are meant to provide a sense of the scope of the opportunity and activity, and to inform further data inquiry.

Discarded Food	•2014 CalRecycle Waste Generator-Based Waste Characterization, LeanPath
Edible or Preventable Discarded Food	•2015 Metro Vancouver Waste Composition Monitoring (Tetra Tech), LeanPath •FUSIONS, UK WRAP
Landfill Diversion Rates	•2014 CalRecycle Waste Generator-Based Waste Characterization
Environmental Impacts	•ReFED •Rock and Wrap It Up! Whole Earth Calculator
Economic Impacts	•ReFED
Prevention and Recovery Activity	•Public, internal and self-reported data
SB 1383 Compliance	•2014 CalRecycle Generator-Based Waste Characterization •2008 StopWaste Characterization Study

Discarded Food: An estimated 220-345 million pounds of food is discarded annually (including landfill, recycling, compost and "other" streams).

Edible or Preventable Discarded Food: Of total food discarded annually, approximately 72-115 million pounds (33%) is edible and approximately 20 million pounds (6-9%) is preventable. The breakdown by commercial sector

(portrayed as layers in the waste bin figure) apply the 33% factor across the board, since sector-specific data regarding edible food do not exist.

Landfill Diversion Rates: 77% of discarded food is being is sent to landfill while only 23% is diverted through organics collection for composting or other activities (such as backhaul to distribution centers or processing for animal feed), resulting in an estimated 56-87 million pounds of edible food going to landfills annually. Diversion rates vary by commercial sector as shown in the light/dark shading in each layer. The estimates apply the same split between landfill and compost/other reflected in the overall waste characterization data (for all food discarded) to edible/preventable food (assuming edible food is discarded proportionately in all streams to non-edible food).

Environmental Impacts: Producing, processing and distributing the estimated wasted food consumed 5 billion gallons of water (or 9% of the county's household water use) and generated slightly over 38,000 tons of greenhouse gas emissions (or the equivalent of a year's worth of driving for over 7,000 passenger cars), which could be reduced or avoided through prevention and/or recovery.

Economic Impacts: Preventing and/or recovering the wasted food might cost about $51 million ($0.72/pound), and might generate about $286 million ($4/pound) in societal economic benefits, calculated as the net present value over 10 years of the aggregate financial benefit to society (including consumers, businesses, governments, and other stakeholders) minus all investment and costs, using a social discount rate of 4%. These estimates come from a national solution set modeled by ReFED and may not have a high level of accuracy for different solutions or conditions in Alameda County, but is a starting point for understanding the scale of the effort that might be involved.

Existing Prevention + Recovery: Existing food recovery (through food recovery intermediaries and food assistance organizations) in the county is on the order of 5-6 million pounds per year, with over half attributed to the Alameda County Community Food Bank Grocery Rescue Program.

SB 1383 Compliance: Using the estimates of edible food going to landfills on an annual basis (56-87 million pounds) as a baseline, the county will need to divert 20%, or 11-17 million pounds annually, via prevention or recovery by 2025 in order to comply with SB 1383.

Status of ReFED Solutions in Alameda County

Formed in 2015, ReFED is a collaboration of over 30 U.S. business, nonprofit, foundation and government leaders committed to reducing wasted food in the United States. It released *The Roadmap to Reduce U.S. Food Waste* in 2016, the most comprehensive analysis of wasted food in the U.S. to date, including an action plan. The ReFED report recommends 27 strategies for wasted food reduction and recovery. From our research in Alameda County, we identified 15 strategies that have been fully implemented and 4 in planning or early operation phase. Local examples in each category are provided in the table below.

	No Local Program	Planning/Early Operation	Full Scale
Prevention	Standardized Date Labeling	Pending state legislation AB 954[34] Voluntary Industry Labeling Initiative[35]	
	Packaging Adjustments	Some manufacturers assumed to be addressing packaging and spoilage prevention; USDA Agricultural Research Service in Albany, CA conducting research.	
	Spoilage Prevention Packaging		
	Produce Specifications		Imperfect Produce,[36] Ugly Fruit & Veg campaign[37]
	Smaller Plates	Smaller plate offerings assumed to be on the menu at some local restaurants.	
	Trayless Dining		U. C. Berkeley,[38] Cal State East Bay, Mills College[39]
	Waste Tracking & Analytics		Smart Kitchen Initiative[40] Bon Appétit, Aramark
	Cold Chain Management	Some distributers assumed to be addressing cold chain management and improved inventory management.	
	Improved Inventory Management		
	Secondary Resellers		Grocery Outlet[41]
	Manufacturing Line Optimization		American Licorice[42]
	Consumer Education Campaigns		Stop Food Waste,[43] Save the Food[44]

[34] http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB954
[35] http://www.gmaonline.org/news-events/newsroom/grocery-industry-launches-new-initiative-to-reduce-consumer-confusion-on-pr/
[36] https://www.imperfectproduce.com
[37] http://www.endfoodwaste.org/ugly-fruit---veg.html
[38] http://news.berkeley.edu/2010/01/11/tray/
[39] https://www.mills.edu/news/2013/pressrelease-04172013-princetonReviewGreenGuide.php
[40] http://www.stopwaste.org/preventing-waste/smart-kitchen-initiative
[41] https://groceryoutlet.com
[42] http://www.stopwaste.org/resource/american-licorice
[43] http://stopfoodwaste.org
[44] https://www.savethefood.com

	No Local Program	Planning/Early Operation	Full Scale
Recovery	Donation Matching Software		Copia,[45] ChowMatch[46] CropMobster,[47] Re-Plate [48] (see full list in Appendix 7)
	Donation Storage & Handling		Food Pantries, Soup Kitchens
	Donation Transportation		Food Recovery Intermediaries
	Value-Added Processing	Food Shift Kitchen[49]	
	Donation Liability Education	StopWaste	
	Standardized Donation Regulation	Alameda County Environmental Health	
	Donation Tax Incentives		PATH Act[50]
Recycling	Centralized Anaerobic Digestion		East Bay Municipal Utility District[51]
	Water Resource Recovery Facility with Anaerobic Digestion		East Bay Municipal Utility District[52]
	In-Vessel Composting	Some in-vessel composting and commercial greywater systems assumed to be located on-site at some local facilities.	
	Commercial Greywater		
	Community Composting	Some Community Composting at community gardens.	
	Centralized Composting	Davis Street Organics Processing[53] Altamont Compost Facility[54]	Blossom Valley,[55] Newby Island,[56] Redwood,[57] West Contra Costa[58]
	Animal Feed		ReConserve,[59] Sustainable Alternative Feed Enterprises[60]
	Home Composting		StopWaste Backyard Composting[61]

[45] https://www.gocopia.com
[46] http://www.chowmatch.org
[47] https://cropmobster.com
[48] http://www.re-plate.org
[49] http://foodshift.net/foodshiftkitchen/
[50] https://www.pwc.com/us/en/tax-services/publications/insights/assets/pwc-enhanced-deduction-for-charitable-contributions-of-food-inventory.pdf
[51] http://www.ebmud.com/wastewater/recycling-water-and-energy/food-scraps-recycling/
[52] https://www.epa.gov/anaerobic-digestion/food-waste-energy-how-six-water-resource-recovery-facilities-are-boosting-biogas
[53] http://www.sanleandro.org/depts/cd/projects/davis_street_transfer_station.asp
[54] https://www.wm.com/location/california/cabay/empire/landfills/altamont.jsp
[55] http://www.recologyorganics.com/index.php/compost-facilities-old/blossom-valley-organics
[56] http://local.republicservices.com/site/newby-island
[57] http://redwoodlandfill.wm.com/index.jsp
[58] http://www.pointrichmond.org/pdfs/Republic.pdf
[59] http://reconserve.com
[60] https://www.forktofeed.com
[61] http://www.stopwaste.org/preventing-waste/residents/start-with-your-soil

Observations, Findings & Recommendations

We interviewed many of the key players working to address wasted food in Alameda County, including government agencies, food recovery intermediaries, food assistance organizations, and animal feeding operations. We also conducted research and interviews of some of the major generators of discarded food in the county, including, schools, institutions, restaurants and caterers and made the following 10 observations.

I. **Surplus Food Generation** - Surplus food generators face barriers and lack sufficient incentives to prevent and recover wasted edible food.

II. **Prepared Food** - Effective prevention and recovery strategies vary by type of food; prepared food is hardest to recover.

III. **Data** - Accurate and granular local data on the amount, type and generators of surplus food is limited.

IV. **Food Recovery Challenges** - Implementing food recovery programs is challenging, even though there are many good models.

V. **SB 1383 Implementation** - Implementing and complying with SB 1383 will require new approaches and resources.

VI. **Technology** - Technology supporting food waste reduction is evolving quickly.

VII. **Secondary Markets** - Secondary markets for and value-added processing of surplus food at present is limited.

VIII. **Animal Feeding** - Surplus food not suitable for humans can be fed to animals but currently opportunities are limited.

IX. **Schools** - School nutrition services directors would like to reduce wasted food and provide more nutritious food to their students and families.

X. **Policy** - New policies have the potential to address market problems, silos and competing priorities.

We identified over 50 potential policy and program solutions that could be implemented locally that flow from these observations. They are categorized into three areas: education and data; policy; and logistics and infrastructure and further sub-divided into short-term (1 to 3 years), medium-term (3 to 5 years) and long-term (5+ years) based on their ease of implementation and the countdown to the SB 1383 deadline of 2025.

I. Surplus Food Generation

Surplus food generators face barriers and lack sufficient incentives to prevent and recover wasted edible food.

Interviews at corporate dining facilities, large-event caterers, institutional dining and schools corroborate that food goes to waste for a variety of reasons, and that there is a growing awareness of the problem of wasted food, but also a number of barriers and challenges.

Many food generators do not know how much surplus food they are generating. StopWaste's Smart Kitchen Initiative demonstrates the effectiveness of measurement in educating generators (owners and employees) about how much waste they generate as well as the opportunities for prevention and associated cost savings.

While the CalRecycle data identify restaurants as the single largest generators of food discards in the county, a recent survey (Sakaguchi master's thesis 2016) revealed that 86% of small restaurants in Berkeley CA do not donate edible food. Only 31% were familiar with donation tax incentives, and 75% expressed (unfounded) liability concerns. Other key challenges cited were: lack of time and resources needed to package, store and transport donations and difficulty coordinating donation pick up.

Generators lack awareness and accurate, actionable information about food donation tax law, donor liability, and options for prevention/recovery, as well as the true costs of wasted food. Many interviewees were unaware of the 20+-year-old Good Samaritan Act, and few were aware of tax benefits or the recent amendments. Several expressed interest in a comprehensive, up-to-date, easily accessible resource for food donation options, including location, hours, contact information, etc.

There are significant start-up costs in terms of time and training to encourage and empower employees to participate in prevention and recovery programs, from procedures for setting aside and handling donations, to adequate physical capacity (adequate freezer or refrigerator space) to interacting with recovery organizations. Even simple logistics can be a hurdle, such as not enough LeanPath devices in a large, busy kitchen to enable food service staff to easily follow Smart Kitchen Initiative procedures.

Many businesses and institutions simply lack the space (and often sufficient financial incentives) to store or even compost food, which results in the vast majority ending up in local landfills.

Currently only two out of the 15 weekly farmers markets in Alameda County operated by the Pacific Coast Farmers' Market Association are connected to local food recovery operations. According to our interviews, acknowledgements of donations and their impact makes farmers more willing to donate.

Recommendations for Surplus Food Generation	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
1. Create, maintain, distribute and publicize a donation and prevention guide, highlighting information and resources. Leverage business improvement districts, merchant associations, farmers' markets, small business assistance centers, service providers and site inspectors to reach food generators.	●			●		
2. Distribute guides and contacts to food service operations when they get their new or renewed business licenses or food safety inspections. Include descriptions of practices that reduce plate waste, such as discounted selling, smaller portion sizes and trayless dining.	●			●		
3. Promote program and grant resources offered through the Altamont Education Advisory Board, CalRecycle and StopWaste to support generators seeking to do more prevention and recovery.	●			●		

Recommendations for Surplus Food Generation	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
4. Create, maintain, distribute and publicize an interactive centralized, and possibly crowd-sourced resource to include all players and information on prevention and recovery.	●				●	
5. Develop curriculum, certification and professional development materials in partnership with community colleges on food waste prevention, recovery, recycling and composting, focused on culinary training and existing culinary and custodial professionals. Evaluate whether to subsidize the training.	●					●
6. Evaluate the feasibility of incentive pay schemes for employees trained and certified in food waste prevention, recovery, recycling and composting.	●					●
7. Promote a local TV show on food rescue, like UK's The Big Food Rescue on BBC One to raise awareness of the problem and local actions taking place.	●					●
8. Create and distribute model language for catering contracts specifying donation after events.		●		●		
9. Leverage Alameda County Green Business Program to require caterers to offer food donation in their contracts and require other food service operations to engage in food waste prevention and recovery		●			●	
10. Create a clearinghouse of technical assistance providers and resources for food assistance organizations for: website development and maintenance, grant writing, off-hours volunteers, equipment, cold storage space, etc.		●				●

II. Prepared Food

Effective prevention and recovery strategies vary by type of surplus food; prepared food is especially difficult to recover.

Surplus food in the county ranges from bulk food left at the end of a catered event to pre-packaged soups and salads approaching their "sell by" date to fresh produce to frozen meats to day-old baked goods to shelf-stable products, each requiring specific handling and storage procedures, each appropriate for different destinations based on nutritional profile and diner preferences. In addition, surplus food such as peels and scraps not edible in current form might be made edible with processing.

Hope 4 the Heart provides food, produce, and household items to 11,000 local families per month. They also distribute pallets of food to over 100 churches, schools, and nonprofit organizations every week, and distribute prepared foods collected by Chefs To End Hunger from institutional kitchens.
They are breaking ground on a new 5,000 square foot warehouse. This family-run non-profit operates on a shoestring and relies heavily on its volunteer network.

The waste reduction strategies, therefore, must be multi-faceted. The Alameda County Community Food Bank Grocery Rescue Program focuses on recovering grocery items and pre-portioned prepared food (such as soups and salads approaching expiration) that can be readily distributed by its member agencies. Copia and Re-Plate have honed in on corporate donors, who have the greatest capacity to pay a fee for the service, and are building a diverse network of recipients based on the type of food recovered. Innovative operations like Regrained are collecting spent grain from local breweries to produce energy bars. MOGO and others have developed software to enable restaurants to sell end of day prepared food at deeply discounted prices. Imperfect Produce and Grocery Outlet market cosmetically challenged produce. Dumpster divers, "freegans," and urban farmers surreptitiously scavenge edible food from grocery stores dumpsters for themselves and/or their animals.

Prepared foods seem to pose the biggest challenge, especially bulk prepared foods that are not pre-portioned, such as whole pans of entrees or salads, that are either hot or refrigerated, but not frozen. Prepared foods also potentially offer the greatest recovery opportunity since restaurants and caterers generate the most food discards of any sector in the county, yet most prevention and

recovery efforts are focused on food retail and corporate cafeterias. However, working with independent restaurants could be very labor intensive compared to working with several corporate kitchens under one company umbrella.

The challenges of prepared foods are many. Food pantries with refrigeration often only accept individually pre-portioned prepared food, lacking the labor, supplies and training to re-apportion for distribution. Food pantries that do not have appropriate refrigeration often cannot accept prepared food. Soup kitchens and shelters which serve meals on site usually can accept bulk prepared food and have kitchens and staff to process the food for consumption on-site or off-site, though their capacity may vary day to day and there are only 3-4 large soup kitchens in the county. Direct feeding operations like Food Not Bombs, which take prepared food directly to needy people in local parks, can also handle bulk prepared foods.

Founded by LA & SF Specialty, a wholesale distributor, Chefs to End Hunger, provides interested clients with a food recovery kit which the clients fill with surplus food that is good to eat, label and place in boxes at the end of the work day. The clients store the boxes in their coolers, and hand them over to the LA & SF Specialty driver during their regularly scheduled delivery. Hope 4 the Heart food pantry in Hayward receives and redistributes the surplus food.

Prepared food that is not already frozen also has more stringent health and safety handling requirements, limiting its distribution. Because prepared food is perishable, it needs to be moved quickly and kept at a controlled temperature, posing logistical challenges, whether by intermediaries or food recovery organizations. Volunteers are not always available to pick up and deliver prepared food when it is available. Generators often do not have the staff or resources to package the food for donation, or adequate cold storage space to hold donations. Finally, prepared foods, like many shelf-stable foods, are often high in salt, fat, sugar and carbohydrates, making them less suitable for some food insecure populations facing chronic illness or specific dietary needs or restrictions.

Recommendations for Prepared Food	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
11. Support AB 1219, the California Good Samaritan Food Donation Act, to expand liability protections to include the donation of food directly to end recipients.		●		●		
12. Encourage food service brokers and distributors operating in the county to adopt LA & SF Specialty's Chefs to End Hunger model, leveraging existing refrigerated transit routes to expand food recovery.			●	●		
13. Promote tools, apps and markets that create alternate paths to donations for prepared food that is not matched to nutritional needs of food assistance organizations, or not otherwise well-suited to donation.			●	●		
14. Explore leveraging new equipment and technologies such as FreshRealm Vessels[62] to support food recovery.			●	●		
15. Create more stationary or mobile outlets for direct feeding of bulk prepared foods (building on the Food Not Bombs model), keeping foods at controlled temperatures and eliminating the need for intermediate distribution stages and storage facilities.			●		●	
16. Develop more capacity (prep space, SafeServ training) within food pantries to handle bulk prepared foods.			●		●	
17. Tap local businesses that may be assets in providing support and resources to food waste reduction, such as ride sharing (Lyft, Uber), food delivery (DoorDash, GrubHub), vehicle sharing (Zipcar), cold storage (7-Eleven), and commercial kitchen space for repackaging bulk prepared foods (Oakland Kitchener, Alameda Point Collaborative, FoodShift Kitchen).			●	●		
18. Expand refrigerated transit capacity to allow for efficient routing of donation collection and delivery, possibly shared among food assistance organizations or serving a "surplus food hub."			●			●
19. Develop one or more physical "surplus food hubs" regionally, modeled on Hope 4 the Heart, with the capacity to sort donations and distribute them to their highest value and/or create value-added products.			●			●

[62] https://freshrealm.co/creates/vessels

III. Data

Accurate data on the amount, type, and generators of surplus food is limited.

Effective prevention and recovery strategies vary by type of food and ultimate destination and self-reported information tends to underestimate wasted food, more rigorous local data would be helpful to identify the most effective solutions. Local data is needed to pinpoint the highest value solutions.

Further data collection should focus on verifying the CalRecycle industry sector estimates and viable solutions by gaining more granular local information on the quantity and type of surplus food and handling of surplus food by sector by addressing the following questions:

- What might be preventable (through efficiencies, discounted sales, etc.)?
- What is edible as is (recoverable)?
  - What are the nutritional qualities and how does that match up with potential recipients and their needs?
  - What format does it take (grocery item, bulk prepared, pre-portioned prepared) and how does that match up with potential recipients?
- What might be suitable for value-added processing?
- What might be suitable for animals?
- How can necessary discards be recycled/composted rather than landfilled?
- How does this vary by key attributes within the industry group (enterprise size, etc.)?

Plate Waste Studies

StopWaste is conducting plate waste studies with Oakland Unified and Livermore Valley Joint Unified to determine the amount of wasted food generated from the district nutrition programs. Preliminary data is consistent with a 2013 Harvard School of Public Health study which concluded that 40% of food served at Boston middle schools was discarded uneaten.

For example, restaurants may have varying types and amounts of surplus food based on their format (quick service versus fine dining versus buffet). Chain restaurants such as those currently served by Food Donation Connection are likely to have surplus food and freezer capacity to immediately freeze, while smaller, cook-to-order restaurants may have more produce or ingredients to donate. Restaurants with buffets or salad bars are perfect candidates for services like BuffetGo.[63] Food service establishments in general are also likely to have higher proportions of post-consumer food discards (coming from plate waste) compared with other sectors, which may call more for solutions such as adjusting serving sizes than for recovery efforts.

Likewise, the CalRecycle data combines food wholesale and manufacturing, two sector with very different dynamics from a wasted food generation standpoint. Large amounts of discarded food from manufacturing are diverted from disposal through secondary sources (processed to create other food products or animal feed); but we know little about how much of this is occurring versus opportunities for further waste reduction.

Data Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
20. Conduct generator-based waste characterization studies by jurisdiction in Alameda County, including estimates of edible food (pre- and post-consumer) to support compliance with SB 1383.	●				●	
21. Support local or statewide studies on edible food (pre- and post-consumer) by sector.	●				●	
22. Develop food recovery metrics to include in local climate action plans.		●			●	
23. Conduct targeted sector pilots that can develop granular, local data while testing the effectiveness of prevention and recovery programs.			●		●	

[63] Founded in Finland in 2014, the BuffetGo app lets users buy leftover food from restaurant buffets at up to 90 percent off the original price.

IV. Food Recovery Challenges

Implementing food recovery programs is challenging, even though there are many good models.

We estimate that nearly six million pounds of food is currently being recovered in the county, or 5-8% of an estimated total edible food being discarded. Some of these efforts, such as Daily Bread and the Grocery Rescue Program, have grown over time, while others like Copia and Re-Plate, are newcomers.
Some common challenges that face all food recovery operations we interviewed include:

- Recipients receive food that is not suitable for distribution – expired, rotting, moldy. Some of this is inherent to the timing challenges of donating perishables. In some cases, tax incentives encourage donation of marginal product, to the benefit of donors and the detriment of recipients who must pay disposal costs.
- Food assistance organizations receive food that doesn't meet nutritional guidelines for distribution – including pastries, desserts and sugary beverages – that might be put to better use through discount sales, resales or distribution to different clientele. Bread is often cited as an item in oversupply. Sales could raise funds which could be used to purchase nutritional foods or cover operating costs. Larger institutions may donate this material to animal feeding operations; smaller institutions do not do that as much as they do not have the resources.
- In the case of one-to-one relationships, such as those brokered through Grocery Rescue and Food Donation Connection, there are instances where the quantity or type of food cannot be used by the regular recipient on a given day, and the recipient does not have the staff or resources to reallocate the material.

- For non-profit intermediaries and food assistance organizations limited resources and restrictions from host organizations that include restricting operating hours, number of clients, on-site services (such as kitchens or on-site compost) and other operations and facilities practices can constrain their ability to redistribute surplus food.
- Reliance on volunteers can pose challenges to expanding services, because volunteers may not be available when needed, may not be reliable and may stop volunteering with or without notice. Donors and recipients both cited similar challenges with reliability and quality of paid food recovery models, suggesting that earned revenue may not be a panacea to food recovery challenges.

St. Vincent de Paul is the largest soup kitchen in Alameda County serving an average of 600 hot meals per day, to about 500 clients per month (some eat more than one meal each day). St. Vincent de Paul has an on-site food pantry and offers clients packaged meals to go. The operation also provides non-perishable food to 55 "Vincentians" member churches that run feeding programs. They receive donations of rescued food through the Grocery Rescue Program and also have established relationships with independent grocery stores, restaurants, caterers, food delivery services, food service brokers and distributors, farmers, religious institutions and schools.

Recommendations for Food Recovery Challenges	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
24. Create a resource of animal feeding operations and procedures for food recovery and food assistance organizations to reallocate food that is not appropriate for human consumption.	●			●		
25. Incentivize innovation of new direct donor-to-diner food recovery models to alleviate pressures on existing food assistance organizations with limited capacity and operational restrictions.		●		●		

V. SB 1383 Implementation

Implementing and complying with SB 1383 will require new approaches and resources.

Based on our estimates, just under one million pounds, or less than one-sixth, of the existing recovery taking place in the county is under a fee-for-service model, using paid labor (Copia and Re-Plate). Another approximately 1 million pounds is linked to Chefs to End Hunger, a complimentary service for customers of LA & SF Specialty customers. Food Donation Connection (a national organization currently expanding in the Bay Area) charges donors for the service of brokering connections with recipient agencies and providing reporting for tax purposes, which is especially valuable to the corporate entities representing decentralized chain restaurants who make up the bulk of the Food Donation Connection customers. However, recipient agencies must still handle recovery logistics.

SB 1383 establishes targets to achieve a 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025. The law grants CalRecycle the regulatory authority required to achieve the organic waste disposal reduction targets and establishes an additional target that not less than 20 percent of currently disposed edible food is recovered for human consumption by 2025. CalRecycle is currently holding workshops to help in drafting the regulations, which will be adopted in 2018- 2019 and implemented in 2022.

The remainder of recovery in the county is taking place under the auspices of nonprofit agencies, relying predominantly on volunteer labor. The Alameda County Community Food Bank Grocery Rescue Program is currently the largest player, nonprofit or otherwise, facilitating the donation of 3.6 million pounds in 2016, more than half of the total estimated recovery activity, by matching donors with recipient agencies. Recipient agencies, like the Berkeley Food Pantry, are instrumental transporting the donations. St. Vincent de Paul, Hope 4 the Heart, and Daily Bread offer the most robust nonprofit models directly handling the logistics of pick up, delivery and redistribution to other organizations, each recovering approximately 100,000 pounds per year.

Given the tight budgets of donor agencies and the challenges of relying on volunteers, it is difficult to envision that food recovery could increase sufficiently

to meet SB 1383 requirements under existing models. The Alameda County Community Food Bank Grocery Rescue program has successfully focused on recovery that matches their operations and priorities – nutritious grocery items and pre-portioned prepared foods that are most desirable and manageable by all types of food assistance agencies including pantries – and has captured about 25% of the 15 million pounds of edible food in the food retail sector. Recovering food from other large generators such as restaurants, corporate cafeterias, other retailers and food wholesale pose greater challenges, as they most likely include less shelf-stable food and more bulk prepared food than grocery stores.

Orange County, California

Waste Not OC Coalition

County Health Inspectors educate restaurants & grocery store owners during inspections with a one pager explaining the Good Samaritan Act.

If the local food recovery volunteers can't do a pickup and delivery, Yellow Cab will.

A grocery store or restaurant that donates to Waste Not OC, receives a seal that they can put in their window showing that they support Waste Not OC.

Hospitals, family resource centers, social services agencies, and public health nurses use a Waste Not OC screening tool to determine if clients are food insecure.

Waste Not OC developed an interactive map for the food insecure including all the county food pantries, kinds of food provided and hours of operation.

Early data from Copia and Re-Plate suggest there may be a viable market for expanding paid food recovery (see box). Further evidence includes a recently published British study which found that "for every dollar spent on reducing food waste, companies save an average $14."[64] Other useful benchmarks may include a forthcoming NRDC food recovery cost estimation tool and a recent estimate of the wholesale value of groceries by Feeding America of $1.67 per pound[65], which could be a good proxy for the dollar value of surplus food.

[64] https://champions123.org/the-business-case-for-reducing-food-loss-and-waste/
[65] Feeding America Product Valuation Study, June 2016, KPMG, Audited.

Financial Case for Food Recovery

Paid food recovery services operating in the Bay Area, including Copia, Food Donation Connection and Re-Plate, provide initial benchmarks for the costs and benefits of food recovery.

The benchmarks suggest that the financial benefits for donors may exceed the costs of recovery, creating a viable financial pathway to an expanded paid sector. The recent PATH changes to food donation tax incentives may make this case even stronger.

Costs*

Low end ~ $0.17/ pound
(Re-Plate, high volume pick-up)
High end ~ $0.50 / pound
(Copia, event pick-up)

Savings*

Tax Savings ~ $0.54 / pound
(Food Donation Connection; chain restaurants)
Tax + Disposal Cost Savings ~ $5.50 / pound
(Copia)

*All figures current as of October 2016. Note that the market for paid food recovery is limited and the business models and price structures of these start-up services are evolving.

Recommendations for SB 1383 Implementation	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
26. Participate in the SB 1383 stakeholder process to shape implementation.		●		●		
27. Support CalRecycle in the development of statewide standards for measuring the prevention and recovery of edible food that are feasible for local jurisdictions to implement.						
28. Create an Alameda County Food System Alliance, a non-profit or county level program to facilitate interaction and coordination between agencies, modeled on Waste Not OC Coalition. ALL IN may represent the beginning of such an alliance.		●				●
29. Add a food recovery requirement to local organics collection contracts such as LA City's Zero Waste franchise agreement (which requires food recovery, education, diversion rates with potential financial penalties).		●				●
30. Incentivize paid food recovery innovation by leveraging the potential to create more robust funding for recovery from donor tax and disposal cost savings.		●				●
31. Pilot a publicly funded and regulated food recovery services sector. Analyze the feasibility of developing the pilot as a social enterprise public or non-profit business and prepare a business plan. Local jurisdictions would issue Request for Proposals for food recovery services, which will generate employment and rapidly scale up food recovery (modeled on the planned ALL IN pilot).			●			●

VI. Technology

Technology supporting food waste reduction is evolving quickly.

We evaluated over 35 technology platforms that have been developed to support food recovery and waste reduction.

28 platforms are designed to match wasted food generators (growers, restaurants, corporate cafeterias, caterers, manufacturers/processors, food service brokers and distributors, truckers, moving companies) to recipients (food recovery intermediaries, soup kitchens and other feeding operations). Some are open source and available to anyone and others are proprietary, provided for a fee or used within an organization to coordinate volunteers or staff. Seven are being used in Alameda County.

Various features:

- Generators post and recipients claim
- Recipients request and generators offer
- Food allocated based on location/proximity
- Provide information about recipients
- Provide information about food (for foraging)
- Charge for pick up & delivery
- Charge for the food
- Free pick up & delivery

Five platforms enable restaurants to sell food leftover at the end of the day at a discount.

ShareCity developed in Dublin, Ireland is a website of food sharing activities and organizations around the world. This 'space' is quickly evolving with new platforms coming on line rapidly. Unrelated technology could also provide models/know-how for the logistical challenges of food recovery, such as routing software used by food delivery and transportation services. A complete list of the technology platforms and details about how they are used is included in Appendix 7.

Food Recovery Technology Platforms

412 Food Rescue
Aggregate ND
Ample Harvest
Bring the Food
BuffetGo
Chow Match
COPIA
CropMobster
ExtraFood.org
Falling Fruit
FareShare FoodCloud
Food Cloud
Food Connect
Food Cowboy
Food for All
Food Rescue Locator
Food Sharing
Foodwe
Fork It Over
MealConnect
MealSaver
MEANS
MOGO
Move for Hunger
Olio
Recycle Where
Re-Plate
Share City
Spoiler Alert
The Food Rescue Robot
Too Good To Go
Unsung
Waste No Food
Yume
Zero Percent

: matching software
: restaurant focused

Most food assistance organization we interviewed use technology for some aspects of their operations, including placing orders via an online platform with the Alameda County Community Food Bank. Many felt that a technology platform could address some critical problems – helping to more efficiently and equitably allocate food among organizations in real-time, creating more transparency, more control over the flow of donations, and less waste.

However, access to and comfort with technology varies among agencies. Beyond the benefit to existing recovery players, a county-wide online platform might serve to vet and connect food assistance organizations outside of the Alameda County Community Food Bank universe, expanding the network of recipients, and deliver reporting, branding or marketing benefits to donors.

Montgomery County, Maryland

Community Food Rescue

Community Food Rescue recognizes all participating licensed food businesses donating food on their website and through social media. Donors also receive a printer-friendly template that they can use to recognize the organizations that receive their donated food. They can print a certificate to frame and post in their establishment. In addition, all participating businesses are encouraged to become certified food donors through Food Recovery Certified. The system uses ChowMatch, Community Food Rescue matching software; matching criteria includes: types of food, quantity, proximity, timing availability, and transportation capacity.

Technology Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
32. Publicize the various food sharing apps that are available locally, potentially providing user reviews.	●			●		
33. Pilot a county-wide (or Bay Area-wide), open source virtual clearinghouse (online platform) for food donors and recipients, including food assistance organizations, food recovery intermediaries, and animal feeding operations to create a transparent system to easily claim, trade and allocate surplus food (Montgomery County model).			●			●

VII. Secondary Markets

Secondary markets for and value-added processing of surplus food at present is limited.

Secondary markets, including discount tables/direct sales, discount resellers, and value-added processing like catered meals, jams or juices can be important tools to reduce wasted food. Innovative examples like Regrained are turning spent brewery grain into energy bars.

We were not able to identify many value-added processors in Alameda County of recovered food beyond food assistance organizations. Food Shift, a food recovery pioneer founded in Oakland, is piloting a project with the Alameda Point Collaborative called the Food Shift Kitchen[66] (modeled after the D.C. Central Kitchen).

Washington, DC

DC Central Kitchen

DC Central Kitchen offers:

Culinary job training - Preparing unemployed adults for culinary careers

Community meals - Transforming wasted food into nutritious meals for homeless shelters and nonprofits

Healthy school food - Serving award-winning farm-to-school menus to low-income schoolchildren

Healthy corners - Delivering fresh produce and healthy snacks to corner stores in DC's food deserts

Campus Kitchens Project - Encouraging college students to fight food waste and hunger

Some locally based secondary food sellers, such as Imperfect Produce and Grocery Outlet, sell food from sources outside of Alameda County that might otherwise go to waste. The "ugly" fruits and vegetables and discounted grocery items are available to anyone. However, the surplus products are not generated within the county and thus do not have a direct effect on wasted food reduction in the county.

[66] http://foodshift.net/foodshiftkitchen/

Dorchester, Massachusetts

Daily Table

Founded by Doug Rauch, former president of Trader Joe's, Daily Table is a non-profit grocery store open to members in the local community that sells donated and low-cost surplus food at low prices and "ready-to-go" meals created on-site. While there is currently only one site, the company plans to open additional stores in cities across the country.

Recommendations for Secondary Markets	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
34. Incentivize social food entrepreneurs, such as Nom!Nom![67] members (an on-line community featuring food entrepreneurs with pickup locations in downtown Oakland), commercial kitchen incubator users (such as at Kitchener Oakland[68] and Forage Kitchen), and home cooks selling their meals on Josephine.com to repurpose more surplus food for sale. Incentivize/encourage operations like DC Central Kitchen, FoodShift Kitchen and Daily Table.		●		●		
35. Engage with food system incubators and accelerators (such as Food System 6),[69] to promote wasted food prevention and recovery in the county.		●		●		
36. Adopt policies that allow/encourage non-profits to re-purpose recovered food and sell it for cash to subsidize their operations.		●			●	

[67] https://www.nomnom.menu/
[68] http://www.kitcheneroakland.com
[69] http://www.foodsystem6.org/

VIII. Animal Feeding

Surplus food not suitable for humans can be fed to animals, but currently opportunities are limited.

There are no large animal feeding operations in Alameda County. Some smaller operations exist locally. Some surplus food is being transported out of the county to large farms in the Central Valley. A small amount of surplus food is gleaned informally from local dumpsters by small in-county operations. Local entrepreneurs are exploring opportunities to repurpose surplus food not suitable for humans for animals. However, permitting requirements can be a hurdle for some operations. For example, the Perennial Farming Initiative[70] processes food scraps to create nutrient-rich aquaponics produce, but does not put the fish used in the operation to commercial use.

There are large-scale operations processing surplus food from industrial sources for animal feed, such as ReConserve[71] and Sustainable Alternative Feed Enterprises[72] nearby, outside of the county. However, at this time there are no robust options for repurposing discarded commercial food for animal feed within the county.

Low-income individuals with pets may use their limited resources to feed their pets and thereby jeopardize their own nutrition. Alameda County SPCA operates a Pet Food Pantry, and AniMeals and Meals on Wheels for Animals were founded to address this issue. They accept surplus and donated pet food.

The Perennial Farming Initiative is a nonprofit organization dedicated to combating climate change from a culinary perspective. Their 2,000 square foot aquaponic greenhouse in West Oakland is designed to use food scraps from their sister restaurant, The Perennial, to grow soldier fly larvae that is fed to fish which they would like to provide back to the restaurant.

[70] http://perennialfarming.org
[71] http://reconserve.com
[72] https://www.forktofeed.com

Animal Feeding Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
37. Identify solutions for connecting in county urban and backyard animal husbandry to surplus food sources.	●				●	
38. Identify and analyze regulatory barriers of recovery for animal feedstock and recommend how to overcome them.		●			●	
39. Explore the feasibility of an in-county aggregation of food discards for animals to reduce the expense of transport to out-of- county processors.			●	●		

IX. Schools

School nutrition services directors would like to reduce wasted food and provide more nutritious food to their students and families.

School nutrition services directors would like to provide adequate and nutritious food, but are constrained by a lack of resources. Some schools would like milk dispensers (to reduce milk and packaging waste), but don't have the budget to purchase them and unless there are staff and parent volunteers to manage a food donation program, share table leftovers are thrown out (into compost or landfill). Directors are concerned that donating surplus food could violate federal regulations. In addition, directors may have to accept food from the USDA program that students won't eat, such as unripe fruit. In some cases, custodians do not want to support food recovery, as it requires more time. Schools need a champion for food recovery and recycling programs to be successful. And when these champions leave, the program may fold. Similarly, school food recovery and donation efforts depend upon volunteers, not a sustainable source of labor.

Oakland Unified and StopWaste have developed model programs for K-12, including food share and food donation. Their School Food Donation Program Guide, provides the lessons learned from the Oakland Unified food donation pilot program, an evaluation of options for establishing a donation program, and a step-by-step guide to the procedures, including forms and resources. They have worked closely with the Alameda County Environmental Health Department to establish safe food handling guidelines for food donation and sharing food in the cafeteria. They are now sharing these resources with school districts across the county and beyond. Many of the school nutrition directors that we interviewed expressed interest in the program.

Recommendations for Schools	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
40. Create and distribute model language for school boards supporting food recovery, modeled on Oakland Unified.		●		●		
41. Create Alameda County-wide coalition of School Nutrition Services Directors to meet quarterly and share best practices and apply for grants to expand wasted food prevention and recovery efforts.		●		●		
42. Create language for schools to address custodial labor union agreements to support food share, donation and composting.		●			●	
43. Advocate for “offer vs. serve” for school food distribution in state and federal guidelines.		●			●	

X. Policy

New policies have the potential to address market problems, silos and competing priorities.

It is easier for generators to put edible surplus food in the green or black bin than arrange for it to be donated. Recycling coordinators and hunger assistance staff tend to operate in silos (where they do not interact with each other) and may not be aware of the issues related to organics management and food recovery. However, SB 1383 will require jurisdictions to address edible food recovery as a component of their organic waste reduction mandate. We are at "horse and buggy" stage in food recovery (volunteer-based, operations run on a shoestring), similar to the development of the recycling movement in the 1970s. The mandatory requirements of AB 939 (residential curbside), AB 341 (commercial recycling) and AB 1826 (commercial organics) contributed to a reduction in per capita landfill disposal statewide. Similarly, SB 1383 may contribute to an escalation in expansion of food recovery.

In July 2016, the City of Rosemead, CA adopted a "Food Waste Recovery Resolution" encouraging local food service organizations to donate food and supporting the work of Urban Harvester, a local nonprofit that matches surplus food donors to recipients.

Without a market intervention, such as increased technical assistance, mandatory participation, and incentives and penalties, food recovery could continue as it has for several decades. Dedicated volunteers and charities will fill the needs of the food insecure to the extent that they are able, but a significant amount of food will continue to be wasted.

Action is required to implement SB 1383, but it is unclear who will be responsible to take the initiative and the consequences of noncompliance. We anticipate that the effort will require all sectors to be involved. Regional agencies, such as StopWaste, may be asked to develop model programs and policies. Local jurisdictions may be required to implement specific programs to address SB 1383, as they were called on to implement AB 939. Food generators may be asked to be more mindful about how they use food and may be required to reduce, track and donate surplus food. Food recovery and food assistance organizations may need to double or triple their efforts. And entrepreneurs and innovators may need to develop new tools and techniques for increasing efficiency and reducing waste.

NCRA was founded in 1978 (back in the "horse and buggy days" of recycling) to promote the recycling industry and to share information and best practices. NCRA has supported innovative policies and programs and provided a platform for advocacy and leadership in Zero Waste. NCRA will continue in that role and will support the development of a more robust food waste prevention and food recovery system in Alameda County.

Policy Recommendations	Education & Data	Policy	Logistics & Infrastructure	Short-Term	Medium-Term	Long-Term
44. Enlist support of Food Policy Councils in Alameda County.		●		●		
45. Encourage local jurisdictions to adopt food recovery resolutions modeled on Rosemead City Council Resolution.[73]		●		●		
46. Support state legislation and industry initiatives on date labeling.		●		●		
47. Require surplus edible food plans for large food generators, for special events requiring an event permit, and for public facilities.		●			●	
48. Ban edible food from compost or landfill (and make sure this policy has "teeth"/enforcement mechanism).		●				●
49. Raise landfill and organics collection fees to better reflect true/full cost of disposal.		●				●
50. Require food service operations to donate surplus food.		●				●
51. Advocate for eliminating subsidies in US Farm Bill that result in the generation of surplus edible food and unhealthy food (corn and soybean-based). [74]		●				●
52. Advocate for eliminating tax benefits for donating non-nutritious food (e.g., soda and pastries).		●				●

[73] Rosemead Food Waste and Recovery Resolution No. 2016-39

[74] The Harvard Law School Food Law and Policy Clinic, with support from Food Policy Action and ReFED, released Opportunities to Reduce Food Waste in the 2018 Farm Bill, which outlines 17 recommendations that Congress can implement to tackle food waste in the next farm bill.

Appendices

1. Background Reports
2. List of Interviews
3. Synopsis of Interviews
4. Models and Best Practices from Outside Alameda County
5. Glossary
6. Detailed Assumptions
7. Detail on Technology Platforms

Appendix 1 Background Reports

The proliferation of recent and ongoing research initiatives around wasted food is providing critical data and analysis, informing the conversation around solutions in the public, nonprofit and private sectors. Research specific to Alameda County is limited - this report seeks to add to the body of knowledge specific to the county and to identify future research needs.

Below are some key research efforts that have provided data or influenced the framing of this report.

CalRecycle Waste Characterization Studies: CalRecycle conducts periodic statewide waste characterization studies[75] to better understand the types and amounts of materials disposed in and diverted from California's waste stream, and provides waste estimates for California jurisdictions using local employment and population data. Commercial sector data includes both disposal and diversion streams data. The latest available data is from the 2014 Disposal-Facility-Based Characterization of Solid Waste in California.[76]

Food Waste Reduction Alliance (FWRA):[77] A joint project by the Food Marketing Institute, the Grocery Manufacturers Association and the National Restaurant Association, the FWRA released a report in Fall 2016: "Analysis of U.S. Food Waste among Food Manufacturers, Retailers and Restaurants."[78] The study relies on survey data, providing an industry perspective on perceived barriers, programs and investments, trends by firm size, and attempts to align its data collection with the Food Loss Waste Protocol standards.

Harvard Food Law and Policy Clinic: Released a toolkit in October 2016, Keeping Food Out of the Landfill: Policy Ideas for States and Localities,[79] laying out recommendations states and localities can adopt to reduce wasted food, addressing: Liability Protection for Food Donations; Tax Incentives for Food Donations; Date Labeling; Food Safety for Food Donations; Food Waste Reduction in K-12 Schools; Feeding Food Scraps to Livestock; Organic Waste Bans and Waste Recycling Laws; and Government Support for Food Waste Reduction.

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[75] https://www2.calrecycle.ca.gov/WasteCharacterization/Study
[76] http://www.calrecycle.ca.gov/Publications/Detail.aspx?PublicationID=1546
[77] http://www.foodwastealliance.org/
[78] http://www.foodwastealliance.org/wp-content/uploads/2014/11/FWRA_BSR_Tier3_FINAL.pdf
[79] http://www.chlpi.org/wp-content/uploads/2013/12/Food-Waste-Toolkit_Oct-2016.pdf

Metro Vancouver 2015 Waste Composition Monitoring Program report:[80]

Provides aggregated estimates of materials in the waste stream for industrial, commercial and institutional generators (not broken out by sector) based on waste sampling at transfer stations. The report estimated that approximately 33% of wasted food was "food that could have been donated" (p 10). The categories measured include two that DO NOT qualify as "food that could have been donated": Unavoidable Food Waste and Plate Scrapings; Unfinished Meals; and six categories that DO qualify: Whole Fruits and Vegetables; Whole Meats, Fish; Full/Unused Ready-Made; Baked Good; Deli (cheese, salads); and Liquids (drinks, oil in package).

Natural Resources Defense Council (NRDC):[81] The NRDC has been at the forefront of raising awareness about wasted food through its national Save the Food Campaign, in partnership with the Ad Council and staffer Dana Gunders' 2012 issue paper, "*Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill*". The issue paper is an excellent overview of wasted food in the US. The NRDC is currently developing a community wasted food measurement and estimation model based on a full assessment of relevant prior data and new data developed through work in Nashville and Denver, which should be available in late 2017.

ReFED:[82] ReFED (Rethink Food Waste Through Economics and Data) is a collaboration of U.S. business, nonprofit, foundation and government leaders formed in 2015. The *Roadmap to Reduce U.S. Food Waste*, released in 2016, the most comprehensive analysis of wasted food in the U.S. to date, including an action plan, provided in report form as well as an interactive website.[83] ReFED's frame is that wasted food is "an untapped strategy that can save resources, create jobs, alleviate hunger, conserve water, and reduce greenhouse gas emissions — all while stimulating a new multi-billion dollar market opportunity." ReFED ranks solutions on their return (in terms of cost/benefit, environment/natural resources and jobs/economy) for stakeholders throughout the food system, including farms, food businesses, government, foundations and investors. ReFED just released two new resources:

Innovator Database:[84] A searchable database of over 400 commercial and nonprofit entities innovating in the wasted food space growing via crowdsourcing.

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[80] http://www.metrovancouver.org/services/solid-waste/SolidWastePublications/2015_Waste_Composition_Report.pdf
[81] http://www.nrdc.org/issues/food-waste
[82] http://www.refed.com/
[83] Ibid.
[84] http://www.refed.com/tools/innovator-database/

Food Waste Policy Finder:[85] An overview of federal and state wasted food laws, including liability protection, tax incentives, animal feed, and waste bans developed in partnership with Harvard Law School's Food Law and Policy Clinic.

StopWaste-LeanPath Internal Study: Under the Smart Kitchen Initiative, StopWaste provides free waste tracking technology (through LeanPath a food waste tracking technology provider) and training to reduce pre-consumer wasted food in institutional kitchens. An internal analysis in 2014 provided some rough estimates of pre-consumer wasted food generation (both edible and inedible) in the county, and what might be considered preventable.

US Environmental Protection Agency (EPA):[86] The EPA offers a variety of tools and resources on wasted food, and is currently developing a Wasted Food Mapping Tool, a national-scale interactive tool to map industrial, commercial and institutional wasted food producers (excluding agriculture), users (e.g., food banks and animal feedlots), and processors (e.g., anaerobic digestion and composting facilities). The tool will help communities and stakeholders quantify and locate excess food and scraps, existing infrastructure, and identify opportunities for new programs or services. The tool will rely on a variety of data developed by FWRA, statewide studies in Connecticut, Massachusetts, Vermont and South Carolina, some of which were used to benchmark our estimates for Alameda County.

[85] http://www.refed.com/tools/food-waste-policy-finder/
[86] https://www.epa.gov/sustainable-management-food/tools-assessing-wasted-food

Appendix 2 List of Interviews

School Districts	Name	Title
Alameda Unified School District	James Assia	Director Food & Nutrition Services
Albany Unified School District	Sara Fuentes	Sustainability Program Manager, CIWA, Inc.
Berkeley Unified School District	Mia Villanueva	Green Star School Coordinator
Berkeley Unified School District	Mark Coplan	Public Information Officer
Castro Valley Unified School District	Lisa Maloney	Director of Child Nutrition
Dublin Unified School District	Frank Castro	Director of Child Nutrition
Emery Unified School District	Juliette Dunn	Director of Food Services & Wellness
Fremont Unified School District	Karen Miller	Supervisor, Nutrition Services
Hayward Unified School District	Robin Gallagher	Director of Food Services
Livermore Valley Joint Unified School District	Mojgan Hashemi	Nutrition Education and Operations Manager
New Haven Unified School District	Bessie Maynard	Acting Director of Nutrition Services
New Haven Unified School District	Jason Rodgers	Director of Maintenance
Newark Unified School District	Mary Sayers	Director of Child Nutrition Services
Oakland Unified School District	Nancy Deming	Sustainability Manager
Piedmont Unified School District	M'Lisa Kelley (plus several parent volunteers)	Nutrition Director and Executive Chef
Pleasanton Unified School District	Brandy Campbell	Director of Child Nutrition Services
San Leandro Unified School District	Jennifer Abbe	Green Program Facilitator
San Lorenzo Unified School District	Jennifer Abbe	Green Program Facilitator
Sunol Glen Unified School District	Teresa Donovan	Director of Food Services

SOURCES		Name	Title
Restaurants	Study of waste food at 29 restaurants in Berkeley	Leo Sakaguchi	Partnership Specialist, MealSaver
Catering	California Rose Catering, Inc.	Dov Sims	Executive Chef and CEO
	Hugh Groman Catering	Hugh Groman	Chef and Proprietor
Other Retail	Pacific Coast Farmers Market	Greg Pursley	Regional Manager Alameda County
Medical & Health	Piedmont Gardens	Jeremy Thomas	Food Services Director
Education	Cal Dining, U. C. Berkeley	Samantha Lubow	Environment Initiatives Coordinator
	Cal Dining, U. C. Berkeley	Isabella Dang	Cal Dining Sustainability Coordinator
	Choice Lunch	Karen Heller	Director of Key Accounts
	Juvenile Justice Center, San Leandro	Ray Nickaloff	Food/Supply Services Manager
	Laney College Culinary Arts Program	Scott Strong	Food Services Manager
FOOD RECOVERY INTERMEDIARIES		**Name**	**Title**
Food Recovery & Distribution to Member Agencies	Alameda County Community Food Bank	Kate Cheyne	Research Manager
	Alameda County Community Food Bank	David Amarathithada	Director of Food, Agencies & Nutrition Services
Food Recovery from LA & SF Specialty Clients & Distribution to Hope4theHeart	Chefs to End Hunger	Julianna Phillips	Key Account Manager, LA Specialty
Food Recovery & Distribution to Organizations & Individuals	Daily Bread	Patrice Ignelzi	Executive Director
Food Recovery & Distribution to Organizations	Re-Plate	Hooman Yavi	Director and Corporate Secretary
Food Recovery & Distribution to Organizations & Individuals	WE Run Food	Sandra Frost	Director of Food Recovery

RECOVERY RECIPIENTS		Name	Title
Food Pantries	Alameda Food Bank	Cindy Houts	Executive Director
	Berkeley Food Pantry	Sara Webber	Executive Director
Food Recovery & Distribution to Organizations & Individuals	Emeryville Citizens Assistance Program	Bobbie Miller	Operations Manager
Food Recovery & Distribution to Organizations & Individuals	Hope4theHeart	Victoria Popejoy	Executive Director
Shelter	Midway Shelter	Laurie Curtis	Development Manager
Shelter & Soup Kitchen	St. Vincent de Paul	John Ratti	Dining Room Manager
Animal Feeding Operation	M-R Ranch, cow operation near Sacramento	Marianne Ratt	Rancher
	Devils Gulch Ranch, pig operation, Nicasio	Mark Pasternak	Rancher
	ReConserve		
	Sustainable Alternative Feed Enterprises (SAFE), Santa Clara		
	O2 Scraps to Feed, Oakland	Aitan Mizrahi	Consultant
	Tiny Farms	Daniel Imrie-Situnayake	Founder
GOVERNMENT/NON-GOVERNMENT ORGANIZATIONS			
County Agency	StopWaste	Annalisa Bellis	Food Waste Reduction Associate
Education & Training	U. C. Cooperative Extension	Sheila J. Barry	County Director Santa Clara / Livestock and Natural Resources Advisor, San Francisco Bay Area
Coalition	ALL IN	Courtney Gonzalez	Food Recovery Project Manager
Regulators	Alameda County Department of Environmental Health	Ronald Torres	Supervising Environmental Health Specialist
	Alameda County Department of Environmental Health	Tanvir Chahal	Registered Environmental Health Specialist
Green Business Program	Alameda County Green Business Program	Carolina Miranda	Coordinator

Appendix 3 Synopsis of Interviews

School Districts

Schools were a special focus for this grant-funded report, as StopWaste provides food waste reduction assistance to Alameda County school districts.

Nancy Deming, Sustainability Manager in Custodial and Nutrition Services at the Oakland Unified School District, in partnership with StopWaste developed food share table protocols and food donation guide.

We conducted interviews or site visits at all 18 public school districts in Alameda County as well as the Alameda County Juvenile Hall.

A 2013 study published by the Harvard School of Public Health looked at plate waste in several Boston middle schools and found that 40% of food served was discarded uneaten.

Reasons include: making playing more of a priority than eating, not enough time for lunch, and lack of interest in the food served.

Oakland and Livermore Unified School Districts are conducting plate waste studies. Initial observations which appear to corroborate Boston findings that about 40% of food served was discarded

We found that:

- School nutrition directors don't know how much food is being wasted as they don't look in the compost or landfill bins.
- There is a lack of information about food share and food donation and what is allowable.
- Many school districts are not yet in compliance with state and county mandatory recycling and composting requirements.
- Schools districts are very interested in receiving information and technical assistance.
- Schools with higher percentages of students receiving free and reduced lunches have more opportunities for food recovery due to federal requirements that students be offered (or served) certain items, which they then don't want to eat. Therefore, they have more leftovers that are appropriate for food donation.
- Many schools have food share tables, but there are challenges. Some of the schools repurpose the food on food share tables (milk and whole fruit are returned to the kitchen), but most others throw out the food at the end of lunch.

Alameda Unified School District

Alameda Unified serves 2000 elementary lunches and 1,300 secondary lunches daily at all school sites. Breakfast is served at most school sites. The district has implemented salad bars at 18 schools and has expanded family style servings. They do not currently donate food, although they are exploring this option with the Alameda Food Bank. They do not think they have enough edible surplus food to donate, but would potentially be interested if it made sense.

Most of the elementary school sites have share tables. Some food is returned to the kitchen; some fruit goes to the nurse's office for distribution to students at the end of the day. Very little is wasted.

However, Alameda County Environmental Health advised the Food and Nutrition Services Director against food share. They are now working with StopWaste and Nancy Deming, Sustainability Consultant, on a district wide rollout of best practices to ensure safe handling of food.

The district participates in the "Traveling Apple"[87] program which encourages students to eat more fruit and vegetables by allowing them to take the produce outside of the cafeteria. They received a federal grant to expand distribution of fruits and vegetables outside of the cafeterias.

Albany Unified School District

There is currently no food donation program. There are minimal leftovers and the Food Service Director has not explored this option. The leftover edible food is reused or composted.

The District is environmentally conscious and open to programs that save resources and/or money. They recently established a formal Sustainability

[87] http://www.cde.ca.gov/ls/nu/sn/mbcnp052015.asp

Committee. Some schools in the District have adopted policies that reduce wasted food, including scheduling recess before lunch and food share tables at all of the elementary and middle schools. The three elementary schools have thriving garden programs, supported by the PTA, and the teachers love to work with their classes in their small classroom gardens. This effort is supported by an eco-literacy curriculum.

Schools must dispose of food left on the share table after lunch. Rules about how long milk can sit out means much of it is tossed. Food share food and milk could be collected for donation.

Berkeley Unified School District

The Cooking and Garden Nutrition Program is staffed by one full-time supervisor, one half-time coordinator, and ten site-based garden instructors. The Coordinator currently supports school green teams through an Altamont grant and ensures district efforts to properly manage material, including food, at end of life. Nutrition Services staff receive training on recycling and composting; they are very sensitive to food waste prevention. All Berkeley students are offered free breakfast as part of the Universal Breakfast Program. Breakfast foods include: fresh fruit, milk, packaged items and baked items prepared by outside vendors according to Berkeley Unified specified requirements. The District offers students a Fresh Buffet Style Service approach to lunch.

Once the food has been reheated, if it is not consumed, it is disposed of in the compost bin. According to food safety protocol it cannot be recovered. Refrigerated not reheated foods are sent back to the central kitchen for reuse.

Surplus food at school sites is not monitored or tracked. Leftover foods returned to the Central Kitchen are tracked by the Central Kitchen Sous Chef and used accordingly depending on the item. Students are allowed to take fruits and vegetables outside of cafeteria to eat later.

None of the schools visited had food share tables. The concern is who will clean up the share table after lunch is over. In classrooms there are breakfast share tables. Even students who bring their own lunches must be served a “legal

lunch" (one that meets the Federal National School Lunch Program Requirements), which can result in waste as students must be given food they may not want to eat. The amount of leftover/waste food at school sites is not monitored or documented.

Castro Valley Unified School District

Castro Valley Unified School District has 9,000 students in nine elementary schools, two middle schools and two high schools. 35-40 percent of the students are eligible for free or reduced priced meals (which is an increase from previous levels of 27-28 percent). Breakfast and lunch are served at all schools.

There are food share baskets in all of the school cafeterias for students to share school meals, fruits, vegetables, or milk that they don't want to eat. The nutrition services staff is able to repurpose packaged foods and fruit from the food share baskets, but they discard the milk because they are not able to keep it at temperature control. The district practices "offer vs. serve." Students must only take what they want to eat as long as it contains three out of the five food components (milk, fruit, vegetables, grains, meat/meat alternatives). Some menu items may contain more than one component. There are salad bars at all of the schools and some scratch cooking or "quick scratch" methods are used. The nutrition services director does not think they have enough surplus food to donate and would be concerned about the liability of donating food set to expire. Although she was potentially open to it once the Good Samaritan Act provisions were explained.

Dublin Unified School District

All of the schools cook their meals on-site except the high school. One of their high school's kitchens also prepares sandwiches, parfaits, and salads which are delivered to the two middle schools.

Last year they piloted having a substitute teacher sell surplus a la carte food for $1.00 during the free periods and after school. It was very popular because the food was affordable and the students were hungry. However, they had to stop this because the substitute teacher is no longer there and they don't have the staff to manage this program.

Surplus food goes in the garbage but some goes in the compost if it's at a school that has a compost program.

Some of the schools have composting in the cafeteria. There's still some contamination but overall good participation. The Child Nutrition Services Director was not aware of the program and the nutrition services staff is not trained.

They currently do not have share tables and have some concerns about students sharing food from home and the staff time needed to manage it.

They have recently been approached by Open Heart Kitchen and Alameda County Community Food Bank to discuss surplus food. They want to figure out ways they can reach more students who are food insecure. They are interested in helping, but not sure their schools are the best places to distribute the surplus food.

If there were a food waste prevention, food share, and/or food donation program at their schools they would like it to be coordinated district wide and to receive some implementation help.

The department is not General-Funded which means they don't receive the same kind of resources or assistance as other school district departments.

Most of the food that is wasted comes from the salad bar. At the high schools they've tweaked their food delivery system in the cafeterias by removing the salad bar and serving prepared to-go salads. They offer fruit and/or vegetables instead of automatically giving them to the students.

Emery Unified School District

Emery Unified has a new school and community center that opened in September 2016. They are launching a comprehensive recycling and composting system at the new site and are working with Nancy Deming, Sustainability Consultant on food share and food donation. The district provides students with breakfast and lunch and will be serving dinner at the new site. High school students are allowed to take food outside of the cafeteria to eat later in the day.

The district is installing water dispensers with filters. The students eat lots of fruits and vegetables; they are encouraged to take these items for snack and can eat them throughout the day. At first they had "grape wars", but have since learned how to behave appropriately.

There are food share tables throughout the day and a cooler for milk. In accordance with the National School Lunch Program, there is strict portion

control for bread and protein; however, students may take as many fruits and vegetables as they want.

Kitchen staff receive training in food waste prevention and recycling; they are being trained in composting at the new site. In general, there is very little surplus food except the first couple of months of year as the kitchen staff learn how much will be eaten. The goal is zero waste. The staff engage in re-use and only discard out-of-date or stale and moldy food.

Fremont Unified School District

Fremont Unified serves family style meals at most of its 43 school sites. Students are allowed to serve themselves from the salad bar (which is free and open to all). Some packaged items are served at the high schools. They also have some packaged items in the line in case the students don't choose enough of the right things from the salad bar. 17% of the 35,000 students are eligible for the free and reduced lunch program. They have share tables within the line of site of the nutrition services staff at most schools (depending on the preference of the principal). High schools and middle schools have their own production kitchens. Food is prepared at four of the high schools for the elementary schools. American High School has piloted a food share/food donation program supported by student leadership. Donated items are placed in tubs with ice sheets and delivered to food assistance organizations. Nutrition Services staff work hard to ensure that they have just enough food for each meal and that no student goes hungry. Their goal is to have one serving of each item leftover at the end of the meal. They are open to expanding food share and food donation, if the individual schools and principals would like to pursue it. They are also able to donate items from the freezer and surplus items from the warehouse (especially around school breaks).

Hayward Unified School District

All schools (30 locations) in Hayward have full production kitchens (except for the alternative high school). 69% of students are on the free and reduce lunch program. There are school gardens at each of the elementary schools and at two of the high schools. At the time of the interview, the director was told by Alameda County Environmental Health that they could not repurpose fruit that did not have a peel (apples – no, bananas and oranges – yes). They have

donated food leftover from the summer feeding program to the Alameda County Community Food Bank, Salvation Army and to Hope 4 the Heart. There is an afterschool culinary arts program. The schools do not participate in the green bin program. The Associate Superintendent would like to see cost savings from food waste reduction.

Inspired by the Hoover Elementary donation program at Oakland Unified, Hayward Unified is launching a multifaceted food waste reduction program in spring 2017 at six elementary schools. Food Services staff have developed an outreach plan focused on: taking what you want, sharing what you don't want and donating the rest. The staff will be doing whole school assemblies with skits that emphasize the importance of eating right and reducing waste. They have partnered with a local food assistance organization that will be taking the donated food.

Livermore Valley Joint Unified School District

They've been incorporating sustainability into their kitchen thanks to the help of Cassie Bartholomew from StopWaste and Nancy Deming, Sustainability Consultant. They received Nutrition Services training on Food Waste Reduction practices from Prevention to Composting in addition to setting up and improving sorting stations in all of their cafeterias.

They have a student food share table where students can place unwanted, unopened, and uneaten whole fruit, milk carton, and packaged food from the cafeteria.

If the food has already been cooked and heated they will properly toss the surplus food into the compost.

They have signs that try to raise the awareness and educate students to only take what they need. For example, they have a sign that says "Take It or Leave It" next to the milk cartons when the students are in the cafeteria line filling up their trays.

They recognize that appetites differ for students of different grades. For example, the younger students often have smaller appetites, so they will leave surplus food on the share table, which is then often taken and eaten by the older students.

They noticed that entrees are often eaten, but the milk and fruit are not consistently eaten by the students.

All students can take items from the share table, and students are encouraged to do so. Their food share table is also open to students who even bring their own lunch.

The food share tables are more robust and used at the elementary and middle schools, in schools where there are more free and reduced meals, and in schools where the lunch count is higher.

The high school students tend to eat everything because “they’re hungry.”

They want to follow all safety protocols. For example, they want to ensure they have insulated containers to maintain the milk at the correct temperature. They do not have a food donation program and would be concerned about the logistics and coordination.

New Haven Unified School District

There is no waste at the Central Kitchen. Food is taken from the freezer based on the order and nothing is unserved. Surplus food at the school site is composted. They do not have food share tables and don’t know how it would work. They would be interested, but would need approval from the school administrators. They do not have a food donation program, but would potentially be interested.

Newark Unified School District

There are eight food share tables in the elementary schools only. Children are allowed to place any unwanted food items which are sealed, unopened, and edible in the food share ‘basket.’ Students know that items in these baskets are available to others during the same lunch period.

If the items are on a food share table at the end of lunch, staff is encouraged to take re-useable ones to the kitchen. However, staff must take temperature controls during lunch period(s) into account to make sure the items have not gone into the unsafe zones. If so, items are discarded.

Every cafeteria has a water dispenser. But they have not noticed an associated reduction in milk consumption.

They are not currently donating surplus food, and would be concerned about food safety or liability.

They would be interested in receiving supporting documents that can provide more details food waste reduction initiatives.

Oakland Unified School District

Oakland Unified, the twelfth largest school district in the state, is a demonstrated leader in waste prevention, recycling and composting and food waste reduction, food share and food donation. They operate 86 schools serving 49,000 students. In 2011, the district was awarded the Going Green! Golden Bell Award for their Green Gloves Program. Green Gloves engages Nutrition Services and Custodial Services to take on waste prevention and recycling programs through peer-to-peer sharing and recognition. 73% of students are eligible for the free and reduced lunch program. The district has rolled out food share tables at all of its schools as a standard practice. The district is developing a Central Kitchen that will include a district farm for growing fresh produce and teaching students about food and nutrition.

Oakland Unified developed a pilot program for food donation and conducted national research on best practices and state and federal regulations. They worked with the Alameda County Environmental Health Department and StopWaste to develop guidelines for safe food handling for share tables and food donation.

The district has worked with StopWaste to develop a food donation guide that provides a step-by-step description of how to develop a food donation program. The pilot district's food donation program is expanding from two schools to six schools in spring 2017 with a goal of reaching all schools by the end of 2018. The district has partnered with Food Donation Connection to assist with the procedures and logistics.

Piedmont Unified School District

Vendors provide lunch at the elementary schools; at present all elementary schools are contracting with Food For Thought.

Meals for the middle school and high school are prepared in the high school central kitchen and packaged in compostable/recyclable containers and delivered to the middle school kitchen.

The high school has an open campus, so students can buy lunch elsewhere or go home if they live close by. Open campus and other options may reduce the pressure on the kitchen to produce "ample" food; if it runs out, students have other options. High school students help with prepping the food and the Executive Chef teaches cooking, nutrition classes.

Pizza and Chinese food from outside vendors (each once per week at Piedmont High School) is very popular. On those days, there are no leftovers and they run out of food.

Food for Thought provides 3 to 5 extra emergency meals daily. If they are not purchased by students, they are put in the staff refrigerator for staff to eat. Other emergency meals are shelf-stable (boxed cereal).

In terms of post-consumer waste, students seem to eat more Food for Thought meals than ChoiceLunch, the previous vendor.

Vendor meals are pre-ordered and include milk/water, so there is no inventory of milk that needs to be managed for spoilage at school sites.

A parent volunteer has overseen donation of leftovers not consumed by students and staff; leftovers are stored in campus refrigerators and donated once or twice a week to St. Joseph Mercy in Oakland. In addition, the Chef runs an informal donation program, making sure that no student goes hungry. Once the students' needs are met, the leftovers are available for donation.

Pleasanton Unified School District

There is one central kitchen which prepares all of the meals and sends them to nine elementary schools, three middle schools, and two high schools plus one high school which is on-site. All of the schools that receive the prepared meals from the central kitchen then heat and serve the food on-site at their satellite cafeterias.

At the high school some of the leftover lunches are sold after school. If the food cannot be sold or it's not edible, then it is thrown away in the garbage. At all the schools only food with peels are re-sold (e.g., bananas and oranges).

The district follows federal guidelines to avoid surplus food and prevent as much wasted food in the first place.

They have many long-term employees who are very familiar with food ordering and the amount of meals needed. They are frugal and efficient and work hard to prevent over ordering food.

Employees also have a good understanding of what types of foods are popular and pay attention to what's received well on the menu.

They changed the way they provide food to "offer" from "serve" which results in students taking food because they want it, not because they have to, and therefore being more likely to eat all or most of their food. They offer all 5 components of a meal and students have to take at least 3 of the 5.

Information from teachers such as the lunch count is very helpful with food preparation.

They are interested in food share, but would like to know what types of food would be appropriate and appealing for a food share table. For example, wrapped and unopened food is okay with the Director of Nutrition Services, but for probably not anything else. The dining services staff expressed concern about maintaining food temperatures and not having it sit out too long so that food safety is not compromised.

They are currently not donating surplus food and would be concerned with possibly violating the federal programs which funds them.

There seems to be more wasted food at the high schools because students have more menu options and there's a salad bar with loose fruit and vegetables. Also, there seems to be more wasted food when high school students use the plastic clamshells with compartments vs. the paper boat open trays. The larger plastic clamshell may be enable students to take too much food which they can't finish.

San Leandro Unified School District

We conducted site visits to schools in San Leandro. Several are active participants in the recycling and composting collection program. Elementary schools have family style servings and salad bars. Students must take items that they may not want to eat. There are informal share tables at some schools and at other schools we were told that the district does not allow share tables. We observed that the hard pears served the day we visited were composted without being eaten.

San Lorenzo Unified School District

We conducted site visits to schools in the San Lorenzo Unified School District. Several are active participants in the recycling and composting collection program. Elementary schools have family style servings and salad bars. There are share tables at some schools and an informal system of donating surplus food to students, families, staff, after school programs and local churches. They do not want to see it go to waste.

Sunol Glen Unified School District

Meals are provided by Choice Lunch. Leftovers are sent back to the company, which then sends them to a food bank. The food comes pre-packaged and includes milk in individual cartons. They have a recycling program for cans and bottles

They have a garden that parents manage. It includes a classroom garden, 5 chickens that are fed leftover food and a small compost bin. The school district does not recycle paper and has no green bin. They tried using the green bin, but it didn't work for them, as they didn't have staff to oversee it.

The cafeteria has a filtered water fountain with bottle refiller. So students refill their water bottles rather than buy water bottles. There is a food share basket in the cafeteria and children are encouraged to put food they will not eat there or take it home. At the end of lunch, anything packaged is put in the fridge, while the remaining items are thrown out. Students are encouraged to take food and have it as a snack on the way home.

Restaurants

In 2016, Leo Sakaguchi conducted a survey of small restaurants in Berkeley, California as part of his master's thesis.[88] He received responses from 20 and conducted 9 in-person interviews with restaurants with an average lunch cost of about $10 and average seating capacity of 30 seats.

Of the 29 restaurants, 22 were independent restaurants, 4 were chain restaurants with 2-4 stores and 3 chain restaurants with 5 or more stores. 62% of responding restaurants made most dishes from fresh ingredients; 38% made most dishes from processed or prepared foods.
For some chain restaurants, corporate food waste management guidelines preclude donation.

Leo's Restaurant Survey

38% IGNORE food waste generation

14% toss edible leftovers into the LANDFILL bin

86% of chain restaurants do not donate edible food.

31% familiar with donation tax benefits

38% proactively offer customers doggy bags

75% don't donate food because of liability concerns

Primary Barriers for Food Donation

- Lack of time and resources needed to package, store and transport food
- Difficulty coordinating donation pick up (i.e., lack of volunteers willing to pick up donations when restaurant can make them available)
- Liability concerns

Few respondents were familiar with the Good Samaritan Act.
Most business managers were not aware of the cost difference between compost and landfill disposal.

Most of the interviewed respondents requested further information as well as updates on the ongoing research to understand where they stand in comparison to the other restaurants.

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[88] *Tackling the Issue of Food Waste in Restaurants: Options for Measurement Methods, Behavioral Change and Reduction,* Leo Sakaguchi, MA Thesis, 1518054, U. C. Berkeley & Technische Universitat Darmstadt, 2016.

Catering

Restaurant and on-site venue catering (where food is produced on-site) does not produce surplus food. Corporate events (where food is brought to the event) can result in a large amount of surplus food. Some customers will take the leftovers. The caterers donate when they can (by using SF FoodRunners or dropping the food off at a women's shelter or People's Park). They do not have the ability to individually portion leftovers. They would prefer to drop off food at night, after an event, but can take the surplus food back to their kitchen for pickup the next day.

Other Retail

Pacific Coast Farmers' Market Association

There are over 15 weekly-certified farmers' markets in Alameda County that are associated with the Pacific Coast Farmers' Markets. Two are currently connected to food recovery operations: the Alameda Farmers' Market donates to the Alameda Food Bank and San Leandro Farmers' Market donates to Faith Lutheran Church of Castro Valley.

The Berkeley Farmers' Market is managed by the Ecology Center and donates to the Berkeley Food Pantry.

The challenge with donating surplus food from farmers' markets is that the farmers have only one hour to clear out of their sites. Farmers need to have all of their trucks/stands/material completely packed up and their spaces clean within that hour. Compostable and recyclable material is sometimes backhauled or placed in local dumpsters. So gleaners need to be fast and efficient to make collection work.

The Association can help facilitate donations and gleaning, but they don't make the donations. The food belongs to the farmers.

Medical & Health

Piedmont Gardens

Sodexo contracts with Piedmont Gardens and four of the food service management staff are Sodexo employees. Surplus food at Piedmont Gardens is not repurposed or reserved. Some surplus food is provided to employees. Piedmont Gardens uses the Sodexo Food Management Systems to track how much food is prepared for menu planning and budgeting. The software can track food costs and can look at waste, but the staff is not trained to do that.

Saving food would require a 6-hour procedure. It would have to be cooled down. But there is no one in the kitchen at that time to oversee this and there are a safety concerns. They would be open to donating frozen items from periodic cleanouts. They try to minimize waste. They are learning about the Smart Kitchen Initiative and LeanPath.

Education

Cal Dining

Dining establishments need someone to pick up surplus food when it is generated; food recovery organizations may not have volunteers available for the pick up. The food recovery organizations ideally would like to schedule regular pick-ups; but dining operations don't know if they will have material to donate regularly. Food recovery organizations want to know about the type and quantity; the dining operations don't know until the "last minute" what they have that can be donated. They don't know what the food recovery organizations will want, so they don't know whether it's worth taking the time to arrange donations (i.e., they have been told the food recovery organizations don't want cold pizza). They can't recover self-serve food (from salad bars and other food stations) in good faith due to potential contamination; but students can take it in to-go containers if they serve themselves.

They donate material to food recovery organizations when they will be closed for a period of time (e.g., over Thanksgiving and winter break). On Fridays at the

end of the week, a student group distributes surplus packaged food through their network to food insecure parents affiliated with the university.

ChoiceLunch

ChoiceLunch is a Danville-based company that delivers 60,000 school lunches to almost 300 schools throughout California on a daily basis. Food is produced to order and they pick up food that is not consumed. Perishable returned food is not donated since it is out of temperature control and they cannot guarantee its safety. They were working with White Pony Express to handle food donation. Leftover food that is non-perishable is reused. This includes snack items such as fruits and vegetables. Returned food that cannot be repurposed is unpackaged and the packaging material is recycled and the food is composted.

Juvenile Justice Center

Alameda County Juvenile Hall is a 24-hour secure detention facility capable of housing 358 minors. Each month, 2,200 meals are delivered to the facility by Revolution Foods or Kidango (for those with restricted diets). Unserved surplus food is stored to be re-served. All meals served are pre-portioned into individual servings. Three times per week, unwanted surplus food is donated and picked up by the New Life Christian Church (which redistributes the food). Donated food includes pre-portioned prepared food, produce and non-perishable food.

Laney College Culinary Arts Program

Laney College Culinary Arts Department offers two certificate programs (majors): *Baking and Pastry* and *Restaurant Management*. They prepare breakfast and lunch for the college cafeteria, sit-down bistro and bakery. Some products are packaged into individual portions for re-serving (sometimes at a discount). The cafeteria donates surplus food to the Open Door Mission. On Fridays, they put surplus food out for free for students. Some surplus bread is repurposed into breadcrumbs and surplus bread is donated to the Salvation Army.

There is currently no training for food waste prevention, recycling and composting in the curriculum and for professional development of janitorial staff and culinary arts staff. The instructors are interested to know more about reducing waste and managing surplus food and would like to incorporate these techniques into their curriculum.

Food Recovery Intermediaries

Alameda County Community Food Bank

The Alameda County Community Food Bank is the anchor of the food assistance ecosystem and was awarded Feeding America's 2016 Food Bank of The Year. They support over 240 member agencies in Alameda County. The Food Bank facilitates food rescue through the Grocery Rescue Program, provides food and coordinates donations to member agencies, operates mobile food pantries at schools and BART stations, and conducts CalFresh outreach to help the member agencies sign up their clients for the federal Supplemental Nutrition Assistance Program.

The Food Bank purchases food for redistribution, receives surplus food through the U.S. Department of Agriculture, and accepts non-perishable food donations. The Food Banks has typically purchased non-standard produce from farmers and are now in competition with purveyors of "ugly" fruits and vegetables (so the prices have gone up).

Member agencies make appointments to "shop" at the Food Bank and can also participate in text-based auctions of food items. The Food Bank receives surplus food that it can't redistribute because it does not meet its nutritional guidelines (such as sodas and sweets) or has expired or spoiled. Approximately, 5% of donated items must be landfilled.

Chefs to End Hunger

Founded by LA & SF Specialty, a wholesale produce, dairy, and specialty foods distributor supplying food service/fine dining establishments in California, and other states, Chefs to End Hunger's provides meals to the hungry by redistributing surplus prepared food from hotels, restaurants, and other food service operations to local food agencies that serve meals to hungry people. Chefs to End Hunger provides interested clients with 3 aluminum hotel pans which the clients fill with surplus food that is good to eat, label and place in boxes at the end of the work day. The clients store the boxes in their coolers, and hand them over to the LA & SF Specialty driver during their regularly scheduled delivery. Each month

participating clients can receive information on donations to the program through a simple credit report. Chefs to End Hunger collections in Alameda County vary by account and are between 1-6 times per week. Chefs to End Hunger tracks the number of kits donated/month, but not the specific type of food donated. Chefs to End Hunger targets perishable prepared foods and also donates produce from their Union City warehouse. Donors include hotels, restaurants, and other food service operations.

There are approximately 70 SF Specialty clients in Alameda County. The number of clients participating in the Chefs to End Hunger program has grown.
Hope 4 the Heart, a food pantry in Hayward, receives and redistributes the surplus food. Hope 4 the Heart sends a refrigerated truck to the SF Specialty warehouse to pick up donated food at end of each day.

Not all LA & SF Specialty account clients are interested in donating. So they revisit the issue every time there is a new chef. Some clients say they don't have surplus food. Some clients don't have the capacity to fill the kit.

Daily Bread of Berkeley

Founded in 1983, Daily Bread is an entirely volunteer-run, grassroots organization that picks up surplus food and brings it to local free-food kitchens, pantries, and shelters. They operate in Oakland, Berkeley, Kensington, and Richmond. Everything is freely donated and delivered. No money changes hands and 100% of the goods go to feeding the hungry in the community.

Daily Bread recovers mostly perishable prepared food and produce, bread and milk. Daily Bread almost never picks up non-perishable food.

Donors include bakeries, cafes, caterers, farmers markets, food stores, gardens, grocery stores, restaurants and schools.

Recipients include shelters, senior centers, youth programs, childcare centers and the Center for Women with Cancer.
Some recipients are willing to accept fluctuating amounts of recovered food and others cannot. Daily Bread knows which organizations can accept which types of food and arranges for donations accordingly.

Daily Bread sometimes delivers more surplus food than the recipients can consume, especially in the case of bread. However, the demand for milk exceeds supply.

Sometimes Daily Bread receives donations that are not edible. For example, a grocery store donated food, much of which was not edible. It required the volunteers to pick out the good portions and dispose of the rotten stuff.
Daily Bread tries not to accept food that is labeled as expired because many recipients, especially the larger shelters, won't accept it. Some smaller places are more relaxed on this front.

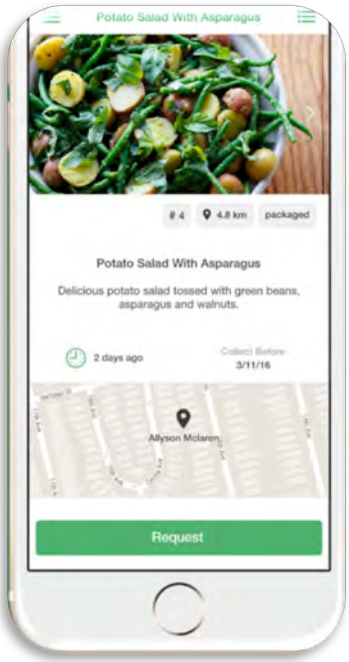
While Daily Bread is receptive to adding more donors and recipients, it is not actively looking for them, as the organization does not have capacity to serve more recipients. Volunteers are not necessarily available when the food is ready to be picked up.

Farmers markets donate loose raw produce, which can be a challenge to pick up. Some donors put salads in plastic bags that sometimes leak. Most food vendors are grateful to donate excess food; however they have so many responsibilities to juggle that they can't always package the material to make it work.

Communication with volunteers and recipients can be problematic. For example, a volunteer may stop picking up food from a donor and if they don't notify Daily Bread, the staff won't know about it.

Re-Plate

The "Uber" of food recovery. Launched January 2016. Re-Plate considers itself a technology company that matches extra food with communities in need. Re-Plate hires drivers as independent contractors, for $15-$25 per hour. The drivers use their own private vehicles between 2-5 p.m. (when Uber/Lyft are typically slow) to pick up and deliver prepared food within a 4-hour window, from the refrigerator at the donor to the refrigerator at the recipient.



Re-Plate charges donors for pick-up service (cost varies depending upon volume and labor and whether they have to package the food).

Most donors do not take the tax benefit because they are already claiming the deduction as an employee benefit. Re-Plate provides tax receipts, and reports on the quantity donated food by weight. Re-Plate targets perishable prepared food from corporate cafeterias (in-house cafes or catered events). Re-Plate delivers surplus food to shelters and soup kitchens.

WE Run Food

Washington Eden (WE) Run Food, the Washington Eden Food Recovery Cooperative, is a pilot program that was born out of a social innovation fair put on by ALL IN Alameda County, an initiative of Alameda County Supervisor Wilma Chan. WE Run Food received a $50,000 grant from the Stupski Foundation, a funder devoted to addressing the issue of food insecurity in the Bay Area and Hawaii. The funding will provide startup funds for technology, food recovery equipment and training. The project will use technology and volunteers to connect people and organizations that have more food than they need. Then a network of volunteers and organizations will distribute that food to people who need it. The WE Run Food pilot program will target the southern portion of the county — Cherryland, South Hayward, Fremont, and Union City. The goal of WE Run Food is to become a model that can be scaled and replicated in other parts of the county and potentially across the country.

Food Recovery Recipients

Alameda Food Bank

The Alameda Food Bank is an independent non-profit formed in 1977 to serve needy families; it has 150 volunteers and 4 paid staff. Food is distributed 6 days per week to 800 households representing 2,100 people. All types of food are distributed through their pantry and perishable food programs, including individually pre-portioned salads, sandwiches and deli items from the Grocery Rescue Program. The Alameda and Jack London Farmers' Markets, Imperfect Produce, Peet's and Starbucks also donate surplus food. They also receive gleaned fruit from Alameda Backyard Growers and surplus vegetables from community gardens and individual gardeners. Surplus food not suitable for distribution is donated to St.

Vincent de Paul in Oakland. A “cowboy from the Hayward hills,” who they found on Craig’s List, accepts surplus bread to feed his animals. The Alameda Food Bank is well connected in the community and their executive director meets quarterly with the other executive directors of non-profits in town. This networking allows for more sharing of information and distribution of surplus food. The Alameda Food Bank is slated to be a recipient of products prepared by the Food Shift Kitchen job-training program which makes products from recovered food.

Berkeley Food Pantry

Founded in 1969, the mission of the Berkeley Food Pantry is to provide families, especially those with children, in Berkeley and Albany, California with enough nutritious emergency groceries to help them through times of financial crisis.

The pantry distributes food on Monday, Wednesday & Friday from 2-4 p.m. to over 2,000 Berkeley and Albany resident per month. Recipients sign in and wait in a small covered courtyard for their turn to come and pick out groceries. Under the terms of their fiscal sponsor and landlord, the Berkeley Friends Church, clients are limited to 1 grocery bag of food 7 times in a 6-month period. The pantry has two paid part-time staff and a core of 40-50 dedicated volunteers who help pick up, sort, organize and distribute the food.

The pantry participates in the Grocery Rescue Program and also receives rescued food from food recovery intermediaries Daily Bread and the Berkeley Neighborhood Food Project, farmers markets, food delivery services, gleaners, and restaurants (provided that the food is packaged for individual families).

The donations are unpredictable both in terms of volume and type of food. However, the pantry has been able to accommodate this issue. There is some competition and lack of coordination among recipient organizations.

Their current client needs exceed the pantry’s protocols. Very low-wage workers rely on food donations to survive and yet they can only go to the pantry 7 times in 6 months. The pantry has the capacity accept more donations and distribute more, but has limitations at its current site.

Emeryville Citizens Assistance Program

This all volunteer-run, nonprofit organization provides nutritious food, warm coats and blankets, household items, information and referral services to the underserved in Emeryville and surrounding communities. Founded more than 30 years ago by Nellie Hannon, they have a volunteer staff of at least 12 on a daily basis from a pool of 35-40 people who donate at least 2-3 hours weekly.

They offer free food in farmers' market style distribution experience on-site. They offer prepared food on-site and deliver prepared food to homeless encampments. They sporadically deliver free food to a local school site.

More than 300 people come through the line 6 days per week collecting 3-4 days of food for an average family of 2.6 people; this is enough food to feed 600-700 people daily, which works out to more than 15,000 people every month. They accept and offer all kinds of food, including shelf-stable, perishable and prepared food, fresh fruits, vegetables, meats, and packaged food.

Donors include bakeries, grocery stores, food recovery intermediaries, local corporate cafeterias, local food service brokers and distributors, local feeding programs, local schools, and the Alameda County Community Food Bank. Donations are coordinated by telephone.

Hope 4 the Heart

Hope 4 the Heart is a family-run non-profit formed in 2000 seeking to alleviate hunger and improve nutrition in the southern part of Alameda County. They provide food, produce, diapers, and household items to 11,000 local families per month who are experiencing food insecurity. They also distribute pallets of food to over 100 churches, schools, and nonprofit organizations every week, free of charge. They receive food through the Grocery Rescue Program and also from restaurants, caterers, schools and Chef to End Hunger (most of this food is recovered from Google in Santa Clara County). They receive staffing through retirees and Victory Outreach volunteers, individuals released from prison for misdemeanors and living in a group home. The volunteers receive on-the-job training from a more experienced volunteer. Challenges include: insufficient funding, inadequate numbers of volunteers to pick up perishable food on weekends (when food needs to be distributed or it will go bad), lack a technical resources (for updating their website and social media campaigns), and lack of capacity to accept last minute donations or to rescue food from the farmers market. Their recipients could use more meat, dairy and fresh produce.

Midway Shelter of Alameda, San Leandro

Founded in 1989, Midway Shelter of Alameda provides a safe and supportive environment for women and children suffering from homelessness and domestic violence.

Volunteer organizations and church groups prepare evening meals for shelter residents. Each group is responsible for preparing a meal a month. The food fills about 2-3 large metal pans. For unassigned evenings, the shelter staff prepares the meal using food from the Alameda County Community Food Bank. The shelter is very limited in what it can accept. They can't accept sporadic donations, as storage is limited. They do not accept donated prepared foods.

St. Vincent de Paul

St. Vincent de Paul is the largest soup kitchen in Alameda County serving an average of 600 hot meals per day, to about 500 clients per month (some eat more than one meal each day). St. Vincent de Paul has an on-site food pantry and offers clients packaged meals to go.

The operation also provides non-perishable food to 55 "Vincentians" member churches that run feeding programs. They receive donations of rescued food through the Grocery Rescue Program and also have established relationships with independent grocery stores, restaurants, caterers, food delivery services, food service brokers or distributors, farmers, religious institutions and schools.

They currently do not receive enough donated protein (such as meat, cheese and eggs). The Food Bank currently sends text messages when food is available and member agencies can claim what they would like.

Animal Feeding Operations

Food recovery organizations receive food that is not suitable for human consumption, including spoiled food, excess bread and pastries and soda. There are informal distribution channels to get this food to animal feeding operations (obtained by word of mouth or through Craig's List). There are also more formal outlets through ReConserve and Sustainable Alternative Feed Enterprises.

Food Pantries and the Food Bank receive packaged food and drinks that do not meet their nutritional requirements and must be landfilled (leading to a need for a de-packager). Several of these organizations use organics collection. Others are precluded from using organics collection because of the expense. However, state law and county ordinances require that organic materials be collected separately from trash.

Animals can eat surplus food that people will not eat. There are no large farms operating in Alameda County accepting surplus food from Alameda County sources. However, local food recovery organizations and food service operations with surplus food or food that is no longer suitable for feeding people have connected informally with animal farms by posting their offerings on CropMobster or Craig's List, talking with farmers at local farmers markets, and meeting up with scavengers at local grocery store dumpsters.

Some food recovery organizations transport the surplus food to the farms. Farmers will also pick up the surplus food either regularly or when notified (for a fee for low value material or free for high value material). Scavengers also identify surplus food sources and collect it (with or without consent from grocery stores) and bring it to their animals.

Cow, pig, goat, chicken, turkey and rabbit operations accepting surplus food from Alameda County sources include:

- M-R Ranch, cow operation, near Sacramento
- Devils Gulch Ranch, pig operation, Nicasio
- Olivera Livestock, cow operation, Tracy

- Urban homesteaders and small local animal operations (El Sobrante, Richmond, Berkeley)

Chickens can be fed table scraps, peelings, stale bread and leafy vegetables as well as washed, dried, crushed eggshells. Goats can eat a wide variety of foods including all sorts of food scraps as well as some general garden and kitchen scraps like banana peels, orange peels, tomato, garlic skins other vegetables and fruit cutting. Goats should not be fed cabbage, meat, rice, potatoes, cooked food, eggs shells, and fish cuttings. Cows eat bread, old produce, and brewery grain. Cows don't eat lemons, limes, ginger, rhubarb, moldy bread or meat.

Pigs are less fussy than cows; they happily eat all sorts of food. Pig farmers prefer items that are high in carbs, fat and nutritional value as they cause the pigs to get fat fast. These include outdated milk (fresh milk gives pigs diarrhea), cheese, whey, bread, tortilla, brewery grain, and oats. While pigs eat produce, it doesn't result in the same weight gain as other foods. Rabbits can be fed table scraps, peelings, stale bread and leafy vegetables.

There are also several local organizations that process surplus food or food scraps into animal feed.

Sustainable Alternative Feed Enterprises (SAFE), Santa Clara

SAFE technology transforms wasted food into nutrient-rich finished product suitable for use in non-ruminant (animals that do not chew cud) animal feed. Headquartered in Reno, Nevada, the SAFE pre-processing facility located at Mission Trail Waste Systems in Santa Clara, California, can process 99 tons of material per day.

ReConserve, Stockton

National recycler of bakery and cereal grain, snack food and related food by-products that turns wasted food into a high-energy dried component for livestock feed. It is marketed under the DBP brand and headquartered in Santa Monica with the nearest facility in Stockton, California.

O2 Scraps to Feed, Oakland (not yet operational)

Mission: to collect organic waste from food manufacturers and convert it into animal feed for chicken and fish. They are located at 2311 Magnolia Street, Oakland, CA 94607 and are working to develop the technology and market. They are currently exploring the possibility of feeding scraps to soldier fly larvae, which can then be processed into animal feed.

Government

StopWaste

StopWaste is a public agency responsible for reducing the waste stream in Alameda County. They help local governments, businesses, schools and residents reduce waste through: source reduction and recycling, market development, technical assistance and public education. StopWaste adopted a new countywide year 2020 strategic target to reduce the amount of food sent to landfill through food waste prevention the recovery of food to feed people, recycling food scraps, and promoting the use and benefits of compost. The agency's organics programs and initiatives support Food Waste Reduction through planning, buying, storing, eating and donating food so there's less waste, composting (recycling) what can't be eaten to create nutrient-rich compost, and completing the cycle by incorporating compost into the soil to sustain food production and build healthy soil.

K-12 School Food Share/Food Donation supporting schools to expand share tables in the cafeteria and donate surplus food to food recovery organizations. StopWaste has worked closely with Oakland Unified School District to develop a Food Share Table Guide to help prevent food from going to waste in schools. All school cafeterias in the Oakland Unified School District have food share tables. These allow students to share their unwanted, still sealed or unbitten food items, so other students can select these food and beverage items during mealtime. StopWaste has prepared a detailed School Food Donation Program Guide that describes the specific procedures and handling requirements for recovering and redistributing surplus food.

The Smart Kitchen Initiative to reduce pre-consumer wasted food using automated tracking systems, to save on food purchases. Participants receive free tools, technology and support for one year to track and measure pre-consumer wasted food in order to spot opportunities to minimize and prevent wasted food. In turn, participants commit to implementing food waste tracking procedures, set food waste reduction goals and share results.

Smart Kitchen Initiative Participants		
Type of Food Service	**Name of Participating Company**	**Food Service Provider**
Event-Based Food Service	Alameda County Fairgrounds O.co	Spectra by Comcast-Spectator
Corporate Dining	The Clorox Company Lam Research Corporation Mentor Graphics Pacific Research Center Rosewood Commons Ross Inc. Safeway Inc. SAP State Compensation Insurance Stoneridge Business Center Stryker Wind River Systems	Guckenheimer
Schools/Universities	Bishop O'Dowd (in process) Cal Dining Cal State East Bay Laney College (in process)	The Epicurean Group In-house Aramark In-house
Health Care/Senior Living	Kaiser Fremont Piedmont Gardens (in process)	Fresh and Natural Sodexo
Caterers	Checkers Catering (in process)	In-house
Other	Dominican Sisters of Mission San Jose	In-house

Stop Food Waste Campaign

New food waste reduction media and outreach campaign reaching Alameda County focused on building awareness and inspiring residents to take action to reduce wasted food through local media paired with on-the-ground outreach tactics and community events to help reduce wasted food in households. The current campaign messaging is focused on storing fruits and vegetables properly.

U. C. Cooperative Extension

There are no large animal feeding operations in Alameda County. There are some larger confined dairy operations near the Altamont Pass using brewer's grain, almond hulls, and culled tomatoes as feedstock. These operations would not be appropriate for perishable food. The Extension conducted a project on outdoor hog production, but there are no large quantities of pigs in Alameda County (12 pigs at the most). There are 4H projects in Alameda County that might be interested in using discarded food. However, 4H members are very project driven and are producing animals on strict rations to show at fairs. Use of discarded food would require a lot of understanding about animal nutrition that would be beyond the capabilities of a typical 4H member.

ALL IN Alameda County

In 2014, Alameda County Supervisor, Wilma Chan, launched ALL IN Alameda County: The New War on Poverty (ALL IN). ALL IN is an innovation incubator within county government; membership consists of community residents, nonprofit leaders, providers, and the business community.

Recognizing food security as an important factor in health, school and job success, ALL IN chose this issue as one of its top priorities. In January 2015, ALL IN launched the End Hunger 2020 campaign, with the goal of ending food insecurity in Alameda County by the year 2020. As part of this campaign, a volunteer Food Recovery Action Team was established by non-profit, government, and Alameda County resident leaders in early 2016.

The goal of the Action Team is to establish a food recovery system consisting of infrastructure and mechanisms that enable food to be diverted from the waste stream to feed people. Towards that end, the Action Team formed three groups to develop pilot projects in Berkeley, South Hayward/Union City, and Oakland to test potential recovery system models. At the most basic level, the goal of the pilots is to educate individuals, organizations, and businesses about the negative effects of wasted food, identify food donation sources, set up the infrastructure, relationships and workflows to recover food, and to decrease both food insecurity and wasted food.

The South Hayward/Union City pilot project is being led by two residents of the Washington Eden area of South Hayward County and branded as the Washington Eden Food Recovery Cooperative. The pilot has begun with 5 donor and 5 recipient organizations.

The Berkeley pilot project is housed at Satellite Affordable Housing Associates (SAHA), and was prompted by a SAHA senior resident living on SSI. It is a collaboration between SAHA, the Berkeley Food Pantry, and Daily Bread focused on sourcing fresh produce, lean proteins, and non-perishable staples to residents who live in affordable housing.

The Oakland pilot project is focused on creating a paid food recovery service sector. The project is a collaboration between ALL IN, Alameda County Public Health Department, Waste Management, Oakland Unified School District, Civicorps, StopWaste, Alameda County Environmental Health, NCRA, and others.

Alameda County Department of Environmental Health

The role of Alameda County Department of Environmental Health is to inspect and permit food service establishments operating within the county (except for in Berkeley), to insure that they comply with the California Retail Food Code. Berkeley has its own health department.

The establishments they inspect and permit specifically include restaurants, grocery stores, farmers markets, and corner stores. Environmental Health has an inventory of all of the food bank facilities and hopes to permit all of them. They are most concerned about ones that prepare and serve meals.

Environmental Health would like to eliminate the mystery and stigma associated with their inspections. They see collaborating with ALL IN and other food recovery organizations as an opportunity to do this via education. They are looking into developing collateral and teaching food service operations how to be safe and protect the community. They understand that many foodservice operators would prefer to donate than to discard edible food, but want to comply with Environmental Health regulations.

Environmental Health began working with Oakland Unified to develop a document explaining what food can and cannot be donated. Environmental Health staff has been in touch with colleagues in Orange and San Diego Counties to learn from their successes. After finalizing the Oakland Unified handout, Environmental Health hopes share a business food donation guidance tool being developed with StopWaste with for food service establishments inspected by Environmental Health. Many restaurant owners don’t know that they are protected, so long as they are keeping the food safe. Owners want to know that Environmental Health supports donation. Environmental Health is planning to replicate the Orange and San Diego County food recovery models. There is a state Association of Environmental Health Directors that is trying to standardize guidelines and documents regarding food donation and recovery. Alameda County Environmental Health staff is planning to join this group.

Alameda County Green Business Program

To be certified as a Green Business, companies must demonstrate how they conserve resources and prevent pollution, such as using LED lighting and purchasing Energy Star products. Food donation is included on the checklist of options. But the program does not collect information in a formal way about whether businesses donate food and who they donate to. Reasons for not donating food include a lack of information and logistics (e.g., they're not sure who they can donate to or they don't have the time to drive around and make the donations).

The checklist makes specific reference to non-perishable food because it is easier for busy small businesses to donate those items than perishable items, especially if they don't have the time to deliver the food to the right place within a short period of time. Some recipient organizations won't accept perishable food if there's not enough to give to everyone. For example, if a caterer wants to drop off leftover food at a soup kitchen, the kitchen may not accept it because it would mean that they would be serving different food to different people rather than having all of it be identical.

Appendix 4 Models and Best Practices from Outside Alameda County

We profiled a number of organizations outside of Alameda County that could be useful references in developing a more cohesive food recovery ecosystem.[89]

Orange County, California

Waste Not OC Coalition

County Health Inspectors educate restaurants & grocery store owners during inspections with a one pager explaining the Good Samaritan Law.

If the local food recovery volunteers cannot pickup and deliver a donation, Yellow Cab will.

A grocery store or restaurant that donates to Waste Not OC, receives a seal that they can put in their window showing that they support Waste Not OC.

Hospitals, family resource centers, social services agencies, and public health nurses to use a Waste Not OC screening tool to determine if clients are food insecure.

Waste Not OC developed an interactive map for the food insecure with all the county food pantries, kinds of food provided and hours of operation.

Waste Not OC created a toolkit that can be used to replicate their model.

[89] Waste Not OC Coalition: http://www.wastenotoc.org/
Community Food Rescue: https://communityfoodrescue.org/
Boulder Food Rescue: https://www.boulderfoodrescue.org/
Lovin' Spoonfuls: http://lovinspoonfulsinc.org/
The Real Junk Food Project: http://therealjunkfoodproject.org/

Montgomery County, Maryland

Community Food Rescue

Community Food Rescue recognizes all participating licensed food businesses donating food on their website and through social media. Donors also receive a printer-friendly template that they can use to recognize the organizations that receive their donated food. They can print a certificate to frame and post in their establishment. In addition, all participating businesses are encouraged to become certified food donors through Food Recovery Certified.

Community Food Rescue uses ChowMatch, Community Food Rescue matching software; matching criteria includes: types of food, quantity, proximity, timing availability, and transportation capacity.

Boulder, Colorado

Boulder Food Rescue

Boulder Food Rescue runs Just-in-Time food recovery by bicycle, collecting soon-to-expire produce that cannot be collected by larger food banks that use warehouses. This approach does not require any storage and the food can be used immediately.

Recipients include day shelters and food pantries that serve the homeless and low-income folk, as well as places that do not traditionally handle food, such as low-income housing sites, elderly homes, preschools and daycares.

Boulder Food Rescue enables individuals to set up “Grocery Programs”, a type of food-pantry in their own community rooms.

Boulder Food Rescue also provides food to special events for charities and provides some food for pay-what-you-can meals, and low income housing cooperatives.

Boston, Massachusetts

Lovin' Spoonfuls

Lovin' Spoonfuls refrigerated trucks pick up fresh, healthy, perishable, edible-but-expired or unwanted food from farms, supermarkets, and wholesalers (not individuals) every weekday using trained paid drivers and deliver it directly to meal centers within the same day.

Donors qualify for a tax-deduction for their donated food.

All Lovin' Spoonfuls employees are ServSafe certified and trained in proper and responsible food handling.

Lovin' Spoonfuls is working with the Department of Environmental Protection and the Massachusetts Food Association to educate businesses on their options for diverting food waste from the waste stream to comply with a recent commercial organics waste disposal ban.

Lovin' Spoonfuls partners with Plenty, a program in which notable Boston chefs teach people, primarily low-income residents, senior citizens, and immigrants, how to cook fresh, healthy food on a budget.

United Kingdom

The Real Junk Food Project

A global network of pay-as-you-feel cafés that use food destined for waste to create delicious and healthy meals. The only rules are that the cafés must feed everyone, not just poor people, and customers should only pay what they feel the meal is worth. If they have no money, they can volunteer labor and skills instead.

Appendix 5 Glossary

This glossary defines the major terms used in this report. At present there are no universally agreed upon terms and definitions in the wasted food/recovery sector. The varying terminology and definitions reflect the different goals, purposes and geographic regions for which they were created (i.e., reducing waste, developing markets, and addressing hunger).

General

Food	Any substance or product, processed or unprocessed, intended or expected to be consumed by humans.
Pre-Consumer Food	Food at any point in the food supply chain before it reaches the consumer.
Post-Consumer Food	Food in the hands of the consumer.
Food Loss	The decrease in quantity or quality of food along the food supply chain, whether due to improper handling, spoilage or other factors.
Surplus Food	Food that is not eaten or moved through the food supply chain as intended.
Discarded Food	Surplus food which ends up in the materials management system.
Wasted Food	Discarded food that can be put to a higher use than compost or anaerobic digestion, either through food recovery or as input to value-added processing and/or feed.
Prevention / Source Reduction	Reducing surplus food and wasted food through improved purchasing, inventory management and food production methods.
Food Scraps	Parts of food which are not considered edible in their current state, such as peels, bones, skin and plate scrapings, but might be suitable for value-added processing and/or feed.

General

Recoverable Food	Surplus food that can avoid being wasted if redistributed in a timely, efficient manner. May include mislabeled, overproduced, dented or damaged packaging, test market items and products close to expiration.[90]
Feed	Any substance or product that is manufactured for animal consumption. Surplus food and food scraps can be utilized for feed directly or after being processed.

Food Categories

Perishable Food	Foods that will spoil or suffer significant deterioration in quality within 2-3 weeks unless frozen. Perishable foods include raw or cooked meats, produce and bread.
Shelf-Stable Food	Foods that can be safely stored at room temperature for long periods of time, including jerky, rice, pasta, flour, sugar, spices, oils, and packaged, canned and bottled foods that do not require refrigeration until after opening.
Prepared Food	Ready-to-eat food that might be assembled in commercial or institutional kitchens such as grocery stores, caterers or catered events, sports events/concerts, restaurants, hotels, commissary kitchens, airports, corporate cafeterias, hospitals, universities, and schools.
Grocery Staples	Perishable or shelf-stable food ingredients that are not ready-to-eat, such as produce, eggs, milk, and meats.
Pre-Portioned Prepared Food	Prepared foods, whether warm, refrigerated or frozen, in pre-portioned or "grab and go" formats (such as soups and sandwiches from grocery stores).
Bulk Prepared Food	Prepared food, whether warm, refrigerated or frozen in sheet or cambro pans, bags or other bulk formats (such as lasagna, pizza, cooked grains, prepared meat dishes, deli meats, etc.)

[90] http://www.wyomingfoodbank.org/food-banks-vs-food-pantries-whats-the-difference/

Food Ecosystem and Materials Management

Food Supply Chain	The processes by which food from a farm ends up on consumers' tables. The processes include production, processing, distribution, consumption and disposal.
Food Recovery	The collection of wholesome food for redistribution. It includes gleaning from fields and collecting perishable, shelf-stable, and prepared foods from various stages in the supply chain.[91]
Food Waste Prevention	Activities that avoid wasted food generation, for instance, reduction of food surplus.
Anaerobic Digestion	A biological process that decomposes organic material in a tank or bunker without oxygen to create a biogas that can be burned for energy and a solid digestate that can be composted and used as a soil amendment.
Compost	The product resulting from the biological decomposition of organic material in the presence of oxygen.[92]
Value-Added Processing	Processing food to convert it into new products such as soups, sauces, jams, juices or other prepared foods.
Food Security	Access by all people to enough food for an active healthy life.[93]
Food Insecurity	Lacking access to enough food for an active, healthy life; unable to afford balanced meals, cutting the size of meals because of too little money for food, or being hungry because of too little money for food at times.
Food Desert	Areas lacking access to fresh fruit, vegetables, and other healthful whole foods, usually in impoverished areas. This is largely due to a lack of grocery stores, farmers' markets, and healthy food providers.

[91] https://www.nrdc.org/sites/default/files/wasted-food-IP.pdf
[92] http://www.endfoodwastenow.org/index.php/resources/miscellaneous-1
[93] http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.asp

Food Organizations

Food Assistance Organizations	Organizations that make food available to food insecure people, either to be eaten on-site or to be taken away. Many organizations provide more than one type of food assistance, and many also engage directly in food recovery activities.
Food Bank	A non-profit organization that solicits, collects, stores, and distributes food to food assistance organizations, typically member agencies.
Food Pantry	Provides food directly to those in need, either in fixed locations or as mobile pantries. These facilities receive, buy, store and distribute food to low-income individuals in their community, typically to be consumed off-site, and often have limited refrigeration.[94]
Soup Kitchen	A place where prepared food is served on-site to those who are hungry, typically involving paid and/or volunteer kitchen staff.
Shelter	A place where temporary overnight shelter is provided. Many shelters also provide meals or other food assistance.
Food Recovery Intermediary	A growing category of for-profit and non-profit organizations focused on increasing Food Recovery by providing services such as technology and transportation to donors and/or recipients.
Gleaner	Organizations that harvest excess produce from farms, community gardens or backyard gardens.
Food Recovery Service	Organizations, mostly fee-for-service, that primarily implement food donation, including pick-up and delivery, and transportation. They may also provide record-keeping, reporting, and/or technology services.
Food Recovery Broker	Organizations, paid or unpaid, that primarily facilitate food recovery by brokering relationships between donors and recipients. They may also provide record-keeping reporting, or technology services.

[94] Ibid.

Appendix 6 Detailed Assumptions

Estimation Sources and Methods

The data included in the ecosystem graphic for Alameda County was developed using the following sources. Estimates rely on county-specific data and extrapolation from other sources, summarized in the table below (the primary source is listed first, the secondary/benchmarking source is listed second).

Discarded Food	•2014 CalRecycle Waste Generator-Based Waste Characterization, LeanPath
Edible or Preventable Discarded Food	•2015 Metro Vancouver Waste Composition Monitoring (Tetra Tech), LeanPath •FUSIONS, UK WRAP
Organics Capture	•2014 CalRecycle Waste Generator-Based Waste Characterization
Environmental Impacts	•ReFED •Rock and Wrap It Up! Whole Earth Calculator
Economic Impacts	•ReFED
Prevention and Recovery Activity	•Public, internal and self-reported data
SB 1383 Compliance	•2014 CalRecycle Generator-Based Waste Characterization •2008 StopWaste Characterization Study

Discarded Food: An estimated 220-345 million pounds of food is discarded annually in Alameda County based primarily on internal estimates prepared for StopWaste by LeanPath (low end) and CalRecycle (high end). StopWaste is conducting a waste characterization study in 2017 that will provide updated information. The data seem reasonable when benchmarked against estimates from other localities, including Massachusetts and Vancouver. (Table A)

Edible or Preventable Discarded Food: Of the total food discarded annually, approximately 72-115 million pounds is edible, relying on Tetra Tech's finding that 33% of industrial, commercial and institutional discarded food was "food that could have been donated", including whole fruits, vegetables, meats, and fish, full/unused ready-made products, baked goods, deli items, drinks and packaged oil. The estimate may be conservative, since benchmark sources from Europe (FUSIONS and WRAP) are higher (upwards of 50%) and materials like peels that could be edible with processing are not included. Reliable sector-level data on edible food currently does not exist. The Tetra Tech samples only cover landfilled food; it is hard to know whether the "donatable" percentage would be higher or lower for other discard streams like compost or recycling, so we have applied the same percentage across the board. (Table A)

Approximately 20 million pounds of food wasted annually may be preventable by using more efficient and conscientious kitchen procedures, according to LeanPath's internal estimates. This could be a conservative estimate, because it does not include retail food or food manufacturing sectors and because LeanPath estimates for commercial discarded food from the remaining sectors is significantly lower than CalRecycle estimates.

In addition, some portion of the remaining two-thirds of discarded food, comprised of "unavoidable food waste arising from food/drink preparation, such as bones, egg shells, tea bags, peels, oil, fats" and "plate scrapings, unfinished meals" according to the Metro Vancouver study, might be put to higher use than landfill/compost in value-added processing and/or feed.

The breakdown of discarded food by sector (portrayed as layers in the waste bin) reflects CalRecycle's estimates for the county, applying the 33% factor across the board, since sector-specific data for edible food does not exist.

Organics Capture: According to CalRecycle data applied to Alameda County, 23% of the food being discarded is being composted or otherwise diverted from disposal; known as the "capture rate"; the remainder is landfilled or improperly recycled. The 77% not being captured is more wasteful and contributes more to greenhouse gas emissions than compost, due to the way it decomposes in the landfill. As a leader in organics management, Alameda County may have a higher amount of food diversion than the state average. Capture rates are expected to grow as generators comply with the county ordinance and statewide mandatory regulations. As the waste bin graphic depicts, there appears to be quite a bit of variability in capture rates among the different commercial sectors. (Table A)

Environmental Impacts: Robust local estimates of environmental impacts would require more detailed data and modeling than we are able to undertake at this time. However, simple estimation based on ReFED methodology suggests that 115 million pounds of wasted food would waste 7.3 billion gallons water (or nearly 300 Bellagio fountains full of water) and generate nearly 82,800 of greenhouse gases (or 166,000 miles of passenger car driving). Again these calculations may vary based on the solutions used to reduce wasted food as well as local conditions. (Table B)

Economic Impacts: ReFED estimates that a 20% reduction in wasted food (25 billion pounds) would cost about $18 billion ($0.72/pound) and result in $100 billion ($4/pound) in societal economic benefit. While these calculations rely on the specific solutions modeled under the ReFED report, including discounted flows over 10 years, they provide a good starting point for estimating the costs and benefits of a 20% reduction in Alameda County's estimated 115 million pounds of wasted food – costs of $51 million and societal benefits of $286 million. (Table B)

Existing Prevention + Recovery: Based on all the data we were able to compile, existing food recovery in the county is on the order of 5-6 million pounds per year. The only recovery intermediary or food assistance organization to publish data is the Alameda County Community Food Bank, the largest player at 4 million pounds. Other figures on food recovery in the county were derived from internal data or interviews, and many are based on very rough, back-of-the-envelope estimates. This suggest that current efforts would need to be significantly increased to achieve the mandated SB 1383 redirection of edible food from landfills. (Table C)

SB 1383 Compliance: CalRecycle data reflects discards by waste stream, including landfill; food represents 87 million pounds in Alameda County. The 2008 StopWaste Waste Characterization study contains direct measures of food in the landfill in the county. Applying that percentage (7.88%) to 2014 landfill volumes (2.1 billion pounds) yields an estimate of 57 million pounds of food. Figures benchmarked against LeanPath estimates are similar. Applying the same 33% as edible and the 20% redirection mandated by SB 1383, the total amount of food needing to be redirected to people is 11-17 million pounds by 2025. (Table A)

TABLE A: WASTED FOOD, CAPTURE AND 1383 COMPLIANCE ESTIMATES

		DISCARDED AND EDIBLE FOOD ESTIMATES										SB 1383 COMPLIANCE ESTIMATE	
Business Group	**NAICS Codes**	**Tons Total Generation**	**Lbs Total Generation**	**Tons Edible FoodTons Edible Food**	**Lbs Edible Food**	**Tons Disposed**	**Tons Curbside Recycle**	**Tons Curbside Organics**	**Tons Other Diversion**	**Organic Capture Rate**	**LeanPath Sector?**	**Lbs Edible Food Landfilled**	**Lbs Edible Food To Be Redirected**
A	**B**	**C**	**D = C x 2,000**	**E = C x 33% ***	**F = E x 2,000**	**G**	**H**	**I**	**J**	**K = (I+J) / C**	**L**	**M = G x 33% * 2,000**	**N = M x 20%**
Restaurants	722	44,683	89,366,962	14,880	29,759,198	39,437	494	4,183	569	10.6%	Y	26,028,191	5,205,638
Multifamily		31,332	62,664,362	10,434	20,867,233	29,374	1,466	493	0	1.6%	NA	19,386,636	3,877,327
Retail Trade - Food & Beverage Stores	445	22,528	45,056,452	7,502	15,003,799	5,676	102	876	15,874	74.4%	N	3,746,112	749,222
Manufacturing - Food & Nondurable Wholesale	311, 312, 424	20,108	40,216,973	6,696	13,392,252	11,485	8	257	8,358	42.8%	N	7,580,424	1,516,085
Business/Services (Combined categories: Services - Management, Administrative, Support, & Social; Services - Professional, Technical, & Financial; Services - Repair & Personal)	425, 515, 517-9, 521-5, 531-3, 541, 551, 561, 624, 811-3	31,421	62,842,288	10,463	20,926,482	28,300	175	2,676	270	9.4%	Y	18,678,156	3,735,631
Retail Trade - All Other	441-448, 451-454	14,366	28,732,689	4,784	9,567,985	14,239	29	0	99	0.7%	N	9,397,674	1,879,535
Medical & Health	621-623	8,879	17,757,774	2,957	5,913,339	8,619	38	221	1	2.5%	Y	5,688,343	1,137,669
Education	611	8,451	16,901,121	2,814	5,628,073	8,104	10	316	21	4.0%	Y	5,348,820	1,069,764
Arts, Entertainment, & Recreation	711, 712, 713	7,603	15,206,703	2,532	5,063,832	7,008	22	0	573	7.5%	Y	4,625,544	925,109
Not Elsewhere Classified	111-115, 211-213, 221, 444, 481-488, 512, 562	7,268	14,536,956	2,420	4,840,806	2,103	66	3	5,097	70.2%	N	1,387,977	277,595
Hotels & Lodging	721	2,363	4,726,952	787	1,574,075	2,179	48	33	104	5.8%	Y	1,438,086	287,617
Durable Wholesale & Trucking	423, 484, 491, 492, 493	2,093	4,185,604	697	1,393,806	2,061	12	0	19	0.9%	N	1,360,433	272,087
Manufacturing - All Other	313-316, 321-327, 331-333, 336-337, 339, 511	1,225	2,450,655	408	816,068	1,222	3	0	0	0.0%	N	806,475	161,295
Manufacturing -Electronic Equipment	334, 335	690	1,379,771	230	459,464	577	2	0	111	16.1%	N	380,759	76,152
Public Administration	921-928	658	1,315,795	219	438,160	643	0	13	1	2.1%	N	424,651	84,930
CalRecycle Commercial Total		**203,671**	**407,341,057**	**67,822**	**135,644,572**	**161,028**	**2,475**	**9,071**	**31,096**	**19.7%**		**106,278,281**	**21,255,656**
CalRecycle ICI Total (Exc Multifamily)		**172,338**	**344,676,695**	**56,872**	**114,777,340**	**131,654**	**1,010**	**8,578**	**31,096**	**23.0%**		**86,891,645**	**17,378,329**
LeanPath ICI Benchmark													
Total Annual Food Waste for sectors covered **		40,840											
Total CR data for sectors not covered by LeanPath		68,937											
Benchmarked Total (Assuming average capture rate)		**109,777**	**219,554,895**	**36,227**	**72,453,115**	-				**23.0%**		**55,773,441**	**11,154,688**
StopWaste Benchmarks * **													
Food in Landfill	O					**93,594**							
Total Landfill in 2008	P					1,187,108							
Food as % of Landfill	Q = O/P					7.88%							
Total Landfill in 2014	R					1,089,497							
Food in Landfill Estimate 2014	**S = Q x R**					**85,898**						**56,692,780**	**11,338,556**

Sources:

All data except as noted from CalRecycle Waste Characterization Web Tool: Commercial Waste Stream - Business Group Data Export;
https://www2.calrecycle.ca.gov/WasteCharacterization/BusinessGroupStreams?cy=1&lg=1001&mt=40

* *2015 Metro Vancouver Waste Composition Monitoring* (Tetra Tech)
other benchmarks: "edible food waste": 59% food service, 83% wholesale/retail (FUSIONS EU, 2016, Table 7, p. 18); "avoidable" food waste: 75% hospitality/food service, 56% retail/manufacturing (UK WRAP)

** 2014 LeanPath internal study prepared for StopWaste

*** Applies data from 2008 StopWaste Waste Characterization Study to 2014 landfill figures (no waste characterization available for other discard streams)

TABLE B: ENVIRONMENTAL AND ECONOMIC BENCHMARKS

ReFed Data *		
Total Estimated Food Waste (Landfilled) in US (lbs)	*A*	126,000,000,000
Proposed Reduction Amount (20%) (lbs)	*B = A x 20%*	25,200,000,000
Water Conservation (gallons)	*C*	1,600,000,000,000
Water Conservation per lb Food Waste (gallons/lb)	*D = C / B*	63.4921
Greehouse Gas Reduction (tons)	*E*	18,000,000
GHG Reductions per lb Food Waste (tons/lb)	*F = E / B*	0.00071
Total Costs ($s)	*G*	18,000,000,000
	H = G / B	0.7143
Net Societal Benefit ($s)	*I*	100,000,000,000
	J = I / B	3.9683

Benchmark		
Q	93.3	Gallons of Water/person/day (EBMUD)**
R	1,579,000	Residential population EBMUD service area
S = Q x R x 365	53,791,266,667	Residential water usage per year
Z	1,082,464	Passenger cars registered 2015 *****

Estimates of Food Waste in Alameda County (FROM TABLE A)		P	Estimated Impacts of Wasted Edible Food Reduction							
			Water (gallons)		Greenhouse Gases (tons)				Economic Costs ($)	Economic Benefits ($)
			Based on ReFed	% of East Bay Residential Usage	Based on ReFed	Whole Earth Calculator	Passenger Cars (driven for 1 year)	Fraction of Passenger Cars in County	Based on ReFed	Based on ReFed
			T = P x D	*U = T ÷ S*	*V = P x F*	*see* ***	*see* ****	*1 in every…*	*W = P x H*	*X = P x J*
Based on CalRecycle (lbs)	*K*	114,777,340				**31,162**				
Based on LeanPath (lbs)	*L*	72,453,115				**19,671**				
Landfilled Food Waste in Alameda County (Equivalent Basis as ReFed Report)										
Organics Capture Rate	*M*	23.02%								
Based on CalRecycle (lbs)	*N = K x (1-M)*	88,354,064	**5,609,781,810**		**63,110**				63,110,045	350,611,363
Based on LeanPath (lbs)	*O = L x (1-M)*	55,773,441	**3,541,170,844**		**39,838**				39,838,172	221,323,178
AVERAGES			**4,575,476,327**	**9%**	**38,445**		**7,367**	**147**	**51,474,109**	**285,967,270**

TABLE C: Estimates of Food Recovery Activity in Alameda County

Organization	Recovery Estimate (Lbs)	Source
ACCFB Grocery Rescue	3,600,000	2016 Annual Report
Chefs to End Hunger	800,000	Estimates based on interview notes
Copia	830,000	Self-reported figures on website
Daily Bread	120,000	Self-reported estimate from interview
Food Donation Connection	116,000	Internal data shared by FDC
Re-Plate	30,000	Self-reported estimate from interview
St. Vincent de Paul	98,000	Self-reported estimate from interview
Hope 4 the Heart	94,000	Estimate from internal data
Emeryville Community Assistance Program (ECAP)	20,000	Estimates based on interview notes
Perennial Farming Initiative (PFI)	3,500	Estimates based on interview notes
Total	**5,711,500**	

Sources:

* ReFED, *A Roadmap to Reduce U.S. Food Waste by 20 Percent,* p. 7

** per East Bay Municipal Utility District (EBMUD), as accessed 3/9/17

*** Rock And Wrap It Up Whole Earth Calculator, designed to help organizations calculate GHG impacts of food recovery, primarily from concerts and events, as accessed 3/13/17

**** EPA Greenhouse Gas Equivalencies Calculator, as accessed 3/13/17.

***** CA DMV, Estimated Vehicles Registered by County, 2015, "Autos", as accessed 3/13/17

Appendix 7 Detail on Technology Platforms

Name	Website	Location	Description/Features	Key
412 Food Rescue	http://412foodrescue.org/	Pittsburgh, PA	412 Food Rescue is a rapid response organization that utilizes a technology-based reverse logistics model to aggregate and match food donors and beneficiaries and mobilizes a community of volunteers to efficiently transport food between locations.	0; NP; D2V2BN
Aggregate ND	http://aggregatend.com/beta/	North Dakota	A website connecting people who make and grow things in North Dakota to people who transport them and to people with storage space along transport routes.	0; D2V; D2BN; V2BN
Ample Harvest	AmpleHarvest.org	New York/ New Jersey	AmpleHarvest.org helps 42 million home and community gardeners end wasted food and hunger by educating and enabling them to donate their excess garden produce to one of 7,682 nearby food pantries across America.	0; NP; G2BN
Bring the Food	http://www.bringfood.org/public/landing?locale=it	Italy	This site enables food donors to connect with recipient organization and receive credit for their donations in Italy.	0; NP; D2BN
BuffetGo	https://www.buffetgousa.com/	Finland	The BuffetGo app lets users buy leftover food from restaurant buffets — at up to 90 percent off the original price at a designated time, which is usually around closing. After showing the email receipt, you can fill a to-go container with buffet food. For every meal sold through BuffetGo, the company donates 20 percent of the profit to the United Nations World Food Programme; Of the 80 percent remaining, BuffetGo gives the lion's share to the restaurant that made the food and keeps the rest. The precise revenue split varies from restaurant to restaurant.	$; FP; B2C

Key: $ fee/0 free; NP non-profit/FP for-profit; B Business, BN Beneficiary, C Consumer, D Donor, G Gardener, GV Government, I Individual, V Volunteer

Name	Website	Location	Description/Features	Key
Chow Match	Peninsula Food Runners: http://www.chowmatch.org/	San Francisco Bay Area, Peninsula	Chow Match is a software technology aimed at distributing untouched surplus food to agencies and organizations. It requires a sponsor to manage the Chow Match application within the county or city. A sponsor can be a local food recovery organization, government county, or even an individual who cares about wasted food.	$; NP; D2V2BN
Copia	https://www.gocopia.com/	San Francisco Bay Area	Mobile app that allows companies or event planners to give their extra food to hungry mouths; donors are charged for the service.	$; FP; B2BN
CropMobster	sfbay.cropmobster.com/	San Francisco Bay Area	CropMobster is an online community exchange platform and social alert service for broadcasting food and agricultural needs and offers. Alerts are posted by the local community, which contain offers or requests in search of anything within the food and agriculture system. When these alerts are published, the community is sent email notifications which acts as a crowd-sourced solution to get together to share or connect with others in local areas.	$/0; FP; G2C
ExtraFood.org	ExtraFood.Org	Marin County, CA	Focuses on enabling pick up and delivery of donated food in Marin	0; NP; D2V2BN
Falling Fruit	https://fallingfruit.org/	Boulder, CO	Built by and for foragers, Falling Fruit is an interactive map of the overlooked culinary bounty of the city streets. It aspires to be the most comprehensive map of its kind.	0; NP; G2BN
FareShare FoodCloud	http://www.fareshare.org.uk/ & http://www.fareshare.org.uk/fareshare-foodcloud-2/	United Kingdom	Using simple technology FareShare FoodCloud links charities and community groups directly with food outlets that have surplus fresh food at the end of day. Charities receive text messages notifying them of the donations.	0; NP; D2BN

Name	Website	Location	Description/Features	Key
Food Cloud	http://food.cloud/	Ireland	FoodCloud facilitates donation of surplus food to charities. FoodCloud creates a network of charities to match donating businesses. Using its technology platform, either via smartphone app or online through its website, participating businesses can upload details of their surplus food and the time period in which it can be collected. This automatically sends a text message to a charity in their local community who collects the food directly from the business.	D2BN
Food Connect	http://www.foodconnectgroup.com/	Philadelphia	Helps organizations with excess food find local charities who can use the food.	0; NP; D2BN
Food Cowboy	http://www.foodcowboy.com/	Maryland	App linking facilities with excess produce to consumers; targets truckers with produce that is not accepted and links them to food banks that will take the loads.	FP; D2BN
Food for All	http://www.foodforall.us/	Boston	App enabling consumers to buy restaurant food not sold at end of day at an 80% discount.	$; FP; B2C
Food Rescue Locator	http://sustainableamerica.org/foodrescue/	United States	The Food Rescue Locator helps provide information to food donors and connects them with organizations in need. The Locator shows location, hours of operation, type of food recovered, contact information, and other information.	NP; D2BN
Food Sharing	http://foodsharing.de/	Germany	Links local food rescuers in Germany.	0; NP; I2C
Foodwe	www.foodwe.nl	Holland	Website where businesses can make food donations and sales to charity.	$/0; FP; B2C & B2BN
Fork It Over	Forkitover.org	Portland, Oregon	Links businesses with food rescue agencies in the Portland area.	0; NP; B2BN
MealConnect	https://mealconnect.org	United States	Feeding America's on-line food donation platform serving food banks; technology to help them manage donations to food bank member agencies; some recipients may require a minimum donation size for pick up.	0;NP; D2BN

Key: $ fee/0 free; NP non-profit/FP for-profit; B Business, BN Beneficiary, C Consumer, D Donor, G Gardener, GV Government, I Individual, V Volunteer

Name	Website	Location	Description/Features	Key
MealSaver	http://www.mealsaver.de/	Berlin, Germany	An app that enables customers to buy restaurant food not sold at the end of the day at a discount.	
MEANS	https://www.meansdatabase.com/	Washington, DC	The MEANS Database is a notification system for food banks and food pantries that alerts them when food is made available for donation nearby. This directory of all food banks, food pantries, and emergency feeding locations is maintained as a service to the community.	0; NP; D2BN
MOGO	http://mogo.io/	San Francisco Bay Area	Aims to repurpose the 10% of food that the average restaurant has leftover every day. MOGO has been designed to connect consumers, willing to buy fresh food at a discounted price, to a network of restaurants, keen on generating revenues on leftovers at the end of the service. To address this problem, MOGO is developing a web-platform and a smartphone app, so that restaurants can display their offers mentioning content, quantity, location and discounted price. Customers then select their meal before paying directly on the platform, which automatically updates remaining food quantity in the targeted restaurant.	$; FP; B2C
Move for Hunger	https://moveforhunger.org/	New Jersey	A listing of professional movers who will offer to deliver your non-perishable food donations to the local food bank.	0; NP; I2BN
Olio	https://olioex.com/	United Kingdom	Mobile app connecting neighbors with each other and with local shops so surplus food and other items can be shared, not thrown away.	0; I2C; B2C
Recycle Where	RecycleWhere.org	San Francisco Bay Area	Website developed using open source software; lists food donation sites throughout SF Bay Area	0; GV; I2BN & B2BN
Re-Plate	http://www.re-plate.org/	Berkeley, CA	Re-Plate is a technology company that matches extra food with communities in need instantly. Its platform enables businesses to donate, charities and hungry people to recover food based on their need and location.	$; FP; B2BN

Key: $ fee/0 free; NP non-profit/FP for-profit; B Business, BN Beneficiary, C Consumer, D Donor, G Gardener, GV Government, I Individual, V Volunteer

Name	Website	Location	Description/Features	Key
Share City	http://sharecity.ie/research/sharecity100-database/	Dublin, Ireland	Website of food sharing activities worldwide; includes a map	comprehensive
Spoiler Alert	http://www.foodspoileralert.com/	Boston, MA	B2B marketplace and reporting tool to help businesses manage wasted food, improve margins, and fight food insecurity. The B2B marketplace is for donation and sale of surplus inventory, closeout deals, and ugly produce. The automated reporting tool tracks savings and documents charitable contributions. Currently only available in New England.	$; FP; B2B; B2BN
The Food Rescue Robot	http://robot.boulderfoodrescue.org/	Boulder, CO	Web-application for scheduling, routing, and tracking just-in-time food rescue (open source).	0; NP; D2V2B
Too Good To Go	http://toogoodtogo.co.uk/	Denmark	App and website allowing users to buy unused food from restaurants just before closing for a reduced price. Those leftovers are usually packaged randomly, so that the customer gets a surprise-meal.	$; FP; B2C
Unsung	http://www.unsung.org/	Baltimore, MD	App enabling users to identify extra food and volunteer to pick up deliver the food to people in need.	0; NP; B2V2BN; I2V2BN
Waste No Food	http://wastenofood.org/	South Bay Area, CA	Technology platform to connect excess food and resources to those in need. The app is currently available for download from Google Play and iTunes and all qualifying businesses can receive a tax deduction for their donations. Waste No Food is a nonprofit web and mobile marketplace.	0; NP; B2BN
Yume	https://yumefood.com.au	New South Wales	Wholesale marketplace for surplus food; useful for food vendors to sell and donate food.	0; FP; B2B; D2BN
Zero Percent	https://zeropercent.us/	Chicago, IL	For-profit business. Its product is an app that permits restaurants to list their leftover food and send text alerts to food pantries about what's available. The cloud-based program tracks donations, so restaurants can record them as tax deductions.	$; FP; B2BN