

Use Food Well Washington Plan

*A roadmap to a more resilient food system
through food waste reduction*

Solid Waste Management Program

Washington State Department of Ecology

Headquarters

Olympia, Washington

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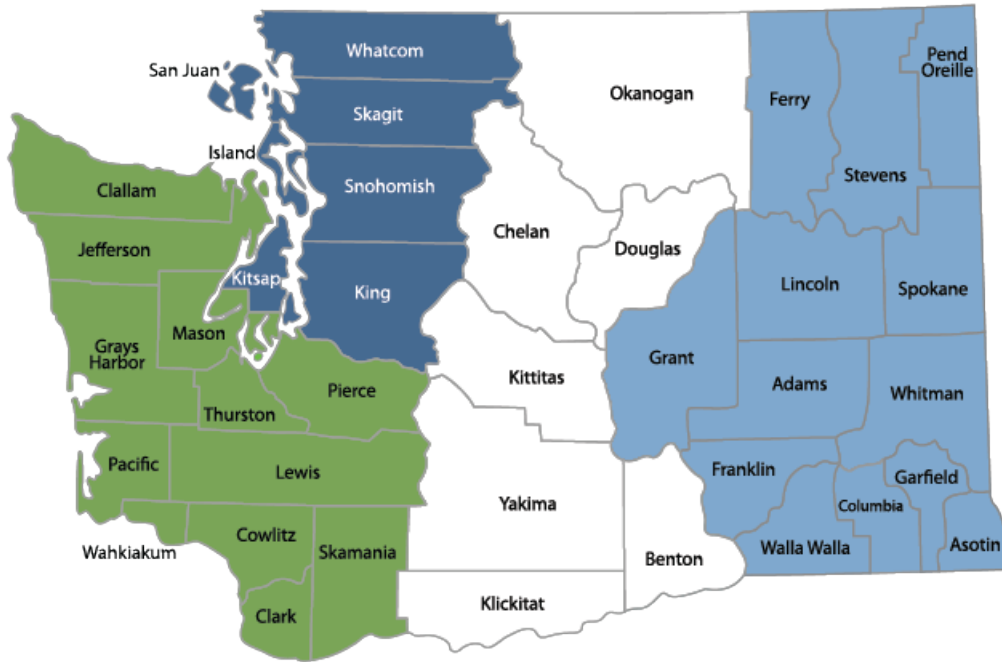
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Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	15700 Dayton Ave. N., Shoreline, WA 98133	425-649-7000
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Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
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Olympia, WA

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DEPARTMENT OF
ECOLOGY
State of Washington

Table of Contents

Use Food Well Washington Plan.....	4
List of Figures and Tables	6
Acknowledgements	7
Acronyms.....	8
Executive Summary.....	9
Use Food Well Washington Plan.....	11
What is food waste?.....	11
Why is food waste reduction important?	12
How is Washington addressing food waste?.....	13
Goals and Measurement.....	14
How was the baseline data calculated?.....	14
How can we monitor progress towards food waste reduction goals?.....	16
Strategies.....	17
Recommendations	18
Federal policy.....	18
State policy.....	18
Funding.....	18
Public education.....	18
Infrastructure development.....	18
Recommendations Summary.....	19
Federal policy recommendations	23
1. Strengthen the Bill Emerson Good Samaritan Food Donation Act.....	24
2. Support national date labeling standard	26
3. Increase markets for lower-grade or “imperfect” produce.....	28
4. Improve federal tax incentives	30
5. Create the Washington Center for Sustainable Food Management.....	33
6. Continue support for the Pacific Coast Food Waste Commitment.....	35
7. Connect the Use Food Well Washington Plan to the Food Policy Forum.....	37
8. Research strategies and develop partnerships to prevent food and food waste from entering landfills	38
9. Improve regulatory certainty for organics management facilities.....	40
10. Develop an emergency food distribution plan for Washington schools.....	41
11. Support 20-minute seated lunch minimum in Washington elementary schools	42
12. Support recess before lunch in Washington elementary schools.....	43
13. Increase access to food waste reduction education in Washington schools.....	44

14. Dedicate state grant funding for food waste reduction	47
15. Increase funding for local health jurisdictions	49
16. Increase funding for local governments food waste reduction	52
17. Build more farm to school partnerships	54
18. Develop and maintain statewide food waste reduction campaigns.....	56
19. Develop and maintain a statewide food waste contamination reduction campaign.....	58
20. Increase use of food waste and wasted food data tracking.....	60
21. Develop and maintain maps of food and wasted food flows.....	62
22. Improve food donation transportation.....	63
24. Build more community food hubs.....	67
25. Support value-added food processing and manufacturing.....	69
26. Increase infrastructure investments in Washington schools	71
27. Expand AD at WRRFs, compost facilities, and farms.....	74
28. Develop high-solids anaerobic digesters for mixed organic residuals.....	76
29. Increase use of small-scale anaerobic digesters	77
30. Diversify food waste management systems statewide	79
References.....	92
Appendix A. Washington annual food waste data	97
Appendix B. Economic Analysis	98
Appendix C. Recommendation index by strategy, lead agencies, and food sectors	102
Appendix D. Subject matter expert and public engagement summary.....	104
Appendix E. Barriers to food waste reduction.....	105
Appendix F. Existing state-level funding mechanisms	107
Appendix G. Healthy Kids Grants Worksheet	110
Appendix H. Example food waste reduction campaigns.....	111
Appendix I. Local government survey summary.....	112
Appendix J. Partnering agency letters of support.....	116

List of Figures and Tables

Figures

Figure 1. The environmental, social, and economic benefits of the <i>UFWW Plan</i>	9
Figure 2. The <i>UFWW Plan</i> development process.....	10
Figure 3. National Guard helps deliver potatoes at the Tacoma Dome in May 2020.	12
Figure 4. Goals to reduce food waste by 50 percent by 2030	13
Figure 5. Goal 1 infographic.....	14
Figure 6. Goal 2 infographic.....	15
Figure 7. Food waste generated in Washington with 2030 target.....	15
Figure 8. Residential and commercial infographic.....	16
Figure 9. Food waste reduction strategy icons.....	17
Figure 10. <i>UFWW Plan</i> benefits.....	20
Figure 11. Food sector icons.....	22
Figure 12. PCFWC resource partners’ logos	35
Figure 13. PCFWC map.....	36
Figure 14. Students and staff perform waste audits through EarthGen’s School Food Share	45
Figure 15. Sustainable Connections volunteer rescuing edible food from local food	49
Figure 16. Lewis County school food waste audit for reduction awareness outreach.	53
Figure 17. Swedish First Hill medical facility in Seattle.....	61
Figure 18. Thurston County Food Bank CPODs in action.....	64
Figure 19. Food Lifeline cold storage trucks.....	66
Figure 20. Tomatoes grown at Bee Organic Farm in Elma, WA. The SW WA Food Hub	68
Figure 21. Puget Sound Food Hub makes a delivery to Dandelion Organics	68
Figure 22. Luke standing next to depackaged food residuals ready for animal feed	70
Figure 23. WA Dairy Council start strong campaign.....	72
Figure 24. Anerobic digestion on dairy farms.....	75
Figure 25. Diagram and photos of Vashon Bioenergy Farm	78
Figure 26. Beta Hatch staff inspect and research mealworms to process food waste	81

Tables

Table 1. <i>UFWW Plan</i> estimated cumulative costs and benefits.....	21
Table 2. Federal policy recommendations economic analysis summary.....	23
Table 3. State policy recommendations economic analysis summary	32
Table 4. Funding recommendations economic analysis summary.....	46
Table 5. Public education recommendations economic analysis summary.....	55
Table 6. Infrastructure development recommendations economic analysis summary.....	59
Table 7. Washington annual food waste data	97
Table 8. Recommendation summary table	100
Table 9. Recommendation index by strategy, lead agencies, and food sectors.....	102
Table 10. List of existing state-level funding mechanisms.....	107
Table 11. 2019-2021 Healthy Kids Healthy Schools Grant program funding requests.....	110

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Acronyms

AAFCO – Association of American Feed Control Officials

AD – Anaerobic digestion

BSFL – Black soldier fly larvae

COM – Washington State Department of Commerce

DOH – Washington State Department of Health

EPA – Environmental Protection Agency

ECY – Washington State Department of Ecology

ESHB – Engrossed Substitute House Bill

FLW – Food Loss and Waste

FDA – (US) Food and Drug Administration

FTE – Full-time equivalent

GHG – greenhouse gas(es)

GRAS – Generally recognized as safe

HRO – Hunger Relief Organization

JHD/LHJ - Jurisdictional Health Department/
Local Health Jurisdiction

K-12 – Common designation for US schools –
grades kindergarten (K) through grade 12.

LSWFA – Local Solid Waste Financial Assistance

NRCS – Natural Resource Conservation Service

NRDC – National Resource Defense Council

OSPI – Office of the Superintendent of Public
Instruction

PCC – Pacific Coast Collaborative

PCFWC – Pacific Coast Food Waste
Commitment

PPG – Public Participation Grants

PAYT – Pay-As-You-Throw

ReFED – Rethink Food Waste through
Economics and Data

RNG – Renewable Natural Gas

RIN - Renewable Identification Number

RCW – Revised Code of Washington

SME – Subject matter expert

UFWW Plan – Use Food Well Washington Plan

UN – United Nations

USDA – United States Department of
Agriculture

UN SDG – United Nations Sustainable
Development Goals

UN FAO – Food and Agriculture Organization of
the United Nations

WSDA – Washington State Department of
Agriculture

WCS – Waste Characterization Study

WRAP – Waste and Resources Action
Programme (UK)

WRRF – Water Resource Recovery Facility

WRI – World Resources Institute

WRRED – Waste Reduction Recycling and
Education Grants

WWF – World Wildlife Fund

Executive Summary

The *Use Food Well Washington Plan (UFWW Plan)* outlines a pathway to a more resilient food system through food waste reduction.

Food waste is one of the greatest challenges of our time, with substantial environmental, social, and economic impacts. Thankfully, our research shows the potential benefits of reducing food waste and wasted food in Washington are just as substantial (Fig. 1). Addressing food waste is a clear component to achieving Washington’s climate goals, along with a more just and resilient food system.

Our calculations indicate Washington generates more than 1 million tons of food waste annually, with a large portion (about 35 percent) being edible food going into landfills ([Appendix A](#)).

To address food waste and wasted food in Washington, the 2019 Washington State Legislature passed ESHB 1114, now codified as RCW [70A.205.715](#).

The law established statewide food waste reduction goals, relative to 2015 baseline levels, including a focus on reducing the amount of edible food wasted. The law required Ecology to establish baseline data to annually track progress towards the statewide food waste reduction goals.

Ecology developed the 2015 baseline data (p. 14), and further defined the edible food waste reduction goal, resulting in the following statewide food waste reduction goals:

Goal 1: Reduce food waste generated by 50 percent by 2030.

Goal 2: Reduce at least half of edible food waste by 2030.

Ecology was also tasked to develop and implement a food waste reduction plan that focuses on three key strategies:

1. **Prevention:** Prevent and reduce the amount of food that is wasted.
2. **Rescue:** Rescue edible food that would otherwise be wasted and ensure the food reaches those who need it.
3. **Recovery:** Support productive uses of inedible food materials, including using it for animal feed, nutrient recovery, and off-site or on-site management systems including composting, vermicomposting, anaerobic digestion, and other biological systems.



Environmental Benefits

The *UFWW Plan* has the potential to annually reduce food waste generated in Washington by 1.3 million tons.

This reduces greenhouse gas emissions by over 1.9 million metric tons. The US EPA Waste Reduction Model estimates this reduction is equivalent to the energy needed to power over 346,000 homes annually.



Social Benefits

The *UFWW Plan* has the potential to reduce edible food waste by at least 295,000 tons per year. This is critical when over 2 million Washingtonians experienced food insecurity in 2020.



Economic Benefits

Full implementation of the recommendations would create \$4 in benefits for every \$1 spent, and potentially garner net benefits of over \$1 billion annually in Washington.

Figure 1. The environmental, social, and economic benefits of the *UFWW Plan*

A total of 30 recommendations (p.18) were identified through a collaborative process that took place from the fall of 2019 thru 2021 (Fig. 2). To draft the plan, Ecology consulted with the Washington State Departments of Agriculture (WSDA), Commerce (COM), Health (DOH), the Office of Superintendent of Public Instruction (OSPI), and over 100 subject matter experts to identify actionable strategies to reduce food waste in Washington. Ecology also conducted research and literature reviews to develop the recommendations in the plan.

This research found it is possible to achieve the 2030 food waste reduction goals through: comprehensive plan implementation; reducing barriers through public-private partnerships; and investing in critical infrastructure.

Our economic analysis ([Appendix B](#)) found that there is no one single solution to meeting the state’s 2030 goals, but instead an interconnected network of recommended solutions across the food system. Estimated costs, benefits, and food waste diversion potentials are based on a comprehensive implementation of the *UFWW Plan*.

When implemented together, the 30 recommendations have the capacity to meet our statewide goals by 2030. While each recommendation could be implemented on its own, a piecemeal approach could result in higher costs, reduced effectiveness, and Washington not reaching its food waste reduction goals.

Through comprehensive implementation, the recommendations in this plan could prevent, rescue, and recover an estimated 1.3 million tons of food waste each year from landfill disposal. A significant portion of this reduction (at least 295,000 tons per year) would be edible food diverted to hunger relief or new markets.

The 30 recommendations potentially garner net benefits of over \$1 billion annually in Washington, from elements such as reduced disposal costs, development of new markets and waste uses, and avoided purchases of additional food. With full implementation of this plan, our calculations show Washington also avoids over \$150 million annually in costs associated with climate change – a benefit that increases each year.

Once achieved, the work should not stop at the 2030 goals. It is necessary to keep moving forward to close the loop on the important nutrient and life cycle of food. Food is too valuable to waste, and we all have the obligation to use food well.



Figure 2. The *UFWW Plan* development process

Use Food Well Washington Plan

“Looking down the road, there is pressure to get it right.”

-Aaron Czyzewski, Food Lifeline

There is an ethical obligation to respect food, the people who grow it, and the earth that gives it to us. We all have an obligation to use food well.

Food has intrinsic value. It nourishes us and is a cornerstone of all cultures. Despite this importance, food waste is a large component (17 percent) of Washington’s solid waste stream (1). Washington is also experiencing unprecedented food insecurity, with over 2 million Washingtonians (26 percent) identified as food insecure, or unable to reliably access a sufficient quantity of affordable, nutritious food, in 2020 (2).

Generating food waste at a time of increased food insecurity is unacceptable. Also unacceptable are the wasted time, resources, and energy used to move food through Washington’s food system. Washington must do better.

The difficulties Washington faces in responding and adapting to these challenges are rooted in longstanding vulnerabilities. The COVID-19 pandemic exposed existing weaknesses in Washington’s food system and emphasized the need to strengthen the system’s resiliency. Weaknesses and vulnerabilities exist across the food system, and are amplified within overburdened communities.

The *UFWW Plan* includes 30 actionable recommendations (p. 18) to address these vulnerabilities by preventing, rescuing, and recovering food waste and wasted food. Together, the recommendations have the potential to meet Washington’s 2030 food waste reduction goals, and beyond, creating a more resilient and vibrant food system.

What is food waste?

The *UFWW Plan* uses definitions from RCW [70A.205.715](#) to define food waste and wasted food:

Food Waste: Waste from fruits, vegetables, meats, dairy products, fish, shellfish, nuts, seeds, grains, and similar materials that results from the storage, preparation, cooking, handling, selling, or serving of food for human consumption. Food waste includes, but is not limited to, excess, spoiled, or unusable food and includes inedible parts commonly associated with food preparation such as pits, shells, bones, and peels. "Food waste" does not include dead animals not intended for human consumption or animal excrement.

Wasted Food: The edible portion of food waste.

Why is food waste reduction important?

When food is wasted, so are the resources and labor used to grow, harvest, process, transport, and manage the food from farm to table. Food waste has clear environmental, social, and economic impacts (Fig. 1). A greater understanding of these impacts catalyzed global, national, regional, and statewide efforts to reduce food waste and wasted food (Fig. 4).

The Food and Agricultural Organization (FAO) of the United Nations found that one third (approximately 1.3 billion tons) of all food produced for human consumption is wasted (3). In the U.S., 35 percent of the 229 million tons of food available went unsold or uneaten in 2019. That is nearly \$130 billion worth of meals unsold or uneaten each year, at a cost of almost 2 percent of U.S. GDP (4).

Food insecurity increased over the last year, both nationally and in Washington State. Rescuing edible food for human consumption is a viable pathway to help meet this growing need, while also reducing wasted food in landfills. Reducing wasted food and food waste increases system resiliency, which is critical when food systems are challenged during crises.



Figure 3. National Guard helps deliver potatoes at the Tacoma Dome in May 2020. (Drew Perine/The News Tribune)



Use Food Well Stories: Washington-grown potatoes

A successful example of food redistribution partnerships in response to disruptions caused by the pandemic can be seen through efforts to save Washington-grown potatoes.

According to the Washington State Potato Commission, 90 percent of all potatoes grown in the state are sold to institutions, restaurants, and other food service providers. With many restaurants closed due to COVID-19 restrictions, potato farmers had storage sheds full of whole potatoes that would no longer be processed into French fries, tater tots, and other restaurant products due to decreased demand.

With leadership from [EastWest Food Rescue](#), significant volunteer assistance (Fig. 3), and coordination with the Washington State Potato Commission, Washington farmers gave away more than 200,000 pounds of potatoes in May 2020. The mission was to get one million pounds of potatoes into the hands of people in need during the pandemic (5).

The pandemic underscored the need for collaboration and partnerships across the food chain, particularly between farmers, food businesses, and hunger relief organizations. The need for improved mapping of how food flows, emergency food distribution planning, education, infrastructure, transportation, and funding was amplified during the pandemic response.

How is Washington addressing food waste?

The *UFWW Plan* is the result of ESHB 1114, now codified as RCW [70A.205.715](#). Passed during the 2019 legislative session, this law established a statewide food waste reduction goal, relative to 2015 baseline levels, and required a subset of the goal to focus on reducing the amount of edible food wasted. Ecology was required to establish baseline data and annually track progress towards the statewide food waste reduction goals.

Ecology developed the 2015 baseline (p.14) and further defined the edible food waste reduction goal, resulting in the following statewide food waste reduction goals:

Goal 1: Reduce food waste generated by 50 percent by 2030.

Goal 2: Reduce at least half of edible food waste by 2030.

The law required Ecology to determine baseline data and annually track progress towards these statewide goals. Ecology was also required to develop and implement a food waste reduction plan that focuses on three key food waste reduction strategies:

1. **Prevention:** Prevent and reduce the amount of food that is wasted.
2. **Rescue:** Rescue edible food that would otherwise be wasted and ensure the food reaches those who need it.
3. **Recovery:** Support productive uses of inedible food materials, including using it for animal feed, energy production through anaerobic digestion, and for off-site or on-site management systems including composting, vermicomposting, or other biological systems.

To draft the plan, Ecology consulted with the Washington State Departments of Agriculture (WSDA), Commerce (COM), Health (DOH), the Office of Superintendent Public Instruction (OSPI), and over 100 experts to identify ways to reduce food waste and wasted food in Washington.

Ecology also conducted research and literature reviews to support the recommendations in the plan. As required by the law, Commerce issued an [evaluation on Washington State food waste management](#). This research was utilized throughout the planning process to better understand Washington's food system. The results identify 30 actionable recommendations to reduce food waste and wasted food in Washington.

Washington is aligned with global, national, and regional goals to reduce food waste by 50 percent by 2030:

Global

SDG Target 13.2



**SUSTAINABLE
DEVELOPMENT
GOALS**

United States

U.S. EPA & USDA

CHAMPIONS 12.3

Regional

CA, OR, WA, and B.C.

**Pacific Coast
COLLABORATIVE**

Figure 4. Goals to reduce food waste by 50 percent by 2030

Goals and Measurement

RCW [70A.205.715](#) required Ecology to identify Washington’s baseline food waste data. The law also requires Ecology to track annual metrics to measure progress towards the statewide food waste reduction goals.

Washington’s food waste reduction goals are (Fig. 5 and 6):

Goal 1: Reduce food waste generated by 50 percent by 2030.

Goal 2: Reduce at least half of edible food waste by 2030.



Goal 1

Reduce food waste generated by 50 percent by 2030.



Figure 5. Goal 1 infographic

The 2015 baseline data shows Washington generated approximately 1.2 million tons of food waste annually (Fig. 5), with over 390,063 tons being edible food waste (Fig. 6). The residential sector generated 37 percent, and the commercial sector generated 60 percent of food waste annually (Fig. 8).

To achieve the 2030 food waste reduction goals, Washington will need to annually reduce food waste generated by at least 579,373 tons, with at least 195,032 tons being edible food waste.

How was the baseline data calculated?

Several sources of data were used to determine the amount of food waste generated in a given year, and whether that food waste was disposed or recovered in Washington.

A general overview of sources is provided below, and more data and details can be found in [Appendix A](#).

Municipal solid waste disposal data: Ecology has collected data on the amounts of disposed municipal solid waste (MSW) going to permitted landfills and incinerators since the late 1980s. These facilities are required to annually report the tons of mixed MSW received and disposed by their facility under [Chapter 173-351 Washington Administrative Code \(WAC\)](#). Ecology also receives and compiles annual report data from local governments and the public (6).

Waste characterization data: To estimate the amount of food in the disposed waste stream, Ecology contracts for periodic sampling studies, or waste characterization studies (1). Ecology is required by [Chapter 70A.205 RCW](#), to conduct periodic characterization of the state’s MSW. This obligation includes determining solid waste disposal rates for each waste category and keeping the dataset current. Ecology took the percentages of materials from the 2015-2016 Waste Characterization Study and applied those percentages to the 2015 reported disposed numbers to get the food waste disposed in 2015.

Food waste recovery data: Food waste recovery data is tracked in annual reports received by Ecology from compost facilities, anaerobic digesters, land application sites, and other facilities that recover food from the solid waste stream for beneficial uses. Most of these facilities are permitted or conditionally exempt from solid waste handling standards ([Chapter 173-350 WAC](#)), and thus are required to report quantities and types of waste in their annual report. Other facilities report through an annual voluntary recycling survey, conducted by Ecology (7).



Goal 2

Reduce at least half of edible food waste by 2030.

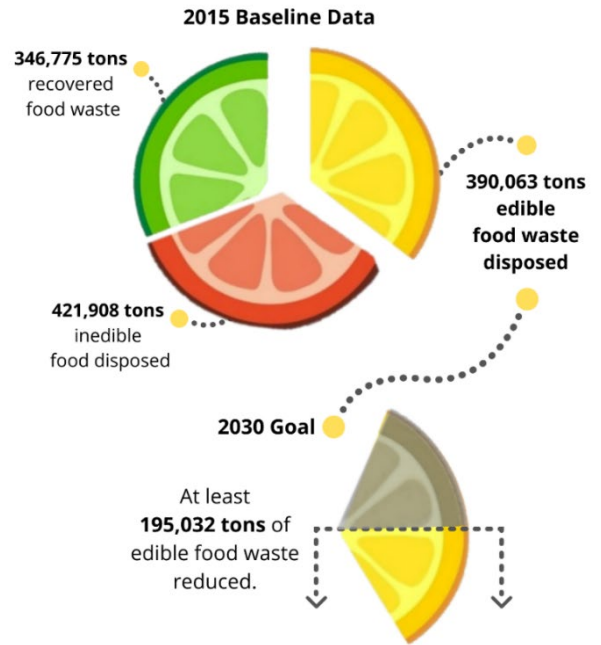


Figure 6. Goal 2 infographic

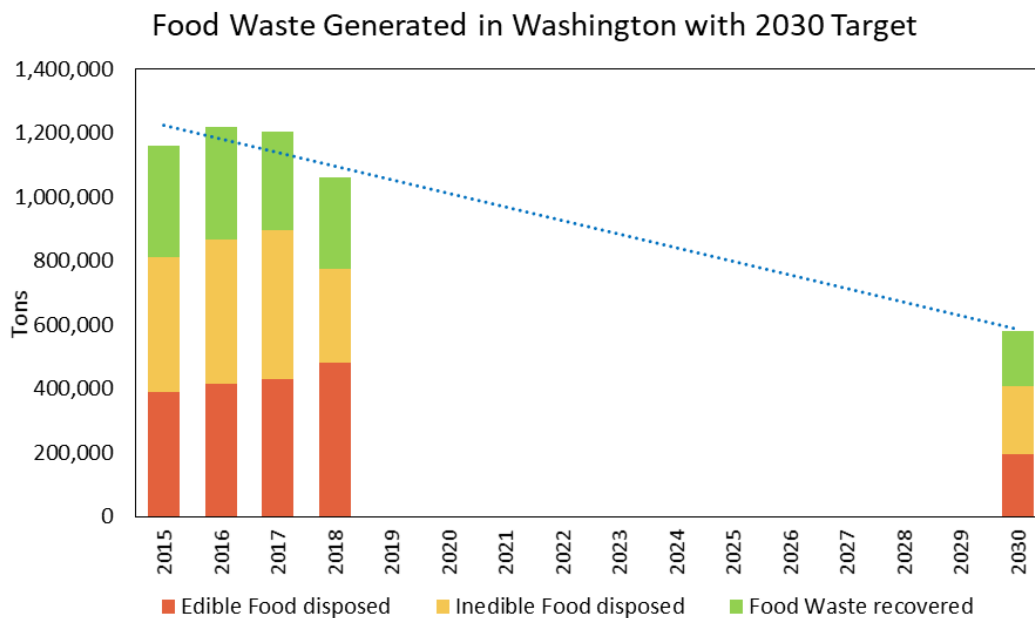


Figure 7. Food waste generated in Washington with 2030 target

How can we monitor progress towards food waste reduction goals?

Calculations will be consistently and annually replicated as data becomes available. Annual data will be tracked on Ecology’s website and in report updates. Figure 7 shows the goal progress with the 2016 through 2018 data.

As more data become available throughout the progress of this plan, Ecology will utilize the best available data to track progress towards the statewide food waste reduction goals.

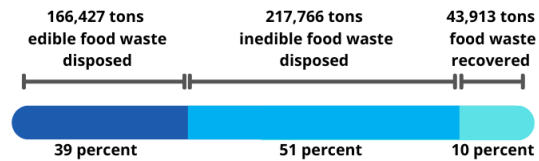
Any plan reporting or updates will include up-to-date methodology and data sourcing to best illustrate the progress through data. This information may include per capita analysis or other data visualization beyond the required goal tracking.

For the most current information and plan tracking, please visit Ecology’s food waste reduction webpage:

<https://ecology.wa.gov/UseFoodWellWA>

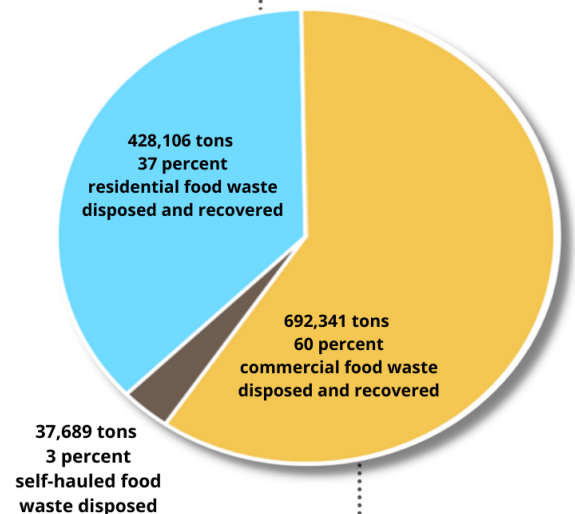


Residential food waste generation equaled **37 percent** of total annual food waste generation.

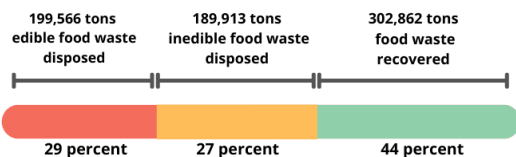


Residential Food Waste

2015 Food Waste generated by sector



Commercial Food Waste



Commercial food waste generation equaled **60 percent** of total annual food waste generation.

Figure 8. Residential and commercial infographic

Strategies

Washington’s food waste reduction goals must be met through three strategies: prevention, rescue, and recovery. Each recommendation includes strategy icons (Fig. 9) to illustrate how these strategies are applied within the plan.

Prevention: Prevent and reduce the amount of food wasted.

Food waste prevention can happen at every point in the food system and is the priority of the US EPA’s Food Waste hierarchy and Washington’s Organics hierarchy. By preventing the occurrence of food waste and wasted food, we avoid all of the associated impacts of wasting food. This plan focuses on actionable food waste prevention strategies through policy improvements, dedicated funding, and improving food storage and preservation through education and infrastructure development.

Rescue: Rescue edible food that would otherwise be wasted and ensure the food reaches those who need it.

Food rescue is a critical component of this plan and is centered on increasing access to affordable nutritious foods within Washington. To increase food rescue and hunger relief in Washington, more support for the hunger relief sector is needed. Hunger relief organizations across the state are at capacity, despite the increasing need for nutritious foods. This plan focuses on ways to reduce barriers for HROs, including increasing funding for donation tracking, access to transportation, cold storage, and additional facilities.

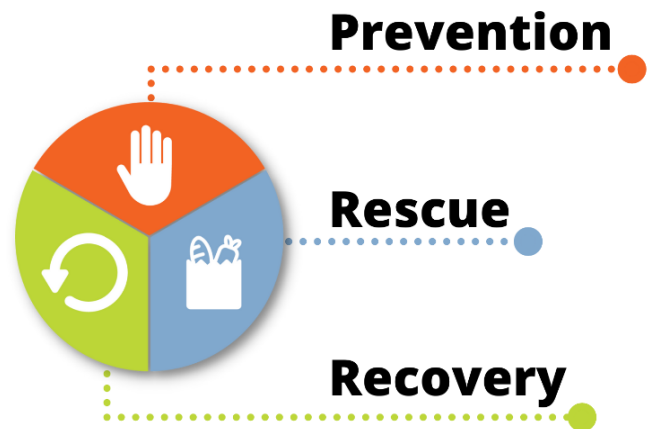


Figure 9. Food waste reduction strategy icons

Recovery: Support productive uses of inedible food materials, including using it for animal feed, energy production, and nutrient recovery through anaerobic digestion, and for off-site or on-site management systems including composting, vermicomposting, or other biological systems.

Recovery strategies prioritize closing the nutrient and energy loop of food waste. For Washington to meet its food waste reduction goals, significant investments in recovery pathways will be needed. This plan focuses on expanding diversion of food waste to animal feed production, increasing support for composting and anaerobic digestion operations, and supporting emerging organics management systems. Educational campaigns to reduce contamination in collected food waste will improve the quality and marketability of finished compost and digestate. More research is needed on how to improve diversion of inedible food waste, especially post-consumer food waste, to these recovery systems.

Recommendations

Federal policy

1. Strengthen the Bill Emerson Good Samaritan Food Donation Act, p. 24
2. Support a national date labeling standard, p. 26
3. Increase markets for lower-grade or “imperfect” produce, p. 28
4. Improve federal tax incentives, p. 30

State policy

5. Create the Washington Center for Sustainable Food Management (WCSFM), p. 32
6. Continue support for the Pacific Coast Food Waste Commitment (PCFWC), p. 35
7. Connect the *Use Food Well Washington Plan* to the Food Policy Forum, p. 37
8. Research strategies and develop partnerships to prevent food and food waste from entering landfills, p. 38
9. Improve regulatory certainty for organics facility operations, p. 40
10. Develop an emergency food distribution plan for Washington schools, p. 41
11. Support 20-minute seated lunch minimum in Washington elementary schools, p.42
12. Support recess before lunch in Washington elementary schools, p. 43
13. Increase access to food waste reduction education in Washington schools, p. 44

Funding

14. Dedicate state grant funding for statewide food waste reduction, p. 47
15. Increase funding for local health jurisdictions, p. 50
16. Increase funding for local government food waste reduction work, p.52
17. Build more farm to school partnerships, p. 54

Public education

18. Develop and maintain statewide food waste reduction campaigns, p. 56
19. Develop and maintain statewide food waste contamination reduction campaign, p. 58

Infrastructure development

20. Increase use of food waste and wasted food data tracking, p. 60
21. Develop and maintain maps of food and wasted food flows, p. 62
22. Improve food donation transportation, p. 63
23. Increase access to cold chain management, p.65
24. Build more community food hubs, p. 67
25. Support value-added food processing and manufacturing, p. 69
26. Increase infrastructure investment in schools, p. 71
27. Expand AD at WRRFs, compost facilities, and farms, p. 74
28. Develop High-solids anaerobic digesters for mixed organic residuals, p. 76
29. Increase use of small-scale anaerobic digesters, p. 77
30. Diversify food waste management systems, p. 79

Recommendations Summary

As directed in the law, the recommendations in the *UFWW Plan* are the result of an extensive expert and public feedback process. Careful attention was dedicated to identifying unintended consequences of recommended actions. Collaborators focused on how to best reduce burdens across the food system, particularly for the hunger relief sector. As a result, public-private partnerships solutions were prioritized over regulations whenever feasible.

To develop the plan, Ecology and the partnering agencies facilitated public comment periods ([Appendix D](#)), along with developing five subject matter expert (SME) workgroups to address the critical areas outlined in RCW [70A.205.715](#). The SME workgroups covered the following focus areas:

- Hunger relief
- Food businesses
- Food safety
- Education and behavior change
- Collection and conversion

Workgroups began in the fall of 2019, and in March 2020, all workgroups moved online to continue the collaboration and plan review process. Despite the coronavirus pandemic response pulling many SMEs and partner agencies to front line work, collaboration continued into 2021 to develop the recommendations. Necessary and actionable solutions to food waste and wasted food reduction were identified throughout the pandemic, largely thanks to many of the SME's commitment to the planning process.

The workgroup collaboration and public comment period identified barriers across the food system that will need to be addressed to meet the 2030 food waste and wasted food reduction goals. This process revealed the major barriers to food waste reduction in Washington ([Appendix E](#)):

- **Funding** – Across Washington, efforts are already underway to reduce food waste and wasted food. There is a great want and desire to expand and build on this work, but sustainable funding is needed. This is particularly an issue for hunger relief and food rescue efforts.
- **Facilitation and networking** – Sectors are segmented and siloed across the food system, creating inefficiencies and barriers to food waste reduction. Existing resources and public investments can be maximized through effective public-private partnerships. More research is needed on food waste reduction and market development, and this work can be facilitated through continued partnerships and collaboration.
- **Infrastructure** – Washington needs to expand existing infrastructure across the food system to meet the 2030 food waste reduction goals. For example, farmers, HROs, and added-value food businesses can benefit from strategically building more community food hubs and cold storage facilities. Access to tracking and analytics technology can be installed across the state to better understand food waste reduction opportunities. Recovery systems, including compost and AD facilities, will also require expansion and development.

The 30 recommendations in this plan are a collection of challenging, yet practical solutions to address these barriers, and to build on current food waste reduction work in Washington. Recommendations are numbered for organizational purposes only, and should be seen as a network of actions working both independently and together. Recommendations are also organized into five summary categories: (p. 18) Federal policy; State policy; Funding; Public education; Infrastructure development.

This research indicated some actions are best taken at the federal level, like improving date labeling and the food donation law. Improvements to state policy were also identified, including creating the Washington Center for Sustainable Food Management to coordinate this critical work. Funding needs and mechanisms were identified to support ongoing and new food waste reduction efforts, especially for HROs and Local Health Jurisdictions (LHJs).

Public education and infrastructure development support measurable food waste reduction by increasing the awareness of and ability to use food well in Washington. Increasing access to community food hubs, cold storage, and transportation are also critical to effectively reducing food waste and wasted food.

Ecology conducted an economic analysis of the identified recommendations to estimate costs, impacts, and the diversion potential of the recommendations. This research found it is possible to meet the 2030 goals through comprehensive implementation of the *UFWW Plan*. This implementation prioritizes public-private partnerships over regulations, relying on a coordinated and strategic approach to funding, education, and infrastructure development.

UFWW Plan

There are real environmental, social, and economic benefits to reducing food waste and wasted food in Washington:



Environmental Benefits

The *UFWW Plan* has the potential to annually reduce food waste generated in Washington by 1.3 million tons.

This reduces greenhouse gas emissions by over 1.9 million metric tons. The US EPA Waste Reduction Model estimates this reduction is equivalent to the energy needed to power over 346,000 homes annually.



Social Benefits

The *UFWW Plan* has the potential to reduce edible food waste by at least 295,000 tons per year. This is critical when over 2 million Washingtonians experienced food insecurity in 2020.



Economic Benefits

Full implementation of the recommendations would create \$4 in benefits for every \$1 spent, and potentially garner net benefits of over \$1 billion annually in Washington.

Figure 10. *UFWW Plan* benefits

Our research found the recommendations in this plan could divert over 1 million tons of food waste each year (Fig 10). A significant portion of this reduction (at least 295,000 tons per year) would be edible food diverted to hunger relief, K-12 nutrition, or new markets. Feeding America uses a calculation of 1.2 pounds of food per meal, so the rescue of 295,000 tons per year equals over 492 million meals (8). This is a critical social value as over 2 million Washingtonians experienced unprecedented food insecurity in 2020.

When implemented in full, the recommendations in this plan have the potential to annually reduce greenhouse gas emissions (GHGs) by over 1.6 million metric tons, equivalent to the energy needed to power over 346,000 homes (Fig 10). The benefits of this GHG reduction can also be illustrated through the social cost of carbon. Social cost of carbon rises over time and is an equation that calculates the avoided expenses and costs of rising GHG emissions in the atmosphere. With comprehensive plan implementation, Washington avoids over \$150 million in climate change impacts stemming from GHG emissions that would otherwise come from food waste and wasted food.

In addition to these significant avoided costs, there are real economic benefits to food waste reduction. If comprehensively implemented, this set of 30 recommendations could result in annual net benefits of over \$1 billion in Washington, from elements such as reduced disposal costs, development of new markets and waste uses, and avoided purchases of additional food. This means for every \$1 spent in implementing recommendations, \$4 in benefits are created in Washington, mostly realized by the private sector. Table 1 further details the estimated cumulative total costs, benefits, and diversion potential of the recommendations.

It will not be easy to achieve the 2030 goals, but it is possible. Once achieved, the work should not stop at the 2030 goals. It is vital to keep moving forward to close the loop on this important nutrient and life cycle. Food is too valuable to waste, and it is our obligation to use food well.

Table 1. *UFWW Plan* estimated cumulative costs and benefits

	Cumulative Annual Costs	Cumulative Annual Gross Benefits	Cumulative Annual Net Benefits	Cumulative Annual Diversion Potential (tons)	Cumulative GHG reduction potential (MTCO _{2e})	Avoided SCC 2022
Federal policy	\$28 million	\$113 million	\$85 million	49,000	71,000	\$6 million
State policy	\$17 million	\$54 million	\$36 million	142,000	204,000	\$16 million
Funding	\$53 million	\$473 million	\$420 million	109,000	156,000	\$12 million
Public education	\$5 million	\$142 million	\$137 million	47,000	67,000	\$5 million
Infrastructure development	\$233 million	\$690 million	\$457 million	979,000	1,409,000	\$111 million
Grand total*	\$344 million	\$1.5 billion	\$1.1 billion	1.3 million tons**	1,907,000 MTCO_{2e}	\$151 million

*Grand total includes an additional decentralized implementation cost calculation of \$8 million to account for county-level staffing costs and expenses.

**total includes at least 295,000 tons of edible food diversion

Recommendations include strategy icons (p. 17) and food sector icons (Fig. 11) to illustrate how the food waste reduction strategies and food sectors apply to each recommendation. [Appendix C](#) indexes the recommendations by strategy, lead agency, and sector as well.

For planning purposes, food sectors are divided into sector categories, including:

- Farmers and ranchers.
- Transportation, storage, and logistics.
- Retail food businesses.
- Schools and institutions.
- Hunger relief organizations.
- Food service and hospitality.
- Community and residential (non-profits, neighborhood organizations, community members).
- Food manufacturers and processors.
- Composters and anaerobic digesters.
- Local government (local health jurisdictions, counties, and cities).
- Washington Legislature (dedicated funding, legislation, rule change, or joint memorial).

This plan also features “Use Food Well Stories” to highlight examples of some of the impressive and innovative food waste reduction work already underway in Washington.

[Appendix B](#) includes a table with estimates on each recommendation's total cost, benefits, and diversion potential.

[Appendix J](#) includes letters of support from *the UFWW Plan's* partnering agencies.

Current information on progress towards the 2030 goals and plan updates can be found on our webpage at: <https://ecology.wa.gov/UseFoodWellWA>

Food sector icons



Figure 11. Food sector icons



Federal policy recommendations

1. Strengthen the Bill Emerson Good Samaritan Food Donation Act
2. Support a national date labeling standard
3. Increase markets for lower-grade or “imperfect” produce
4. Improve federal tax incentive

U.S. Capitol Building (U.S. Federal Government)

Federal policy recommendations are necessary to meet state, regional, national, and global food waste and wasted food reduction goals. Washington State has an opportunity to become a national leader in food waste and wasted food reduction by advocating for these four federally orientated recommendations.

Throughout this planning process, food businesses, HROs, and regulatory agencies identified four strategies best handled by the federal government. Ecology and the partnering agencies support these recommendations, acknowledging some state-by-state policies have the potential to generate more food waste through piecemeal solutions. Table 2 details the estimated costs, benefits, and diversion potential of the federal policy recommendations.

Table 2. Federal policy recommendations economic analysis summary

	Cumulative Annual Costs	Cumulative Annual Gross Benefits	Cumulative Annual Net Benefits	Cumulative Annual Diversion Potential	Cumulative GHG Reduction Potential
Federal Policy	\$28 million	\$113 million	\$85 million	49,000 tons	71,000 MTCO ₂ E

1. Strengthen the Bill Emerson Good Samaritan Food Donation Act



Recommendation

The Washington State Legislature passes a joint memorial to support federal legislation to strengthen the Bill Emerson Good Samaritan Food Donation Act to:

- **Allow the sale of food at a discounted price:** Broaden language to protect nonprofit organizations that sell food at a discounted price and the donors that donate to these nonprofits.
- **Encourage direct donations from restaurants:** Modify language to include donations made by food businesses and retailers directly to individuals.
- **Emphasize food safety:** Change the definition of “apparently wholesome food” to read: “The term ‘apparently wholesome food’ means food that meets all safety and safety-related labeling imposed by Federal, State, and local laws and regulations even though the food may not be readily marketable due to appearance, age, freshness, grade, size, surplus, or other conditions.”

Overview

The federal [Bill Emerson Good Samaritan Food Donation Act](#) provides liability protection for individuals who donate “apparently wholesome food” to nonprofit organizations for ultimate distribution to the hungry.

Despite this law, many businesses, including 50 percent of food manufacturers, 25 percent of retailers/wholesalers, and 39 percent of restaurants, cite liability concerns as a barrier to donating food (9).

Additionally, liability protection does not extend to businesses that provide direct donations to hungry people, or those that sell meals to the hungry at a reduced cost (10).

This recommendation supports making three critical improvements to the existing federal food donation law. When implemented, this recommendation can annually divert an estimated 16,311 tons of food waste from the landfill, while generating an annual net financial benefit of approximately \$20 million in Washington. Our research also found this recommendation has a high benefit to cost ratio, and ability to rescue a significant amount of edible food.

Once the federal law is modified and improved, best practices can be applied to state law changes. State law changes should further study impacts to HROs and LHJs, to ensure changes best support food donation and food rescue in Washington.

While the Food Recovery Act of 2020 did not pass, [H.R. 5841](#) includes the supported improvements to the Bill Emerson Good Samaritan Food Donation Act. These improvements are outlined below.

Allow liability protection for the sale of food at a discounted price

An innovative approach to tackling food insecurity and waste generation is the development of nonprofit grocery stores that sell surplus food at low cost to food insecure individuals. These organizations may meet a need in the community by providing food at a reduced cost for hungry individuals not willing or able to qualify for government assistance or visit a food pantry (11).

Broadening the law to expand liability protections to include these nonprofit organizations may result in more donations. The ability to sell surplus food at a low cost allows for the use of the additional funds to buy things such as more storage space or refrigerated vehicles.

Encourage direct donations from restaurants

Extending liability protection to food establishments that provide direct donations to the hungry shortens the supply chain and may allow for timelier donations of perishable food. This modification will increase efficiency and reduce costs, encouraging more food establishments to provide direct donations. These facilities are already required to follow food safety standards in the Washington State Retail Food Code ([Chapter 246-215 WAC](#)). This work increases food rescued while maintaining food safety, to reduce food donation barriers for food businesses and HROs.

Emphasize food safety

There is ambiguity regarding what qualifies as “apparently wholesome food” because both state and federal law uses the term “quality” and not “safety” in the definition. “Quality” is not defined and can refer to a variety of things such as flavor, safety, appearance, freshness, “best by” date, etc. Similarly, many labeling standards correspond with quality and not safety requirements. This recommendation supports revising the definition of “apparently wholesome food” to focus on safety, not quality.

This change should read: “The term ‘apparently wholesome food’ means food that meets all safety and safety-related labeling imposed by Federal, State, and local laws and regulations even though the food may not be readily marketable due to appearance, age, freshness, grade, size, surplus, or other conditions.”

2. Support national date labeling standard



Recommendation

The Washington State Legislature passes a joint memorial to support federal legislation to:

- **Standardize date labels:** Require standard labels to be used by food manufacturers.
- **Differentiate between quality and food safety labels:** The suggested standard is to use “best if used by” or “best if used or frozen by” as a food quality date label and “use by” or “use or freeze by” as a food safety date label.
- **Provide date label education:** Increase access to donation education to consumers, food retailers, donors, and hunger relief organizations to provide education about how to understand labels.



Overview

Consumer confusion regarding food date labels is well documented and accounts for approximately 20 percent of consumer waste (12). The 2016 report from ReFED identified standardized date labels as the most impactful way to prevent food waste (13).

There is no comprehensive national regulation with the direct mandate to regulate food date labeling for safety and perishability. The food safety labels vary widely depending on state and manufacturer preference.

Date labeling requirements at the federal level would best serve Washington. While state and voluntary efforts are celebrated as a step forward, like [California’s AB-954](#), regulating date labeling at the state level is difficult and cumbersome (14). Modifications to federal law instead of state law will increase consistency for food manufacturers that sell products in multiple states and reduce confusion amongst consumers and businesses.

This recommendation focuses on supporting federal legislation to standardize consumer facing labels, similar to the [Food Recovery Act of 2020, H.R. 5841](#), proposed in 2020, which includes all three components of this recommendation.

When implemented in full, our calculations show this recommendation can annually reduce about 12,771 tons of food waste, while generating an annual financial net benefit of over \$53 million. Our research also demonstrated this recommendation has a high benefit to cost ratio, low cost per ton, and has the potential to rescue a significant amount of edible food.

Standardize date label language

It is [often unclear to the consumer](#) what the date label really means on food packaging. One study showed when asked to define ‘best before’ dates, 65 percent correctly included a reference to product quality, although 27 percent of participants incorrectly stated product safety (12). For this reason, standardized language using “best if used by” or “best if used or frozen by” as a food quality date label and “use by” or “use or freeze by” as a food safety date label has been proposed in federal legislation.

Differentiate between quality and food safety labels

Many consumers use food date labels to make decisions about discarding food and incorrectly assume that the date label is an indicator of food safety. In Washington State, it is not against the law to sell or donate food past the label date. However, consumers are often confused about what the date labels mean. By requiring different standard labels be used to indicate food quality versus food safety, it will be easier for consumers to make informed decisions about donating or discarding food past the label date.

Develop and provide date label education

Once a national standard for date labeling is enacted, support for a nationwide and statewide education campaign is recommended to help inform businesses and consumers of the changes. This date label education must be provided to consumers, food retailers and donors, and hunger relief organizations. Education is needed at every level to increase understanding of food date labels (15). Education is needed for all participants to understand how the date label is used to identify *when* food is still safe to eat or donate and when it should be disposed. Organizations like WRAP in the UK have [measurably reduced food waste](#) with clear education and labeling that includes food storage and safety instructions (9).

3. Increase markets for lower-grade or “imperfect” produce



Recommendation

Increase market demand for lower-grade or “imperfect” produce by:

- Supporting federal and state legislation to research and identify best practices and programs that increase demand for lower-grade or “imperfect” produce.
- Supporting programs or campaigns that promote lower-grade or “imperfect” produce through price reduction and nutritional value education.
- Including stipulations in state purchasing contracts to require a certain percentage of produce purchased to be lower-grade or “imperfect.”



Overview

U.S. produce grading standards assign grades to produce that indicate levels of “perfection.” These grading standards are used to support pricing structures for bulk sales. Lower-grade or “imperfect” produce includes fruits and vegetables that do not meet grading specifications but are otherwise edible and nutritious. Specifications include standards for produce color, size, and appearance and are particularly important for trade.

This recommendation focuses on promoting actions that create a cultural and economic shift towards increasing the value of and access to lower-grade, or “imperfect” produce. A major challenge is that most consumers have an aversion to “imperfect” produce (16) and are not willing to pay the same cost for produce perceived to be lower quality or undesirable.

Through education in elementary schools, an educational and cultural shift can be made in the value of lower grade produce. Similarly, creating programs and levers to increase markets for “imperfect” produce at the state and federal level can help catalyze this cultural and economic shift.

When implemented, this recommendation increases system resiliency while reducing food waste. This recommendation has an estimated annual food waste diversion potential of 10,206 tons while generating an annual net financial benefit of approximately \$19 million. Our research also showed this recommendation has the potential to develop new businesses, increase market share for farmers, and rescue a significant amount of edible food.

Support federal and state legislation to increase demand for “imperfect” produce

In addition to state focused legislation, the Washington State Legislature can pass a joint memorial to support federal legislation to research and develop best practices and programs to nationally integrate the sale of “imperfect” produce for retail sale, use in food service, restaurants, institutions, and within households.

Many food businesses are unaware of the cost-savings affiliated with the sale of lower-grade or “imperfect” produce. Our federal partners have the unique opportunity to strategically map and identify ways that can help increase the total harvested value for the farmer while decreasing the amount of food left on the field.

This recommendation encourages the Washington State Legislature to consider how stronger connections can be made between farmers and HROs to increase markets for lower-grade produce. Incentives and levers can be designed along with the above actions to increase food rescue and decrease on the farm loss.

Incorporate gardening into elementary school education

Researchers suggest incorporating gardening activities into elementary school science education can improve perceptions of “imperfect” produce and affect purchasing decisions when these children become adults (17).

Gardening exposes students to the natural variation and aesthetic value of fruits and vegetables, giving them personal experience and a more realistic understanding of produce variability. A similar focus can be dedicated to a consumer education campaign as mentioned in Recommendation 18, “Develop and maintain statewide food waste reduction campaigns.”

Include stipulations in state purchasing contracts

Another way to expand the market for lower-grade produce in Washington State is by requiring a certain percentage of produce purchased at state facilities and institutions to be lower-grade with a lower price point.

This recommendation encourages the Washington State Legislature to explore updating [Chapter 39.26 RCW](#) to include stipulations in purchasing contracts to support the purchase of cosmetically lower-grade produce at a lower price than higher-grade produce. Prioritizing locally sourced lower-grade produce will help create “imperfect” produce markets for Washington farmers.

4. Improve federal tax incentives



Recommendation

The Washington State Legislature passes a joint memorial to support federal legislation to:

- Expand the federal tax deduction for food donation to include non-profit sales and transport.
- Offer an alternative tax credit for food donation by farmers.
- Develop valuable end markets through tax incentives.

Overview

This recommendation supports expanding the existing federal tax deduction and developing an alternative tax credit for food donation by farmers. These measures can increase the amount of edible food donations overall while reducing food donation barriers for farmers.

When implemented fully, this recommendation has the estimated potential to annually divert 10,150 tons of food waste from the landfill. This is the only recommendation in the plan with a negative annual net financial benefit, totaling \$7 million. Our research also showed this recommendation has the potential to rescue a significant amount of edible food.

Expand the federal tax incentives for food donation to include non-profit sales and transport.

The federal government already recognizes the value of tax deduction incentives, and existing incentive programs have proven to be effective in rescuing food from the retail sector. For example, when incentives were temporarily expanded to cover more businesses in 2005, food donations across the country rose by 137 percent in 2006 (13).

Under current law, the federal enhanced tax deduction for food donations can only be claimed when food is donated to a non-profit that does not charge the end recipient for the food.

Expanding the federal tax deduction can incentivize donations to more recipients, including social supermarkets that sell donated food at an extremely discounted price or food recovery organizations that charge \$1 to recipients to help offset the costs of home delivery.

Adding transport services for donated food as a separate cost eligible for enhanced deduction will also help overcome one of the most expensive barriers for businesses to donate excess food to those in need.



Offer an alternative tax credit for food donation by farmers

Nationally, farmers produced approximately 10.1 million tons of on-farm waste (12). Some of this waste is a result of unharvested or partially harvested crops. These unharvested crops are well suited for added-value food processing (Recommendation 25) or donation to hunger relief organizations.

The existing federal enhanced tax deduction for food donations is not well-suited to farmers and often is not claimed by them, as many farmers operate at low profit margins and do not make enough income to claim a tax deduction. Further, the calculation of the value of the deduction is very onerous for farmers.

Federal tax incentives should be expanded to include an alternative tax credit that can be used by low-margin businesses, like many farms, in lieu of the enhanced deduction. This could incentivize farmers to donate their surplus food and offset some of the costs of donation, including labor. Washington can also enact state-level tax credits for food donation.

This plan also supports the recommendations made by the [Natural Resource Defense Council](#) and the [Harvard Law School Food Law and Policy Clinic](#) to improve federal tax incentives:

- Federal tax incentives should be expanded to include an alternative tax credit that can be used by low-margin businesses, like many farms, in place of the enhanced deduction.
- Federal tax incentives should be strengthened by adding a deduction or credit specifically to cover the cost of transporting donated food.
- Congress should foster the development of innovative, sustainable food recovery models by repealing the “no-charge” provision that does not allow the enhanced deduction to be claimed if donated food is “transferred by the donor in exchange for money, other property, or services.”
- Congress should amend the enhanced deduction to only require compliance with safety standards and safety-related labeling Food, Drug, and Cosmetic Act requirements (18).

Develop valuable end markets through tax incentives

To help offset the costs and barriers associated with food waste management and recovery, tax incentives could be developed to increase valuable end markets. To beneficially use food waste through end market development, industries require consistent feed stock, and consistent food waste streams to maintain efficiencies, sales prices, and production. Tax incentives can help reduce barriers to supporting this market development.



Washington State Capitol
(Department of Enterprise Services)

State policy recommendations

5. Create the Washington Center for Sustainable Food Management
6. Continue support for Pacific Coast Food Waste Commitment
7. Connect *UFWW Plan* to the Food Policy Forum
8. Research strategies and develop partnerships to prevent food from entering landfills
9. Improve regulatory certainty for organics management facilities
10. Develop an emergency food distribution plan for Washington schools
11. Support 20-minute seated lunch minimum in Washington elementary schools
12. Support recess before lunch in Washington elementary schools
13. Increase access to food waste reduction education in Washington schools

State policy improvements are necessary to meet Washington’s 2030 food waste reduction goals. This planning process identified nine policy areas of focus, centered on creating efficiencies in communication and use of state resources. Table 3 details the estimated total cost, benefits, and diversion potential of these recommendations.

Public-private partnerships and multi-agency partnerships need to continue to drive measurable food waste reduction. State-level coordination is also needed to connect the *UFWW Plan* to the Food Policy Forum and the Pacific Coast Food Waste Commitment (PCFWC).

Both areas of focus can be supported by developing the Washington Center for Sustainable Food Management. Schools have an opportunity to educate the next generation on food waste prevention, rescue, and recovery while driving measurable food waste reduction in schools. Regulatory certainty is needed for organics management facilities to support recovery infrastructure development.

Table 3. State policy recommendations economic analysis summary

	Cumulative Annual Costs	Cumulative Annual Gross Benefits	Cumulative Annual Net Benefits	Cumulative Annual Diversion Potential	Cumulative GHG Reduction Potential
State Policy	\$17 million	\$54 million	\$36 million	142,000 tons	204,000 MTCO ₂ E

5. Create the Washington Center for Sustainable Food Management



Recommendation

Create the Washington Center for Sustainable Food Management (WCSFM) to help coordinate statewide food waste reduction.

Overview

Many of the recommendations in the plan require strategic implementation, collaborative efforts, and ongoing monitoring to be successful. The majority of the recommendations in the plan require a coordinated effort across the food sector and state agencies to see measurable impacts in food waste reduction.

This recommendation supports developing a one-stop shop, the Washington Center for Sustainable Food Management, to help coordinate work and meet the state's food waste reduction goals. When fully implemented, this recommendation helps support the majority of the recommendations in the plan, while streamlining investments and effort on food waste reduction work.

While it is difficult to calculate the exact food waste diversion potential of this recommendation, this recommendation is a catalyst and amplifier for other recommendations. We estimated this recommendation has an annual net financial benefit of \$7 million in efficiency cost savings from an investment of \$1 million. This cost savings is enough to buy over 5 million meals at wholesale prices.

Without this recommendation, Washington risks not effectively reducing food waste and meeting its food waste reduction goals. Within our current system, businesses, organizations, and volunteer groups become interested in reducing food waste but are faced with a need to contact multiple agencies and organizations to obtain information or assistance. Whether they are trying to prevent food waste, donate food safely, or recover food waste for productive purposes, efforts to get information can be cumbersome and discouraging.

The WCSFM should be housed in the Department of Ecology, as Ecology is responsible for determining the annual food waste data, is the state lead on food waste reduction efforts, and currently participates as the state's liaison for the PCC's regional food waste reduction work.



A more networked and streamlined food waste reduction system would support the critical moments where food needs to be redirected efficiently and safely. This is especially true when large supply chains are disrupted. Instead of throwing away edible food because of communication or logistical delays, organizations, and households can contact the center to be connected with local HRO's and receive timely information on proper food donation standards.

The WCSFM can also support voluntary working groups, similar to the work structure of the Pacific Coast Collaborative, to help support food waste reduction efforts. The WCSFM can coordinate dedicated food waste reduction grant funding, mapping of the food system, and facilitating partnerships across the food system. The WCSFM can also consolidate emerging data and research on the best strategies for food waste reduction.



The Washington Center for Sustainable Food Management may:

- Coordinate the implementation of the *UFWW Plan*.
- Draft plan updates and measure progress towards actions, strategies, and the statewide reduction goals.
- Maintain website with current food waste reduction information and guidance.
- Provide staff support to the Pacific Coast Food Waste Commitment food waste reduction work.
- Stay connected to the Food Policy Forum's work on food system resiliency.
- Facilitate and coordinate public-private and non-profit partnerships focused on food waste reduction through voluntary working groups.
- Collaborate with federal, state, and local partners on solutions to food waste.
- Develop and maintain mapping of the food system of Washington.
- Research capacity for food waste and wasted food prevention, rescue, and recovery, and identify opportunities through data.
- Research and develop emerging food waste reduction markets.
- Develop and maintain statewide food waste reduction and food waste contamination reduction campaigns.
- Distribute and monitor grants dedicated to food waste prevention, rescue, and recovery.

6. Continue support for the Pacific Coast Food Waste Commitment



Recommendation

Continue Washington State’s support for the Pacific Coast Food Waste Commitment (PCFWC).

Overview



Formed in 2008, the Pacific Coast Collaborative ([PCC](#)) established ambitious goals for reducing greenhouse gas emissions (GHGs) by at least 80 percent by the year 2050. The PCC is focused on achieving these goals through developing public-private partnerships in critical areas of concern like clean energy, ocean acidification, and food waste reduction. This food waste reduction work is known as the Pacific Coast Food Waste Commitment (PCFWC).

The PCFWC began in 2016 and established regional goals to reduce food waste by 50 percent by 2030, directly aligning with Washington’s food waste reduction goals. Washington signed onto the PCC’s PCFWC in 2019, along with many other states, counties, and local jurisdictions (Fig. 13).

The PCFWC asks food businesses to voluntarily participate in “pre-competitive” collaboration. This effort is a major component of how experts can provide technical assistance to food businesses and manufacturers.

Jurisdictions work directly with resource partners (Fig. 12) to provide food waste reduction assistance to food businesses, while food businesses learn from each other. The initial focus of this regional food waste reduction work is grocery retail, intending to amplify across the food system to achieve regional food waste reduction goals.

Our research demonstrated this recommendation acts as a lever for other recommendations. When fully implemented, supporting the PCFWC has the potential to generate an annual net financial benefit of approximately \$465,880 in cost savings. This cost-savings are enough to buy over 400,000 meals at wholesale prices.

Figure 12. PCFWC resource partners’ logos



Target-Measure-Act framework

The PCFWC uses the “**Target-Measure-Act**” framework established by the World Resources Institute for the global Champions 12.3 initiative to structure its food waste reduction activities:

Target: Setting ambitious food waste reduction targets that are aligned with Sustainable Development Goal 12.3.

Measure: Implementing streamlined methodology for measurement – including anonymized reporting and individual dashboards – to help businesses across the food supply chain reduce waste and better identify areas to target for action.

Act: Driving industry progress through sharing best practices, leading demonstration projects, and providing technical assistance related to policy, financing, businesses solutions, and education.



The PCFWC connects private sector food businesses with government agencies and nonprofits. All organizations work together by targeting, measuring, and acting on food waste.

Through this Commitment, businesses voluntarily agree to do the following:

- Support and play a part in achieving the West Coast’s regional goal of reducing and preventing wasted food by 50 percent by 2030.
- Annually measure and report food waste reduction data to ReFED for ongoing analysis.
- Take action to reduce food waste, with an emphasis on prevention-related solutions.
- Share existing food waste reduction plans or create and implement new ones.
- Collaborate with other private and public partners participating in the PCC Food Waste Reduction Project, with the option to participate in working groups.



Figure 13. PCFWC map

7. Connect the Use Food Well Washington Plan to the Food Policy Forum



Recommendation

Build connections between the *UFWW Plan* and the Food Policy Forum's food system resiliency planning.

Overview

Washington's food system is complex and multifaceted, and so is the effort to reduce food waste and rescue edible food. Working to eliminate duplicate efforts, and to support existing work, this recommendation focuses on connecting *UFWW Plan* to the Food Policy Forum.

The Food Policy Forum has identified actions similar to the recommendations in the *UFWW Plan* in their most recent [2020 updated actions report](#). Connecting this work with the networking and stakeholder engagement to the *UFWW Plan* will help support information sharing across critical focus areas. For example, some of the funding requests in this plan support the ongoing work of Farm to School and Regional Markets development out of WSDA and OSPI.

Similar to Recommendation 5, it is difficult to calculate the exact diversion potential of this recommendation, but it is important to highlight connected planning and implementation efforts. When implemented in full, this recommendation has an estimated annual net financial benefit of \$70,609 in efficiency cost-savings for other recommendations. This cost savings is enough to buy over 101,000 meals at wholesale prices.

Food Policy Forum Goals

- Increase direct marketing sales and consumption of Washington-grown foods.
- Expand and promote programs that bring healthy and nutritious Washington-grown foods to Washington residents.
- Examine ways to encourage retention of an adequate number of farmers for small-scale farms, meet the educational needs of the next generation of farmers, and provide for the continued economic viability of local food production, processing, and distribution in the state.
- Reduce food insecurity and hunger in the state.
- Identify ways to improve coordination and communication among local food policy entities and communication between the local food policy entities and state agencies.

8. Research strategies and develop partnerships to prevent food and food waste from entering landfills



Recommendation

Research and develop strategies through partnerships to prevent food and food waste from entering landfills.

Overview

A major barrier to food waste reduction in Washington is the lack of strategies, or policy levers, to prevent food from entering landfills. This creates an inaccurate valuation of food and food waste. Our research demonstrates prioritizing public-private partnerships over regulations would be most effective in Washington.

It is important to acknowledge bans without plans and appropriate infrastructure are rarely successful. More needs to be understood on how Washington can best incentivize using food well.

This work can begin by directing Ecology and partnering agencies to facilitate voluntary working groups. These groups can include a broad section of subject matter experts and can collaborate to identify incentives and policy solutions to prevent food and food waste from entering landfills.

While levers to prevent food from entering landfills at the state and local levels are developed, so should incentives to increase diversion upstream, including rescue and recovery infrastructure highlighted in this plan. The commercial and processing sectors need incentives and financing to overcome the initial hurdles of managing food and food waste.

Infrastructure capable of managing this food waste will be needed to effectively implement any type of rule or program that diverts inedible food from landfill disposal in Washington.

Connecting infrastructure investment with policy mechanisms to divert organic waste has shown success in other states and jurisdictions. At least eight states and numerous cities have already adopted policies to do so (19).

We found solutions will need to be data driven and adequately funded to successfully meet the 2030 food waste reduction goals. We calculated when fully implemented, this recommendation has the estimated annual food waste diversion potential of 73,903 tons and an annual net financial benefit of \$3 million. Our research showed this recommendation has a high diversion rate compared to other recommendations, and low cost per ton of food waste and waste food diverted.



Washington needs strong public-private partnerships and comprehensive plan implementation to meet the 2030 food waste reduction goals. If measurable food waste reduction is not achieved, and Washington is not on target to meet the 2030 goals, this recommendation supports enacting a landfill ban on food waste and wasted food by 2030. Below is a list of additional levers and policy mechanisms that should be considered through the collaborative research process.

Examples of levers and mechanisms that influence food waste prevention, rescue, and recovery include:

- **Ban organic waste in landfills** – Connecticut, Vermont, Massachusetts, New York, and Rhode Island all have versions of bans in effect today with additional resources set aside to help local governments and businesses adapt (20).
- **Mandate food scrap recycling** – This model may prove more effective for city governments, given that landfills are not always managed by or within the cities they serve (21). Seattle, Austin, New York City, and San Francisco are all examples where this model is in place today.
- **Implement Pay-As-You-Throw (PAYT) Pricing** – Under this market-based model, recycling and composting organic waste is priced much lower or at no cost versus landfilling it. Any organics sent to landfills is then charged per waste amount via a metering model as most other utilities use today (21). This corrects the market failure that incentivizes landfilling organic waste today, without the potential political resistance that often comes with a government mandate or ban.
- **Levy a Landfill Tax** – A similar variation of PAYT that at least twenty states have implemented is a landfill tax, which is added to the existing tipping fee that each municipal waste facility charges per unit of trash (13). A landfill tax helps to ensure that, even if a tipping fee is inexpensive on its own, the overall cost to landfill remains higher than recycling and composting alternatives. Part of the funding from this tax revenue could be used to fund FLW source reduction and prevention activities. Careful consideration should be made for large and already well-developed programs so they are not penalized.

9. Improve regulatory certainty for organics management facilities



Recommendation

Improve regulatory certainty for organics management facilities, including composting and anaerobic digestion (AD) operations, by creating a coordinated approach for permitting.

Overview

This recommendation supports improving regulatory certainty for organics management facilities by creating a coordinated approach for permitting. This effort will facilitate the development of compost and anaerobic digester capacity, while also improving efficiencies and understanding within the permitting process.

Our research found regulatory certainty is needed for both compost and anaerobic digester facilities. Both processes are needed for Washington to meet its food waste reduction goals. With full implementation, this recommendation has the potential to annually divert approximately 54,000 tons of food waste from the landfill, while generating an annual net financial benefit of an estimated \$129,217.

Compost facilities are the primary conversion option in Washington for residential and commercially collected food waste. Supporting the development of anaerobic digesters at compost facilities will help amplify existing collection efforts. Similarly, developing anaerobic digesters where feasible is a viable and necessary pathway towards meeting the 2030 goals.

Complexity exists within permitting processes for both compost facilities and anaerobic digesters. The mix of state and local agency involvement in permit review and oversight, coupled with the lack of clear regulatory requirements in some areas, can result in delays and miscommunication between organics facilities and regulating agencies. This can decrease feasibility and inhibit the expansion of existing facilities or the development of new facilities.

To get started, this recommendation supports directing the departments of Ecology, Commerce, and Agriculture to work with US EPA, local health departments, and local governments to clarify regulatory requirements; identify ways to improve regulatory coordination, and streamline organics permitting processes.



10. Develop an emergency food distribution plan for Washington schools



Recommendation

OSPI will develop best practices and statewide guidance for the K-12 system to distribute school meals to students when an emergency prevents students from in-person attendance.

Overview

The OSPI 2019 meal participation report shows that schools provided approximately 200 million meals during the school year (including breakfast, lunch, some snack programs) to students across the state. Of that number, the report indicates that 73 million meals were provided at no cost to students who did not have the financial support to purchase the food (22).

When COVID-19 led school districts across the state to close in March of 2020, concerns grew about how to get school food to all students, with particular concern for the students who depend on school meals to survive. Fortunately, many school districts in the state, staffed with faculty, teachers, and volunteer assistance, were able to continue to get meals to those in need (23); (24); (25).

This recommendation supports reviewing actions taken by school districts across the state in response to school closures and determining which approaches can be replicated and standardized across all school districts. The successful approaches would be detailed in an emergency food distribution guidance document.

The proposed guidance should be centered on getting vital nutrition to students while supporting staff implementing the work. This guidance will help improve system resiliency by identifying ways to coordinate state and federal food distribution programs. The guidance should also consider ways to prevent and rescue food waste and wasted food.

When fully implemented, this recommendation has the potential to annually reduce 5,375 tons of food waste, while generating an annual net financial benefit of \$25 million.



11. Support 20-minute seated lunch minimum in Washington elementary schools



Recommendation

Require statewide policy for 20-minute seated lunch minimum in Washington elementary schools.

Overview

According to a study conducted by the Office of the Washington State Auditor on school lunch durations, most elementary-age students have less than 20 minutes of seated time to eat in Washington elementary schools (K-5 or K-6) (26). Seated time is the amount of time students have to eat their lunch after going through the lunch line and sitting down to eat, which is different than the total amount of time scheduled for lunch.

The benefits of a seated 20-minute lunch minimum in elementary schools include:

- **Less edible food left behind by students** – More food eaten correlates with less wasted food. A longer lunch will promote the consumption of more food by students.
- **More nutrition for students** - Healthy mealtime experiences is essential for schoolchildren in developing good eating habits that will last through adulthood.
- **Better overall behavior and learning ability** – With increased nutrition, studies have shown students are more likely to focus in the classroom and do better on tests.

When fully implemented, this recommendation has the potential to annually divert about 3,168 tons of food waste, while generating an annual net financial benefit of an estimated \$158,864.

During the 2019-2020 school year, OSPI began a seated lunch time pilot with 6 schools in Washington State to start establishing best practices for the initiation of a 20-minute seated lunch time in elementary schools.

OSPI determined a few barriers exist to initiating a 20-minute seated lunchtime. This requirement should account for the following barriers:

- Increased staffing needs for extended overall lunch periods.
- Financial barriers to adjusting the school schedule to accommodate extended lunch periods.
- A need for increased lunchroom staff and support.

12. Support recess before lunch in Washington elementary schools



Recommendation

Support statewide policy requirements for recess before lunch in Washington elementary schools.

Overview

This recommendation supports a statewide policy requiring recess before lunch in Washington elementary schools (K-5 and K-6). Recess before lunch has proven to effectively reduce food waste and positively affect student eating habits (27).



Studies have shown students consume 67 percent more food, including fruits and vegetables, when recess is scheduled before lunch, compared to students with recess after lunch (27). When recess is scheduled affects children's nutritional well-being and can directly impact their attentiveness and ability to learn in the classroom. More than half of the Washington elementary schools audited in the report conducted by the State Auditor's Office did not offer recess before lunch (26).

To successfully implement recess before lunch statewide, OSPI could mandate initiating recess before lunch through their rule making process. OSPI may facilitate a pilot program, similar to the 20-minute seated pilot program, to help facilitate the transition to recess before lunch statewide.

In addition to the lunchtime requirement and pilot programs, the OSPI policy should provide technical assistance and manage the concerns and barriers to implementing recess before lunch. Some barriers include concerns about access to handwashing opportunities between recess and lunch and adjustments needed to academic schedules.

When fully implemented, this recommendation has the potential to annually divert over 2,481 tons of food waste from the landfill, while generating an annual net financial benefit of an estimated \$120,831. Our research also shows this recommendation has a low cost per ton of food waste diverted, and the ability to rescue a significant amount of edible food.

13. Increase access to food waste reduction education in Washington schools



Recommendation

Increase access to food waste reduction education in Washington schools, through increased funding and developing a centralized education resource.

Overview

Food waste reduction education and resources are critical to achieving measurable long-term food waste reduction. Students take lessons home from the classroom or innovate on the pressing challenges of our time. A recent study found students who participated in gardening, nutrition, and cooking classes ate, on average, a half serving more vegetables per day than they did before the program (28).

This recommendation supports increasing access to food waste reduction education in Washington K-12 schools. Examples of this education may include:



- Implementing Developing school gardening, composting, and food preservation programs.
- Conducting school waste audits and monitoring food waste data (Fig. 14).
- Developing classroom, Green Team, and school-wide education on the values of preventing, rescuing, and recovering food waste, like [Green Team Activities on Food Systems and Food Waste Reduction](#), the King County Food for Thought workshop described [here](#), and [WWF's Food Waste Warriors](#).
- Increasing access to school pantries and perishable foods to food insecure students.
- Supporting development of student “green clubs” to help educators with food waste reduction program development; pay club advisors a stipend to increase engagement and longevity of the program.
- Participating in the “[Smarter Lunchrooms](#)” initiative and developing nutritional curriculum for students.
- Increasing partnerships with farmers, modeling the successes of [Oregon's Farm to School program](#).

Our research shows that when implemented fully, this recommendation has an annual net financial benefit of over \$500,000 and an annual food waste diversion of approximately 3,000 tons.

While most schools will be able to see cost savings through food waste reduction work, due to differences with collection and hauling of waste it is hard to say if all projects will be so cost effective. The [World Wildlife Fund](#) reviewed multiple schools across the nation and estimated that “if all the schools in the National School Lunch Program reduced their waste by an average of 3 percent, they could save an estimated \$52 million each year.”

[A USDA report](#) describes how their National School Lunch Program “wastes about \$5 million worth of edible food every school day.”

This recommendation supports the following actions to get started with increasing access to food waste reduction education in Washington K-12 schools:

- Ecology and OSPI continue to work on increasing access to funds for food waste reduction in schools.
- OSPI may coordinate a centralized food waste reduction resource hub that is accessible to schools and school districts statewide.
- Ecology and OSPI continue research and working groups to identify educational best practices and ways to reduce barriers to food waste reduction in schools.
- OSPI may consider developing educational frameworks to integrate mathematics, science, environmental and sustainability, and social studies content standards and resources that help support and prioritize food waste reduction in schools.

Additional resources, including legislative funding, will support OSPI and Ecology in achieving measurable progress toward implementing these strategies. Dedicated funding is crucial to ensure equitable and effective implementation of food waste reduction education across the state.

Potential funding mechanisms could include increased support of new funding mechanisms, Ecology’s Local Solid Waste Financial Assistance to fund local program coordination, or OSPI’s Healthy Kids-Healthy Schools program to provide needed equipment.

The development of Use Food Well Washington Grants (p. 48) could also support increasing access to food waste reduction education in schools.



Figure 14. Students and staff perform waste audits through EarthGen’s School Food Share Program (EarthGen)



(Karolina Grabowska, Pexels)

Funding recommendations

14. Dedicate state grant funding for statewide food waste reduction
15. Increase funding for local health jurisdictions
16. Increase funding for local government food waste reduction
17. Build more farm to school partnerships

One of the most critical barriers to addressing food waste in Washington is the need for sustainable and dedicated funding. The four funding recommendations in this plan prioritize efficient use of state resources while addressing this barrier.

Dedicated funding to support localized food waste prevention, rescue, and recovery is needed. Local Health Jurisdictions also require adequate funding to provide the necessary technical assistance to schools, food businesses, and HROs.

Ongoing work by OSPI and WSDA to increase local farm connections to schools requires dedicated staff and funding to incentivize and amplify program participation. Similarly, local governments across the state are already working on food waste prevention, rescue, and recovery, but require dedicated and sustainable funding to drive measurable results. See [Appendix I](#) for more details on local government feedback and best practices.

Table 4. Funding recommendations economic analysis summary

	Cumulative Annual Costs	Cumulative Annual Gross Benefits	Cumulative Annual Net Benefits	Cumulative Annual Diversion Potential	Cumulative GHG Reduction Potential
Funding	\$53 million*	\$473 million*	\$420 million*	109,000 tons	156,000 MTCO₂E

*Fields marked with an asterisk reflect funding of other recommendations and are overlapping costs and benefits are excluded from the final total to avoid double counting.

14. Dedicate state grant funding for food waste reduction



Recommendation

Increase Washington state food waste reduction funding through new and existing grants.

Overview

Dedicated state grant funding for food waste reduction has the potential to boost the efficacy of other recommendations, and help fund and support the majority of the recommendations in the plan. This recommendation can also help collect necessary food waste data to help target food waste reduction opportunities.

Nationally, ReFED estimates that an aggregate \$18 billion of new financing is needed to achieve a 20 percent waste reduction – or roughly \$2 billion per year averaged over the next decade.

The ReFED report estimates that a one-time investment of \$18 billion will yield roughly \$100 billion in economic benefits for society nationally, including an estimated \$20 billion in total business profit opportunity over the same period (13).

Our research demonstrated similar outcomes for Washington (\$4 in benefits for each \$1 invested), and state-level grants were identified as sustainable funding mechanisms that can help reduce initial cost barriers.

When implemented fully, increasing state grants for food waste reduction has an estimated annual food waste diversion potential of over 1.2 million tons and an annual net financial benefit of approximately \$1 billion.

This recommendation supports increasing state grant funding through developing new funding mechanisms like “The Use Food Well Washington Grants,” and through utilizing existing funding mechanisms. [Appendix F](#) inventories existing and historic state-level grants.

Pairing state and federal support (e.g. various USDA programs) is a tried and true approach to maximizing investments, and when used together, can be great catalysts for food waste reduction infrastructure development and innovation. More information on federal level funding opportunities can be found on the [U.S. EPA](#), [USDA](#), and [NRCS](#) websites.





Use Food Well Washington Grants

New food waste reduction funding mechanism

The most efficient way to increase state-level funding for food waste reduction is to develop a grant specifically focused on food waste prevention, rescue, and recovery. This grant can provide funds to support the development of critical food waste reduction infrastructure, while simultaneously requiring data reporting to better understand food flows in Washington.

This recommendation supports developing the Use Food Well Washington Grant system. This grant can prioritize food waste reduction through the strategies of prevention, rescue, and recovery. This includes reducing the burden on the hunger relief sector through strategic investments. Supporting commercial food waste reduction, specifically the grocery retail sector, could also be a successful initial focal point of the grant system. By requiring data collection and demonstrated landfill diversion, important data on Washington's food flows and food waste reduction best practices can be collected through the grant system.

The Use Food Well Washington Grant can be designed to help bridge the gap between existing funding mechanisms and what is needed to build a more resilient food system. This new grant system can be administered out of the Center for Sustainable Food Management, or Ecology's Solid Waste Management program. The grant system can be funded by MTCA and/or WRRLLCA, or other new or existing funding mechanisms.

This grant system will support public-private partnerships, data collection whenever available, and can be combined with federal food waste prevention funds for maximum community impact. Local governments, businesses, hunger relief organizations, and non-profits can apply for funds that cover:

- Food waste prevention projects that prevent food waste from being generated and becoming waste normally destined for landfills.
- Food rescue projects that result in rescued food being distributed to people, that would otherwise be destined for landfills.
 - Any food waste residuals from the food rescue project must be composted or sent to a digester within the project service area (if applicable).
- Food waste recovery projects that recover food that would otherwise be discarded in the landfill and not applied to higher beneficial use.



Use Food Well Stories: Sustainable Connections

Doing traditional waste audits at food producing businesses, staff at Sustainable Connections saw too much edible food being thrown away. Most of the businesses, including restaurants, schools, and caterers were not connected to hunger relief organizations. Staff saw an unmet need, received a grant from the Department of Ecology and in 2017 the Food Recovery Program (FRP) was created.

The FRP helps businesses redirect food to support community hunger relief organizations, which reduces disposal costs for the businesses and reduces the environmental impacts of disposed food. Managers work hard to understand the needs of different hunger relief organizations so each gets the food they want and can use rather than indiscriminate distribution that can result in the food going to waste.

The pandemic produced new challenges and opportunities. The organization helped shift the supply chain to get bulk foods to new destinations and volunteers gleaned food the food banks could not collect (Fig. 15). The repackaging and distribution of bulk *prepared* food is an area that needs support. As the program grows, grants and donations will help buy new food handling equipment and data management programs to better track food flows.

Sustainable Connections surplus food recovered:

2019: 59,000 pounds

2020: 255,000 pounds; 212,415 meals served

2021: Over 100,000 pounds as of July, 2021.



Figure 15. Sustainable Connections volunteer rescuing edible food from local food businesses (Sustainable Connections)

15. Increase funding for local health jurisdictions



Recommendation

Increase public health funding to LHJs to:

- Support consistent application of food safety regulations regarding HROs and food donation.
- Provide inspections and technical assistance to HROs through addressing funding shortfalls.
- Promote proper food donation with food businesses, schools, and institutions through increased technical assistance.

Overview

The [Centers for Disease Control](#) (CDC) estimates that approximately 960,000 Washingtonians fall ill with a foodborne illness each year. The majority of these illnesses go unreported and the associated costs can be significant.

While there have been no reports of foodborne disease outbreaks in Washington associated with HROs, there have been outbreaks in other states. In 2012, [over 60 people fell ill](#) after eating at the Denver Rescue Mission. As we see the increasing need for more resiliency and connectivity within our hunger relief networks, there is an equal need to ensure food safety.

This recommendation supports increasing public health funding to help provide technical assistance and food waste reduction education to HROs and food businesses, schools, and institutions.

When fully implemented, this recommendation has an estimated annual food waste diversion potential of 104,179 tons and generates an annual net financial benefit of approximately \$415 million. Increased funding does not increase staff capacity. Full implementation must include enough money to add FTEs to be successful and drive measurable food waste reduction.

Through simultaneous investment in staffing and inter-agency coordination, this recommendation has the potential to catalyze Washington’s food waste reduction efforts. Our research also showed this recommendation has a high benefit to cost ratio, high diversion potential, including the ability to rescue a significant amount of edible food from going to the landfill.



Regulation of Hunger Relief Organizations (HROs)

The lack of HRO permit fees presents a unique challenge for LHJ food safety programs, which are often already understaffed. In Washington, HROs are considered food establishments in the Washington State Retail Food Code [WAC 246-215](#) and are regulated by LHJs. According to [WAC 246-215-09400\(2\)](#), HROs are not required to pay permit fees or obtain a food establishment permit. Instead, HROs (called Donated Food Distributing Organizations in [WAC 246-215-0115](#)) are required to submit an annual report to their LHJ describing their food handling activities.

Local Health Jurisdiction (LHJ) Funding Shortfalls

Since the adoption of WAC 246-215 in 2005, HROs have not been required to pay permit fees or obtain a food establishment permit. As a result, most LHJs do not collect fees to support HRO inspection or technical assistance activities. In 2005, the rule change transferred the cost burden to the LHJ, and over the years fewer and fewer LHJs have been able to support unfunded inspection activities of HROs or promotion of safe food donation in their communities.

Limited LHJ inspection and technical support

LHJs regulate food establishments, including HROs, to evaluate safe food handling practices. Increased communication, frequent inspections, and technical assistance from LHJs can increase food safety at HROs. Due to a lack of funding and resources in LHJs across the state, LHJs often struggle to adequately monitor and regulate HRO's.

For example, some HROs are unaware that food safety regulations apply to them and are not used to working with their LHJ when questions arise. Many LHJs do not have the resources to identify all the HROs within their community and instead rely on HROs submitting an annual report. This can result in a lack of food safety oversight at HROs that do not submit annual reports.

If LHJs had additional funding they may be able to identify and communicate with HROs that are unaware of regulatory requirements. Without this oversight of HROs, there is little assurance of food safety among potential corporate donors as well as some members of the public who would otherwise need the hunger relief services.

LHJ outreach to food businesses on important donation regulations can significantly impact food rescue efforts. There are misconceptions on what foods can be donated in addition to how to safely donate food. According to a 2016 study by the Food Waste Reduction Alliance, approximately 50 percent of manufacturers, 25 percent of retail/wholesalers, and 39 percent of restaurants identified liability as a barrier to donation (10). Several retailers mentioned anecdotally during the planning process that they have concerns donating food to HROs that are uninspected and unpermitted.

Currently, this type of outreach is rarely done by LHJs when interacting with food businesses. By identifying and mapping all of the HROs in the state, a better communication network can be realized within the food system. This will enable LHJ food safety professionals to provide technical assistance to food businesses about safe food donation and encourage them to donate to local hunger relief organizations within their community.

16. Increase funding for local governments food waste reduction



Recommendation

Support local government food waste reduction work by:

- Stabilizing and increasing state-level funding for local government food waste reduction and on-site recovery education.
- Developing standardized language and communication materials, and providing state-level food waste reduction technical assistance.
- Facilitating voluntary working groups to set targets and remove barriers to food waste reduction.



Overview

Local governments are the powerhouses behind much of the food waste reduction and on-site food waste management education in Washington State. In addition to supporting many of our communities’ essential services, local governments are often found at the helm of community food waste reduction.

There is not a “one-size-fits-all” solution to food waste reduction, and challenges can vary widely across the state. Local governments are best suited to coordinate and target opportunities within their communities, and many are already working on food waste prevention, rescue, and on-site recovery programs.

There are many benefits to this recommendation, including tailoring the food waste reduction to work to local communities. When fully implemented, this recommendation has an estimated annual food waste diversion potential of 100,238 tons, while generating an annual net financial benefit of approximately \$65 million. Our research also showed this recommendation has the potential to rescue a significant amount of edible food.

To support the development of this recommendation, and to learn more from local governments, we conducted a local government survey in December 2020. Results and best practices from this survey can be found in [Appendix I](#).

The survey revealed that the major limiting factors to supporting existing and new programs are funding and staffing related. Food waste reduction is time intensive work and requires adequate resourcing and funding to be successful. Similarly, infrastructure investments are needed statewide to prevent, rescue, and recover food waste and wasted food.

More cold storage and transportation infrastructure are needed statewide to help support food rescue efforts. Local governments in both rural and urban communities have also expressed interest in small-scale anaerobic digesters and increased access to organics collection services. Increased funding to local governments could come from existing or new food waste reduction grant programs, or through leveraging federal funding.

There is also a need for more standardized information and clear messages on food waste prevention, rescue, and recovery. Ecology can develop and maintain a website that includes details, guidance, and toolkits to help communicate about food waste reduction. Communication on share table best practices, milk dispenser implementation guidance, and other food waste reduction strategies could be supported through this work as well.



Use Food Well Stories: Lewis County workshops

Melanie Case, Recycling Coordinator for Lewis County, developed the “Take a bite out of waste” food waste prevention workshops to educate residents on food waste issues, and to share tips on how to reduce the amount of food they waste (Fig 16).

The workshops included food waste statistics, reasons behind food waste, ideas on how to reduce food waste, and a “walk the talk” session by members of the County’s Master Recycler Composter group. They shared their tips to store, prepare, preserve, and use up food so it doesn’t get wasted. Melanie said that while “the statistics on food are interesting, people just want tips on how they can reduce food waste.” Workshops information was also shared at school presentations and community events.

Costs to produce the workshops included staff time and printing costs for educational information, but participation by the many volunteers helped keep costs to a minimum.

Establishing a stable food waste reduction grant program, and a statewide food waste reduction campaign will help all counties in their outreach efforts related to food waste.



Figure 16. Lewis County school food waste audit for reduction awareness outreach. (Lewis County)

17. Build more farm to school partnerships



Recommendation

Build more farm to school partnerships in Washington, through increased funding and staffing.

Overview



Farm to school programs connect communities to our state's farmers, ranchers, and fishers through local food purchasing. This purchasing can support child nutrition programs, school gardens, and hands-on agricultural education. Farm to School programs also boosts rural economies and improve children's health.



According to the [USDA's Farm to School 2015 Census Data](#), 49 percent of school districts in Washington State participate in Farm to School activities in some way. This includes 91 school districts that bought ingredients directly from Washington farmers between 2013-2018 and spent over \$17 million on local food in 2013-2014.



Since 2008, farm to school programming has been coordinated between the WSDA and OSPI to build farm to school partnerships across the state. In 2018, the [Washington State Farm to School Network](#) was also formed to support and grow this work. To help connect more schools to farms, this recommendation encourages mirroring the successes and structure of the [Oregon Farm to School Grant program](#) for farmers, producers, and local food suppliers.



This recommendation supports the ongoing efforts by WSDA and OSPI to build Washington's Farm to School program. Similarly, this recommendation supports increasing funds for Farm to School activities like gardening and agricultural education in Washington schools.



To reduce burden on educators and staff, investment can also be made in community-based organizations. These partnerships between local organizations and schools can help sustain food waste reduction education efforts while improving student understanding of the food system. Having experts from the community partner with schools also helps reduce the education burden on teachers and staff.

Once successfully implemented, this model and effort can be further used to connect local farms to more Washingtonians. When fully implemented, this recommendation has the potential to reduce about 4,508 tons of food waste, while generating an annual net financial benefit of \$5 million.



Poster from Oregon’s new food waste reduction education campaign. (Oregon DEQ)

Public education recommendations

18. Develop and maintain statewide food waste reduction campaigns
19. Develop and maintain a statewide food waste contamination reduction campaign

Changing the perception of the value of food waste and wasted food will require a robust education and outreach effort. The two public education recommendations focus on education and behavior change and elevating Washington’s cultural value of food. Education and outreach towards the residential sectors are needed to drive food waste prevention, rescue, and recovery strategies within our communities.

Technical assistance is needed to support commercial sector food waste reduction. In tandem with these efforts, Washington will need to develop communication on food waste contamination reduction. This will help drive a clean stream of organics residuals and increase the value of Washington’s organics markets. Table 5 further details the public education costs, benefits, and diversion potential of the recommendations.

Table 5. Public education recommendations economic analysis summary

	Cumulative Annual Costs	Cumulative Annual Gross Benefits	Cumulative Annual Net Benefits	Cumulative Annual Diversion Potential	Cumulative GHG Reduction Potential (MTCo2E)
Public education	\$5 million	\$142 million	\$137 million	46,000 tons	67,000 MTCo2E

18. Develop and maintain statewide food waste reduction campaigns



Recommendation

Develop statewide education and behavior change campaigns to support food waste reduction in Washington’s residential and commercial sectors.

Overview

A major barrier and opportunity to food waste reduction is education and understanding the value of food and how to use food well. Nationally, food waste reduction campaigns have a diversion potential of 548,000 tons, with an economic value of \$2.65 billion (13). [Appendix H](#) includes examples of these food waste reduction campaigns.

Our research showed this recommendation has a high benefit to cost ratio for Washington as well. When fully implemented, this recommendation has the potential to annually divert approximately 31,000 tons of food waste, while generating an annual net financial benefit of \$137 million.

Both the public and private sectors of Washington need more support with food waste reduction education and technical assistance. To begin this effort, this recommendation focuses on developing two statewide food waste reduction campaigns for the residential and commercial sectors.

These campaigns will be made available to local governments, the commercial sector, and HROs. The campaigns can be modified according to local needs and markets and can be developed and administered out of Ecology (ideally the WCFSM).

Residential food waste reduction campaign

Studies have indicated that while consumers understand the importance of food waste reduction, they do not recognize their role in solving the problem (29). In addition to promoting more responsible behavior, a food waste reduction campaign can also promote a greater understanding of the value of food and a cultural shift towards more sustainable behaviors.

Ecology, in collaboration with other state and local agencies, can develop a food waste prevention campaign focused on the residential sector. This campaign should have key components focused on all three of the plan’s strategies: prevention, rescue, and recovery.



This campaign can include online modules, customizable toolkits, and guidance on the following key subject areas:

- Meal planning and Smart Shopping.
- Making better use of leftovers.
- Preserving food through canning, drying, and freezing.
- Date labels and food storage practices.
- Safe food donation and edible food rescue.
- Metrics gathering software and food waste reduction challenges.
- Diversified food waste management systems like composting and vermicomposting (See Rec. 30).

Commercial Technical Assistance Campaign

Ecology can lead and facilitate a commercial technical assistance campaign focused on food waste reduction. This campaign, in coordination with other state and local agencies, should have key components across the plan’s strategies of prevention, rescue, and recovery.

Increasing the quality of edible food donated to HROs should be a priority of the campaign, along with ensuring HROs and food businesses have clear guidance on food donation and rescue laws. This campaign should also utilize the “Target, Measure, Act” food waste reduction framework as mentioned on page 36.

Within food businesses and HROs, there can be high turnover in staff/volunteers and numerous competing priorities. To help facilitate food rescue and food waste prevention education, Ecology, with the help of partnering agencies, can develop technical assistance materials in support of food waste reduction in commercial and hunger relief settings.

This campaign can include online modules, customizable toolkits, and guidance on the following key subject areas:

- Guidance for food businesses on the best practices of food donation.
- Reviewing inventory control and tracking systems.
- Donor education and training.
- Research and report how to effectively reduce barriers to donating quality edible food to HROs.
- Education on how to maximize existing resources and networks to leverage otherwise difficult to get resources like transportation, cold chain management, and labor.
- Develop guidance and share research on feeding non-meat food waste to animals (See ‘Areas of future research’ section for more details).

19. Develop and maintain a statewide food waste contamination reduction campaign



Recommendation

Develop and maintain a food waste contamination reduction campaign.

Overview

Contamination is a major barrier to effectively managing food waste in Washington. Through this planning process, Subject matter experts identified food waste contamination as a critical issue to converting food waste into beneficial products.

As Washington pivots to diverting more food waste away from landfills, it is important to address the consequences of food waste contamination. Clearer communication and more resources on how to reduce food waste contamination can improve the quality of food scraps composted or converted into energy.

This recommendation supports the development and promotion of a food waste contamination reduction campaign focused on the residential, commercial, food business, and hunger relief sectors.

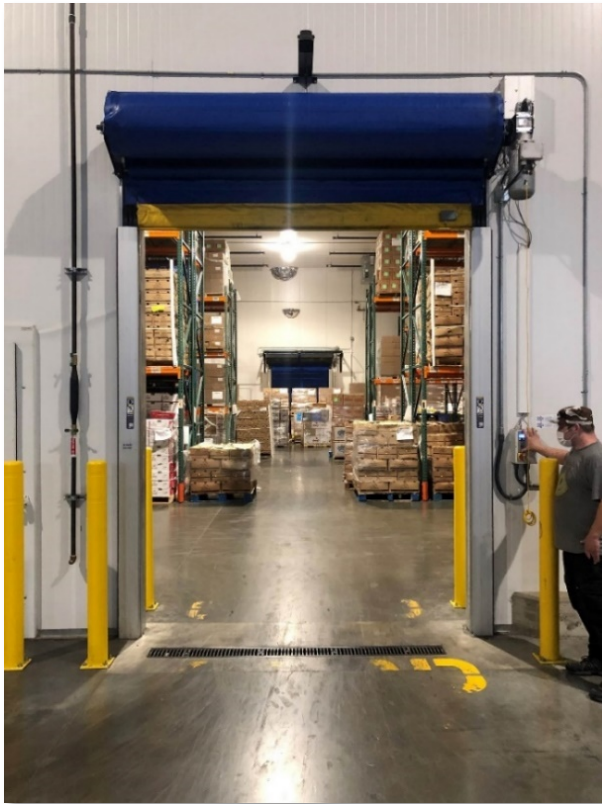
When fully implemented, this recommendation has the potential to annually divert over 15,507 tons of food waste from the landfill, while generating an annual net financial benefit of approximately \$376,140.

A general contamination reduction campaign can be modified by local governments to reflect local program requirements, systems, and opportunities. The campaign can be developed by staff at Ecology, and ideally implemented through the Washington Center for Sustainable Food Management.

The campaign should include:

- A general statewide contamination reduction messaging strategy to promote clean stream of organics and food waste.
- Using survey results from the [Washington State Organics Contamination Reduction Report](#) to inform the campaign.
- Reviewing state and local CROP plans and lessons learned to determine the need for additional research for this campaign.
- Adapting CROP and Recycling Partnership toolkits for contamination reduction for use in the campaign.
- Facilitating focus groups to identify barriers not already addressed in CROP plans, such as food rescue operations.





Cold storage facility (Food Lifeline)

Infrastructure development recommendations

20. Increase use of food waste and wasted food data tracking
21. Develop and maintain maps of food and wasted food flows
22. Improve food donation transportation
23. Increase access to cold chain management
24. Build more community food hubs
25. Support-value added food processing and manufacturing
26. Increase infrastructure investment in Washington schools
27. Expand AD at WRRFs, compost facilities, and farms
28. Develop high-solids anaerobic digesters for mixed organic residuals
29. Increase use of small-scale anaerobic digestion
30. Diversify food waste management systems

Investments in infrastructure across Washington’s food system are critically needed, including investments in transportation, cold storage, and community food hubs. Our research found this needs to include technology and digital infrastructure, to increase the availability of food and food waste data statewide. This information coupled with better mapping of Washington’s food system can help increase our understanding of food waste and wasted food in Washington.

Farmers, HROs, and food businesses require more donation transportation, cold chain, and networking support. Schools similarly need equipment to practice and educate on food waste reduction. Recovery systems need to be expanded and built up statewide, to achieve the 2030 food waste reduction goals. Table 6 shows the costs, benefits, and diversion potential of the infrastructure development recommendations.

Table 6. Infrastructure development recommendations economic analysis summary

	Cumulative Annual Costs	Cumulative Annual Gross Benefits	Cumulative Annual Net Benefits	Cumulative Annual Diversion Potential	Cumulative GHG Reduction Potential
Infrastructure development	\$233 million	\$690 million	\$457 million	979,000 tons	1,409,000 MTCO₂E

20. Increase use of food waste and wasted food data tracking



Recommendation

Support waste tracking analytics to better understand food flows in Washington, including:

- Standardizing wasted food and food waste tracking and analytics statewide, modeling after methods developed by the [ReFED Insights Engine](#) and [WRAP](#).
- Increasing voluntary food waste tracking and analytic efforts.
- Connecting food waste tracking to funding mechanisms and incentives.
- Providing technical assistance to help share information across sectors.

Overview

The adage “what gets measured, gets managed” can be easily applied to food and food waste. The more we know about food flows, the better we can target and manage them.

The existing data on food waste in Washington is incomplete, and as a result, there is much to be learned from Washington’s food waste flows, or how food moves within the food system.

State level data currently includes waste characterization studies and regulated components of the food system, but much is unknown about how food waste happens in Washington.

For example, even when the data is available, pounds of rescued food does not tell the full story of how much of the food was distributed for human consumption versus how much was disposed/composted. A better understanding of food and wasted food flows will help Washington meet the 2030 food waste reduction goals.

This recommendation supports increasing statewide wasted food and food waste tracking and analytics effort through the Washington Center for Sustainable Food Management (Rec 5) and the PCFWC’s work (Rec. 6).

This network can help produce results through regionally planned and locally focused food waste reduction efforts using the Target > Measure > Act framework, as highlighted on page 36.

When fully implemented, this recommendation has the potential to divert about 20,359 tons of food waste annually, while generating \$76 million in annual net financial benefits. Our research also showed this recommendation has the potential to catalyze business development.





Use Food Well Stories: Swedish First Hill and Leanpath partnership

Swedish First Hill (Fig. 17) is the largest non-profit healthcare provider in the Puget Sound. The campus typically serves about 1,800 customers a day in patient services, 600 meals a day retail, and hosts about 10 catered events. Corporate Executive Chef Zachary Schwab has overseen food waste reduction using Leanpath since 2007, resulting in deep cuts in food waste.

Schwab remembers seeing the food waste data for the first time, 13 years ago. “What surprised me was the amount of food waste overall, but what stood out was the amount of protein waste,” he said, “You are not in the kitchen all the time, and food waste adds up throughout the day. A little here and a little there. Then you see the [Leanpath](#) data and it’s, ‘Wow, we overproduced \$100 worth of that protein today.’”

The data gathering technology included built-in food waste photography. “The photos were surprising too,” says Schwab. “You see eight loaves of banana bread that had too much lemon agent in them and couldn’t be used. That’s hard to see.”

Through this partnership, Swedish First Hill has been able to sustain 53 percent food waste reduced by value and 40 percent reduction by weight.

Some of the most effective food waste reduction strategies came from staff after meetings to collectively review the food waste data. For example, the data showed a high level of food waste due to overproduction. Oftentimes cooks were following production sheets correctly, but the expected number of covers didn’t show up. “Maybe it was sunny outside,” says Schwab. The solution—was to engineer the menu for second-day use, and use overproduction in the doctor’s dining room.



“For example, instead of baking off all the chicken quarters for dinner, you bake off half of it. If we don’t get the covers we want, we know the next day we can serve it at the doctor’s dining room and it will be fresh. Now, with our menu development, we always ask, ‘If I make this today, will it still be good quality tomorrow?’”

The same mindfulness has been applied at Swedish First Hill during the coronavirus pandemic. “We’re really on top of it these days,” says Schwab. “Food costs are so expensive, all the hospitals around the country are financially strained right now.”

Figure 17. Swedish First Hill medical facility in Seattle (Leanpath)

21. Develop and maintain maps of food and wasted food flows



Recommendation

Map Washington’s food system to:

- Identify food flows, where waste occurs, and opportunities to prevent food waste.
- Find resources that could be shared for greater efficiencies and resilience (such as cold storage, processing, and transportation).
- Connect potential partners, especially HROs, and facilitate sharing challenges and opportunities within the food system.



Overview

While [statewide food information](#) exists thanks to federal and state agency partnerships, more needs to be done to develop maps of food production, transport, and storage. Through identifying key partnerships in the food system, food waste and wasted food can be measurably reduced. The mapping of Washington’s food system would support many of the recommendations in the plan, and is a key component of each of the prevention, rescue, and recovery strategies.

This recommendation supports developing a statewide map of the food system. Mapping the Washington food system could be conducted by Ecology, in partnership with Commerce, WSDA, subject matter experts, and federal agency partners.

This map should build off existing mapping efforts to tailor a map that best serves Washington. The United States Environmental Protection Agency (EPA) maintains the [Excess Food Map](#), and another great example is the [Eat Local First Farm Finder](#).

With the increased need for shared commercial kitchens, cold chain supply, food supply redirection, and identification of local hunger relief organizations, the Washington map can be a hub that helps connect food with those who need it and can use it well, while facilitating connections to further reduce food waste.

While it is difficult to determine the total food waste diversion potential of this recommendation, mapping has a clear financial benefit of \$2.6 million annually in reduced information and networking costs in other recommendations. Our research also showed this recommendation has a high benefit to cost ratio, and the ability to catalyze other recommendations.

22. Improve food donation transportation



Recommendation

Improve donation transportation by:

- Developing partnerships between food businesses, logistics companies, and hunger relief organizations.
- Increasing food rescue through efficient transportation and incentives.
- Increasing funding for transportation investments.



Overview

One of the greatest needs in Washington's food system is to increase the ability to transport, store, and process nutritious edible food. ReFED estimated that nearly 80 percent of food waste generated nationally comes from perishable foods (12). Meanwhile, hunger relief organizations (HROs) experience unprecedented need for quality nutrient-dense foods such as dairy, meats, fruits, and vegetables (30).

Across the state, HROs have demonstrated over \$10 million in needs for transportation, cold chain management, and storage infrastructure through legislative requests. Pooling transportation resources within local food networks like the South King County Food Coalition may be a valuable option to get the highest return on investment.

This recommendation supports improving donation transportation by developing more cross-sector partnerships within the food system, increasing efficiencies, and dedicating funding for transportation investments.

When fully implemented, this recommendation has the annual food waste diversion potential of 48,300 tons, while generating an annual net financial benefit of \$184 million.

Our research also showed this recommendation has the potential to rescue a significant amount of edible food while supporting business development. Even greater long-term benefits are realized when fleets are electrified.

Partnerships and connections

Many recommendations in this plan work together to increase partnerships and connections, and this type of partnership facilitation would be stewarded through the Center for Sustainable Food Management. Partnerships can also be facilitated between organizations and academic institutions like the UW Urban Freight Lab. Food donors and HROs need access to shared donation information, effective communication systems, and aligned donation protocols to ensure transportation and cold storage systems are efficient.

Increasing food rescue through efficient transportation

The need for efficiency with food donation, coupled with the natural uncertainties of food rescue creates deep supply chain challenges within the food system. Perishables need to be distributed quickly and efficiently to maintain freshness and food safety. Costs to transport donated food are typically covered by HROs, many of which are operating with small budgets and increasing demand. Many of the smaller HROs in Washington rely on volunteer help to transport and process donated food. The COVID-19 pandemic has directly disrupted volunteer supply, as much of the HRO volunteer base can be considered vulnerable populations and may take extra precautions.

As transportation funding is made available through the state, metrics and collection data can be requested through grant funding mechanisms. The more available data on the food system, the better we can assess where food waste prevention, rescue, or recovery opportunities exist.



Use Food Well Stories: Thurston County Food Bank

In response to the COVID-19 pandemic, Thurston County Food Bank (TCFB) pivoted from usual distribution models to serve the community as safely as possible. One model developed was the Community Point of Distribution (CPODs) (Fig. 18).

Throughout 2020, TCFB had CPODs at five locations and served over 8,000 households. TCFB was able to maintain its existing food rescue community partnerships while successfully making the pivot to the new system. TCFB Executive Director Robert Coit said, “The rules do not go away when things go wrong. Best practices carry forward into modified operations during a pandemic. But without the right tools, you are faced with tough decisions and often lower service levels.”

Their success can be found in long-term planning and support. TCFB has benefited from the state-level funding many HROs across the state require to build capacity. These investments are critical to giving HROs the capability to adapt and serve their community. Coit shared, “our ability to respond last year was directly related to the capacity we built within our system. Now we are motivated to expand capacity even further.”



Figure 18. Thurston County Food Bank CPODs in action (TCFB)

23. Increase access to cold chain management



Recommendation

Increase access and funding for cold chain management across the food supply chain, especially for local farmers and HROs.

Overview

Cold chain management is the temperature-controlled supply chain from harvest to consumption. Cold chain management processes are focused on managing the temperature of perishable products to maintain quality and safety from the point of origin through the distribution chain to the final customer.

This recommendation supports increasing access to existing cold chain management, in addition to increasing statewide investments in cold chain infrastructure. This is especially critical for local farmers and HROs.

When fully implemented, this recommendation has the potential to annually divert 22,427 tons of food waste from the landfill, while generating an annual net financial benefit of approximately \$70 million. Our research also showed this recommendation can rescue a significant amount of edible food while promoting business development.

Experts within the Washington hunger relief community indicate access to cold chain infrastructure as being one of the main limiting factors in the amount of nutritious food they can provide their communities.

Improving distribution efficiencies and storage capacity in donated food distribution networks would also allow for more food to be introduced to hunger relief efforts, leading to less food waste in landfills. Through this planning process, subject matter experts report local farmers having similar issues and needing more support and infrastructure.

Maximizing existing cold chain infrastructure through innovative partnerships and networking can help minimize environmental impacts while increasing the quality of food donated to hunger relief organizations. Developing a better understanding of existing infrastructure and potential partnerships can benefit the entire supply chain, especially in times of crisis.



This recommendation can best be supported by the following actions:

- Developing a better understanding of existing cold chain infrastructure in Washington through research and mapping.
- Facilitating partnerships of existing cold chain storage capacity through the Center for Sustainable Food Management, connecting all sectors of the food supply system.
- Increasing funding to hunger relief organizations through statewide grants, so they can purchase more cold chain infrastructure including; storage trucks, storage facilities, and equipment (Fig. 19).

Actions and solutions should prioritize increasing:

- **Food safety** and the quality of food donated to hunger relief organizations.
- **Food rescue** by prioritizing access to cold chain management for hunger relief organizations, especially in times of crisis.
- **Energy efficiency** through heat reclamation, renewable energy supply, retrofitted cold storage units, and maximizing existing infrastructure first.
- **Community resilience** through shared cold storage facility hubs for HROs, businesses, and food distributors.
- **Access** to mobile cold storage units and depackaging machinery to increase food waste prevention and food rescue.



Figure 19. Food Lifeline cold storage trucks
(Food Lifeline)

24. Build more community food hubs



Recommendation

Strategically increase the number of community food hubs across the state to:

- Assist small farms in packaging, storing, and marketing smaller or specialty crops.
- Help connect local farmers and producers to schools and the local community.
- Support and facilitate local community education on food preservation, food rescue, and recovery systems.



Overview

A community food hub can be considered a network and shared community space to process, add value, repackage, depackage, or otherwise prepare food for human consumption. Figures 20 and 21 illustrate a few examples of community food hubs at work in Washington.

Farmers can use the space to prepare or add value to produce, and hunger relief organizations can use the space to repackage donated edible food. Community food hubs may facilitate education like canning courses or composting guidance and can locate food waste management systems on-site for easy pick-up.

Across the food system in Washington, businesses and organizations request more community food hub support. Regional processing hubs will support area farmers, facilitate new and innovative partnerships, and have the potential to reduce the wasting of edible food. This effort also supports schools, local businesses, and social service programs with nutritious, locally-grown food (31; 32).

This recommendation supports investments in existing or new infrastructure. Our research also shows this recommendation has the potential to rescue a significant amount of edible food while supporting business development.

When fully implemented, this recommendation has the annual food waste diversion potential of 25,405 tons and has the potential to generate an annual net financial benefit of \$57 million.

This recommendation supports increasing the number of community food hubs across the state by:

- Directing WSDA and Ecology to coordinate efforts and [identify optimized locations](#) for community food hubs across the state.
- Facilitating connections between state agencies and existing networks like Regional Agricultural Development Partnerships or the Northwest Agriculture Business Center and local hunger relief networks.
- Creating funding specific to supporting the development of community food hubs.
- Co-locating depackaging and repackaging machines and infrastructure at community food hubs.
- Co-locating food waste management and recovery systems at community food hubs.



Figure 20. Tomatoes grown at Bee Organic Farm in Elma, WA. The SW WA Food Hub offers an easy platform for rural consumers to be able to purchase produce and meats in areas that are typically USDA defined “food deserts” (SW WA Food Hub)

Helping farmers

In recent decades, fruit and vegetable processing has shifted from small dispersed processing to large-scale centralized processing. This shift has made it increasingly difficult for smaller farms or specialty crop growers to have their crops processed for market (31). Many rural economies in Washington are dependent on agriculture as a core industry, so smaller-scale processing, distribution, and logistical services for small to mid-sized food producers reduce food waste while increasing rural economic activity, making local purchasing possible, and supporting small farm viability (32).



Figure 21. Puget Sound Food Hub makes a delivery to Dandelion Organics. The mission of the PSFHC is to support and champion local, family scale farms by providing a direct connection with buyers in our region seeking high quality, locally produced food. (PSFH)

Hunger relief support

Similarly, HROs could use the facility and network support of community food hubs. With increased food insecurity, HROs across the state require more access to nutritious food. Connecting HROs directly with local farmers through community food hubs is an emerging opportunity that could be facilitated through this recommendation.

HROs can also benefit from the processing space community food hubs provide. Food is often donated in commercially sized packaging and needs to be repackaged into smaller quantities for consumers. Community food hubs provide the space to process larger donations, increasing the amount of edible food rescued for hunger relief.

25. Support value-added food processing and manufacturing



Recommendation

Support value-added food processors and manufacturers by:

- Increasing incentives for sector development in rural and urban areas.
- Promoting innovations in de-packaging and re-packaging technology.
- Increasing understanding of regulations and best practices for value-added food processing and manufacturing.
- Assessing the opportunities for large-scale food donations and food preservation to prepare food at risk of spoilage for donation or resale.

Overview

Value-added food processing is the process of taking a raw commodity and changing its form to produce a high-quality end product. In Washington, this can look like a farmer making salsa out of some of their tomato crop, or a company purchasing food residuals from a manufacturing process and then upcycling them into baking and smoothie ingredients.

Value-added food processing has the potential to have a large role in food waste reduction work across the state. When fully implemented, this recommendation has the potential to annually divert 27,854 tons of food waste from the landfill, while generating annual net benefits of approximately \$40 million. To catalyze this work, this recommendation supports the following actions:

Increase incentives for sector development

Both farmers and small businesses indicate their need for more infrastructure support. Machines, costs to process the food or residuals, trucks to transport the feedstocks, and materials can become a barrier (33).

Access to quality ingredients and networks is another barrier for this sector. Increasing network strength through the Center for Sustainable Food Management is a viable solution to support the emerging field. Similarly, networking large-scale systems for food rescue can help strengthen food system networks. Grants through Ecology and the Department of Commerce could support this initial infrastructure development.

Promote innovations in de-packaging technology

The state does not currently have adequate infrastructure to depackage food waste or repackage food for redistribution. Since there is no one-size-fits-all solution, successes in depackaging are largely dependent on each feedstock.

There is more to understand about the Washington food system to help support innovation in depackaging technology. Through supporting value-added food processors, Washington can divert more edible and inedible food from the landfill that would otherwise be considered contaminated. Contamination is an area of concern with depackaging technology, and careful effort should be made to decrease plastics and microplastics from the food and organic material streams. [Federal research](#) has begun evaluating de-packaging technologies, including testing the performance of food de-packaging equipment available on the market.

Develop a voluntary working group to support value-added food processing and manufacturing

Another large barrier for this sector is how new and innovative the work is. More could be done to help facilitate information and guidance to both farms and food businesses in this sector. One solution could be to facilitate voluntary working groups through the Center for Sustainable Food Management to increase connectivity. Voluntary working groups could help build an understanding of food flows, networks, and help value-added food processors and manufacturers learn quickly and reduce more food waste in this emerging field.



Use Food Well Stories: Addie's Alternative LLC

When a request came in asking if Addie's Alternatives LCC could haul packaged food to the landfill, owner Luke Dynes had a great idea: to removing the packaging so the food could be made into animal feed instead. Luke quickly realized the largest barrier to redirecting this food waste was access to depackaging technology. Through trial and error, Luke built equipment that would not require "hand repackaging," but instead would be mechanical.

With locations across the Pacific Northwest, Addie's has since expanded to work with food manufactures and businesses to direct edible but non-marketable food to value-added processing and inedible food to animal feed when possible. (Fig. 22). From bread companies and potato chip manufacturers, to lower grade carrots, Luke has a connection or method that can beneficially use food residuals.

In April 2021, Addie's sent 3,697,200 pounds of feed to cattle feeders and dairies, which otherwise would have gone to the landfill for disposal. Building on these innovations and networks across the state will ensure Washington meets its food waste reduction goals, using food well along the way.



Figure 22. Luke standing next to depackaged food residuals ready for animal feed. (Addie's Alternatives LLC)

26. Increase infrastructure investments in Washington schools



Recommendation

Increase funding and support for food waste prevention infrastructure in Washington schools.

Overview

This recommendation supports increasing funding to invest in the infrastructure needs of Washington K-12 schools. Washington schools have demonstrated a need for over \$2.5 million worth of funding to expand staffing and invest in equipment to increase food waste reduction efforts ([Appendix G](#)). Our calculations show that with an investment of \$2.5 million, Washington's K-12 schools can demonstrate a net benefit of almost \$4 million by avoiding costs like garbage hauling while reducing food waste.

Across the state, infrastructure investments are necessary to support more locally sourced and nutritious food, and for schools to make more sustainable choices overall. For example, many kitchens lack the space to prepare and cook fresh foods or wash durable service ware. Schools across the state want to develop environmental curriculum and need funding for school gardening equipment and supplies. Similarly, schools that want to better understand their waste stream need to purchase waste audit equipment and materials.

Some of the more common requests from K-12 schools include:

- Food processing and preservation equipment
- Dishwasher, refrigerator, oven, range, coolers, and milk dispensers
- Electrical upgrades food waste prevention equipment

Investing in food programs in schools supports increased planning for food prep and storage space and equipment, which can lead to greater partnerships with local farmers and growers. Supporting waste audit stations to monitor food waste and adding space to handle edible food for donation furthers school goals to reduce food waste. Coupling this investment with increased sustainability staffing can result in more local partnerships and a better understanding of a school's food waste.

For example, Clark County Green Schools measured saving 548 gallons of milk from being wasted across four different school districts by providing milk dispensers and washable cups. This work replaced milk cartons and demonstrated a significant reduction in milk and carton waste.

When implemented in full, this recommendation has the potential to divert an estimated 6,811 tons of food waste from landfills per year, while generating an annual net financial benefit of approximately \$1.9 million.



Use Food Well Stories: Clark County Green Schools

Milk dispensers are a two-for-one solution for food AND packaging waste reduction. When giving students the option to dispense how much they will drink and giving a more positive milk drinking experience with a cup instead of a carton, less is wasted.

In the [Pilot for Clark County](#) schools, changing from carton milk to dispensers with washable cups showed the following results:

- All 5 schools showed a reduction in milk waste ranging from 1.15 to 7.25 gallons per day, with an average reduction of about 70% per day.
- Using this data and assuming 180 days in a school year, these schools each prevented an average of 548 gallons of milk from being wasted each year!

Despite the initial cost of installation (Each milk dispenser set up costs between \$4,500 - \$9,000 depending on the number of students), many school districts that have switched to milk dispensers have saved thousands of dollars and created a lighter and cleaner waste stream (no soggy half-filled milk cartons) for custodians to manage.

The success of this pilot is demonstrated in the partnerships and willingness to try new systems. For example, Clark County Green Schools received a \$40,000 grant from Ecology to cover the cost of the dispensers, glasses, dishwashing racks, and other equipment needed. They also worked with school officials on education, planning, and implementation of the pilot, while developing partnerships with the Washington Dairy Council to help support and promote the program (Fig. 23).

» **START** →
strong
with Local Milk

Increase your ADP and reduce waste.
Promote milk dispensers in your school with a turnkey marketing program from the Washington State Dairy Council!

The program offers:

- Posters & digital assets
- Tips tool kit
- Kick-off events
- Milk dispenser signage

Questions?
Bri Kappel, RDN
425.245.2526
brianne@wadairy.org

FUEL UP
with a cup

Find out more at
eatsmart.org/pages/start-strong

Dairy Council

Figure 23. WA Dairy Council start strong campaign (Clark County Green Schools)

What is Anaerobic Digestion?

Anaerobic digestion (AD) is an important part of Washington’s food waste management portfolio. AD is the process where complex microbial communities break down organic matter in a sealed environment in the absence of oxygen. This process produces methane-rich biogas and digestate. In waste management systems, this organic matter is most commonly animal manures, wastewater biosolids, and food wastes (34).

Digestate is the liquid and solid residual material left after digestion. With appropriate treatment, both the solid and liquid portions of digestate can be used in many beneficial applications, including animal bedding (solids), nutrient-rich fertilizers (liquids and solids), precursor chemicals for bio-based products (e.g., bioplastics), and organic-rich compost (solids). Digestate products can be a source of revenue or cost savings and are often pursued to increase the financial and net-environmental benefit of an AD/biogas project (34).

Biogas is composed primarily of methane (generally 40 to 75 percent depending upon source). Raw biogas can be used to provide heat, generate electricity, and power cooling systems, among other uses. Biogas purified to meet the same standards as fossil natural gas (around 97 percent methane) is known as biomethane, or more commonly renewable natural gas (RNG). RNG can be injected into the natural gas distribution system and used in the same manner as fossil natural gas, including transportation fuel, heating, and power generation, or in various industrial applications, including advanced biochemicals and bioproducts.

Washington has three large biogas projects already producing enough RNG to offset 1.3 percent of current fossil natural gas consumption. At present, most of the RNG is being sold into the California market due to the significant value available under that state’s low-carbon fuel standard (35).

Hundreds of additional locations where RNG could be produced in proximity to the natural gas pipeline grid have been identified throughout the state. However, significant investments are needed to generate and condition the biogas to RNG quality standards before it can be injected into the natural gas pipeline grid (35).

While this is an exciting time for AD in Washington, there continue to be barriers to expansion. Barriers to expansion include the costs for installation and maintenance, securing clean reliable waste streams, and improving state and federal carbon reduction credit values for RNG made from food feedstocks. Improvements to RNG values and markets, and the development of end markets for other co-products of AD, will produce revenue or reduce costs for traditional fuels.

Establishing contracts to ensure the flow of clean food waste to digesters will also be necessary to sustain operations. Processing technologies and market values are evolving rapidly, increasing the efficiencies and economic viability of both small and large-scale AD processes. Efforts to expand the use of AD include the requirement that natural gas utilities offer RNG to their retail customers ([E3SHB 1257](#) in 2019) and the passage of a state clean fuel standard ([E3SHB 1091](#) in 2021). Recommendations 27, 28, and 29 further detail opportunities to expand AD in Washington State.

27. Expand AD at WRRFs, compost facilities, and farms



Recommendation

Expand the use of anaerobic digesters at Water Resource Reclamation Facilities (WRRFs), compost facilities, and farms.

Overview

This recommendation focuses on expanding AD at WRRFs, compost facilities, and farms. When fully implemented, our research shows this recommendation has the potential to annually divert 783,817 tons of food waste, while generating an annual net financial benefit of approximately \$28 million from mixed food waste and other feedstock.



Full implementation of AD and RNG production at these facilities would require significant capital investments and development beyond 2030. Improving the ability of WRRFs, compost facilities, and farms to treat more inedible food waste and condition raw biogas to RNG quality standards will likely require state and federal financial support (35).

To start, this recommendation supports the following actions:

- Develop a grant and/or loan program to support expansion of AD and RNG development. This can be done by maintaining and increasing the Dairy Digester grant program through Commerce, and the capital facility grants for WRRFs handled both by Ecology and Commerce.
- Expand state tax incentives to facilitate interconnection with electrical and natural gas pipeline grids.
- Support a carbon-weighted Renewable Portfolio Standard (RPS) for natural gas utilities to reduce carbon emissions, increase demand for RNG, and encourage investments in RNG projects.
- Direct the departments of Ecology and WSDA to work with US EPA to identify ways to coordinate and streamline solid waste, wastewater, air quality, and manure management permitting processes to encourage AD and RNG development, especially the co-digestion of food waste.
- Direct Ecology to explore whether to require regular reporting on the volumes and disposition of food processing waste streams with high energy content.

There are about 300 WRRFs in Washington, and at least 65 operate with digesters. Eleven already use digesters and potentially generate enough biogas to produce and market RNG via pipeline. Another four likely generate enough biogas to viably integrate digesters into their operations (35). There are roughly 350 dairy farms, 10 beef and poultry farms, a few rendering facilities, and a couple dozen egg producers of adequate size to consider hosting a digester or

contributing feedstock to digesters (35) within a short distance of the existing natural gas pipeline grid. Of these 350 dairy farms, nine currently use anaerobic digestion to manage manure, produce energy, and recover fiber and nutrients. Our research showed similar opportunities exist for at least a dozen compost facilities in Washington. These opportunities must be evaluated, especially as more food waste is diverted from landfills, and as more RNG pipeline infrastructure is developed.

An exciting opportunity for AD to become an economically viable addition at smaller farms will likely become available through the state's recently adopted Clean Fuel Standard, which will become effective in 2023. Digesters that generate power from their raw biogas for electric vehicle charging will likely offer substantial carbon reduction benefits, and therefore valuable compliance credits under the program. This will enable smaller-scale digesters, and those not within proximity of the natural gas pipeline grid, to be more financially viable.



Use Food Well Stories: Vander Haak and Edaleen Farms

Vander Haak (Fig. 24) and Edaleen Farms are two Western Washington dairies using anaerobic digestion (AD) for production of renewable electricity from dairy manure and pre-consumer food processing waste. They report adding food processing residuals and other pre-consumer food wastes to AD on dairy farms can more than triple the farm revenues through increased tip fees and RNG generation. AD on dairy farms also generates a range of environmental and economic benefits for the surrounding community.

Smaller dairies (typically under 2,500 cows) have less manure to manage. They often choose to incorporate pre-consumer food processing waste into their digesters to boost biogas production. Food waste tipping fees and energy sales add important income to the dairy's bottom line. Electricity can also be generated to reduce the dairy's costs.

Within both farms, current efforts to improve overall AD profitability include increasing the volume of biogas generated from co-digested manure and food waste, exploring new energy markets, and installing nutrient recovery and depackaging equipment. Networks of depackaging equipment to separate pre-consumer spoiled food from its packaging help create a clean food waste stream for digesters (this is good for composters, too!). State grants continued innovation, and partnerships help drive success with AD at dairy farms.



Figure 24. AD on dairy farms
(Craig Frear, Regenis)

28. Develop high-solids anaerobic digesters for mixed organic residuals



Recommendation

Increase opportunities for high-solids anaerobic digesters (HSAD) in Washington.

Overview

High-solids anaerobic digestion (HSAD) can handle large quantities of post-consumer food waste along with other organic materials, like yard and garden debris. Many municipal collection programs combine these wastes. HSAD systems allow what is often the most putrid portion of municipal solid waste to digest in an enclosed space, capturing methane and other fugitive GHG emissions before further processing (most often composting). HSAD can also help landfills save space, reduce generation of leachate and odors, and control vermin. These attributes make HSAD a natural complement at composting operations, in communities, and some agricultural settings.

This recommendation supports increasing opportunities for HSAD in Washington. When implemented fully, this recommendation has the potential to annually divert 36,842 tons of food waste from the landfill, while generating an annual net financial benefit of approximately \$719,683 from mixed food waste and other feedstock.

HSAD systems have been in use in Europe for many years and can be found in the US in California, Wisconsin, Ohio, Maine, Massachusetts, and New York. HSAD developers have explored opportunities in Washington for many years, especially in the central Puget Sound region. At present, the closest facility that combines HSAD with composting is the Surrey Biofuel Facility in British Columbia. Opened in 2018, this facility is designed to handle 127,000 tons of source separated organics each year.

The high cost of development and construction combined with variable feed stock availability, quality, and prices has hindered efforts to install HSAD in Washington. Research and market support are needed to reduce barriers to this development. This recommendation supports the following actions:

- Supporting Ecology and Commerce to research and identify HSAD development opportunities in Washington.
- Providing state grant funding, similar to the program for dairy digesters, to support HSAD installation at compost facilities.
- Supporting a grant program to off-set the cost of depackaging equipment and develop regional depackaging hub-and-spoke infrastructure.



29. Increase use of small-scale anaerobic digesters



Recommendation

Increase the use of small-scale AD food waste management systems, where viable, through funding, continued research, and innovation.

Overview

Small-scale anaerobic digestion (AD) is gaining traction in Washington. Technology and efficiencies in small-scale AD are evolving rapidly. This recommendation supports building on the existing momentum by reducing barriers to small-scale AD development.

Small-scale AD has demonstrated cost savings and environmental benefits, including the production of valuable digestate, bioenergy, and educational opportunities. A few small-scale AD projects are underway in Washington, and local governments across the state have indicated an interest in supporting small-scale AD development in their communities.

When fully implemented, our research found increasing the use of small-scale AD in Washington has the annual diversion potential of 3,908 tons, with an estimated average annual net financial loss of \$3 million while initial capital costs are paid off. Afterward, this recommendation would continue to divert food waste, while breaking even or selling nutrients for a net benefit.

Our research indicated capital costs, technical assistance, and financial support are the largest barriers to small-scale AD development. This recommendation supports the following key actions to increase small-scale AD development in Washington:

- Support feasibility studies and planning to identify opportunities for small-scale AD to provide viable food waste management options for small generators, rural residents, farms, schools and businesses, and island communities.
- Increase state-level funding, incentives, and programs for small-scale AD projects. Work to compound state-level funding with available federal funding.
- Support local government programs that provide technical assistance and funding for small-scale AD development.
- Continue to support research into innovative small-scale AD systems. Examples include ongoing work by WSU's Center for Sustainable Agriculture and Natural Resources and Gonzaga University.



- Provide pilot project funding and support for programs using digestate to boost soil health, food production, reforestation, and carbon sequestration initiatives. For example, similar to rainwater projects, facilitate a digestate [fertiligation](#) system rebate program for small farms, in collaboration with the [King County Local Food Initiative](#), [CompostWise](#), and other complementary program.
- Provide pilot project funding and support for farm-to-school-to-farm projects integrating STEM and climate curriculum.

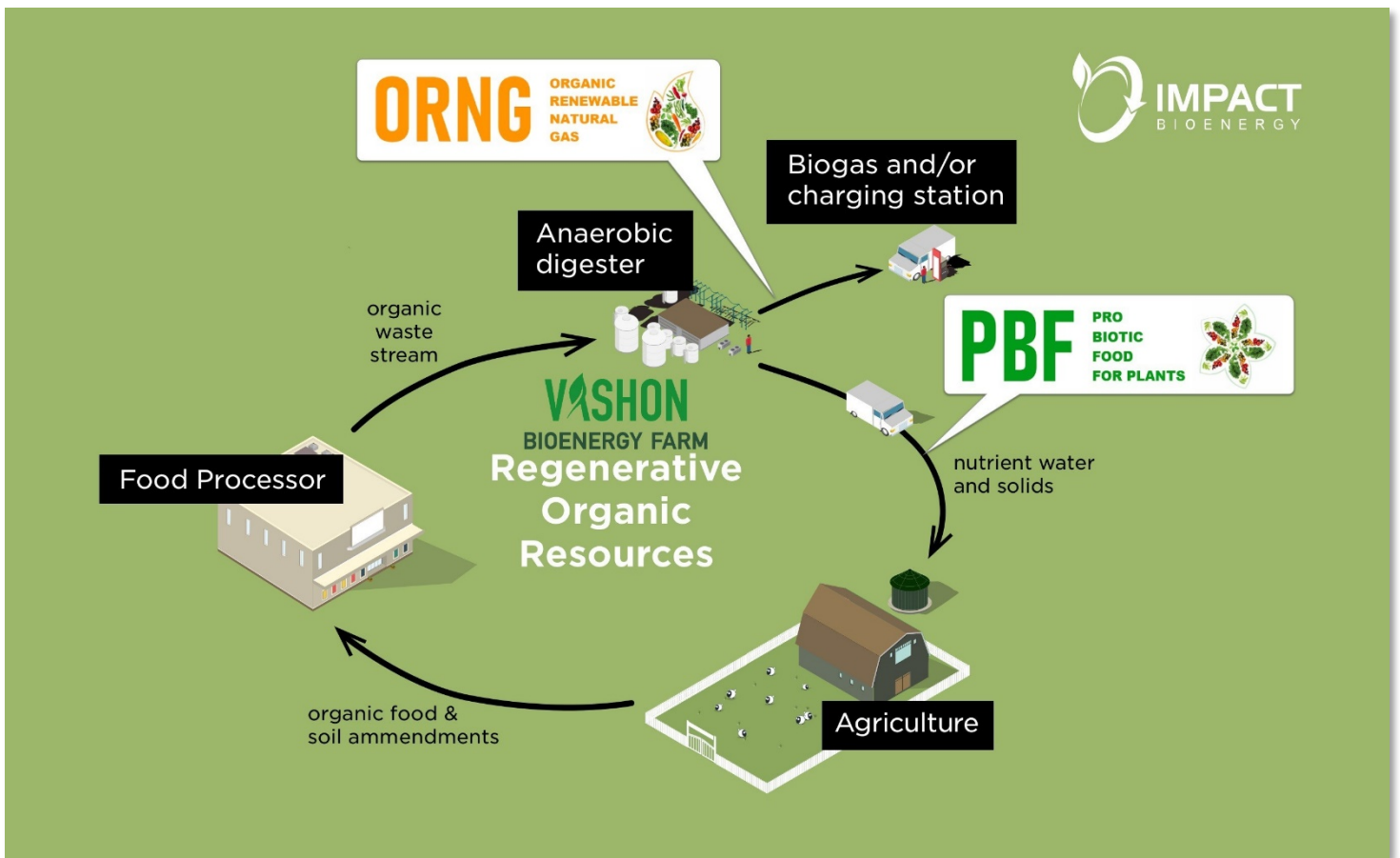


Figure 25. Diagram and photos of Vashon Bioenergy Farm, a community-scale integrated food and bioenergy system on Vashon Island, WA. For every 60 to 80 pounds of “waste” that would otherwise be trucked and long-hauled off island, Impact Bioenergy’s anaerobic digester generates one carbon-negative gasoline or diesel gallon equivalent (ORNG: Organic Renewable Natural Gas), along with 9 gallons of WSDA registered liquid soil amendment (PBF: ProBiotic Food for soil & plants) approved for certified organic producers. The anaerobic digester “biocycles” up to 8,200 pounds of commercial food waste per day (1,500 tons per year) with the potential to mitigate 12,500 MTCO₂E per year of GHGs, which is equivalent to removing 2,700 cars off the road or planting 4,200 new acres of King County Forestland (Impact Bioenergy).

30. Diversify food waste management systems statewide



Recommendation

Increase the development of diversified food waste management systems across Washington.

Overview

This recommendation focuses on diversifying food waste management systems statewide to help close the loop on a food's important nutrient and energy cycle.

Residual food waste can be managed through a variety of food waste management systems. Many of these operations function as closed loop systems that take in local food waste and produce soil enhancing products that can be used locally to grow more food. Others use insects to convert inedible food into a value protein-packed product used for animal or human consumption.

By increasing the development of these systems, Washington can divert over 3,388 tons of food waste from the landfill annually, and receive an annual benefit of approximately \$76,151.

These systems can be installed in the backyards of rural and urban homes as well as spaces in or near businesses to manage food waste.

The following actions are supported to increase the use of backyard/on-site composting, vermicomposting, community composting, and insect conversion of food waste to beneficial products:

- Increase awareness and education for a varied and sustainable food waste management system.
- Support local government programs that provide bins, technical assistance, and grants to residents and businesses that are interested in implementing these systems.
- Create a grant program specific to food waste management and for studies to evaluate diversion impacts (Use Food Well Washington Grants).
- Support cooperative partnerships, pilot projects, and research for established and emerging technologies.



Backyard composting and vermicomposting

“Backyard composting” is the traditional term used to describe the process of converting organics generated on-site using a small compost pile or in a container. Based on a 2008 study from Vancouver, BC, BioCycle magazine reported that backyard composting programs in the region annually diverted between 551 - 915 pounds of organics from the waste stream (36).

Small-scale “vermicomposting,” is the process of converting food scraps into a high-quality soil amendment, which in this context uses red-wiggler worms in a container. While no definitive information exists on the number of at-home vermicomposting systems in operation in Washington State, researchers from Purdue University assert that 64 percent of the compostable waste generated at their test site was diverted from disposal through vermicomposting (37).

Community Composting

The term “community composting” is used here to identify composting programs done on a slightly larger scale that include centralized sites in neighborhoods, community gardens, schools, and civic organizations.

According to the Institute for Local Self-Reliance, composting at the community level provides many benefits, such as improved social interaction, an increase in the quality and quantity of local gardens, greener neighborhoods, and a reduction in urban food deserts (38). Community composting improves local communities and the environment while it helps to improve local soil.

Insects

Another system for beneficially managing food waste involves using insects to convert food waste and moldy grain into an animal feed ingredient. Black soldier fly larvae and darkling beetle mealworms are two examples of how insects can help convert food and crop waste into a value-added end product. The larvae are harvested before they pupate, then are baked or dried and used ‘as is’ for bird or fish feed (39; 40). They can also be processed into a high-quality protein cake or powder and added to animal feed. Additionally, the excrement, or “frass” produced by both types of larvae can be used as an addition to liquid or solid fertilizers to boost crop performance.

Black Soldier Fly Larvae (BSFL)

The black soldier fly is a benign beneficial insect that produces larvae that will eat all types of food waste, wet or dry. They can even eat food that contains packaging waste, consuming all the food while leaving the packaging intact. While the BSFL can eat post-consumer food waste, current focus is on using the BSFL to eat pre-consumer food waste and food processing waste.

While the BSF system is currently considered low-tech and can be labor intensive, research is underway to develop systems that make the process more efficient and less labor intensive (39). More could be understood on how to safely amplify and support BSF systems statewide.

Darkling Beetle Mealworms

Similar to the BSFL, darkling beetle mealworms can convert contaminated food waste into safe food for animal consumption. The mealworm is the larval stage of the darkling beetle and can become a protein rich animal feed ingredient. Mealworms consume dry food waste such as grains that may have been contaminated by molds (mycotoxins), making the grain toxic for humans and animals.

While this is a narrowly focused food waste stream, Washington produces a large amount of grains that, if contaminated by molds, will need safe and beneficial conversion to high-quality animal feed. This system can turn a loss into a gain for grain producers (40).



Use Food Well Stories: Beta Hatch

Beta Hatch (Fig. 26), located in Cashmere, WA, is set on industrializing insect agriculture within a regenerative food system. The start up's insect-rearing technology converts mealworms and their waste into high-value proteins, oils, and nutrients for agriculture.

Beta Hatch is currently building North America's largest mealworm production facility for animal feed, scheduled to be operational in November 2021. Mealworms have a complete amino acid profile and research shows they are a nutritious feed ingredient for a wide variety of animals. Frass, or insect manure, is a natural co-product that can be applied directly to fields to improve soil health, creating a zero-waste food production system.

Cost is a significant hurdle in insect production and economies of scale are needed to reach price parity with fishmeal and other key protein sources. Research showing the health benefits of insect protein versus other protein sources in various species helps to command a premium price over other ingredients, but on-going investment is needed to fund research and to help companies like Beta Hatch over the scaling hurdles.

"Insects can be farmed vertically, indoors, at large scale. They have a complete amino acid profile and a rapidly-growing body of research shows they are a nutritious feed ingredient for a wide variety of animals." – Aimee Rudolph, Beta Hatch



Figure 26. Beta Hatch staff inspect and research mealworms to process food waste and create added-value products (Beta Hatch)

Areas of Future Research

Outside of the listed 30 actionable recommendations, many areas of future research were identified throughout the development of the *UFWW Plan*. The following summaries are of important areas of future research in Washington State.

Equity, Environmental Justice, and Food Security

Many aspects of food waste reduction also align with statewide goals to increase equity and food security within Washington. Inequities exist within overburdened communities, and increasing access to affordable and nutritious produce is a critical area of concern to reduce this burden in Washington. The recently passed HEAL Act ([Senate Bill 5141](#)) directs Washington agencies to reduce environmental impacts to vulnerable populations, including increasing access to nutritious food.

Recommendations in the *UFWW Plan* support these goals, and more could be understood on how this planning process can support equity and environmental justice work in the state. Continued research is needed to learn more on how we can move away from “food deserts,” and into a more resilient and vibrant community where all Washingtonians have access to affordable and adequate nutrition.

Solid Waste Rules and Regulations

Local, county and state regulations need to be examined to better understand how policies can support food waste reduction. Some policies may help or hinder the ability of communities to successfully reduce food waste and wasted food.

Animal Feed

The animal food industry has a long history of using co-products and by-products of the food manufacturing industry as animal feed ingredients. Almost all food and some other industries produce co-products or by-products that can be used as animal feed. One example is distiller’s dried grains which is a by-product of the distillery industry obtained after the removal of ethyl alcohol by distillation from the yeast fermentation process. This common by-product is a good source of nutrients and can be used as an ingredient in various animal feeds, including for poultry and livestock.

Ingredients used for animal feed must be assessed for their safety and efficacy for the intended species or generally recognized as safe (GRAS). Depending on life stage, every species has different nutritional needs. Therefore, their food needs to be assessed for safety and efficacy, which can be difficult with variabilities in the composition of food waste.

In the United States, animal feed ingredient definitions are approved through a process generally carried out by the Association of American Feed Control Officials ([AAFCO](#)) and the [FDA](#) and then [adopted](#) by WSDA for any commercial feed distributed in Washington. Feed labels are reviewed to verify approved ingredients, the accuracy of information, and other safety and consumer protection requirements. In addition to ingredient verification, relevant

processing operations, transportation, and storage of animal feed must be done in a safe and sanitary manner to prevent illness or death. WSDA helps to ensure this through licensing, registrations, outreach, inspections, and investigations.

To improve upon strategies outlined in this plan, more research is needed to better understand the flow of current non-meat food to animal feed operations – whether it’s directly feeding food waste to animals or delivering food processing by-products to animal feed manufacturers.

The [Washington State food waste management evaluation](#) may provide a good starting point for tracking how much food waste is sent to animal feed operations, where the food originates, and how its final destination is determined. Identifying the barriers to getting more non-meat food by-products to animal feed producers is necessary. Finally, food safety, verification of approved ingredients, quality, and composition of feedstock, and reliability of the supply chain are key concerns and that must be addressed.

Improve Markets

A key component to developing recovery systems is increasing the value, consistency, and quality of feed stocks for these systems. More could be understood on how to develop and sustain these markets. This work can be facilitated by the Washington Center for Sustainable Food Management (Rec. 5), and should focus on the following subject areas:

- **RNG from Anaerobic Digestion** – Research on how to increase the value of RNG in Washington is ongoing. Increasing the value of RNG would increase incentives to convert food residuals into energy. Current rates and pricing appear to be a barrier to increased anaerobic digester use for using food waste as part of the state’s energy generation programs. Investing in a renewable energy standard and more research on how to increase value of RNG would greatly support the state’s food waste reduction efforts.
- **Digestate and nutrients from Anaerobic Digestion** – Other by-products from AD contain valuable nutrients and fibers that are valuable alternatives to extracted resources (such as phosphorous, nitrogen, and peat moss). Expanding markets for these products will further support the positive environmental impacts of AD.
- **Compost** – More needs to be understood on how to best expand the amount of food waste collected for composting while reducing contamination in collected food waste. This will improve the quality and quantity of finished compost.
- **Biochar** – Biochar can be made from woody debris and added to composting and AD processes. More could be understood on how biochar can be used to improve nutrient recovery and moisture retention in compost and AD products.
- **Extracts from food waste** – Continue to support studies and research currently underway in Washington into the extraction and use of value-added chemicals, scents, and medical products from food waste.

Food packaging research

Trade-offs and complexities exist in the relationships between food packaging, food safety, food preservation, and the environmental impacts of the packaging. These tradeoffs need better identification when it comes to preserving food through packaging. Future research can be supported by connecting the *UFWW* Plan with Washington's CROP plans, an on-going opportunity to leverage joint research. Food packaging research should focus on:

- **Food preservation** – Preserving food is a priority from a life cycle analysis perspective, but more could be understood on these tradeoffs. For example, a plastic-wrapped vegetable might last longer, but at what cost? More could be understood on how to optimize packaging to increase preserving food while reducing contamination and environmental impacts.
- **Compostable packaging** – Compostable packaging is an understudied emerging issue. Some facilities do not accept compostable packaging and consider it a contaminant of their organics and food waste management systems. More could be understood on how to develop truly compostable packaging that increases the shelf life of food. Research should be conducted to better understand the challenges and barriers that currently exist for compostable packaging. Can compostable packaging provide increased shelf life to food, and if so, in what way and under what conditions?
- **Contamination reduction** – More could be understood on how to best reduce contamination of organics and food waste residuals. The contamination of organics and food waste is a major ongoing issue in Washington and has the potential to increase as more food waste is diverted from landfills.
- **Depackaging technology and processes** – Innovation and research are needed on how to best use depackaging infrastructure to increase the value of food waste in Washington. Contamination can be an issue with some depackaging machinery, which can decrease the value of the related feedstock. More could be understood on depackaging needs and processes in Washington.

PFAS in compost research

Per- and polyfluoroalkyl substances (PFAS) are a group of synthetic chemicals that have been in use since the 1940s. There is evidence that continued exposure above specific levels to certain PFAS may lead to adverse health effects (41). PFAS are found in a wide array of consumer and industrial products including food packaging and industrial fire retardant materials. Due to their widespread use and persistence in the environment, most people in the United States have been exposed to PFAS.

Currently, there is no national or state PFAS threshold for soils or compost. The consensus is that inclusion of food scraps, food packaging, and biosolids in composting operations will introduce some amount of PFAS, but testing has shown the levels to be low (42).

Recognizing the impact that PFAS in food packaging is having on human and environmental health, the Washington State legislature passed a bill in 2018 that prohibits the use of PFAS in paper food packaging. Ecology's Hazardous and Toxics Reduction Program created a [focus sheet](#)

to describe the impacts of that legislation. In addition to continuing the ongoing work and research on PFAS, more could be understood on the impacts of PFAS and how to best manage the impacts of these chemicals.

Blockchain technology

The blockchain in food supply chains and agriculture is estimated to be worth \$60.8 million in 2018, projecting to reach \$429.7 million by 2030 (43). Blockchain is an emerging digital technology allowing financial transactions among distributed parties, without the need for intermediaries, such as banks or brokers. Since 2014, blockchain has been used increasingly across industries and sectors, including for tracking and distributing goods through a supply chain (44).

In 2019, Washington State Governor Jay Inslee signed SB 5638-an act “recognizing the validity of distributed ledger technology” into law. This Act encourages the development of blockchain and recognizes its use in commerce and digital signatures.

More could be understood on how Washington can use blockchain to increase market share for farmers, decrease costs and food waste across the food supply chain, and how the technology can be used to monitor food safety (45).

In addition to research, state-level policies will be needed to help support investment in this technology. Similarly, advocacy at the federal level will be needed to create the optimal environment to support blockchain use across the food supply chain.

Glossary

A

Anaerobic digester (AD) - A vessel that processes organic material into biogas and digestate through microbial decomposition under anaerobic (low oxygen) conditions

B

Bill Emerson Good Samaritan Food Donation Act – Federal act passed in 1996 that protects those who donate edible food in good faith from any liability.

Biochar - A solid material obtained from thermochemical conversion of biomass in an oxygen-limited environment.

Biogas – A gaseous fuel, especially methane, produced by fermentation of organics matter.

Black Soldier Fly Larvae (BSFL) – The black soldier fly is a harmless insect very good at consuming food waste and making larvae that function as an excellent protein source for animal feed.

C

Cold chain management– Interconnected cold storage system designed to keep food cold (reducing spoilage) from farm through the handling system to final purchase.

Compost contamination – Any “chemical, physical, biological, or radiological substance that does not occur naturally in the environment or that occurs at concentrations greater than natural background levels” found in raw collected organics and finished compost.

Compostable product – Any product specifically manufactured to break down in a compost system at the end of its useful life. May be made from plastic, paper, or plant fibers, along with other ingredients that provide necessary form and functionality.

Compostable plastic – A plastic that undergoes degradation by biological processes during composting to yield carbon dioxide (CO₂), water, inorganic compounds, and biomass at a rate consistent with other known compostable materials and that leaves no visible, distinguishable, or toxic residue.

Composting - The biological degradation and transformation of organic solid waste under controlled conditions designed to promote aerobic decomposition. Natural decay of organic solid waste under uncontrolled conditions is not composting.

Contaminant - Any chemical, physical, biological, or radiological substance that does not occur naturally in the environment or that occurs at concentrations greater than natural background levels.

D

Depackaging – The process, either manual or mechanical, of removing the packaging [around food]. Packaging is separated from food so the food can be managed beneficially: if edible, distributed to HRO's or value-added processors, if inedible, distributed to animal feed producers, composters, or anaerobic digesters.

Diversions –The act or actions taken to direct edible food away from disposal or conversion outlets (such as compost and AD) to hunger relief organizations, or food waste from landfill disposal to soil and energy conversion outlets.

E

Edible food – Food that can be eaten by humans.

Energy recovery - A process operating under federal and state environmental laws and regulations for converting solid waste into usable energy and for reducing the volume of solid waste. The recovery of energy may include mass burning or refuse-derived fuel incineration, or other means of using the heat of combustion of solid waste that involves high temperature (above twelve hundred degrees Fahrenheit). ([WAC 173-350-100](#))

EPA Food Waste Hierarchy – The Federal tiered system that promotes food waste prevention, in a tiered diagram, with source reduction at the top, then feeding people, feeding animals, feeding industrial conversion efforts, landfilling, incineration.

F

Food – Food or drink products for human consumption.

Food desert - Geographic areas where access to affordable, healthy food options (aka fresh fruits and veggies) is limited or nonexistent because grocery stores are too far away.

Food Hub - A centrally located facility with a business management structure facilitating the aggregation, storage, processing, distribution, and/or marketing of locally/regionally produced food products.

Food insecurity - The limited or uncertain availability of nutritionally adequate and safe foods, or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.

Food Loss and Waste (FLW) – Food loss: refers to food that gets spilled or spoils before it reaches its final product or retail stage; Food waste refers to edible food left or discarded.

Food rescue - The process of collecting surplus food and donating it to organizations that serve people who need it.

Food system The inter-related resources, inputs, production, transport, processing, manufacturing, retailing, and consumption of food as well as its impacts on environment, health, and society. Food systems are in a continuous state of change and adaptation.

Food waste - Waste from fruits, vegetables, meats, dairy products, fish, shellfish, nuts, seeds, grains, and similar materials that result from the storage, preparation, cooking, handling, selling, or serving of food for human consumption. "Food waste" includes, but is not limited to, excess, spoiled, or unusable food and includes inedible parts commonly associated with food

preparation such as pits, shells, bones, and peels. "Food waste" does not include dead animals not intended for human consumption or animal excrement. ([RCW 70A.205.715](#))

Food waste analytics – Using information gathered through food waste data tracking to identify where and how to best reduce food waste generation.

Food waste baseline – The year identified as the starting point for comparing food waste generation rates to rates calculated in the years following the baseline year.

Food Waste Reduction Act - ESHB 1114 – ([RCW 70A.205.715](#))

G

Greenhouse gas(es) (ghg) - Includes methane (CH₄), carbon dioxide (CO₂), Nitrous Oxide (N₂O), Water (H₂O), and Ozone (O₃) that absorb and emit infrared radiation which in turn warms the planet.

H

Hunger Relief Organization (HRO)– An organization that works to capture edible food from grocery stores, restaurants, and individual donors for distribution to those in need.

I

Imperfect produce – U.S produce grading standards assign “grades” to produce that indicate levels of “perfection.” “Imperfect produce” includes fruits and vegetables that do not meet grading specifications due to color irregularities, scars, damage, size, or shape, but are otherwise edible and nutritious.

J

Jurisdictional Health Department (JHD)/ Local Health Jurisdictions (LHJ) - A city, county, city-county, or district public health department.

K

K-12 – Common designation for US schools – grades kindergarten (K) thru senior class in high school (12).

L

Local - A limited geographic area that can include neighborhoods, communities, cities and counties.

Local government – A local governing body that can include city and county governments.

Local Health Jurisdictions (LHJ) / Jurisdictional Health Department (JHD) - A city, county, city-county or district public health department.

[Local Solid Waste Financial Assistance \(LSWFA\)](#) – A Washington Department of Ecology grant program that provides funding to local governments for solid and hazardous waste planning and implementation, as well as enforcement of solid waste rules and regulations.

Lower-grade produce – U.S produce grading standards assign “grades” to produce that indicate levels of “perfection.” Lower-grade produce includes fruits and vegetables that do not meet

grading specifications but are otherwise edible and nutritious. Specifications include standards for produce color, size, and appearance and are particularly important for trade.

M

N

Nutrient recovery – The process of managing food and manure residuals to recover the beneficial chemicals (like nitrogen and phosphorus) embodied in food and manure.

Nutritionally adequate – Nutrition available in food consumed is adequate to provide the nutrients needed to maintain health.

O

Off-site waste management – Removing waste from the point of generation for disposal or conversion to beneficial products such as compost, energy, and nutrients.

On-site waste management – Keeping waste at the point of generation to convert the waste into beneficial products such as compost, energy, and nutrients – typically for use on-site.

Organics management facility - Any facility, either enclosed or in open air, using techniques and technologies to convert organic materials into useable end products including compost, mulch, castings, and digestate.

Organic materials - Any solid waste that is a biological substance of plant or animal origin capable of microbial degradation. Organic materials include, but are not limited to, manure, yard debris, food waste, food processing wastes, wood waste, and garden wastes.

P

Pacific Coast Collaborative (PCC) – A collaboration between California, Oregon, Washington, British Columbia, and select local governments within those jurisdictions that promotes efforts to accelerate the transformation of energy systems, buildings, transportation, and food waste management within the region.

Pacific Coast Food Waste Commitment (PCFWC) – The Pacific Coast Collaborative’s regional food waste reduction partnership.

Pay-As-You-Throw (PAYT) – An accounting system for waste disposal through which people pay a graduated disposal rate based on the amount of waste they put out for collection (size of collection cart or number of bags).

Prevention – Avoiding the wasting of food in the first place and represents the greatest potential for cost savings and environmental benefits for businesses, governments, and consumers. (Also known as source reduction.) ([RCW 70A.205.715](#))

Public Participation Grants (PPG) – A Washington Department of Ecology grant program that provides funding to individuals and not-for-profit public interest organizations to increase public understanding and involvement in cleaning up contaminated sites and improving recycling and waste management.

Q

R

Recovery - The processing of inedible food waste to extract value from it, through composting, anaerobic digestion, or for use as animal feedstock. (RCW 70A.205.715)

ReFED – Rethink food waste through economics and data – national group working to reduce food waste using information and partnerships.

Regional – A limited geographic area with varying contexts in the plan. Regions can exist within Washington (for example Southwest Region) or can be about the West Coast Region (California, Oregon, Washington, and British Columbia).

Renewable Identification Number (RIN) - A serial number assigned to biofuel to track its production, use, and trading as required by the United States Environmental Protection Agency's Renewable Fuel Standard (RFS) implemented according to the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007.

Renewable Natural Gas (RNG) - Biogas that has been upgraded for use in place of fossil natural gas. The biogas used to produce RNG comes from a variety of sources, including municipal solid waste landfills, digesters at water resource recovery facilities (wastewater treatment plants), livestock farms, food production facilities, and organic waste management operations (46).

Rescue - Refers to the redistribution of surplus edible food to other users. ([RCW 70A.205.715](#))

S

Shelf-life – The estimated time a food product will remain safe for human consumption.

Social Cost of Carbon (SCC) - An estimate, in dollars, of the economic damages that would result from emitting one additional ton of greenhouse gases into the atmosphere. The SCC puts the effects of climate change into economic terms to help policymakers and other decision makers understand the economic impacts of decisions that would increase or decrease emissions.

Statewide – Affecting or extending through all parts of the state.

Supply chain - A network between a company and its suppliers to produce and distribute a specific product to the final buyer. This network includes different activities, people, entities, information, and resources. The supply chain also represents the steps it takes to get the product or service from its original state to the customer.

Sustainable food system - A system that is profitable throughout, ensuring economic stability, has broad-based benefits for society, securing social sustainability, and that it has a positive or neutral impact on the natural resource environment, safeguarding the sustainability of the environment.

T
U

United Nations Sustainable Development Goals (UN SDG) – Also known as the Global Goals, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030 (47).

V

Value-added food processing hub - Small scale, community-oriented food processing cooperatives to minimally process select crops, primarily from small and mid-sized farms, or to re-package large quantities of food into smaller packages for individual or small group use.

Vermicomposting - The controlled and managed process by which live worms convert organic residues into dark, fertile, granular excrement (“castings”). ([WAC 173-350-100](#))

W

[Washington State Organics Management Hierarchy](#) – The Washington State strategy for managing organics in an order that represents best available options in Washington State.

Waste Characterization Study (WCS) – Study of select loads of waste being delivered to pre-determined disposal sites are examined and sorted into various categories to identify the separate types of waste being disposed. The information from these sorts is then extrapolated to provide a snapshot of total wastes disposed.

[Waste Reduction Recycling and Education Grants \(WRRED\)](#) – A Washington Department of Ecology grant program that provides up to \$60,000 to qualified local governments and non-profit organizations for local or statewide education programs designed to help the public with litter control, waste reduction, recycling, and composting.

Wasted food - The edible portion of food waste. ([RCW 70A.205.715](#))

Water resource recovery facility (WRRF) – Updated term that replaces “wastewater treatment facility” that more clearly identifies the water recovery aspect of the sewage treatment system. recovery aspect of the sewage treatment system.

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Appendix A. Washington annual food waste data

Table 7. Washington annual food waste data

	2015 tons	2016 tons	2017 tons	2018 tons
Edible food disposed, all sectors*	390,063	415,807	430,468	479,428
Edible food disposed, residential sector	166,427	177,411	183,666	273,275
Edible food disposed, commercial sector	199,566	212,737	220,238	162,521
Edible food disposed, self-hauled sector	23,790	25,361	26,255	43,195
Inedible food disposed, all sectors	421,908	449,754	465,611	295,298
Inedible food disposed, residential sector	217,766	232,138	240,323	206,498
Inedible food disposed, commercial sector	189,913	202,448	209,585	58,486
Inedible food disposed, self-hauled sector	13,898	14,816	15,338	30,144
Recovered food waste, all sectors	346,775	353,268	306,292	287,296
Recovered food waste, residential sector	43,913	69,575	49,324	38,588
Recovered food waste, commercial sector	302,862	283,693	256,968	248,708
Food waste generated total, all sectors	1,158,746	1,218,829	1,202,371	1,062,022

* Sector data for disposed wastes do not sum to “all sector” disposed totals as disposal sectors are calculated based on estimated quantities of waste disposed by each sector, and disposal totals are based on statewide total quantities disposed.

Appendix B. Economic Analysis

Overview of Approach

Ecology estimated the costs, benefits, and potential diversion resulting from the 30 recommendations with a set of goals in mind:

- Comparable estimates: Using consistent underlying assumptions, timeframe, and unit values
- Versatile results: Estimates that can be considered individually or combined with others
- Interrelated impacts: Reflecting ways recommendations may facilitate, reduce costs, or increase benefits of other recommendations
- Avoiding double-counting: Ensuring impacts are not reflected more than once in total calculations.
- Ordered, flexible timing: Reflecting the cost of financing capital projects and deployment of large-scope projects over time

Precision and uncertainty

The degree and precision of Ecology’s quantified estimates necessarily rely on the specificity and scope of each recommendation. Estimates presented should be considered “high-level” and are based on assumptions regarding implementation and scope, including:

- Statewide versus geographically variable deployment of administrative recommendations (e.g., K-12 related recommendations, local health jurisdictions)
- The number, locations, and attributes of potentially large capital investments (e.g., anaerobic digesters, hubs, transportation)
- Degree of uptake of voluntary programs and improved regulatory structures (e.g., composter expansion, food donation)
- Speed of research and development in understanding the food system and distributing information or establishing networks
- Recommendations with a range of possible implementations are reflected in estimates using a subset or scenario

The degree to which assumptions such as the list above would affect estimates varies by recommendation or applies to specific illustrative scenarios that may not reflect all of the options a recommendation suggests.

Cost scope

Ecology based annual or annualized costs on the cost of implementation, as well as initial development, capital investment, staffing, or other startup costs of an implemented recommendation. Ecology cited references using discount rates and combined approaches, and annualized capital costs over 10 years using a 4 percent discount rate to maintain consistency across independent calculations.

Benefit scope

Capital costs are annualized because most impacts reported here are scalable by tons of food waste. Most unit costs and benefits are calculated yearly. Estimated impacts may be less scalable for recommendations with uncertain development and repayment timelines, highly variable site-specific attributes, or significant capital investment. Cost estimates reflect state administrative costs for each recommendation, as well as the costs for businesses and local governments to implement project process changes, equipment purchases, and staffing. Costs and benefits of recommendations that involve a public development process, rulemaking, or research will vary depending on the outcomes of those processes.

Sources and application

Ecology used nearly 60 cumulative sources across analyses of the 30 recommendations. Many are used across multiple recommendations to develop consistent, comparable estimates and methodological approaches.

- Estimates for some recommendations were independently developed based on Washington-specific data, research, and assumptions.
- In some cases, Ecology was able to scale estimates from the literature to apply a cost or benefit per ton diverted.
- Staff extrapolated tons of food waste diverted from the implementation costs of similar programs in some cases.
- Where a Washington-specific estimate was available from the 2020 ReFED (Rethinking Food waste through Economics and Data) Insight Engine or data was available at the state and sector levels, staff either applied them or adjusted them so the scope or direction of recommendations in this plan was accurately reflected.
 - To ensure ReFED estimates were or were not applicable - and to what degree - staff studied their underlying methodologies and assumptions that were not restricted to the affected sectors and unit values of underlying costs and benefits.
 - Where estimates could be refined with additional or new data relevant specifically to Washington, Ecology included the data in calculations.
 - To allow for some variable assumptions, staff estimated ranges of impacts and present the median of each range.

Special cases: financing recommendations

Recommendations 14 and 16 address the financing of the other recommendations directly or through local governments. Ecology calculated the impacts for these and related recommendations and added the estimated costs to implement the funding and distribution program independently through local staff. The impacts summarized below are the result of these two funding mechanisms and reflect all impacts of all other recommendations, including independent implementation costs.

Estimated impacts by recommendation

Most impacts reported here are scalable by tons of food waste because capital costs are annualized and most unit costs or benefits are calculated yearly. Estimated impacts may be less scalable for recommendations with uncertain development and repayment timelines, highly variable site-specific attributes, or significant capital investment. Cost estimates reflect state administrative costs of each recommendation, costs of implementing projects, equipment purchases, and staffing at businesses or local governments. Costs and benefits of recommendations that involve a public development process, rulemaking, or research will vary depending on the outcomes of those processes. Cost estimates are outcomes of this research and are not the same as implementation cost estimates included in fiscal notes.

Table 8. Recommendation summary table

Rec#	Annual Costs (\$/yr)	Annual Gross Benefits (\$/yr)	Annual Net Benefits (\$/yr)	Avoided Transaction Costs (\$/yr)	Diversion Potential (tons/yr)	Edible Diversion Potential (tons/yr)	GHG Impact (MTCO _{2e} /yr) ^a	Avoided SCC 2022 (\$/yr) ^b	Avoided SCC 2030 (\$/yr) ^c
FEDERAL POLICY									
1	\$1,509,577	\$21,617,056	\$20,107,480	\$0	16,311	16,311	-23,467	\$1,854,690	\$2,099,876
2	\$177,706	\$53,193,216	\$53,015,511	\$0	12,771	12,771	-18,374	\$1,452,138	\$1,644,108
3	\$6,679,400	\$25,930,461	\$19,251,061	\$0	10,206	10,206	-14,684	\$1,160,529	\$1,313,949
4	\$19,875,000	\$12,455,000	-\$7,420,000	\$0	10,150	10,150	-14,603	\$1,154,095	\$1,306,664
<i>Subtotal</i>	<i>\$28,241,682</i>	<i>\$113,195,733</i>	<i>\$84,954,052</i>	<i>\$0</i>	<i>49,437</i>	<i>49,437</i>	<i>-71,128</i>	<i>\$5,621,453</i>	<i>\$6,364,597</i>
STATE POLICY									
5	\$1,000,000	\$7,924,138	\$6,924,138	\$7,924,138	n/a	n/a	n/a	n/a	n/a
6	\$203,958	\$669,838	\$465,880	\$669,838	n/a	n/a	n/a	n/a	n/a
7	\$134,236	\$204,844	\$70,609	\$204,844	n/a	n/a	n/a	n/a	n/a
8	\$1,571,114	\$4,775,726	\$3,204,612	\$0	73,903	0	-106,329	\$8,403,526	\$9,514,455
9	\$5,282,227	\$5,411,445	\$129,217	\$0	54,000	0	-77,693	\$6,140,284	\$6,952,017
10	\$2,776,883	\$27,617,172	\$24,840,289	\$0	5,375	5,375	-7,733	\$611,183	\$691,980
11	\$16,517	\$175,380	\$158,864	\$0	3,168	3,168	-4,558	\$360,232	\$407,854
12	\$16,517	\$137,348	\$120,831	\$0	2,481	2,481	-3,570	\$282,113	\$319,408
13	\$6,097,438	\$6,609,118	\$511,681	\$0	2,931	2,931	-4,217	\$333,258	\$377,314
<i>Subtotal</i>	<i>\$17,098,889</i>	<i>\$53,525,010</i>	<i>\$36,426,120</i>	<i>\$8,798,820</i>	<i>141,858</i>	<i>13,955</i>	<i>-204,100</i>	<i>\$16,130,596</i>	<i>\$18,263,028</i>

Rec#	Annual Costs (\$/yr)	Annual Gross Benefits (\$/yr)	Annual Net Benefits (\$/yr)	Avoided Transaction Costs (\$/yr)	Diversion Potential (tons/yr)	Edible Diversion Potential (tons/yr)	GHG Impact (MTCO2e /yr) ^a	Avoided SCC 2022 (\$/yr) ^b	Avoided SCC 2030 (\$/yr) ^c
FUNDING									
14*	\$299,842,657	\$1,362,793,518	\$1,062,950,861	\$0	1,225,377	168,776	-1,763,024	\$139,337,107	\$157,757,186
15	\$47,781,785	\$462,714,420	\$414,932,634	\$0	104,179	104,179	-149,889	\$11,846,148	\$13,412,184
16*	\$43,686,069	\$108,371,798	\$64,685,729	\$0	100,238	22,427	-144,218	\$11,398,019	\$12,904,813
17	\$5,343,210	\$10,469,797	\$5,126,588	\$0	4,508	4,508	-6,486	\$512,632	\$580,401
<i>Subtotal*</i>	<i>53,124,995</i>	<i>473,184,217</i>	<i>420,059,222</i>	<i>0</i>	<i>108,687</i>	<i>108,687</i>	<i>-156,375</i>	<i>12,358,780</i>	<i>13,992,585</i>
PUBLIC EDUCATION									
18	\$2,319,436	\$139,041,652	\$136,722,216	\$0	31,014	0	-44,622	\$3,526,611	\$3,992,822
19	\$2,319,436	\$2,695,576	\$376,140	\$0	15,507	0	-22,311	\$1,763,306	\$1,996,411
<i>Subtotal</i>	<i>\$4,638,873</i>	<i>\$141,737,229</i>	<i>\$137,098,356</i>	<i>\$0</i>	<i>46,521</i>	<i>0</i>	<i>-66,933</i>	<i>\$5,289,917</i>	<i>\$5,989,233</i>
INFRASTRUCTURE									
20	\$21,731,857	\$97,514,815	\$75,782,958	\$0	20,359	20,359	-29,291	\$2,314,982	\$2,621,018
21	\$52,980	\$2,641,379	\$2,588,400	\$2,641,379	n/a	n/a	n/a	n/a	n/a
22	\$31,262,219	\$215,068,931	\$183,806,713	\$0	48,300	48,300	-69,493	\$5,492,211	\$6,218,270
23	\$30,129,769	\$99,709,883	\$69,580,114	\$0	22,427	22,427	-32,267	\$2,550,164	\$2,887,291
24	\$7,368,073	\$64,572,353	\$57,204,280	\$0	25,405	25,405	-36,552	\$2,888,828	\$3,270,725
25	\$28,300,064	\$68,440,799	\$40,140,735	\$0	27,854	0	-40,076	\$3,167,287	\$3,585,996
26	\$1,189,734	\$3,087,769	\$1,898,034	\$0	6,811	6,811	-9,800	\$774,497	\$876,884
27	\$105,489,939	\$133,479,107	\$27,989,168	\$0	783,817	0	-1,127,725	\$89,127,518	\$100,909,993
28	\$2,712,454	\$3,432,137	\$719,683	\$0	36,842	0	-53,007	\$4,189,316	\$4,743,135
29	\$4,279,206	\$1,244,809	-\$3,034,396	\$0	3,908	0	-5,622	\$444,328	\$503,067
30	\$254,993	\$331,144	\$76,151	\$0	3,388	0	-4,875	\$385,248	\$436,177
<i>Subtotal</i>	<i>\$232,771,286</i>	<i>\$689,523,127</i>	<i>\$456,751,841</i>	<i>\$2,641,379</i>	<i>979,112</i>	<i>123,303</i>	<i>-1,408,708</i>	<i>\$111,334,380</i>	<i>\$126,052,556</i>
TOTAL^a	\$343,528,726	\$1,471,165,316	\$1,127,636,590	\$11,440,200	1,325,615	295,381	-1,907,243	\$150,735,126	\$170,662,000

*Fields marked with an asterisk reflect funding of other recommendations. Their overlapping costs and benefits are excluded from the final total to avoid double counting.

^aTo reflect the possibility of independent, local implementation of funded projects, the total includes a local staffing cost for each county.

a Avoided greenhouse gas emissions are the median impact of shifting food waste away from landfills and do not include lifecycle impacts such as reduced or increased transportation.

b Based on the 2022 Social Cost of Carbon at a 2.5% discount rate.

c Based on the 2030 Social Cost of Carbon at a 2.5% discount rate.

Appendix C. Recommendation index by strategy, lead agencies, and food sectors

Table 9. Recommendation index by strategy, lead agencies, and food sectors

Recommendation	Prevention	Rescue	Recovery	Ecology	DOH	Commerce	WSDA	OSPI	Farmers and Ranchers	Transportation, storage, and logistics	Retail food businesses	Schools and institutions	HROs	Food service and hospitality	Community and residential	Food manufactures and processors	Composters and anaerobic digesters	Local governments	Washington State Legislature
1	X	X		X	X		X		X	X	X	X	X	X	X	X		X	X
2	X	X		X	X					X	X		X	X	X	X		X	X
3	X	X	X	X			X	X	X	X	X	X	X	X	X	X			X
4	X	X	X	X	X	X	X		X	X	X		X	X	X	X			X
5	X	X	X	X					X	X	X	X	X	X	X	X	X	X	X
6	X	X	X	X						X	X		X	X		X		X	X
7	X	X	X	X			X		X	X	X	X	X	X	X	X		X	X
8	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X
9			X	X			X		X	X							X	X	X
10	X	X						X		X		X	X		X			X	X
11	X	X						X		X		X							X
12	X	X						X		X		X							X
13	X	X	X	X			X	X	X			X	X		X			X	X
14	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	X	X	X		X		X				X	X	X	X	X	X	X	X	X
16	X	X	X	X		X			X	X	X	X	X	X	X	X	X	X	X
17	X	X	X	X			X	X	X			X	X					X	X

Recommendation	Prevention	Rescue	Recovery	Ecology	DOH	Commerce	WSDA	OSPI	Farmers and Ranchers	Transportation, storage, and logistics	Retail food businesses	Schools and institutions	HROs	Food service and hospitality	Community and residential	Food manufactures and processors	Composters and anaerobic digesters	Local governments	Washington State Legislature
18	X	X	X	X					X	X	X	X	X	X	X	X	X	X	X
19			X	X					X	X	X	X	X	X	X	X	X	X	X
20	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X
21	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	x	X
22	X	X		X			X		X	X	X	X	X	X	X	X		X	X
23	X	X		X		X	X		X	X	X	X	X	X	X	X		X	X
24	X	X	X	X		X	X		X	X			X		X	X	X	X	X
25	X	X	X	X	X	X	X		X	X						X		X	X
26	X	X	X	X				X	X	X		X	X						X
27			X	X		X	X		X	X							X	X	X
28			X	X		X	X		X	X							X	X	X
29			X	X		X			X	X	X	X	X	X	X	X	X	X	X
30			X	X		X	X		X	X	X	X	X	X	X	X	X	X	X

Appendix D. Subject matter expert and public engagement summary

Through the direction of RCW [70A.205.715](#), Ecology, and partnering agencies prioritized input from subject matter experts and the public frequently throughout the planning process. Subject matter expert (SME) work groups were created during the planning process to help develop recommendations and to identify barriers and actionable solutions to reduce food waste and wasted food. Two public comment periods were held, one at the beginning of the planning process, and one later in 2021 on the first completed draft of the plan.

To develop the plan, Ecology and the partnering agencies facilitated public comment periods, along with dividing the SMEs into five workgroups to address the critical areas outlined in the law. The five workgroups were:

- Hunger relief
- Food businesses
- Food safety
- Education and behavior change
- Collection and conversion

Workgroups began in the fall of 2019, and in March 2020, all workgroups moved online to continue the collaboration and plan review process. Despite the coronavirus pandemic response pulling many experts and partnering agencies to front line work, collaboration continued into 2021 to develop the recommendations. Necessary and actionable solutions to food waste and wasted food reduction were identified throughout the pandemic, largely thanks to many of the SME's commitment to the planning process.

In addition to establishing workgroups, the first public comment session was facilitated by Ecology in the fall of 2019. Little feedback was received, and no official comments were filed. After the first draft was completed, a second public comment period was facilitated by Ecology from August 30 to September 10.

During this public comment period, 21 comments were received, with 20 sharing support and suggestions for improving the recommendations. Letters of support were also received.

To process the public feedback, Ecology staff made a complete list of potential actions from the feedback received. This list was reviewed by the partnering agencies and experts, and feedback and improvements were added to the plan as allowed by the scope of the law. Ecology staff mapped actions across the public comments and noted an overwhelming majority of points made in the public feedback were incorporated into the final draft. Thanks again to all who made the time to review the plan and to provide input.

Appendix E. Barriers to food waste reduction

The planning process identified the following barriers as major challenges to reducing food waste in Washington.

Access to financing

Food waste reduction solutions have varying returns depending on their complexity, which can result in a lower return on investment. In addition to already tight profit margins, this discourages businesses and consumers from investing in food waste reduction. Similarly, many food waste reduction projects have high up-front costs that discourage investment despite their long-term economic benefits.

Truly understanding the value of food

A greater effort and a cultural shift are needed to help consumers and businesses truly understand the value of food so they use food well.

Hunger relief and food rescue support needed

The greatest need for HROs is to modernize and increase storage and distribution capacity across the state's interconnected system of food banks. Increasing access to cold chain facilities, transportation mapping, and related technology would dramatically transform system performance. Additionally, food pantries, meal programs, and other community organizations may not have sufficient infrastructure or labor to accept, inspect, and store large volumes of donated food. This problem is more acute in rural communities. Similarly, many consumer-facing businesses lack sufficient facilities to store food for donation.

Washington provides funding for local hunger relief agencies through the Emergency Food Assistance Program (EFAP) managed by Washington State Department of Agriculture (WSDA). Through this program, WSDA distributes funding to county-level lead contractors that make funding allocation decisions for their county. There is no special category for regional distribution hubs or state strategy for systems-level improvements. This means all hunger relief agencies in a county compete for a share of local funding, although they may have different roles in the statewide network.

The current situation is not conducive for systems-level investment strategies, such as dedicated funding for redistribution hub infrastructure that provides efficiencies to the whole system. Existing state-level financing mechanisms can support this effort. Ecology can develop a new grant program for food waste prevention, rescue, and recovery to address these challenges.

Regulatory uncertainty

Regulatory uncertainty can also hinder food waste reduction. Health regulations vary from state to state, each with different interpretations of the FDA Food Code and other food laws. This obstructs food businesses from developing uniform food donation policies across organizations. Regulatory uncertainty also exists within the food recovery sector.

Reducing regulatory uncertainty would encourage more rapid or greater expansion of composting capacity. This helps reduce delays and the cost to implement other recommendations that would send food waste to a compost facility instead of a landfill. The state's existing compost facilities would face less pressure if they were expanded to increase their annual capacity by *at least* 54,000 tons. The pressure on these facilities would be even less with clear and consistent regulation, statewide. Increasing costs to haul food waste longer distances is the only other option.

Gaps in the food system

Data on how food flows through the food system is virtually non-existent. This creates uncertainty about where food waste occurs in the food system and how much is being wasted. Similarly, the cost of food waste is often invisible, and makes it difficult to manage when it's not being measured. This results in food being inaccurately valued.

End market development and contamination reduction

The difficulty of removing food from its packaging significantly reduces food recycling rates among business and residential customers. Common contaminants include plastics, takeout containers, or food packaging that appears compostable, but is not. Compost or anaerobic digestion facilities that receive highly contaminated feedstock must spend more costs on pre- and post-processing, which reduces profitability. Washington's food waste reduction strategies must include contamination reduction components to be successful and better support end market development.

Appendix F. Existing state-level funding mechanisms

In support of the plan, the following funding mechanisms and grants were identified throughout the planning process. These mechanisms could be utilized along with developing new funding mechanisms to help catalyze investments. Federal and additional funding sources can also be considered when identifying funding for food waste reduction efforts.

Table 10. List of existing state-level funding mechanisms

Grant	Focus
Clean Energy Fund Commerce	Established in 2013. The program funds development, demonstration, and deployment of clean energy technology. This includes using anaerobic digestion to convert food waste into renewable natural gas (RNG), energy, and value-add coproducts.
Local Solid Waste Financial Assistance Grants (LSWFA) Ecology	Provides funding to local governments for solid and hazardous waste planning and implementation, as well as enforcement of solid waste rules and regulations
Waste reduction recycling and education (WRRED) Ecology	This grant program is a competitive grant for qualified local governments and non-profit organizations to help with local or statewide litter control, waste reduction, recycling, and composting education programs.
Public Participation Grants (PPGs) Ecology	Provides funding to individuals and not-for-profit public interest organizations to increase public understanding and involvement in cleaning up contaminated sites and improving recycling and waste management.
Healthy Kids Healthy Schools OSPI	Primarily focused on supporting physical activity enhancement, but may be used to procure food waste prevention equipment.

Department of Commerce

Clean Energy Fund (CEF)

[Clean Energy Fund](#) (CEF) was established in 2013 within the Energy Division at the Department of Commerce to provide grant funds to support the development and deployment of clean energy technologies. Now in its fourth round of biennial funding, CEF has been tapped twice to advance innovative approaches to the value-added disposition of food waste. The CEF can be expanded to support much of the infrastructure development in this plan.

Recommendation in the plan support utilizing the CEF grants to focus investments in both energy (heat and power) and nutrient recovery. This focus would be similar to previously granted funds towards food waste reduction. For example, in 2017, Impact Bioenergy received a \$550,000 grant under the Research, Development, and Deployment (RD&D) portion of CEF to install a community-scale anaerobic digester on Vashon Island (Figure 24 on page 78). Similarly, in 2019, FPE Renewables received a \$300,000 grant under a newly created Dairy Digester Enhancement component of CEF to install a de-packaging system for food residuals. The resulting slurry will be used in their on-site digester and be delivered to other farm-based digesters in the region.

Ecology

Local Solid Waste Financial Assistance (LSWFA)

The Washington Legislature authorized a financial assistance program under the Model Toxics Control Act, Chapter [70.105D](#) RCW to support local solid and hazardous waste planning and implementation, and to enforce rules and regulations governing solid waste handling. Ecology administers the [Local Solid Waste Financial Assistance \(LSWFA\)](#) through chapter 173-312 Washington Administrative Code (WAC).

Financial assistance to local governments is based on the amount allocated for LSWFA by the legislature each biennium. In 2019-21, \$10 million was allocated to administer LSWFA. This amount represents a 64 percent reduction from the full funding amount of \$28 million.

Ecology disburses funds through an application process. Each jurisdiction can receive up to the formula-based amount available for that jurisdiction. Recipients of LSWFA are required to contribute 25 percent of project-eligible costs as cash expenditures and/or in-kind local match.

LSWFA supports local government implementation of eligible projects identified in their local solid and hazardous waste management plans and local enforcement of solid waste handling laws and rules. Projects must be able to produce a measurable outcome. An example of a successful project through LSWFA grants can be seen in the work Thurston County Solid Waste accomplished assisting the Thurston County Food Bank to build capacity.

Public Participant Grants (PPGs)

[Public Participation Grants \(PPGs\)](#) are grants to nonprofit organizations providing public education and outreach on contaminated sites and waste management issues. The competitive grant program provides up to \$60,000 per year to selected projects for the two-year biennium. There is no matching funds requirement.

The Model Toxics Control Act requires that one percent of the revenue from the Hazardous Substance Tax be appropriated to the PPG program. The program received \$2.4 million in the current biennium for grants. The Hazardous Substance Tax was restructured during the 2019 legislative session and is anticipated to collect more revenue.

The PPG program rule prioritizes contaminated site projects and projects with an environmental justice emphasis. Waste management projects that educate on waste reduction are also prioritized. Food waste reduction and redistribution are considered waste reduction projects.

Waste Reduction Recycling & Education (WRRED) grants

The [Waste Reduction Recycling & Education \(WRRED\)](#) grants program is a relatively new program that received an allocation of \$250,000 in the 2020-2021 grant cycle. This grant provides up to \$60,000 for each grant to qualified local governments and non-profit organizations for local or statewide education programs designed to help the public with litter control, waste reduction, recycling, and composting. A match of 25 percent of state funding is required.

Grant projects focus on the products taxed under chapter [82.19 RCW](#), Waste Reduction, Recycling, and Litter Control Account. The funding for this program can vary significantly from biennium to biennium but has historically funded from ten to twenty grants each cycle.

Office of Super Intendent of Public Instruction

Healthy Kids Healthy Schools Grant

During the 2019-2021 grant cycle, the legislature appropriated \$3.25 million to the OSPI capital budget to support the Healthiest Next Generation Initiative (launched in 2014), however over \$8.1 million was requested in grant applications received by OSPI. The large gap between allocated funds and funding requests underscores the need for additional grant funds.

Funds were available in two categories: physical education/physical activity and **nutrition**. Grants may be used to purchase new equipment, repair existing equipment, design, construct, or refurbish facility space and infrastructure.

Additional funds are needed to purchase the equipment necessary to carry out food waste reduction projects. Some examples of equipment needed by schools for food waste prevention, rescue, and recovery education include, but are not limited to:

- Updated kitchen equipment to support schools' capacity to do more scratch cooking. This leads to the production of more nutritious meals, use less food packaging, and potentially, meals that incorporate more locally sourced foods.
- Bins, crates, and ice packs to support school cafeteria edible food sharing.
- Milk dispensers, and, if needed, dishwashing equipment and reusable cups to eliminate single-use milk cartons.
- School gardening and onsite composting equipment, which support students' education about where their food comes from, appreciation for "imperfect" looking produce, and ways to use food waste to create compost as a sustainable food production resource.
- Resources to conduct school food waste audits.

More funding to purchase equipment that supports food waste prevention, rescue, and recovery will lead to measurable food waste reduction in schools through improved storage, sharing, and waste tracking. Furthermore, when school food waste prevention, rescue, and recovery projects educate and engage students in learning, then students bring those lessons home to their families and communities.

Appendix G. Healthy Kids Grants Worksheet

Table 11. 2019-2021 Healthy Kids Healthy Schools Grant program funding requests

District Name	Nutrition	Nutrition Project Description	Physical Ed (PE)	PE Project Description	District Total
Brinnon			\$45,954	1/4 walking path around play yard	\$45,954
Centerville	\$20,100	dishwasher, refrigerator, oven, range			\$20,100
Coupeville	\$82,345	food processing equipment			\$82,345
Freeman	\$17,960	warehouse freezer			\$17,960
Grapeview	\$3,903	water bottle filling stations			\$3,903
Harrington	\$13,432	salad bar equipment			\$13,432
Hood Canal	\$60,151	water bottle filling stations, cafeteria equipment			\$60,151
Index			\$61,000	rubberized playground surface	\$61,000
Keller	\$198,487	hood exhaust fan, walk-in cooling system			\$198,487
Kiona-Benton	\$60,501	walk-in cooler, dishwasher			\$60,501
Kittitas	\$62,478	refrigerator, freezer, food warmer equipment			\$62,478
Klickitat	\$200,000	range, refrigerator, freezer, sink, dishwasher			\$200,000
Lake Quinalt			\$193,222	gym floor, weight room and playground equipment	\$193,222
Mabton	\$5,300	water bottle filling stations	\$5,000	weight room equipment	\$10,300
Mary Walker	\$4,000	kitchen electrical	\$68,681	covered play area, basketball court upgrades	\$72,681
Mill A	\$17,000	refrigerator, dishwasher			\$17,000
Napavine			\$199,980	covered play area, climbing wall, court upgrades	\$199,980
Nooksack Valley	\$61,466	oven, cooler, dishwasher, cold bar			\$61,466
North Beach	\$44,000	water bottle filling stations			\$44,000
Okanogan			\$200,000	playground equipment, ADA ground cover	\$200,000
Quillayute Valley			\$200,000	playground equipment, playground surfacing	\$200,000
South Kitsap			\$123,582	playground equipment, playground surfacing	\$123,582
Sprague	\$9,479	water bottle filling stations			\$9,479
Summit Valley	\$5,000	sink	\$190,000	covered play area, playground equipment, disc golf course	\$195,000
Taholah	\$30,000	walk-in cooler and refrigerator			\$30,000
Thorp	\$58,500	oven, dishwasher, cold bar, hood exhaust fan			\$58,500
Tonasket			\$99,000	playground equipment, playground surfacing	\$99,000
Touchet	\$120,272	dishwasher, greenhouse replacement			\$120,272
Union Gap	\$69,000	oven, dishwasher, mixer	\$30,091	playground surfacing, volleyball net	\$99,091
Wahkiakum	\$43,300	freezer, range, dishwasher, sinks, ice machine			\$43,300
Yakima			\$146,816	ADA playground equipment	\$146,816

Appendix H. Example food waste reduction campaigns

Examples of food waste prevention campaigns:

- [Food Recovery Challenge](#) - US EPA (48) – The Food Recovery Challenge challenges universities, businesses, and other community organizations to make their food management systems more sustainable.
- [Love Food Hate Waste](#) – WRAP, UK (49) – The Love Food Hate Waste campaign provides information on the environmental and socio-economic impact of food waste. Their website offers tips, recipes, and tools to help individuals and families reduce food waste and save money.
- [Love Food Hate Waste](#) – Canadian version of the UK program (50)
- [Save the Food](#) – NRDC (51) – Save the Food is a national public service ad launched by the Natural Resource Defense Council (NRDC) and the Ad Council to raise public awareness about the environmental and socio-economic impacts of food waste.
- [Wasted Food Wasted Money](#) – Oregon DEQ (52) - campaign to assist local governments in running effective waste prevention campaigns, in addition to providing technical assistance to local food businesses.
- [Think.Eat.Save](#) – UNEP (53) – The Think.Eat.Save campaign seeks to provide a global vision for reducing food waste. The campaign hopes to increase public awareness and create greater understanding of the total impact of food waste.
- [I Love Leftovers](#) – Sustainability Victoria (54) – In support of the Love Food Hate Waste campaign, this Australian program encourages people to get creative with leftovers. The campaign’s website includes useful resources, like tips on how to prepare food and store food once it has been cooked.
- [I Value Food](#) – Sustainable America (55) – The I Value Food campaign aims to raise awareness about food waste in the United States. The campaign’s website offers tools and tips on how to help end food waste.
- [Zero Hunger Challenge](#) – United Nations (56) – To eliminate all forms of malnutrition and to build a more sustainable food system, this international initiative focuses on ending hunger and living more sustainably.

Appendix I. Local government survey summary

To help inform this plan, a local government survey was drafted in December 2020. The survey was distributed through Ecology’s existing expert networks from January 12-25. A total of 54 responses were received from 15 city governments, 23 county level agencies, and 8 organizations. Some agencies and organizations had multiple respondents. This list includes the feedback from the survey respondents.

Getting Started

- **Understand there is not a “one-size-fits-all” solution for reducing food waste.** Many local governments responded with the feedback that food waste reduction is complex, time consuming, and often involves trial and error work.
- **Develop baseline data to inform progress towards goals.** What gets measured, gets managed. Some local governments reported ongoing work with determining baseline data for their communities. Food waste baseline data can come from waste characterization studies, technical assistance, and research done in the community.
- **Start food waste prevention, rescue, and recovery work with schools and institutions.** Local governments are finding success in pilot programs and partnerships with schools and institutions. Across the focus areas of food waste prevention, rescue, and recovery, local governments are identifying a “low hanging fruit” topic to begin food waste reduction efforts.

Regulations and strategic planning

- **Linking food waste reduction strategies to existing priorities of the local government:** Local governments have found success in linking food waste prevention, rescue, and recovery work to existing local government priorities.
 - For example, King County has developed a new program, called CompostWise, which supports the use of compost and other recycled content soil amendments and develops markets for these products in the region. As a part of the county’s zero waste of resources by 2030 goal and plan, the Solid Waste Division (SWD) is pursuing additional opportunities to increase diversion through AD and organics processing. Another initiative the county is pursuing is the link of food waste recovery to climate objectives, including developing financial incentives such as soil carbon sequestration markets
 - To meet similar climate goals, the University District Food Bank in Seattle received a grant to establish an onsite system to turn food waste into digestate to use on their rooftop garden.
- **Develop regulations and incentives that make sense for your local community:**
 - Some local governments have found success in developing regulations and incentives that work for their communities. These strategies include:

- *Tie funding incentives to real-time food loss and waste measurement and infrastructure planning* – some county and city level grants require waste tracking and analytics with the grant funds. This method can help collect food waste data that is otherwise difficult to obtain since it is not regulated or required. For example:
 - [King County Commercial food waste grants](#)
 - [Seattle Public Utility Waste-Free Communities Matching Grants](#)
 - [City of Tacoma Sustainability Small Grants](#)
 - *Ban organic waste from landfills* – One option to encourage food waste reduction is to implement a food waste disposal ban, such as the one Seattle implemented in 2015.
 - *Mandate food scrap recycling* – Another way to promote food waste recovery is to mandate that food scraps must be collected for composting and energy recovery.
 - *Reduced cost organics curbside collection* – Under this market-based model, recycling and composting organic waste is priced much lower or at no-cost versus landfilling it. In some jurisdictions, residential customers do not have to pay for curbside organics collection. Others can opt in for a reduced rate.
 - *Incentives for haulers, food businesses, and residents to recover, rescue, and prevent food waste* – Many local governments are curious to explore how to further incentivize food waste reduction participation throughout their communities. Developing innovative incentives that drive food waste reduction is a key consideration amongst Washington local governments.
 - **Develop incentives to monitor and collect food waste** – Local governments expressed an interest in learning how to develop incentives to reduce food waste and methods to collect and monitor food waste and food waste data.
- **Continue to work with state agencies to clarify and shape state and federal food rescue rules.**
 - Multiple respondents indicated regulatory confusion, particularly within the scope of food rescue. More support on consistent rule interpretation and state-level coordination will help local governments prevent food waste and rescue more food. Some businesses have been hesitant to donate food, due to concerns about liability issues.
 - *Too many differences between communities* – Within the need for regulatory clarity, a few local governments reported residents are confused between jurisdictions on what they can and cannot do with edible and inedible food products.
 - *Share tables* – Another area of confusion was share table guidance for K-12 schools since local health jurisdiction rules and interpretations can vary.

- *Food donation guidance* – Local governments reported businesses are hesitant to donate edible food because of regulatory confusion. Other examples of emerging food donation issues are food donation projects like the “food is free” work in Tacoma, where more coordination is needed between local health jurisdictions and the state to determine guidelines and best practices.

Networking and connecting the dots

- **Build opportunities to connect, strengthen, and network the local food system:**
 - Due to the nature of the food supply chain, many public agencies have interests in the food system and these interests can lead to duplications in effort or to competing priorities, reducing the effectiveness of the work. It is often difficult to coordinate efforts and financial resources across agencies and jurisdictions.
 - Many respondents identified developing partnerships with governments, private organizations, and non-profits. Suggestions included forming/participating in partnerships, purchasing cooperatives, cities working together on diversion efforts, counties working together on regional solutions, leveraging already existing programs like EPA’s Food too Good to Waste and Food Recovery Challenge, supporting Master Gardener programs, and gleaning efforts. These partnerships also include accessing grants and other funding support from alternative sources. These can be micro or mini grants from local private sector or non-profit organizations.
 - Suggestions were made for the state to provide food waste reduction specific grant funding to reduce competition between food waste reduction efforts and other recycling programs.

Prevention, Rescue, and Recovery Best Practices

- **Make food waste prevention a priority within food waste reduction work.**
 - Many local governments already have food waste recovery programs, however of the local governments that responded only half had food waste prevention programs in place.
- **Build networks to increase edible food donation:**
 - Food rescue is a strategy to reduce food waste from businesses by diverting edible food to programs that can distribute this food into the community. The respondents indicate a desire to increase edible food donation within their jurisdiction, but with limited time and resources, it is difficult to prioritize.
 - The responses indicate more needs to be done to establish networks and to map hunger relief organizations, and connect edible food donors to groups that distribute the food to those who need it. Food rescue appears to be equally a focus on both commercial and residential sectors when food rescue programs exist.
- **Increase focus on diversifying recovery options while promoting contamination reduction**

- Many local governments across the state want to diversify their food waste management systems. Rural and urban respondents indicated the desire to develop more small-scale anaerobic digesters for on-site processing of food waste residuals. Large scale AD systems are often too expensive and require high waste density to operate, making smaller scale systems more appealing to manage waste on-site.
- Through partnering with master gardeners and community organizations, local governments are providing education on small-scale recovery options like backyard composting, vermicomposting, and food waste prevention strategies.
- Similarly, local governments are finding success offering contamination reduction education in conjunction with their curbside organics hauling program. Local government respondents indicated contamination reduction outreach needs to occur continuously to ensure a clean stream.
- A few respondents mentioned an interest in year-round organics hauling or described pilot projects they'd completed or were interested in initiating, but all noted lack of funding to implement or maintain an organics collection program.
- Some local government respondents noted success with providing free organics collection to commercial and multi-family customers and drop box collection programs.

Appendix J. Partnering agency letters of support

The following letters were submitted by our partnering agencies in support of the *UFWW Plan*.



STATE OF WASHINGTON
DEPARTMENT OF HEALTH

*DIVISION OF ENVIRONMENTAL PUBLIC HEALTH
PO Box 47820 □ Olympia, Washington 98504-7820
(360) 236-3000 □ 711 Washington Relay Service*

November 2, 2021

Jade Monroe, Food Waste Lead
Washington Department of Ecology
Post Office Box 47775
Olympia, Washington 98504-7775

RE: COMMENTS ON USE FOOD WELL WASHINGTON PLAN

Dear Ms. Monroe:

The Environmental Public Health Division at the Washington Department of Health has been an active participant in the development of the *Use Food Well Washington Plan*. We strongly support its pathway to a more resilient food system through food waste reduction. The plan clearly shows the benefits of reducing food waste and wasted food. It identifies the role in achieving Washington's climate goals and highlights partnerships, which align with our agency's values.

In particular, the plan supports strengthening the Bill Emerson Good Samaritan Food Donation Act, which will encourage direct donations from food businesses and retailers and emphasize food safety. It also supports increased funding for local health jurisdictions and the creation of the Washington Center for Sustainable Food Management. These recommendations are essential to maximize food rescue, ensure at-risk populations are safe, and promote partnerships and coordination.

Thank you for your dedication to this important topic. Please feel free to contact us if we can provide any additional assistance.

Sincerely,

Lauren Jenks, MPH, CHES Assistant Secretary
Environmental Public Health Division

By e-mail



STATE OF WASHINGTON
DEPARTMENT OF AGRICULTURE
P.O. Box 42560 • Olympia, Washington 98504-2560 • (360) 902-1976

November 4, 2021

Jade Monroe
Food Waste Lead
Washington Department of Ecology

Re: Comments on *Use Food Well Washington Plan*

Dear Ms. Monroe,

The Director's Office and Food Assistance programs at the Washington State Department of Agriculture (WSDA) have actively engaged in the development of the *Use Food Well Washington Plan* and have been appreciative of the opportunity to invite many of our stakeholders to contribute their thinking as subject matters experts. WSDA strongly supports the thirty recommendations identified in this plan which, when advanced together, will result in better use of food and less food waste and wasted food in Washington. During the pandemic, WSDA's focus on food security has intensified as we've worked to prevent hunger for millions of Washingtonians. Our state's food system has had to overcome enormous challenges during this time, and WSDA is committed to supporting strategies that contribute to the economic viability of producers of all sizes and scales, the stewardship of natural resources required to ensure food security for years to come, and investments in food rescue that maintain a strong supply of healthy food in the emergency food system.

As a co-convenor of the Food Policy Forum, WSDA strongly supports coordination and connection between this body of work and the Forum. We also feel strongly that the recommendations in this plan that foster stronger relationships and coordinated use of resources between the emergency food system and farms and food businesses are critical to long-term food security. The emergency food system, comprised of more than 500 organizations and tribes across Washington, has been pushed to its limits during the pandemic. During this period, WSDA has invested millions of dollars in capacity grants for cold storage, transportation infrastructure, and food to preserve this system's ability to distribute food to hungry people. Additional strategic investments that mutually benefit food businesses and hunger relief organizations will further strengthen the foundation of the emergency food system.

Thank you for stewarding a strong public process that engaged diverse stakeholders from many facets of the food system to develop this plan. The final product is reflective of the most sensible, actionable strategies that Washington State can take to have big impacts on hunger relief and the environment. Please feel free to contact us if we can provide any additional assistance.

Katie Rains
Food Policy Advisor to the Director
Washington State Department of Agriculture



STATE OF WASHINGTON
DEPARTMENT OF COMMERCE

1011 Plum Street SE • PO Box 42525 • Olympia, Washington 98504-2525 • (360) 725-4000

November 10, 2021

Jade Monroe
Food Waste Lead
Washington Department of Ecology

Re: Comments on *Use Food Well Washington Plan*

Dear Ms. Monroe,

The Energy Division at the Washington Department of Commerce has been an active participant in the development of the *Use Food Well Washington Plan*, and strongly supports its many actionable recommendations for reducing food waste and wasted food in Washington. These steps recognize the essential value of our state's expansive food production and distribution system, and its important role in advancing our statewide climate and environmental justice goals.

In particular, the Plan supports the use of food waste to produce low-carbon energy and energy products, including liquid and gaseous fuels, and recover valuable nutrients that can displace fertilizers that are currently mined or manufactured from fossil fuels. Developing and supporting markets for various biogenic feedstocks, including post-consumer and food processing waste streams, and the coproducts resulting from anaerobic digestion and biorefining, is essential for the state to meet its greenhouse gas emission reduction goals.

Thank you for your hard work on this important topic. Please feel free to contact us if we can provide any additional assistance.

Michael Furze
Assistant Director, Energy Division
Washington Department of Commerce

Old Capitol Building
PO Box 47200
Olympia, WA 98504-7200



Washington Office of Superintendent of
PUBLIC INSTRUCTION
Chris Reykdal, Superintendent

k12.wa.us

November 17, 2021

Jade Monroe
Food Waste Lead
Washington Department of Ecology

Re: Comments on *Use Food Well Washington Plan*

Dear Ms. Monroe,

The Child Nutrition Services department at the Washington Office of Superintendent of Public Instruction (OSPI) has been an active participant in the development of the *Use Food Well Washington Plan*, and strongly supports its many actionable recommendations for reducing food waste and wasted food in Washington. We recognize these steps as not only a means to reduce the carbon footprint in Washington State, but also a means to enhance the quality of nutrition accessible to Washingtonians.

In particular, the Plan supports K-12 education policy and infrastructure to build healthier school environments that support both the education and nourishment of students through food waste prevention education and practices. Children are our future. By modeling sustainable practices in schools and providing equitable access to good nutrition, we can hope for a brighter, healthier future for all of our children.

Thank you for your hard work on this important topic. Please feel free to contact us if we can provide any additional assistance.

A handwritten signature in blue ink that reads "Leanne Eko".

Leanne Eko, RD,
Director of Child Nutrition Services
Office of Superintendent of Public Instruction