Big Progress in Reducing
RETAIL
FOOD WASTE

A Special Report from the
Pacific Coast Food Waste Commitment

**An initiative of the
Pacific Coast Collaborative**

**PACIFIC
COAST**
Food Waste
Commitment

This report contains the comprehensive data findings, including analyses and methodology, referenced in the PCFWC's 2023 Year-End Report.

Data collection is a central focus of the Pacific Coast Food Waste Commitment, and at the time of this publication, the PCFWC has collected four years of retail data on unsold food rates and unsold food destinations from more than 50% of the regional grocery market share (Chart 1). The PCFWC has since piloted scaling its data methodology to the foodservice and manufacturing sectors.

Food waste measurement is critical for food waste reduction initiatives, as it is used to:

- Establish a baseline for improvement
- Monitor progress over time
- Identify hotspots that need action
- Inform working groups and intervention projects
- Determine best practices and highlight successes that can be replicated

The PCFWC's data collection efforts are a significant contribution to the body of knowledge around retail food waste, serving as the most recent analysis of retail food waste and the longest year-over-year aggregated dataset in the country. As such, the data outlined in this report is the best-in-class dataset for tracking progress and benchmarking in the retail industry for food loss and waste reduction initiatives.

Data Findings

Unsold Food Rates

Unsold food describes all food that went unsold in each grocery store food department, including both edible food and inedible scraps (pits, peels, etc.).

Chart 1

Signatory Market Share by State in 2022

State	Market Share
California	46.7%
Oregon	64.9%
Washington	60.9%
PCC Region Total	50.1%
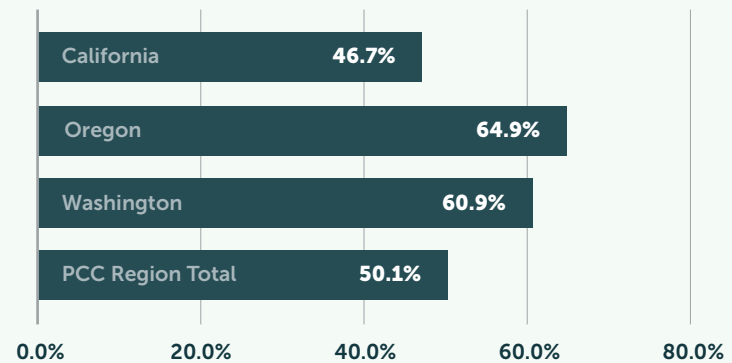
Unsold food rates are the amount of food that went unsold, out of all food handled — and this is the most important measure for tracking food surplus at retail. Along with absolute tons of unsold food, unsold food rates give a sense of actual food waste reduction practices rather than market fluctuations or business performance. For more about unsold food rates, please reference the "Our Methodology" section.

In 2022, the average unsold food rate in regional grocery stores was 3.2%, which was a decrease from an unsold food rate of 3.8% in 2021 (see Chart 2).[1] This translated to a total of 573,367 tons of food that went unsold (see Chart 3a), equivalent to $3.62 billion in lost sales (see Chart 3b).

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[1] As the program progresses, measurement practices are becoming more entrenched. Therefore, in these first few years, changes seen in the data from year to year may reflect improvements in measurement and reporting in addition to actual increases or decreases in unsold food.
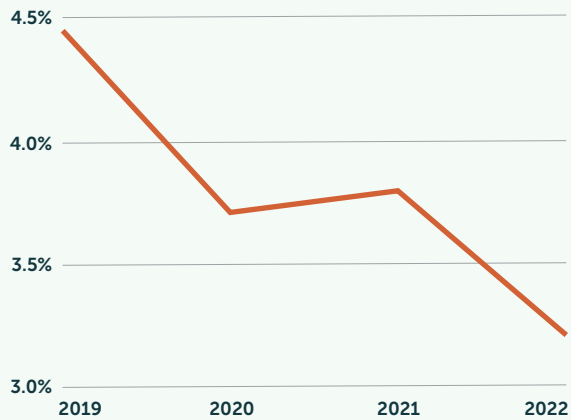
Chart 2[2]

Grocery Unsold Food Rates by Year

4.5%

4.0%

3.5%

3.0%

2019   2020   2021   2022

Chart 3a

Estimated Regional Tons Unsold by Year (in Thousands)

800

700

600

500

2019   2020   2021   2022
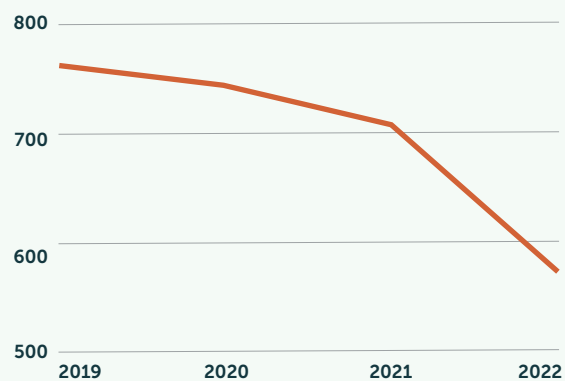
Chart 3b

Retail Value of Regional Tons Unsold (in Millions $)

$4,250

$4,000

$3,750

$3,500

2019   2020   2021   2022
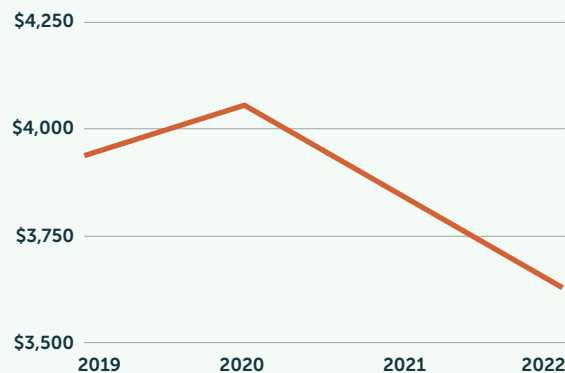
Since the first year of data collection in 2019, unsold food rates decreased by 28% for reporting retailers.

Both absolute and relative measures of unsold food decreased in 2022 — tons of unsold food and unsold food rates, respectively. Since the PCFWC began collecting retail data, unsold food rates in the region have decreased by 28% from 2019 to 2022, although there was a slight increase from 2020 to 2021. The latter increase can most likely be attributed to supply chain disruptions and consumer behavior changes associated with the COVID-19 pandemic. From 2021 to 2022, reporting retailers experienced a 15.6% decline in unsold food rates. Over the same period, the estimated total regional tons unsold decreased by 19%, the sharpest decline since first reporting in 2019.

When comparing trends in unsold food rates and absolute tons of unsold food, population growth, demand for food, food prices, and business performance can all influence the volume of food in the system. If the amount of food handled by a grocery store decreases, then absolute tons of unsold food can decrease even if unsold food rates go up. This phenomenon can be seen when comparing 2020 and 2021 data in Charts 2 and 3a — although the unsold food rate increased from 2020 to 2021, total tons of unsold food still decreased. Sales data from Nielsen indicates that total food handled by regional grocery stores declined from 2020 to 2021, evidently enough to counteract the increase in the unsold food rate. However, in 2022, total food handled in the grocery system continued to decrease; and compounded with lower unsold food rates, the data reveals an all-time low in absolute tons of unsold food.

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[2] ReFED is continually improving the analytical process. In each year of reporting, the best current methodology at the time is applied to all years retroactively. The results for all years are shown so that readers can see trends as calculated consistently. This means that previous years' estimates may not match with past reports.
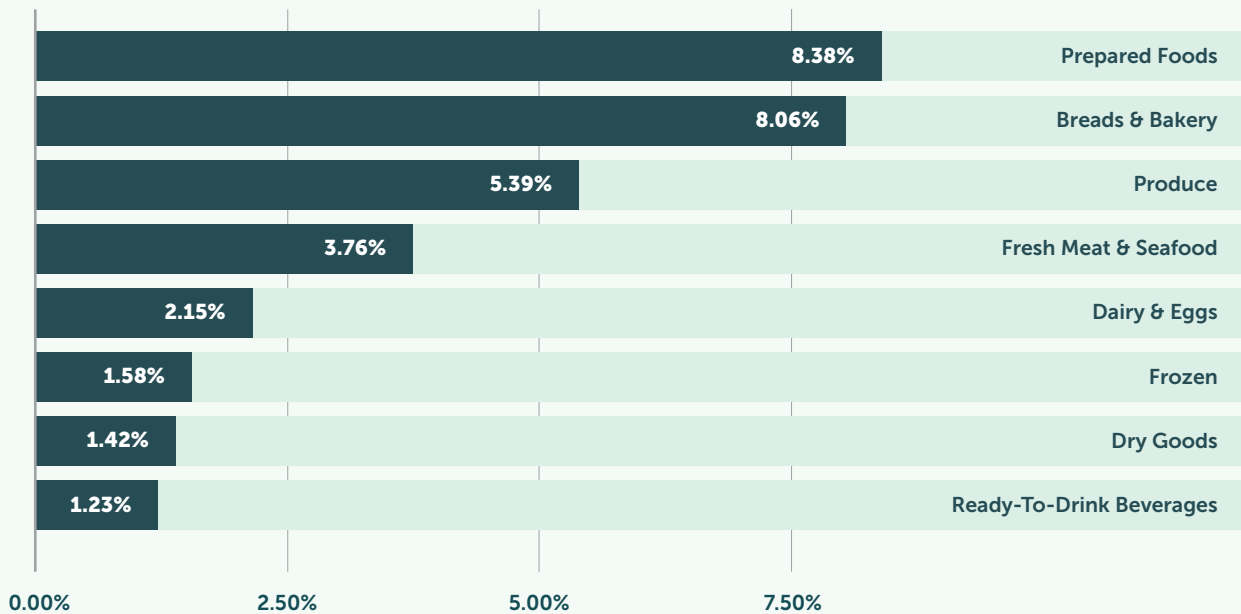
Chart 4

Unsold Food Rates by Department in 2022

Department	Rate
Prepared Foods	8.38%
Breads & Bakery	8.06%
Produce	5.39%
Fresh Meat & Seafood	3.76%
Dairy & Eggs	2.15%
Frozen	1.58%
Dry Goods	1.42%
Ready-To-Drink Beverages	1.23%

0.00%   2.50%   5.00%   7.50%

Chart 5

Unsold Food Rates by Department by Year

Legend:
- Prepared Foods
- Breads & Bakery
- Produce
- Fresh Meat & Seafood
- Dairy & Eggs
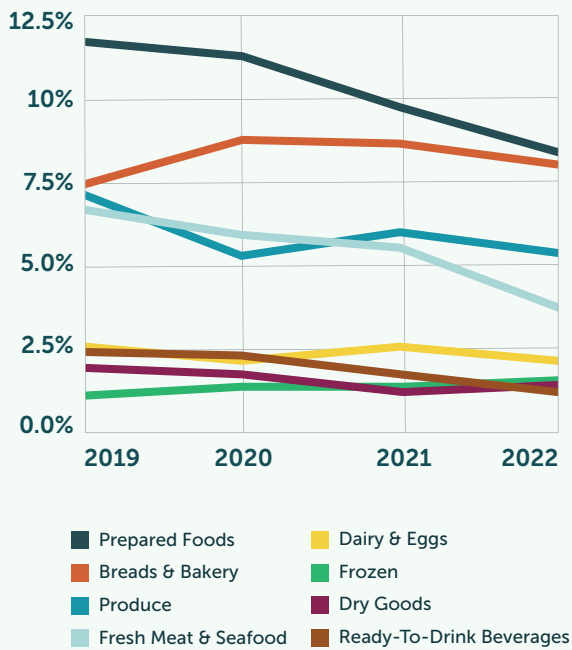- Frozen
- Dry Goods
- Ready-To-Drink Beverages

Chart 4 shows unsold food rates by department for 2022, and Chart 5 shows how these rates have shifted over time. Unsold food rates remained highest in the Prepared Foods (8.38%) and Breads & Bakery (8.06%) departments in 2022, as they have in previous years. The unpredictable demand and perishability of these departments could contribute to their high unsold food rates.

As shown in Chart 6, the impact of these departments is magnified when considering retail value, with Prepared Foods accounting for 22.4% and Breads & Bakery for 15.8% of the total retail value of unsold food. Their substantial retail value share underscores a significant opportunity for reducing waste and recouping lost profit through improved demand forecasting and inventory control, particularly as consumer behavior and supply chains continue to evolve post-pandemic. In contrast to Prepared Foods, the Dairy & Eggs department has a 7.0% share of the total retail value of unsold food despite having a 12.4% share of tons of unsold food, second only to Produce.

Chart 6

Share of Total Tons Unsold & Total Retail Value of Unsold Food in 2022

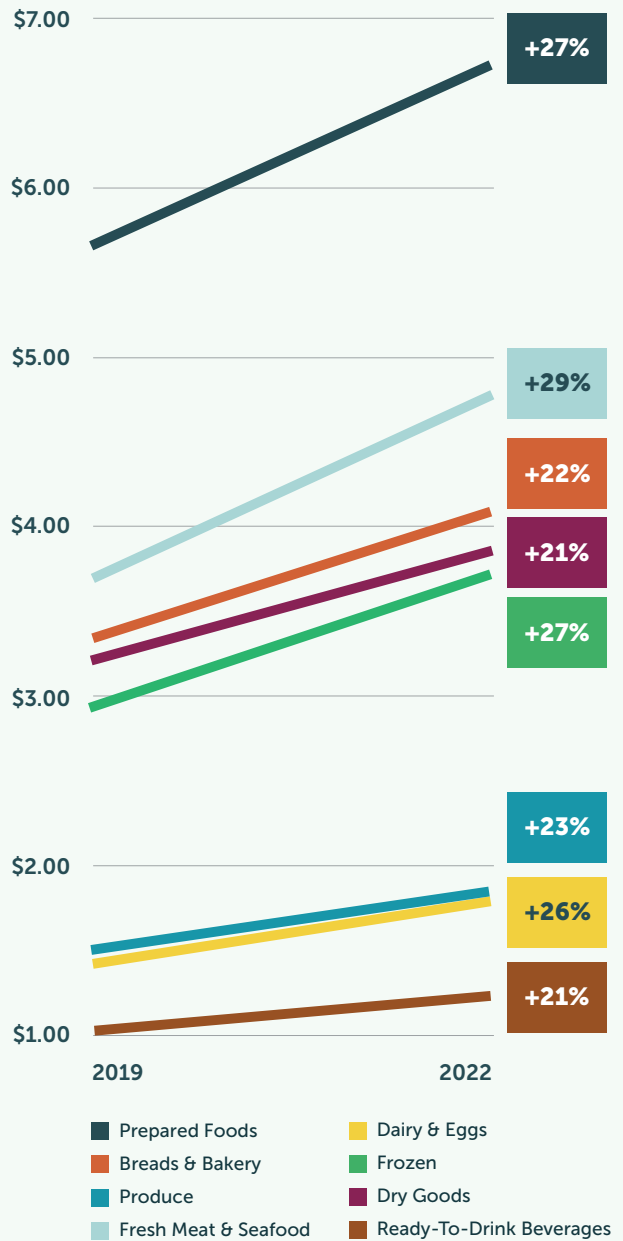| Category	% of Total Tons Unsold	% of Total Retail Value of Unsold Food
Produce	37.2%	21.8%
Dairy & Eggs	12.4%	7.0%
Breads & Bakery	12.2%	15.8%
Prepared Foods	10.5%	22.4%
Dry Goods	10.5%	12.8%
Fresh Meat & Seafood	9.5%	14.4%
Ready-To-Drink Beverages	4.1%	1.6%
Frozen	3.6%	4.2%

In terms of the overall volume of unsold food, the Produce department continues to contribute the most unsold food by weight with 37.2% of the total share. Due to the volume of produce sold, it is among the leading departments in the retail value of unsold food (21.8% share).

Retail value of unsold food is highly dependent on fluctuating retail prices. All retail values in this report are shown on an absolute basis, unadjusted for inflation. Chart 7 shows the percent increase of the retail dollars per pound of food by department from 2019 to 2022.

As shown in the charts above, unsold food rates can vary significantly by food department, and retailers may find it useful to prioritize hotspots for food waste reduction activities. As always, the unsold food rate should be analyzed in conjunction with the total tons unsold and the value of that unsold food, as shown in Chart 8. If a department is low volume, by weight or by dollars sold, then a high unsold food rate alone may not translate to a hotspot worth prioritizing. Conversely, a

Chart 7

Retail Value per Pound by Department Over Time

Legend:
- Prepared Foods
- Breads & Bakery
- Produce
- Fresh Meat & Seafood
- Dairy & Eggs
- Frozen
- Dry Goods
- Ready-To-Drink Beverages

department with a lower unsold food rate may justify intervention if that unsold food rate applies across a significantly large volume of food. These insights allow retailers to focus interventions based on their priorities for impact.

Chart 8

Estimated Regional Tons Unsold & Retail Value of Regional Tons Unsold in 2022

Regional Tons Unsold in 2022 (Thousands)

Retail Value of Regional Tons Unsold in 2022 ($ Millions)

Category	Regional Tons Unsold (Thousands)	Retail Value ($ Millions)
Produce	213.3	$789.4
Dairy & Eggs	71.2	$255.3
Breads & Bakery	70.0	$571.2
Prepared Foods	60.3	$811.3
Dry Goods	60.2	$465.2
Fresh Meat & Seafood	54.5	$520.4
Ready-To-Drink Beverages	23.4	$57.3
Frozen	20.7	$154.0

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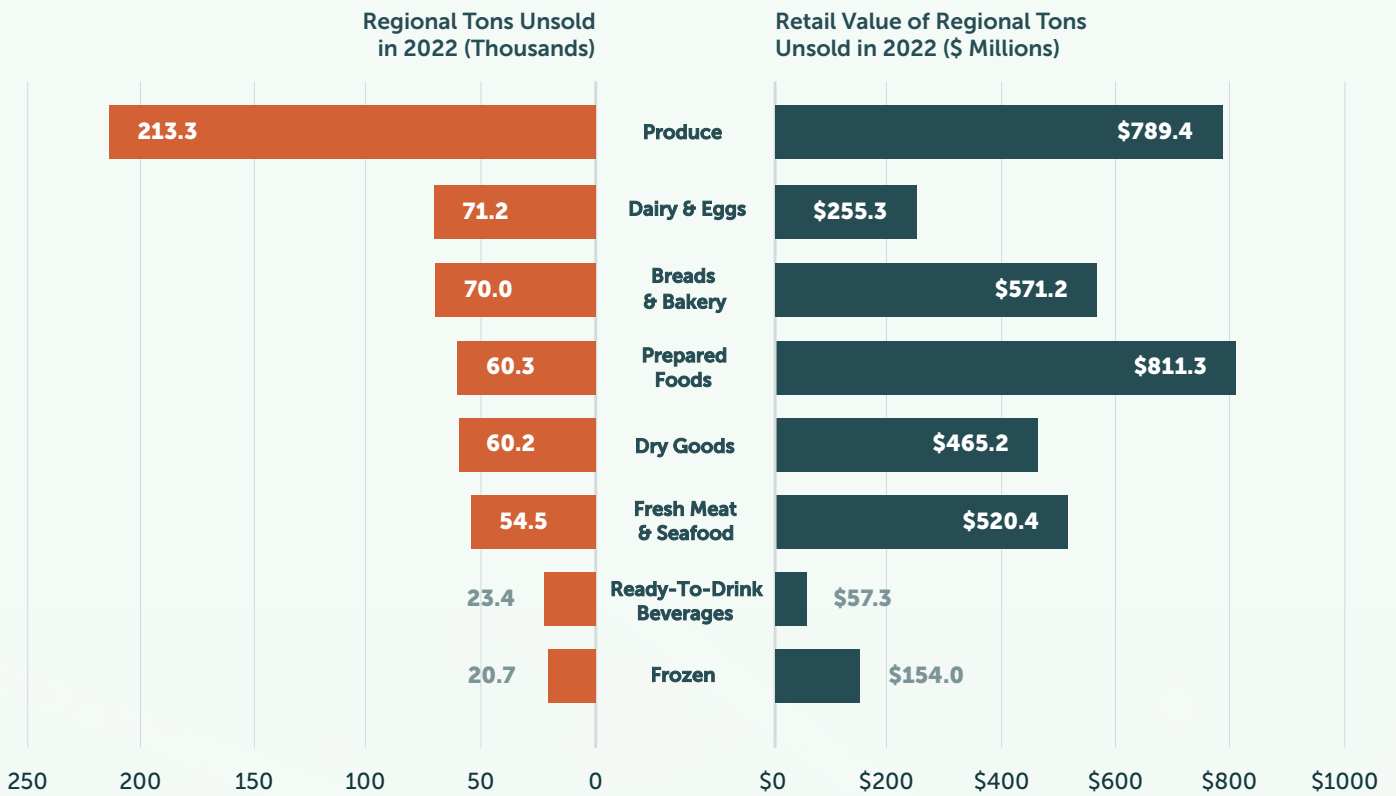
$0 $200 $400 $600 $800 $1000

Chart 9 visualizes the total and percentage change in metrics from 2019 to 2022 across two metrics by department: quantity measured in thousands of tons and financial impact measured in millions of dollars. Conditional color formatting is applied to each column to signify the value's relation to the set targets:

- Green indicates the minimum value within the range, signifying a favorable reduction.
- Red denotes the maximum value, representing the highest increase in the range.
- White represents the average value across departments.

In 2022, the PCFWC region produced an estimated

22.5 pounds of unsold food per capita

24% decrease from 29.7 pounds per capita in 2019

Chart 9

Projected Regional Tons Unsold & Retail Value of Regional Tons Unsold from 2019 to 2022

Department	Change from 2019 to 2022				
	Tons (Thousands)			Dollars (Millions)	
	Total	Percent		Total	Percent
Produce	-74.5	-25.9%		-$76.0	-8.8%
Dairy & Eggs	-14.8	-17.2%		+$10.7	+4.4%
Breads & Bakery	+7.8	+12.6%		+$156.4	+37.7%
Prepared Foods	-25.4	-29.6%		-$157.8	-16.3%
Dry Goods	-18.3	-23.3%		-$38.3	-7.6%
Fresh Meat & Seafood	-48.9	-47.3%		-$244.5	-32.0%
Ready-To-Drink Beverages	-22.2	-48.7%		-$35.3	-38.1%
Frozen	+6.9	+50.5%		+$73.4	+90.9%
Average	**-23.7**	**-24.8%**		**-$38.9**	**-7.9%**

Minimum Value Within Range   Maximum Value Within Range

Unsold Food Destinations

Unsold food at grocery stores is sent to a number of different destinations, which the EPA recently prioritized in the new Wasted Food Scale. If food can't be prevented from becoming surplus, actions that keep food in the human supply chain are preferred, such as donation or recycling into animal feed. Least preferred are those destinations that the PCFWC defines as waste — landfill, incineration, or sewer. Note that the EPA considers composting and anaerobic digestion to also be waste management pathways.

In 2022, while Landfill and Unknown received the most material (together 46%), Composting (16%), Anaerobic Digestion (15%), and Donations (15%) follow closely behind Landfill. Since overall tons of unsold food in the system decreased between 2019 and 2022, it's helpful to look at the destination rates over time. Promising trends over time include a 20% decrease in the percent of unsold food going to Unknown Destination, a 28% increase in the percent of unsold food getting Composted, and a 20% increase in the percent of unsold food going to Donations (Chart 10). Charts 11 and 12 show the absolute tons of unsold food by destination in 2022 and over time.

The increase in the rate of donations suggests an encouraging pattern: even as overall unsold food decreases, prioritizing donations remains central to PCFWC signatories. Also encouraging is the year-over-year decrease in the Unknown Destination rate, which indicates an increase in reporting accuracy — and may explain the documented increase in the percent of unsold food sent to Landfill. The increase in Unknown Destination tons in 2022 highlights the complexity and evolving nature of tracking unsold food, underscoring the importance of continual improvement in measurement practices to ensure accuracy and the effective targeting of food waste reduction strategies. For more information on
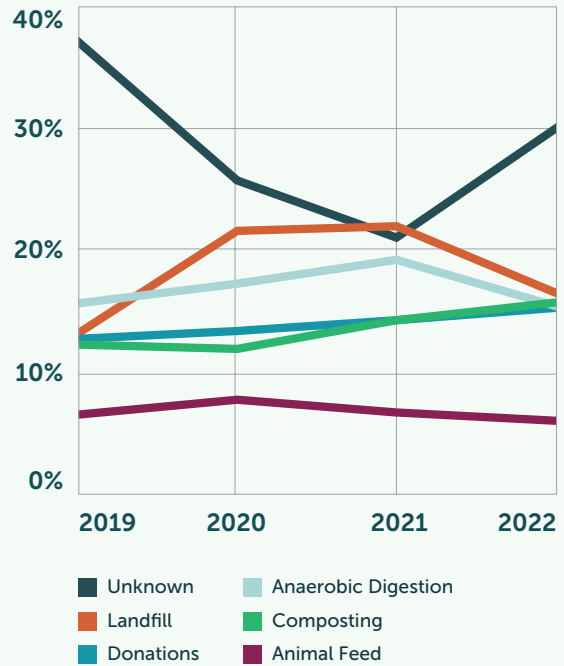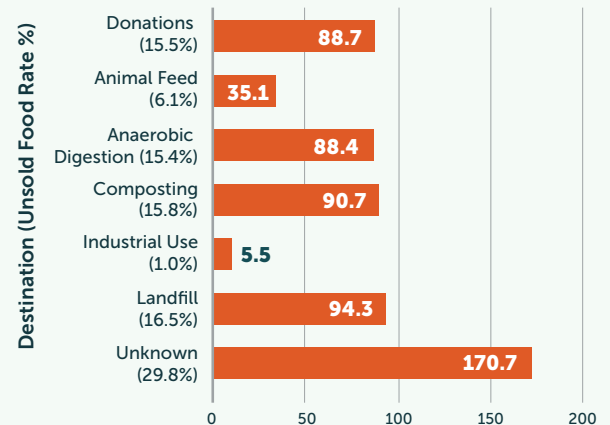
Chart 10
Destination Rates by Year

Legend:
- Unknown
- Landfill
- Donations
- Anaerobic Digestion
- Composting
- Animal Feed

Chart 11
Regional Tons of Unsold Food to Each Destination in 2022 (in Thousands)

Destination (Unsold Food Rate %):
- Donations (15.5%): 88.7
- Animal Feed (6.1%): 35.1
- Anaerobic Digestion (15.4%): 88.4
- Composting (15.8%): 90.7
- Industrial Use (1.0%): 5.5
- Landfill (16.5%): 94.3
- Unknown (29.8%): 170.7

Unknown Destination data, please reference the "Our Methodology" section of the report.

Note that it is likely that the destinations of unsold food in this region skew towards rescue and recycling solutions due to the progressive organics management policies of the PCFWC states and jurisdictions.

Chart 12
Regional Tons of Unsold Food to Each Destination By Year

Legend: 2019 | 2020 | 2021 | 2022
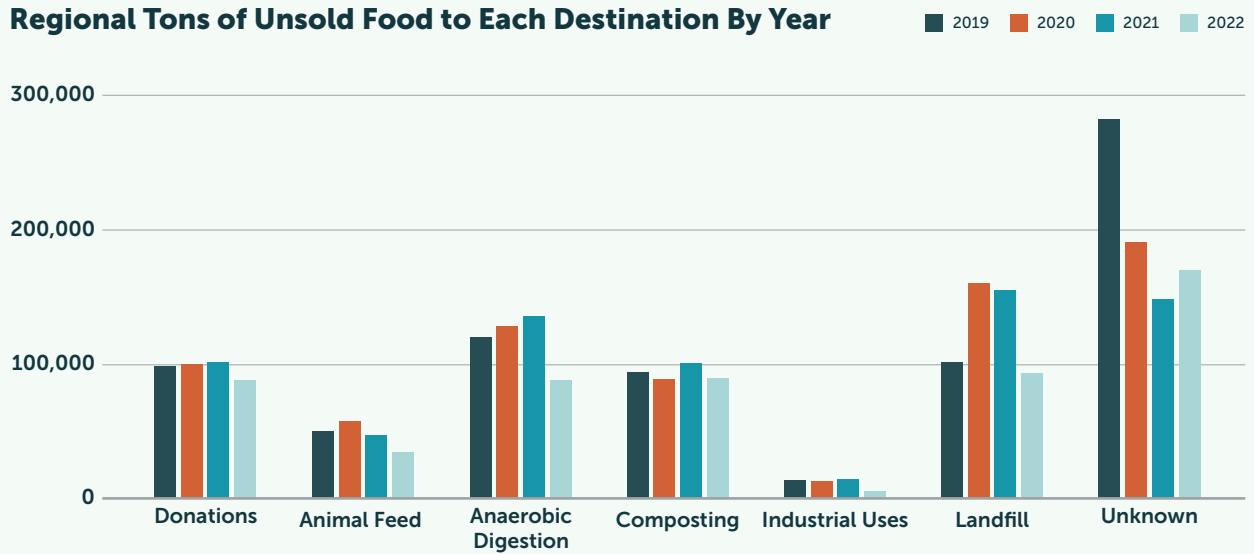
Impacts of Unsold Food

Analysis of the environmental and social impacts of unsold food in retail is pivotal for measuring progress against emissions reduction goals. Using U.S. average impact factors that underlie ReFED's Impact Calculator, the impacts of unsold food in the Pacific Coast region in 2022 were as follows:

Chart 13

Impacts of Unsold Food in 2022	Change from 2019
CARBON FOOTPRINT **2.6 Million MTCO$_2$e** Equivalent to driving 619,000 cars for one year	**30% Decrease**
WATER FOOTPRINT **141 Billion Gallons of Water** Equivalent to 214,000 Olympic-sized swimming pools	**37% Decrease**
LOST SALES **$3.62 Billion** Equivalent to 3.6% of annual regional food sales	**8% Decrease**
MEALS DONATED **148 Million Meal Equivalents** Enough to feed 135,000 people for one year	**10% Decrease**

The total carbon footprint of unsold food for the region decreased by 30% since 2019. The carbon footprint has two components — upstream contributions from all the supply chain activities required to get food from production to retail, and downstream contributions from the destinations of unsold food. The environmental impact of the upstream component vastly outweighs that of the downstream component — at least 94% of emissions from retail unsold food in the PCFWC region are incurred before it leaves the store.

From 2021 to 2022, the unsold tons of food in the Fresh Meat & Seafood department decreased by 36%. This department has the highest emissions factor, so a decrease in tons drives a significant decrease in total emissions. Over the same period, the only departments that experienced an increase in unsold food were Breads & Bakery and Frozen, which have relatively low emissions factors and would not outweigh the decreases seen across all other departments.

Although the amount of unsold food sent to the Unknown Destination category increased from 2021 to 2022 and is modeled as an increase in landfill emissions, it is not significant enough to outweigh other decreases, and the net result is still an overall reduction in the total carbon footprint of unsold food. The high impact of food waste prevention is apparent by seeing the much smaller influence of the downstream component — waste emissions — on the overall footprint.

Because the upstream component depends so much on production practices, transportation, and storage conditions, emissions vary widely according to food type. This can explain why the carbon footprint does not scale linearly with total tons unsold, which decreased less dramatically (25%) over the same time period.

Our Methodology

The PCFWC centralizes its data collection efforts by leveraging the ReFED Grocery Retail Calculator, a tool designed to consolidate and simplify food waste data reporting across diverse platforms. ReFED enhances this tool with comprehensive measurement guidelines, personalized technical support for data identification and refinement, and meticulous data review to ensure accuracy, completeness, and gap identification. All collected data undergoes anonymization and aggregation, with publication contingent on meeting strict criteria regarding market share and the number of contributing entities to maintain anonymity.

At the heart of the PCFWC's mission is the conviction that robust data collection is indispensable for any successful food waste reduction strategy. By understanding the dynamics of food waste — its origins, causes, and trends — targeted and efficient interventions can be more effectively crafted. The PCFWC goes further than merely diagnosing the issue; it empowers businesses with actionable, decision-ready data through establishing baselines, benchmarking, monitoring progress, and prioritizing interventions, thereby enabling substantial and meaningful reductions in food waste.

About Unsold Food Rates

Unsold food rates measure the share of inventory retailers fail to sell, directly impacting their revenue and contributing to broader societal and environmental issues. This surplus represents wasted resources and unnecessary emissions to produce the food that goes unsold, leading to lost sales and inflated consumer prices.

Efficiently managing unsold food transcends waste reduction; it is vital for the sustainability of the food system and an equitable society. By focusing on prevention and optimizing the redirection of surplus food into the human supply chain, retailers can decrease environmental impacts, feed more people, and lower consumer costs, enhancing food distribution sustainability overall. Addressing unsold food rates demands comprehensive strategies that prioritize waste prevention, effective redistribution, and, as a last resort, environmentally conscious disposal.

About the Unknown Destination Rate

The Unknown Destination Rate quantifies the proportion of unsold food with a final destination that cannot be accounted for within a retailer's tracking system. The PCFWC Calculator model operates under the assumption that untracked food waste, shown in the unsold food categorized in the Unknown Destination, is destined for landfill. As a result, reported emissions could be overestimated due to the underreporting of unsold food sent to Donations or other destinations.

A high Unknown Destination Rate is a critical metric, suggesting that the actual amounts of food donated or wasted are likely much higher than reported. Conversely, a low Unknown Destination Rate can indicate improved tracking and estimations.

The Unknown Destination Rate underscores the need for robust waste tracking systems. In the retail industry, reporting inaccuracies are often caused by a lack of standard procedures or employee training, outdated supply chain technology, or other operational gaps. Enhanced accuracy in tracking is not just a matter of operational efficiency but is crucial for environmental sustainability. By identifying and addressing the gaps in food waste reporting, retailers can take more effective steps toward reducing their environmental footprint.

What's Next for PCFWC Data Collection

Data collection remains a vital component of the PCFWC's aim to identify and accelerate solutions. The PCFWC is committed to improving data collection methods and deepening data analysis in order to improve the process and accuracy of what is reported. Priority focus areas moving forward include:

- **Improving price per pound conversions** to more accurately reflect participant pricing structures
- **Refining underlying retail causal data** to make the insights more actionable and accurate
- **Exploring the measurement of solution adoption rates** to capture traction behind and progress against food waste reduction goals
- **Gathering and sharing industry insights** to make reports more tangible and relevant to the industry and beyond

This was the first year that data was collected from participating PCFWC manufacturing and foodservice signatories. While the market share thresholds necessary for public reporting have yet to be met, the time and knowledge that the businesses in these sectors have given provides an important foundation for future data collection. Early insights have already informed improvements in the data collection process — insights that will be incorporated into next year's reporting.

Measurement is critical in the fight against food waste, and this information will support those efforts by highlighting where attention and resources need to be directed — by PCFWC signatories and by businesses across the industry that have not yet joined. Reporting data of this magnitude is a tremendous effort and will facilitate informed, high-impact solutions to continue progress toward our shared 2030 reduction commitment.

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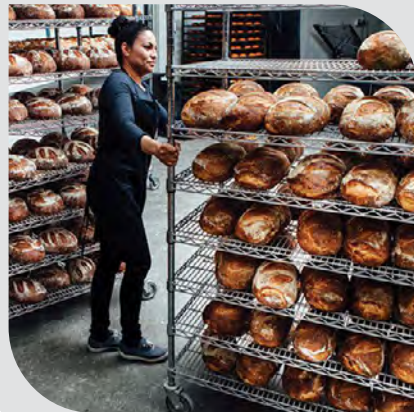
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