

Circular Food Assessment for Nova Scotia

Sankey and Interventions - Discussion and Feedback

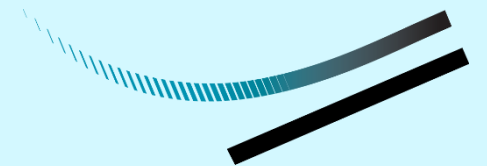
Wednesday, July 18, 2023



**DALHOUSIE
UNIVERSITY**

FACULTY OF AGRICULTURE

Agri-Food
Analytics Lab



DILLON
CONSULTING

Process and Methodology

1. Collect and process StatCan food production data.
2. Clean StatCan data – Not provided it in the form needed or combine the categories of interest for the scope of work.
3. Summarize the imports and exports of interest.
4. Add imports to total production numbers.
5. Subtract exports from total production numbers.
6. Collect waste and loss data from members of the NS supply chain.
7. Refine food loss proxies.
8. Create a material flow diagram (Sankey).
9. Identify GHG hotspots.
10. Develop interventions that could be applied to reduce lost food.

Categories

Based on work already done in Canada by Second Harvest

Food Categories

- Dairy and Eggs
- Field Crops (grains & lentils)
- Meat and Poultry
- Produce
- Sugars/Syrups
- Marine (aquaculture, wild caught)



Supply Chain Categories

- Production (farm/fisheries)
- Processing
- Manufacturing
- Distribution
- Retail
- Hotel, Restaurant and Institution (HRI)
- Household





MENU ▾

[Canada.ca](#) > [Fisheries and Oceans Canada](#) > [Fisheries](#) > [Statistics](#) > [Commercial fisheries](#) > [Landings](#) > [Seafisheries](#)

Seafisheries landed quantity by province, 2021

Preliminary

2021 Atlantic & Pacific coasts commercial landings by province (metric tonnes, live weight)

Species	Nova Scotia	New Brunswick	P.E.I.	Quebec	N.L.	Atlantic Total	British Columbia	Total Canada
Groundfish								
Cod	1,125	3	4	370	12,170	13,673	723	14,396
Haddock	11,289	x	0	x	57	11,346	0	11,346
Redfish spp.	10,363	x	0	x	4,202	14,798	16,014	30,812
Halibut	5,102	141	80	813	922	7,058	3,209	10,267
Flatfishes	666	5	0	431	15,860	16,962	6,323	23,285

Data Sources - Lost Product

- 59 total sources contacted
- 57% did not respond to Dillon's data request in time to be included
- So far, none of the respondents (production/processing/manufacturing) track waste data OR were not willing to share the information.
- Some willing to share data but concerned about repercussions or not in enough detail
- A blueberry producer had a rough estimate of loss on farm but due to inaccuracies the data did not translate well to the model

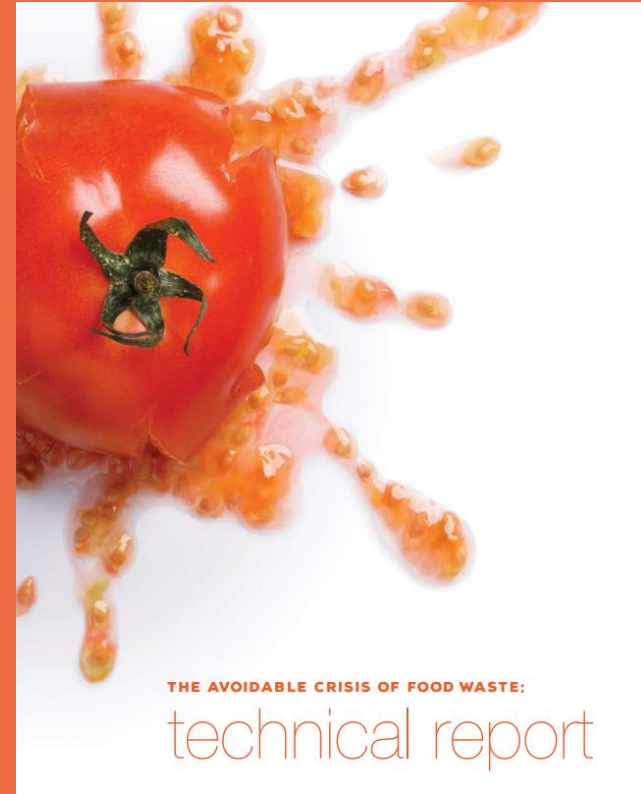
- Source breakdown:
 - Production: 18
 - Processing/Manufacturing/Distribution: 15
 - Retail: 3 (Retail Council of Canada the main contact working with many companies)
 - HRI: 2 (including Restaurant Association of NS)
 - Waste Management: 12
 - Food Rescue/Redistribution: 4
 - Other (e.g., researchers): 6

Waste and Loss Figures - Proxies

The Avoidable Crisis of Food Waste: technical report provides estimates on loss and waste in each food category.

These estimates were used in combination with local data Dillon collected to create food loss figures.

Avoidable and unavoidable waste distinctions were not made.



Based off of Canadian research

DRAFT SANKEY DIAGRAM

Map of how food flows through Nova Scotia

<https://app.mural.co/t/dillonconsulting7627/m/dillonconsulting7627/1689171022739/cda4b1fa1d6dd25126a106b5090697ac973879fa?sender=u185efb674a6b1eec95888605>

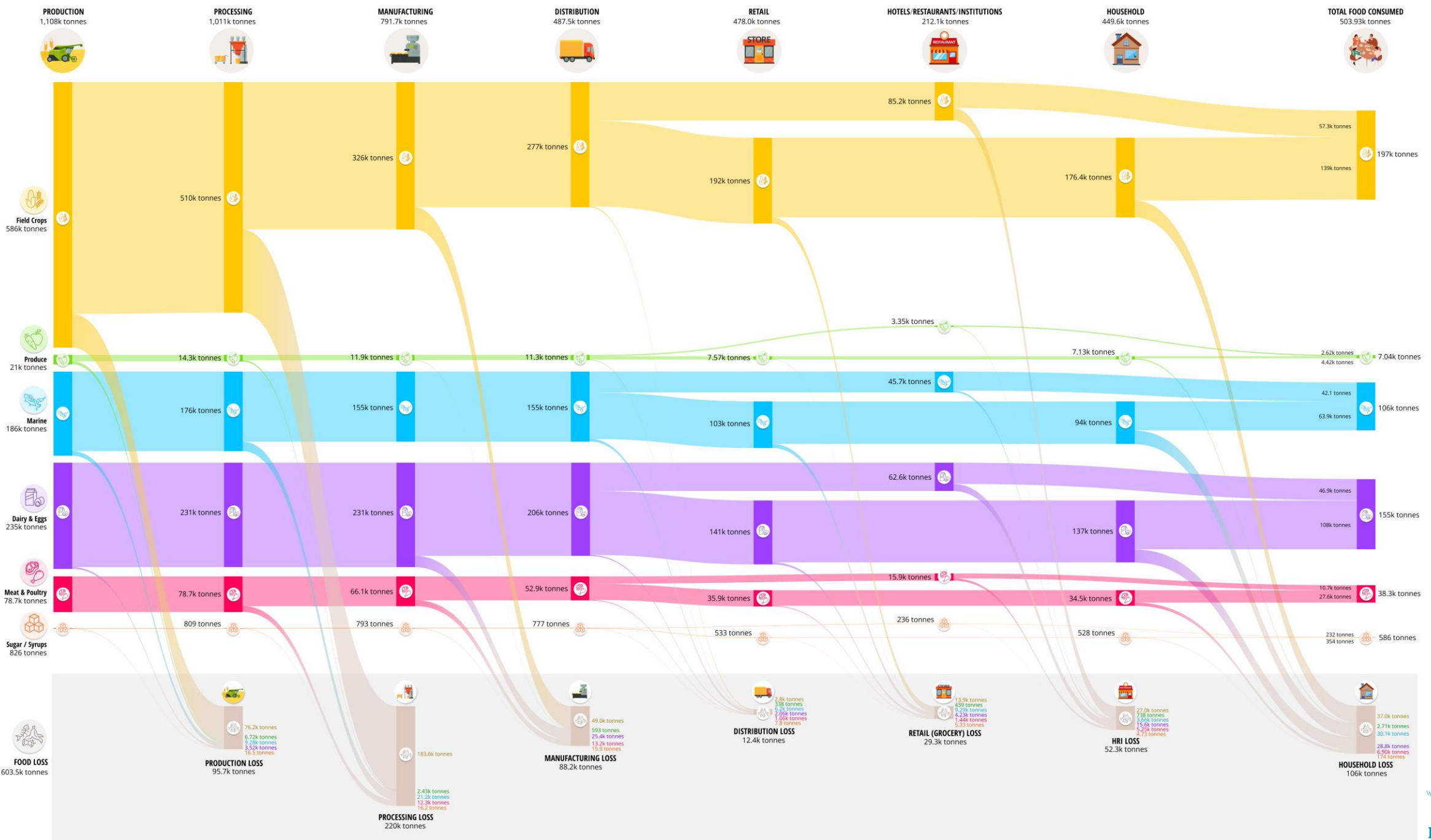
Visualization Process and Updates to Data

- This figure is intended to provide a baseline view of the flow of food products in Nova Scotia.
- The figure presented today is designed to be updated when new data is received.
- Data to update this figure can be shared with –

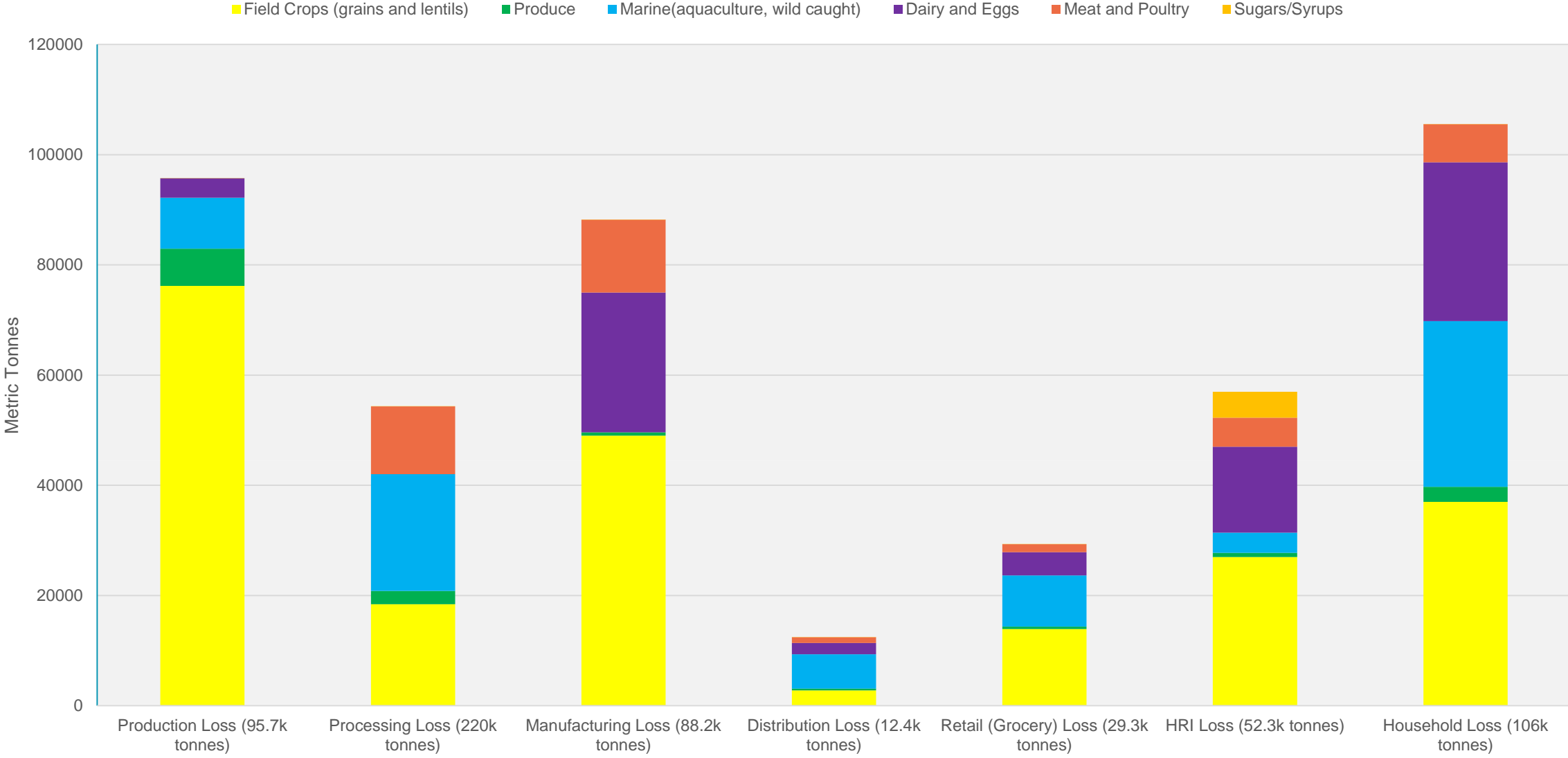
Denise Philippe, NZWC, denise.philippe@metrovancover.org



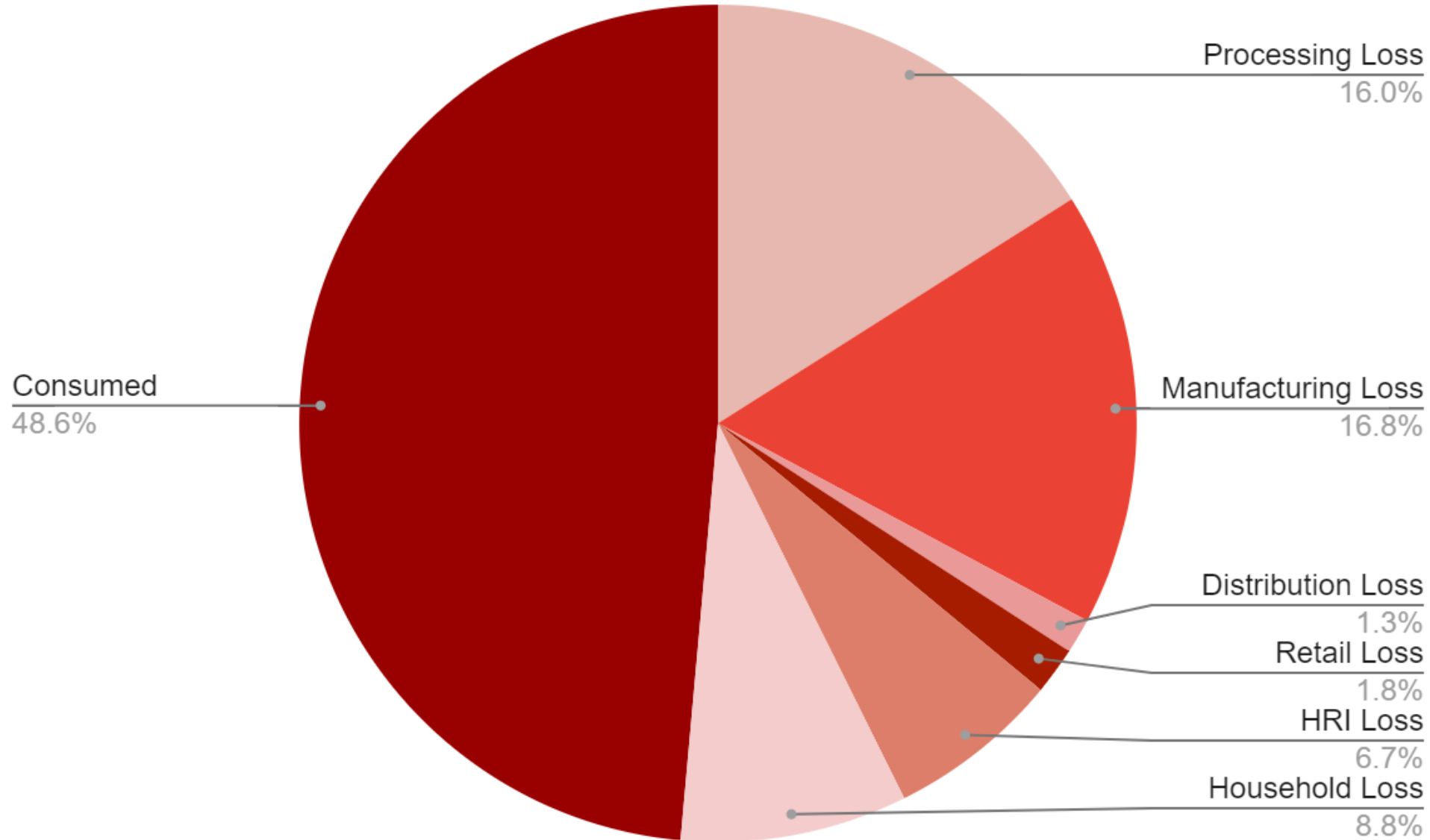
HALIFAX



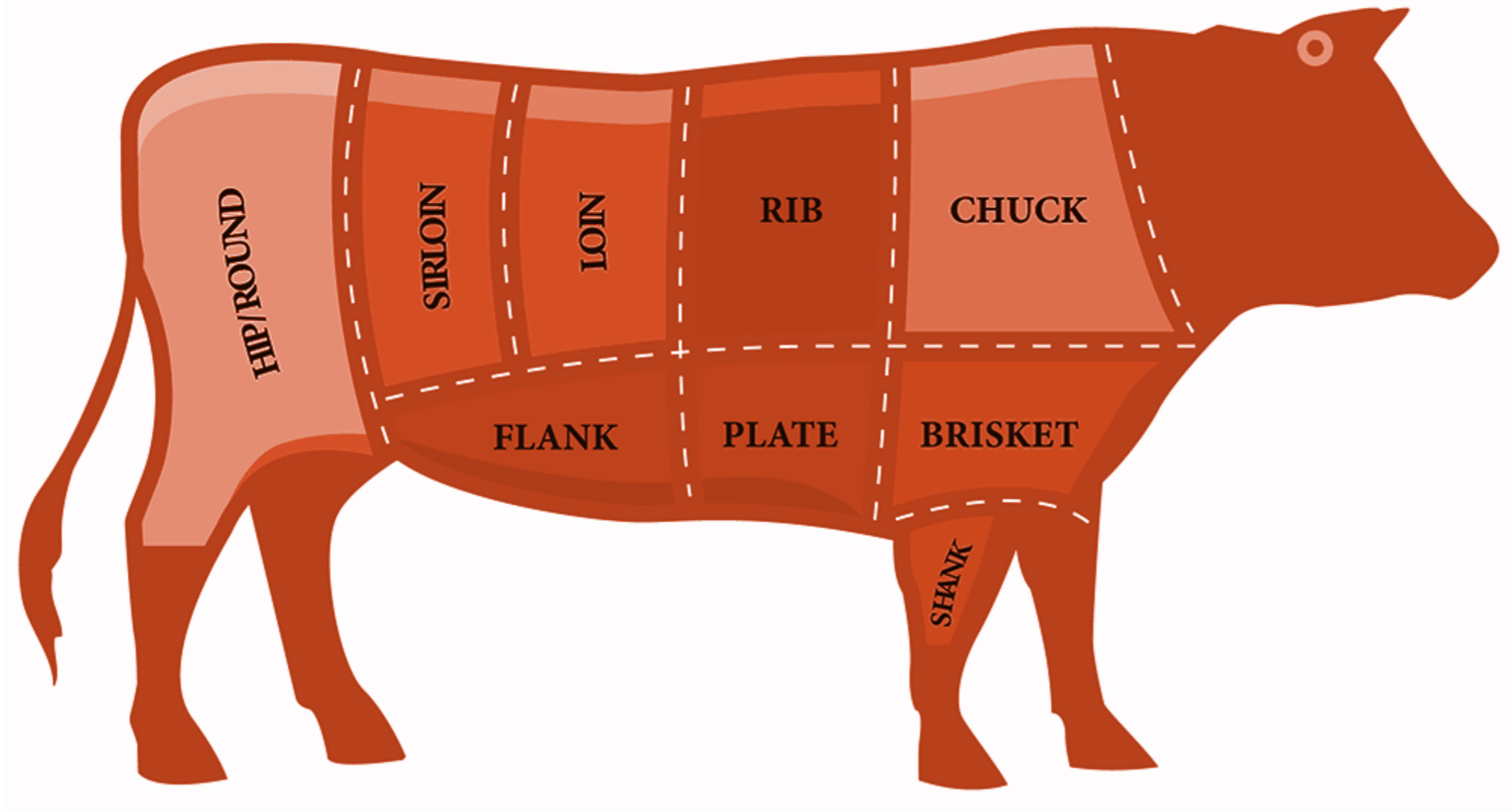
Loss Across the Supply Chain



Example - Loss of Meat/Poultry

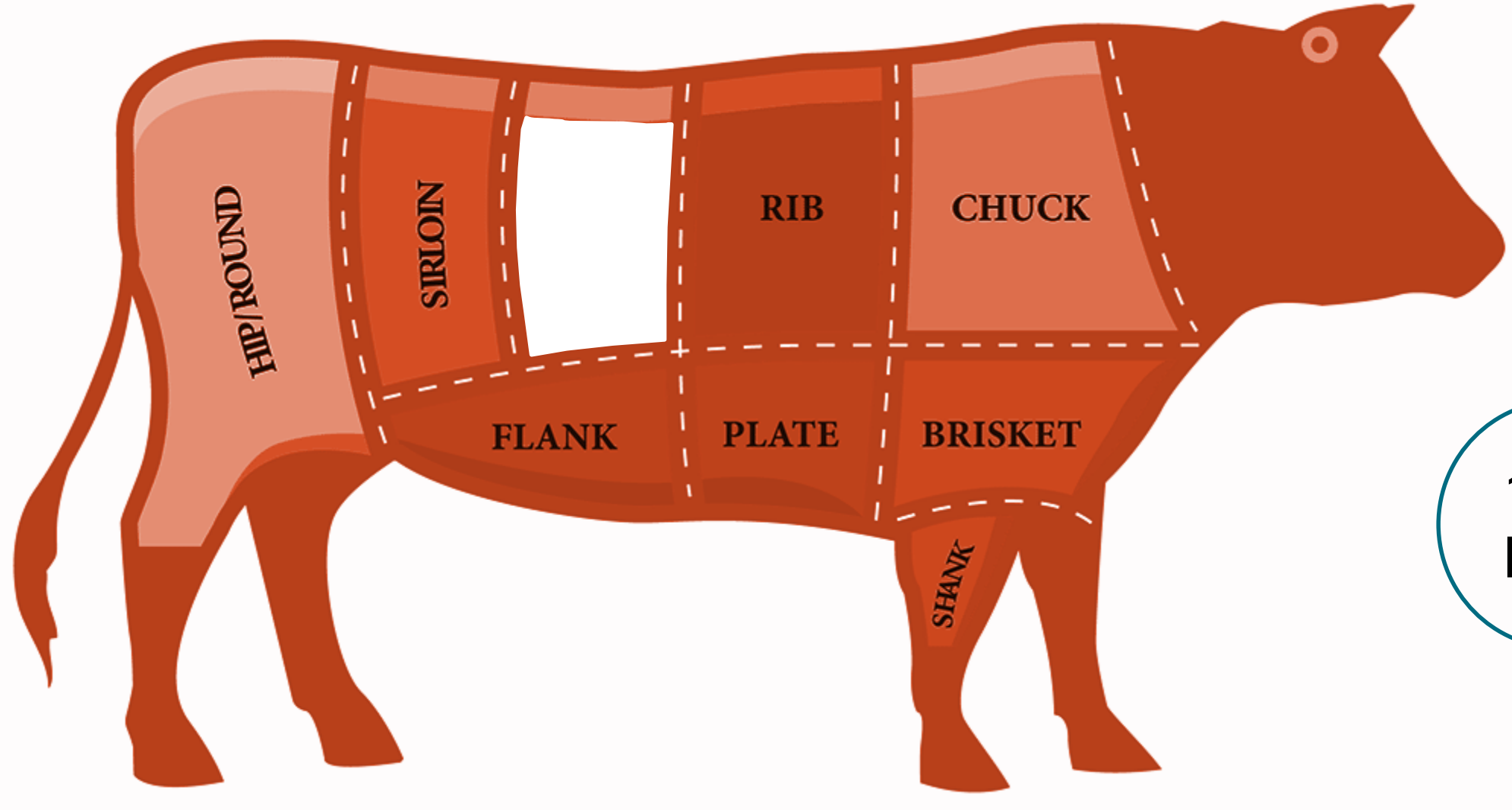


Production



*Image Source: <https://canadabeef.ca/cuts-by-colour/>

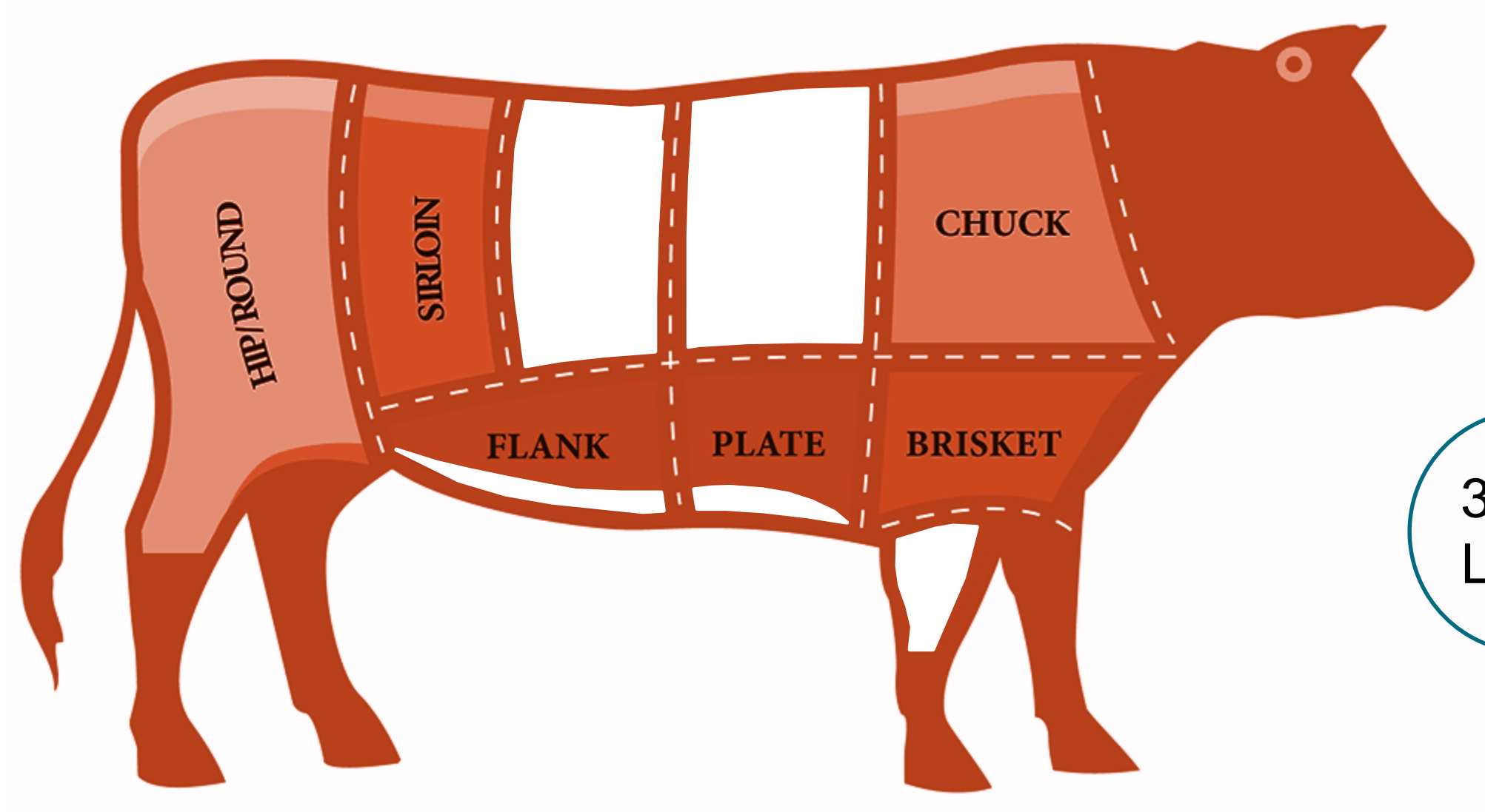
Processing Loss



16%
Lost

*Image Source: <https://canadabeef.ca/cuts-by-colour/>

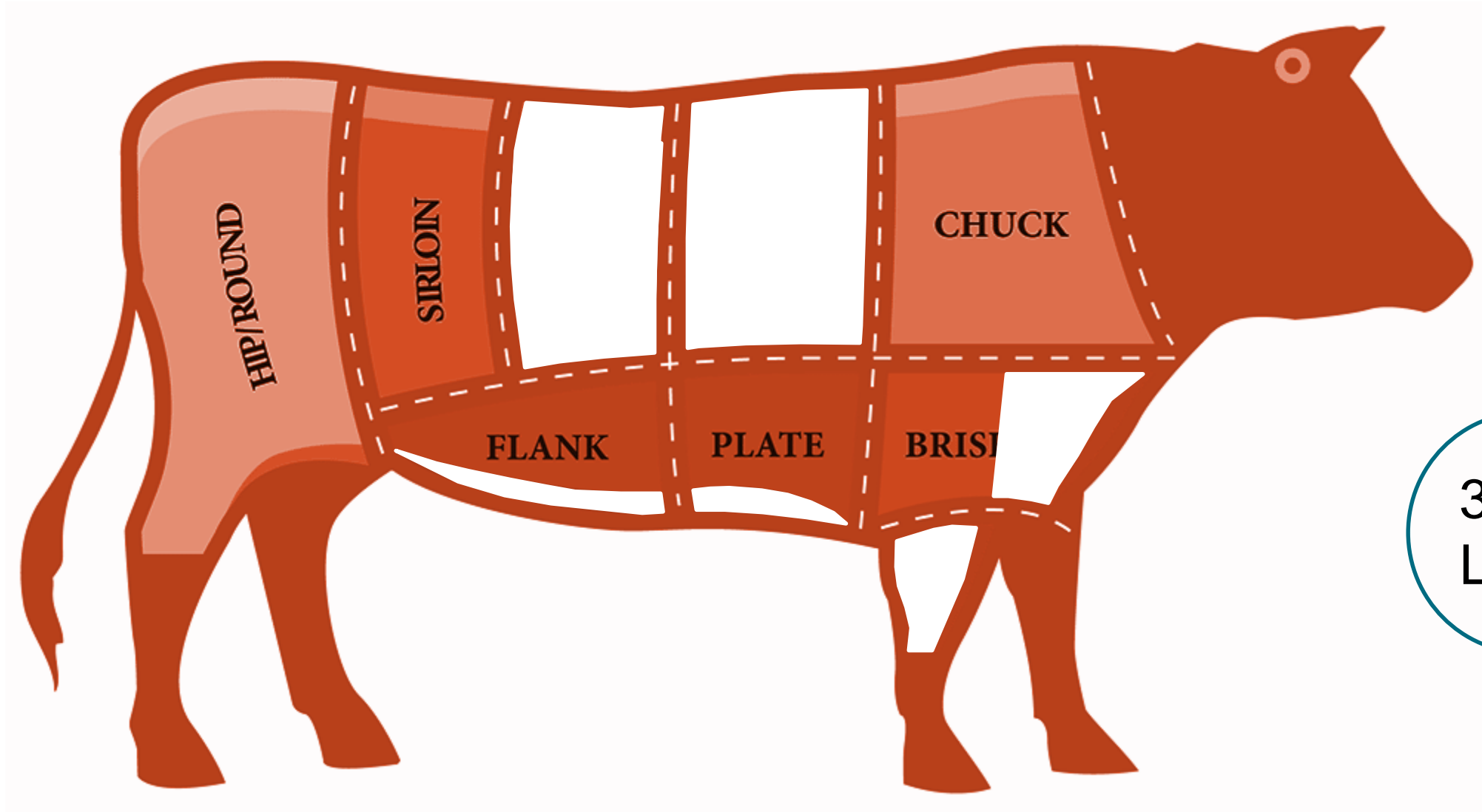
Manufacturing Loss



32.8%
Lost

*Image Source: <https://canadabeef.ca/cuts-by-colour/>

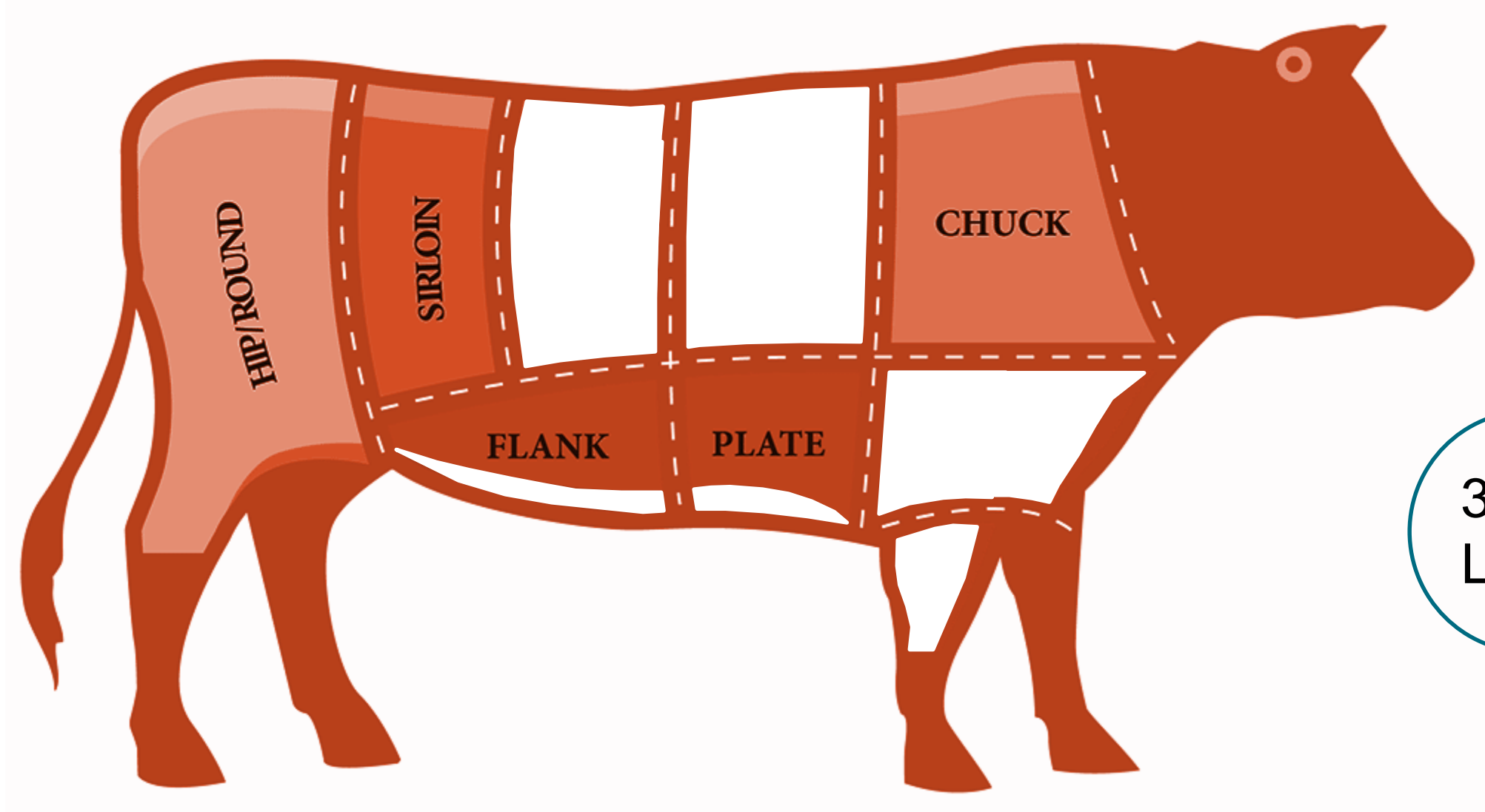
Distribution Loss



34.2%
Lost

*Image Source: <https://canadabeef.ca/cuts-by-colour/>

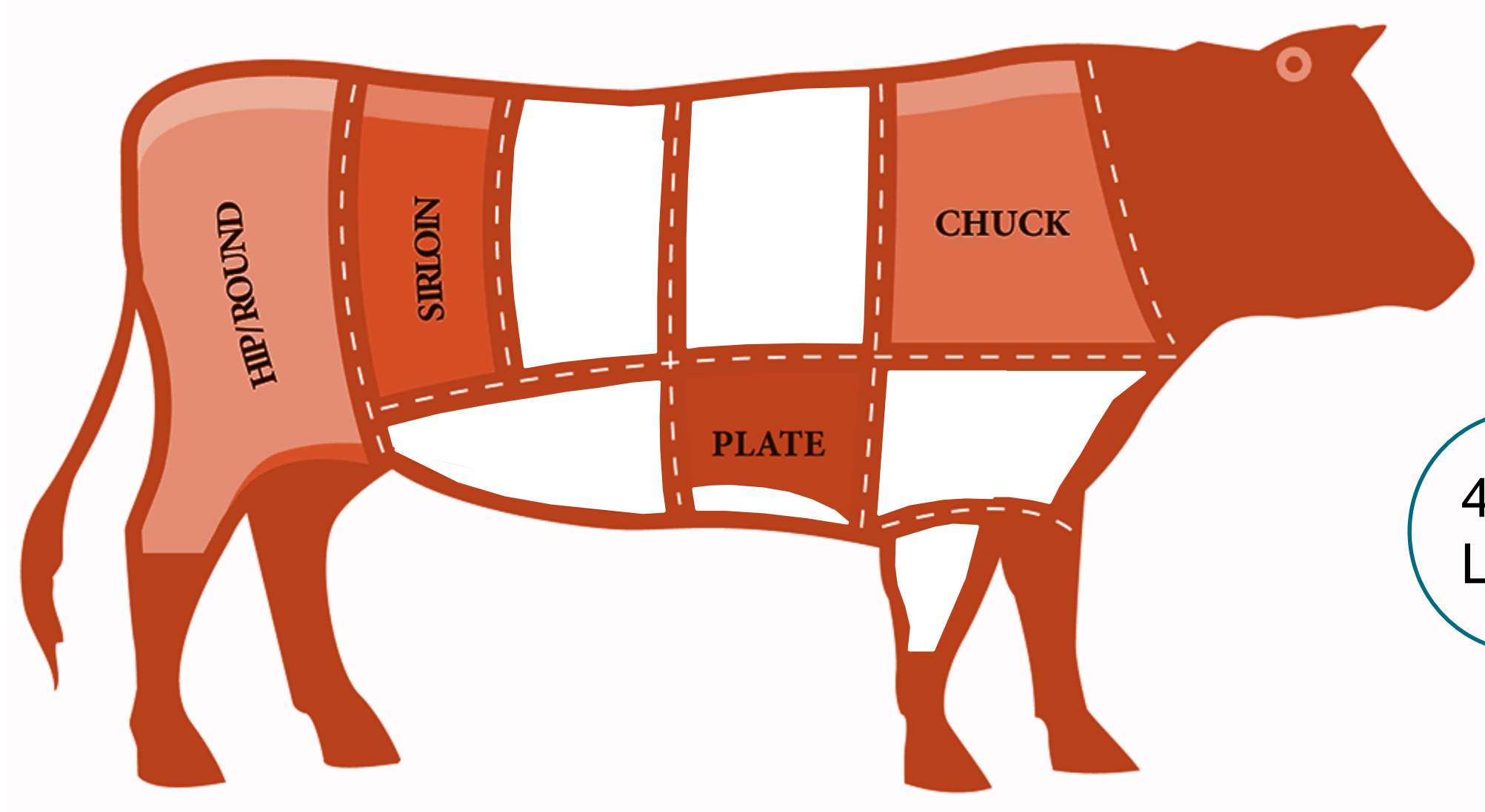
Retail Loss



36%
Lost

*Image Source: <https://canadabeef.ca/cuts-by-colour/>

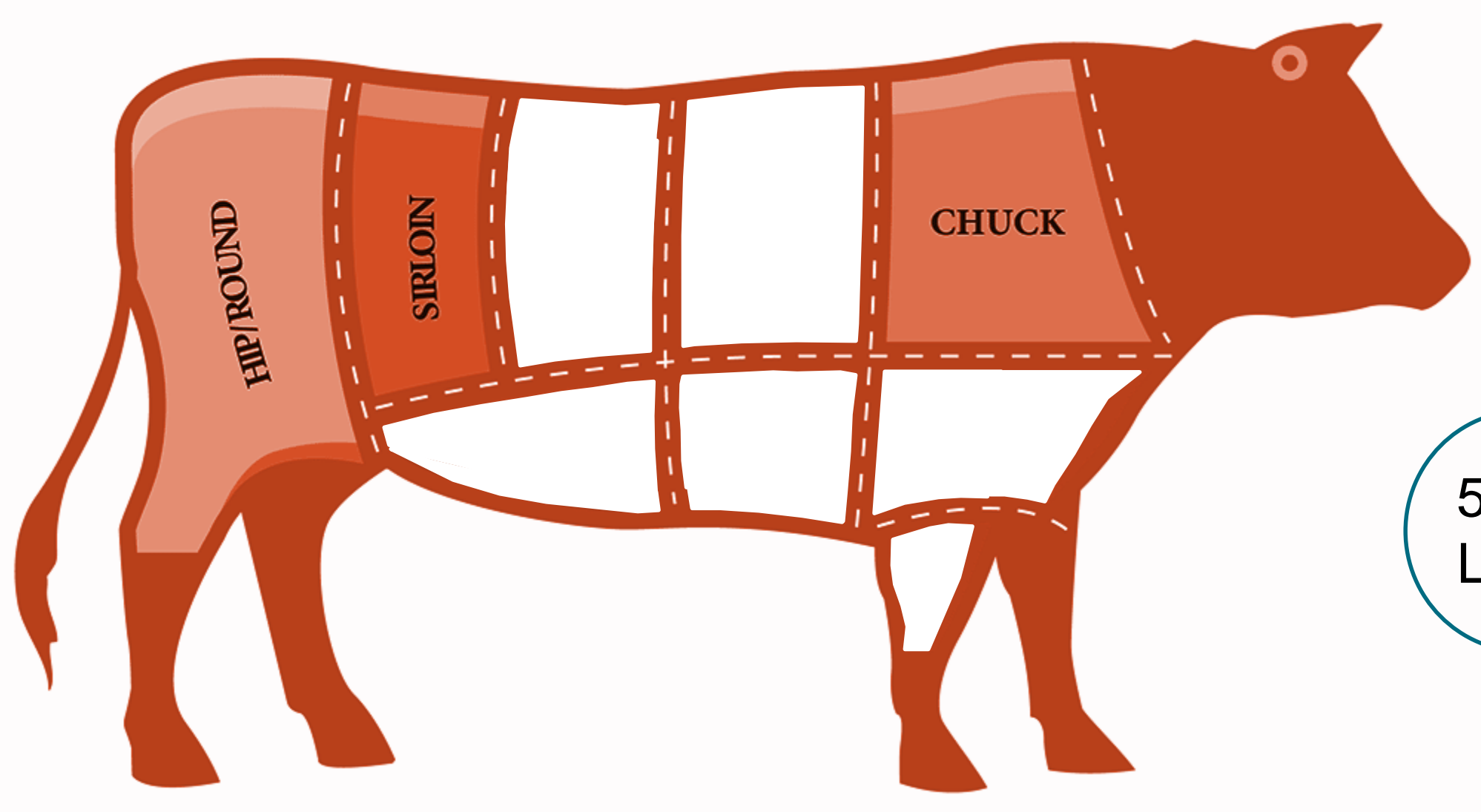
HRI Loss



42.7%
Lost

*Image Source: <https://canadabeef.ca/cuts-by-colour/>

Household Loss



51.4%
Lost

*Image Source: <https://canadabeef.ca/cuts-by-colour/>

Hotspots for GHG Emissions – tonnes of CO2 equivalents

PRODUCTION LOSS



FIELD CROPS
10,378.31



PRODUCE
931.73



PROCESSING LOSS



FIELD CROPS
27,586.84



MEAT & POULTRY
11,299.03



MARINE
7,842.68



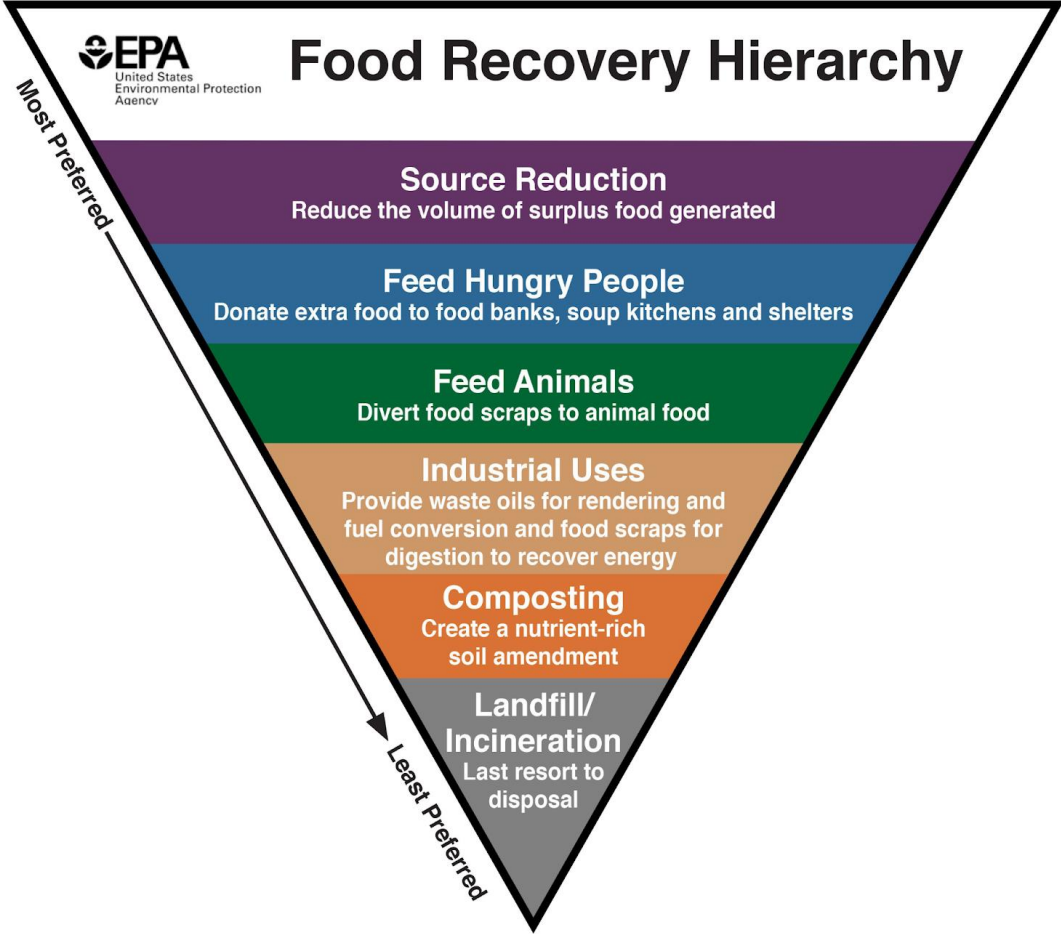
MANUFACTURING LOSS



MEAT & POULTRY
11,696.95



Interventions - Types



*Image Source: EPA

Interventions for Circularity - *HOTSPOT: Production Loss for Field Crops and Produce*



- **Regenerative agriculture approaches (e.g. silvopasture).**
- Reduce lost food due to labour shortages through labourer recruitment and incentives.
- **Using residues to grow mushrooms (e.g. straw) - diversification of income streams for farmers.**
- Donate to food security organizations for meals.
- **On-farm biogas generation, when combined with other substrates.**
- Insect feed.
- Fertilizer production (when mixed with viscera/offal and other ingredients).
- Biodegradable packaging and materials from stems and chaff.
- Medium-Density Fiberboard (MDF) from straw or staw/fiber-concrete.
- **Grounder/fallen produce can be used to create companion animal treats and animal feed.**
- Food rescue platform to share the availability of excess products.
- Use “ugly” produce in other products/ markets/ businesses (e.g.. soup, sauce, jam, juice etc.)
- **Change procurement guidelines for aesthetics.**
- Send produce waste to farms, zoos, rescues animal feed (or require pick-up and alert with food rescue digital platform).
- Dehydrated potato mash.

Interventions for Circularity - HOTSPOT: Production Loss for Field Crops and Produce



<https://www.loveproperty.com/gallery/list/79314/hempcrete-bamboo-and-cob-eco-home-building-materials>



<https://blog.ted.com/straw-into-gold-a-ted-fellow-cultivates-mushrooms-to-fight-climate-change/>



<https://www.getstewart.com/how-to-dehydrate-mashed-potatoes-for-home-or-the-trail/>



<https://www.loveproperty.com/gallery/list/79314/hempcrete-bamboo-and-cob-eco-home-building-materials>



<https://www.theconcordinsider.com/2016/09/20/what-happens-to-all-the-apples-on-the-ground/>



<https://regeneration.org/nexus/silvopasture>



<https://theconversation.com/more-people-are-eating-bugs-but-is-it-ethical-to-farm-insects-for-food-167248>

Interventions for Circularity - *HOTSPOT: Processing Loss for Field Crops, Meat & Poultry, and Marine*



- **Collagen extraction (skin and viscera/offal).**
- Produce “fish meal” from fish processing by-products for the agricultural livestock sector or aquaculture.
- **Insect feed.**
- Send slaughterhouse excesses to rendering plants for conversion into fats, oil, tallow etc.
- **Fertilizer production from viscera and offal or bone meal.**
- Phosphorus extraction from bone.
- Optimization of production processes to reduce the amount of edible products being discarded.
- Offal and other trimmings for livestock or companion animal feed.
- **Explore opportunities for new products - products traditionally consumed by other cultures may provide a market opportunity in Nova Scotia (eg. pig tails or chicken feet).**
- Production of fish sauces or pastes for the retail market.
- Biodiesel from tallow.
- Industrial lubricant production from tallow.
- **Companion animal litter made out of chaff and other grain plant parts.**

Interventions for Circularity - HOTSPOT: Processing Loss for Field Crops, Meat & Poultry, and Marine



<https://onespelledkitty.ca/wood-pellet-cat-litter/>



<https://www.spsdm.com/do-collagen-supplements-really-work/>



<https://honest-food.net/fish-skin-chicharrons-recipe/>



<https://www.chemicalassociates.com/products/tallow-fatty-acid.html>



<https://www.morningsadvertiser.co.uk/Article/2020/09/28/Why-do-you-eat-pork-scratchings-at-the-pub>



<https://www.wittenchinese.com/chinese-snacks-101-let-them-eat-chicken-feet/>



<https://www.fertilizerforless.com/2020/08/30/bone-meal-fertilizer-a-commonly-used-amendment-for-garden-plants/>

Interventions for Circularity - *HOTSPOT: Manufacturing loss of meat and poultry*



- Develop or tap into food rescue platform to share availability of excess products.
- Add to feed for livestock or companion animals.
- Staff training on use and trimming strategies to minimize wasted product.
- Inventory management practices - adhering to First-In-First-Out (FIFO).
- Production planning and forecasting improvements through training and system updates.

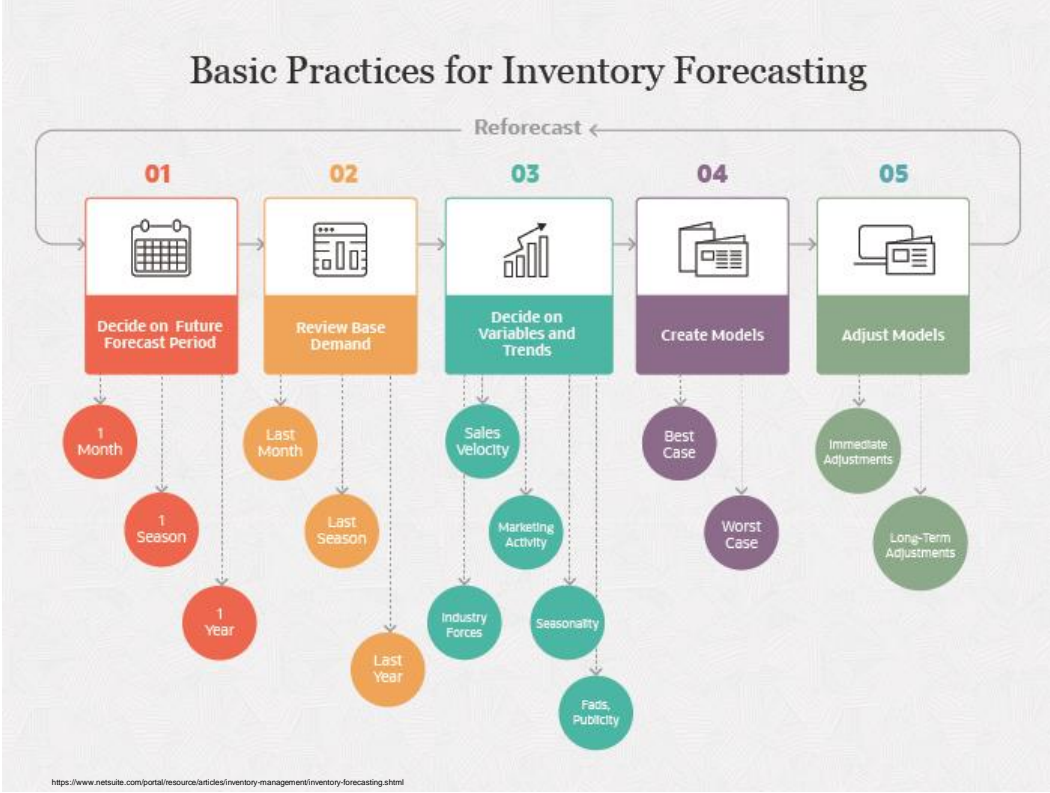
Interventions for Circularity - HOTSPOT: Manufacturing loss of meat and poultry



Food Flows through Nova Scotia



<https://www.greenbiz.com/article/16-apps-helping-companies-and-consumers-prevent-food-waste>



<https://www.netSuite.com/portals/resource/articles/inventory-management/inventory-forecasting.shtml>



<https://www.cbmovers.in/fifo-inventory-model/>



Interventions for Circularity - General



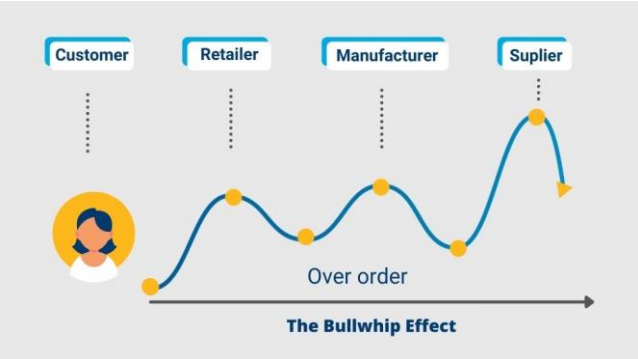
<https://coldchain-tech.com/consulting/thermal-systems/greenbox.html><https://redgoldfoods.com/foodservice-blog/foodservice-detail/2021/02/17/big-ideas-on-serving-condiments-in-a-post-covid-world>



<https://www.bizbusiness.ca/Stainless-steel-takeout-containers-might-be-the-food-packaging-of-the-future>



<https://www.mashed.com/153068/the-disturbing-truth-of-your-grocery-stores-produce-department/>



<https://www.mindereast.com/blog/bullwhip-effect-on-prices>



<https://www.greenbiz.com/article/16-apps-helping-companies-and-consumers-prevent-food-waste>



<https://redgoldfoods.com/foodservice-blog/foodservice-detail/2021/02/17/big-ideas-on-serving-condiments-in-a-post-covid-world>



<https://www.statcan.gc.ca/101/en/plus/1327-df1-composting>

Interventions for Circularity - General



<https://www.biggerbolderbaking.com/cauliflower-pizza-crust-recipe/>



<https://caddyskitchen.com/vegan-mashed-potatoes/>



<https://www.marcellinaucina.com/parmesan-crisps-2/>



<https://www.halifax.ca/parks-recreation/parks-trails-gardens/gardens/community-gardens>



<https://www.marcellinaucina.com/parmesan-crisps-2/>



<https://nutritionrefined.com/veggie-chips/>



<https://simplebits.net/how-to-regrow-vegetable-scraps/>



<https://www.iamcountryside.com/growing-vermicompost-at-home/>

Food Flows through Nova Scotia

End and Next Steps