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Prepared for:

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FPRF
FATS AND PROTEINS RESEARCH FOUNDATION

Pet Food Production and Ingredient Analysis

March 2025

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Legal Disclaimer

Decision Innovation Solutions, LLC ("DIS") has prepared this analysis (the "Project") for review and use. The Project consists of estimations of pet food (cat and dog food only) consumption in the United States.

While DIS has made every attempt to obtain the most accurate data and include the most critical factors in preparing the Project, DIS makes no representation as to the accuracy or completeness of the data and factors used or in the interpretation of such data and factors included in the Project. The responsibility for the decisions made by you based on the Project, and the risk resulting from such decisions remains solely with you; therefore, you should review and use the Project with that in mind.

While the Project includes certain estimates and possible explanations for pet food ingredient usage, it cannot be ascertained with certainty the extent to which these estimates are entirely accurate. The following factors, among others, may prevent complete accuracy of the estimation of feed ingredient usage by species and explanations for the same:

- Inadvertent errors and omissions related to data collection, data summarization and visual display of data.
- Errors and omissions inherent in purchased third-party data.

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1 Executive Summary

The pet food manufacturing industry is an increasingly important partner in the agricultural industry. The production of animal and plant-based protein and energy sources for use in pet food is tremendously diverse, providing nearly countless opportunities for creating recipes to address the nutritional needs of the nation's pets. In addition to identifying ingredient and market trends, this research, which focuses solely on dog and cat food and treat sales, has sought to quantify the influence, from a volume and value standpoint, of the pet food manufacturing industry on the broader agriculture community.

Consider the following findings from dog and cat food and treat sales in 2024:

- Farmers and farm-product processors sell $13.2 billion worth of products to pet food manufacturers every year that are used as ingredients.
- Sales made by farmers and processors of farm products to pet food manufacturers stimulate further upstream economic activity, leading to the purchase of $9.8 billion of materials and services from farm suppliers, providing necessary inputs, such as seed, fertilizer, fuel, labor, machinery and repairs, to produce high-quality products that are used as pet food ingredients.
- In addition, farm suppliers buy $7.6 billion in materials and services, such as fuel, fertilizer, equipment and labor, which they in turn sell to suppliers of farmers.
- The data analyzed indicates that 2024 U.S. retail dog and cat food sales were estimated to be $51.7 billion from 9.8 million tons of product sales.
- Among all pet food products, the lead product was dry dog food, by both sales volume and product value (as reported by Nielsen), with 5.4 million tons (55% of total) and $19.7 billion dollars (38% of total).
- Pet foods use a wide variety of ingredients. The "reverse engineering" of the pet food ingredients from the retail product labels identified 602 standardized food ingredients used in dog and cat foods. Quantities used in pet food production and prices for these ingredients were determined and used in the calculation of the value of ingredients used.
- There are 282 ingredients shared by both cat and dog foods.
- There were 9.28 million tons of food ingredients used in U.S. dog and cat food manufacturing with an ingredient value of $13.23 billion. Ingredient value is based on estimated prices of raw materials (see Appendix A for pricing information sources).
    - There were 4.1 million tons of farm or farm-product processor ingredients valued at $3.4 billion.
    - There are nearly 6.4 million tons of animal-based products with a value of $8.5 billion used in dog and cat foods.
        - There were 2.5 million tons of meat and poultry products valued at $4.7 billion.
        - Animal protein meals and fats contributed 1.6 million tons with a value of $1.0 billion.
        - Marine products contributed 502,013 tons with a value of $3.5 billion.

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        - Broth ingredients account for 184,737 tons with a value of $554 million.
    - Water contributed 440,461 tons with a value of $881,000[1].

- By weight, chicken and chicken products (2,208,736 tons) are the most used ingredients in dog and cat foods. This is followed by grains (1,842,677 tons), milled grains (1,587,505 tons), beef and beef products (1,256,276 tons), and marine products (502,013 tons).
- By value, marine products ($3.5 billion), beef and beef products ($2.44 billion), chicken and chicken products ($1.80 billion), milled grain products ($1.1 billion), and grains ($903 million), are the top five ingredients.
- The 602 standardized food ingredients were aggregated into nutrient groups such as animal protein, animal fat, plant protein, plant carbohydrate, specialty product, etc., summarized as follows:
    - Animal protein ingredients: comprised 275 of the total number of ingredients.
    - Specialty products: comprised 155 of the ingredients (fruits, vegetables and other specialty ingredients).
    - Plant carbohydrates: comprised 80 of the ingredients.
    - Plant proteins: comprised 49 of the ingredients.
    - Plant fats: comprised 24 of the ingredients.
    - Animal fats: comprised 13 of the ingredients.
    - Plant fats and carbohydrate ingredients: comprised five of the ingredients.
- The frequency of ingredients identified on pet food labels is led by animal proteins (15,241 listings), followed by specialty crop ingredients (13,299 listings) and plant carbohydrate ingredients (8,952 listings).

[1] Cost of water was estimated as $0.008/gallon.

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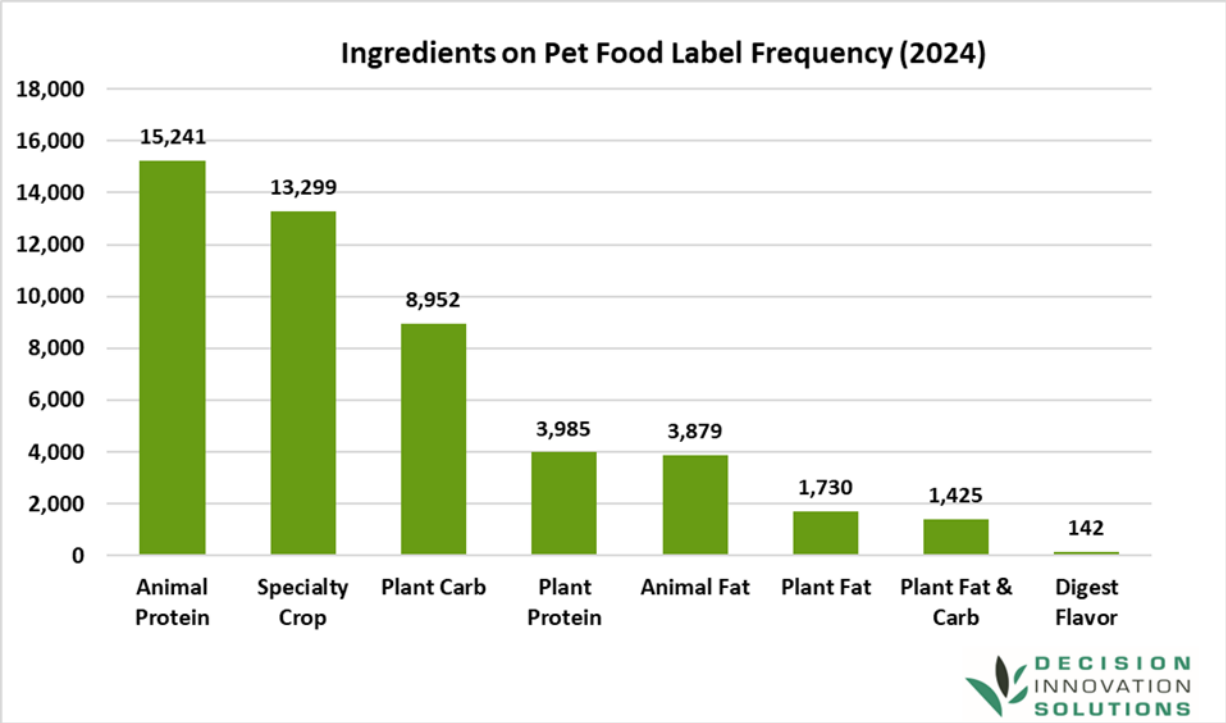

The following tables are high level comparisons of this study relative to DIS's previous 2020 study (2019 data). **Readers should review the specific sections of this report to understand the tables presented below as well as the descriptions provided detailing the findings. Regarding the following "comparison" tables showing updated results in this report compared with the original results, please see the note in Section 3.2.**

Comparison of Retail Pet Food Sales 2025 vs. 2020			
Attribute	**2025**	**2020**	**Percent Change**
Cat Food Sales Volume (Tons)	2,565,367	2,705,868	-5.2%
Dog Food Sales Volume (Tons)	7,236,084	7,127,272	1.5%
Total Food Sales Volume (Tons)	9,801,451	9,833,141	-0.3%
Cat Food Sales Value ($)	$15,329,774,300	$9,328,123,193	64.3%
Dog Food Sales Value ($)	$36,354,318,636	$21,042,778,928	72.8%
Total Food Sales Value ($)	$51,684,092,936	$30,370,902,122	70.2%
Note: Data factored up from Nielsen Data to represent National Data			

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Comparison of Pet Food Ingredients (as Bought), 2025 vs. 2020						
Ingredient Category	Pet Total Ingredient Quantity (as Bought) 2025	Pet Total Ingredient Quantity (as Bought) 2020	Percent change	Pet Total Food Ingredient Value (as Bought) 2024	Pet Total Food Ingredient Value (as Bought) 2020	Percent change
Meat & Poultry Products	2,457,150	1,834,661	34%	$4,749,359,756	$3,089,338,098	54%
Marine Products	502,013	257,720	95%	$3,499,719,013	$967,648,767	262%
Farm or Mill-based Products	4,124,748	4,039,610	2%	$3,390,434,958	$1,389,965,464	144%
Animal Protein Meals & Fats	1,568,606	1,773,116	-12%	$1,025,802,043	$641,528,692	60%
Broth	184,737	166,851	11%	$554,210,754	$834,255,514	-34%
Water	440,461	567,501	-22%	$880,923	$1,135,003	-22%
Grand Total	9,278,408	8,646,211	7%	$13,227,040,232	$6,941,305,251	91%
Comment: Pet food data for this 2025 study was from mid 2023 through mid 2024. The 2020 study used data from 2019.						

Comparison of Impacts of Pet Food Ingredient Purchases on U.S. Farms, Farm Product Processors and Farm Suppliers, 2025 vs. 2020					
Year	Pet Food Manufacturers	Pet Food Ingredients Purchased (Tons)	Pet Food Processor Purchases of Farm and Farm Product Processor Ingredients (Dollars)	Farm Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)	Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)
2025	518	9,278,408	$13,227,040,232	$9,759,320,977	$7,566,893,763
2020	519	8,646,211	$6,891,659,850	$5,342,053,032	$4,118,529,550
Percent change	-0.2%	7.3%	92%	83%	84%

Comparison of Average Impact Per Pet Food Manufacturer to U.S. Farms, Farm Product Processors and Farm Suppliers Due to Pet Food Ingredient Purchases, 2025 vs. 2020					
Year	Pet Food Manufacturers	Average Pet Food Ingredients Purchased (Tons)	Average Farms and Processors Sales Resulting from Pet Food Ingredient Purchases (Dollars)	Average Farm Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)	Average Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)
2025	518	17,912	$25,534,827	$18,840,388	$14,607,903
2020	519	16,659	$13,278,728	$10,292,973	$7,935,510
Percent change	-0.2%	7.5%	92%	83%	84%
Note: Columns in these tables are not additive					

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2 Introduction

The distribution of pet food manufacturing facilities is also relevant for results in this analysis. Figure 1 shows the 441 cities that have at least one of the 518 U.S. pet food manufacturing facilities, based on data from the Food and Drug Administration (FDA).

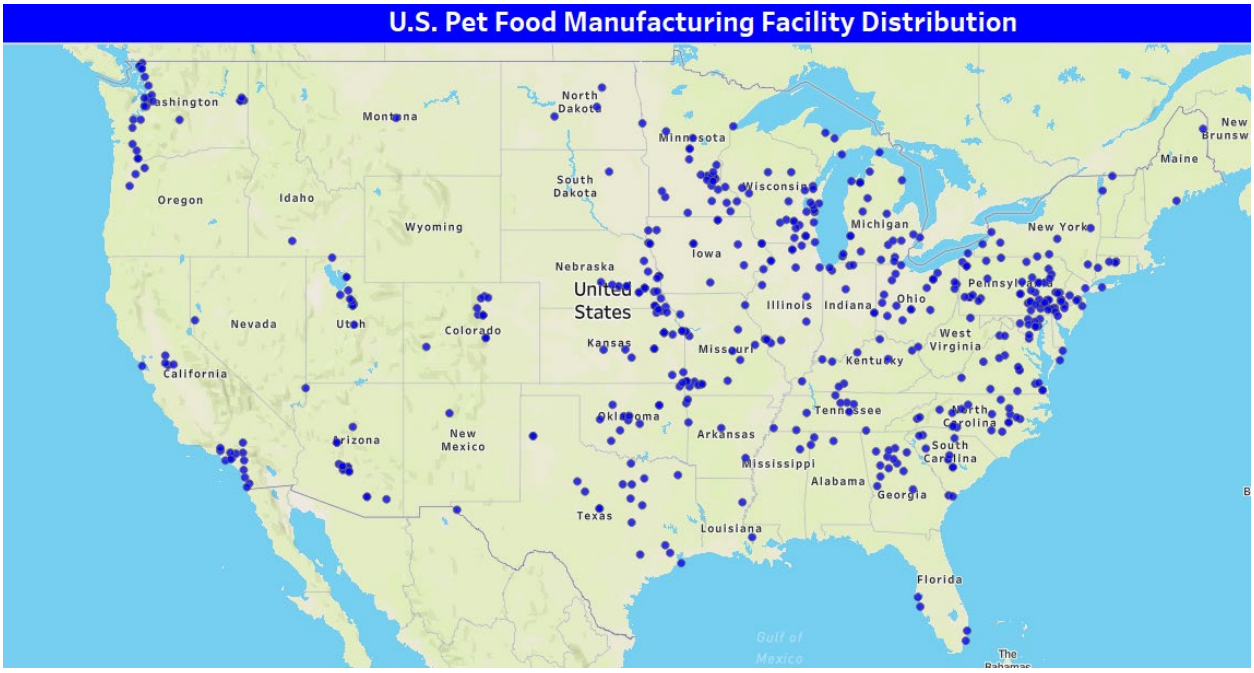

Figure 1. U.S. Pet Food Manufacturing Facility Distribution

As shown in Figure 1, there are pet food manufacturing facilities in 43 of 50 states. The pet food produced in these facilities is diverse in quantity, type and the inclusion and prevalence of many types of ingredients.

To meet the needs and expectations of pet owners, maintain profitability and still provide complete and nutritionally balanced food for dogs and cats, substantial efforts are routinely conducted by pet food manufacturers to better understand trends in consumer preferences and their ability and willingness to pay for diverse ingredients. Understanding pet food ingredient composition and consumption is uniquely complicated when compared to livestock and poultry feed consumption because of at least the following:

- Pets are typically considered to be “family” – pet food is marketed and produced similarly to human food, and consumer health trends find their way into pet food.
- Ingredient inputs can include both human grade as well as other ingredients deemed suitable for use in animal food.
- Consumption of pet food is not necessarily close to points of production. It is not a stretch to say that pet food produced in Missouri can be purchased in Washington, California, Texas, Maine or Florida. Likewise, pet food ingredients are sourced locally, regionally, nationally and internationally. Pet food ingredients are also sourced through a variety of purchasing channels: direct from farm, through brokers, direct from farm-product processors, from renderers, etc.

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- There are many breeds and sizes of cats and dogs, each with unique nutritional requirements.
- While certain minimum nutritional standards need to be met, these standards can be met in a variety of ways, and pet food manufacturers do not generally share their formulations for intellectual property reasons.

DIS's effort seeks to overcome the above challenges in drawing conclusions about pet food ingredients by creating and then adopting a thorough, methodological framework, which utilizes multiple, large data sources that are purchased and publicly available), extensive online research, the use of scripting, statistical and data manipulation software, industry experience and a wide variety of technical skills.

A few notes for reference that readers will find useful:

- By virtue of the nature of the purchased Nielsen dataset, for the purpose of this report, "pet food" is defined as dog and cat food only. This includes all forms of dog and cat food, such as dry/kibble, moist, wet/canned, treats, etc.
- The Nielsen data used to do the reverse ingredient analysis is not the complete "universe" of pet food sales but is assumed to be a representative sample. According to petfoodindustry.com, total pet food sales in 2024 were estimated to have reached $54 billion[2].
- The Nielsen data was received by two sections, "In Store" data versus "Amazon 1P" data. Claimed by Nielsen, the Nielsen "In Store" data represents the total U.S. in store sales records. While the "Amazon 1P" data only represents about one-third of the total U.S. online sales records. Thus, topline numbers have been "factored up" to estimate total U.S. sales of cat and dog food. The factors used are 1 and 3.333 for "In Store" data and "Amazon 1P" data, respectively.
- The Nielsen data represents retail sales and therefore does not seek to quantify "upstream" volumes and values (i.e., the volume or value of goods purchased from industries in other parts of the food and agriculture supply chain for use in pet food). The DIS team has used a variety of data sources, software and industry experience to estimate the upstream volumes and values.

[2] https://www.petfoodindustry.com/pet-food-market/market-trends-and-reports/news/15707536/report-ecommerce-pet-food-sales-projected-to-surpass-us21-billion-in-2024

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3 Results

Using methodology outlined in Appendix A, the following results are presented here:

1. Total national pet food retail volume and sales (based solely on cat and dog foods and treats).
2. Upstream volume and sales.
3. Sales analysis (total, cat and dog foods and treats).
4. Ingredient analysis (total, cat and dog foods and treats).

While there are many charts and maps included in this section as images, DIS provides readers this link for an interactive visualization tool to gain additional insight into ingredient quantities included in cat and dog foods by species, aggregated food type, commodity type and state.

3.1 Total National Pet Food Retail Volume and Sales

U.S. retail dog and cat food in the 2024 data is estimated to be $51.7 billion and encompassed 9.8 million tons[3] of product sales (Table 1). Cat foods make up 26.2% of retail sales volume and account for 29.7% of retail sales value. Dog foods make up 73.8% of retail sales volume and account for 70.3% of retail sale value.

Table 1. Total U.S. Retail Pet Food Volume and Sales

Total U.S. Retail Pet Food Volume and Sales		
Pet Food Category	**Tons**	**Value**
Cat Food Dry	1,599,606	$6,289,431,569
Cat Food Wet	852,081	$7,115,359,370
Cat Treats	113,680	$1,924,983,360
Dog Food Dry	5,364,697	$19,700,513,397
Dog Food Wet	799,837	$6,226,861,861
Dog Treats	1,071,550	$10,426,943,378
Total	9,801,451	$51,684,092,936
Note: Data factored up from Nielsen Data to represent National Data		

[3] Where data are reported in terms of weight throughout this report, "ton" is used, which is 2,000 pounds.

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When the results of this study are compared to the study DIS completed in 2020, the total value of retail sales increased by $21.3 billion, a 70.2% increase (Table 2). Retail sales volume, as represented by the Nielsen data, declined by 31,690 tons, a 0.3% reduction. For ingredients (as bought), the comparison is in Table 3[4].

The total quantity of ingredients, as bought, increased 7% and the value of ingredients, as bought, increased 91%. The quantity of meat and poultry products in pet foods increased 34% and the value increased 54%. For marine products, the quantity increased 95% and the value increased 262%. For farm or mill-based products, the quantity increased 2% and the value increased 144%. For animal protein meals and fats, the quantity decreased 12% but the value increased 60%. For broth, the quantity increased 11% but the value decreased 34%. The quantity of water decreased 22% and the value of water decreased 22%.

Table 2. Comparison of Pet Food Retail Sales, 2025 vs. 2020

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Table 3. Comparison of Pet Food Ingredients, as Bought, 2025 vs. 2020

Comparison of Pet Food Ingredients (as Bought), 2025 vs. 2020						
Ingredient Category	Pet Total Ingredient Quantity (as Bought) 2025	Pet Total Ingredient Quantity (as Bought) 2020	Percent change	Pet Total Food Ingredient Value (as Bought) 2024	Pet Total Food Ingredient Value (as Bought) 2020	Percent change
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Marine Products	502,013	257,720	95%	$3,499,719,013	$967,648,767	262%
Farm or Mill-based Products	4,124,748	4,039,610	2%	$3,390,434,958	$1,389,965,464	144%
Animal Protein Meals & Fats	1,568,606	1,773,116	-12%	$1,025,802,043	$641,528,692	60%
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Comment: Pet food data for this 2025 study was from mid 2023 through mid 2024. The 2020 study used data from 2019.						

[4] For additional discussion on the substantial increase from 2019 to 2024 in retail pet food value and as-bought ingredient values shown Table 2 and Table 3, respectively, please see Appendix E.

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3.2 Summary of Total Ingredient Analysis

Nielsen data were obtained for U.S. retail pet food sales. This data was analyzed for its standardized ingredient content by both ingredient and weight of the ingredients in those pet foods. In total, there were 3,512 unique "label ingredients," which were classified as either pet food ingredients or "additives", that is, safe ingredients that enhance digestibility, provide flavor or maintain freshness on shelves such as vitamins, minerals, amino acids, flavorings, colorings and some extracts. The food ingredients were standardized into 602 food ingredients for analysis. Ingredients classified as "additives" were not quantified in this analysis. The 602 ingredients were then used to quantify total ingredient weight. Representative wholesale prices for these ingredients were obtained from a variety of public data sources and from internet searches on wholesale markets. Total ingredient values were determined by multiplying the quantity of each ingredient (tons) by its associated price per ton.

For summary presentation, the major pet food ingredients were categorized into the following primary categories**: farm or mill-based ingredients** (i.e., ingredients from grains and oilseeds, processed grain and oilseed products, dairy products, egg products, forages, fruits, herbs, nuts, root crops, sweeteners, tree oils and vegetables); **meat and poultry products** (i.e., fresh, frozen, dried and dehydrated meat and poultry products and non-meal byproducts); **animal protein meals and fats**, **marine products, water** and **broth**. The summary of the ingredient product-types and commodity-types are listed in Appendix B. Not all minerals nor all minor additives were included in the analysis[5].

The total amount of food ingredients used in the manufacturing of pet foods was 9,278,408 tons (Figure 2). This included 4.1 million tons of farm or mill-based ingredients, 2.5 million tons of meat and poultry products, 1.6 million tons of animal protein meals and fats, 502,013 tons of marine products, 440,461 tons of water and 184,737 tons of broth.

The value of the 602 food ingredients used in manufacturing pet foods was $13.2 billion (Figure 3). This includes $4.7 billion of meat and poultry products, $3.5 billion of marine products, $3.4 billion of farm or mill-based products, $1 billion of animal protein meals and fats, $554 million of broth and $1 million of water[6].

> ***Note:*** *Care needs to be taken when reconciling changes in values and quantities of total pet food sales at retail with the summary of the ingredient analysis, especially if comparing the 2019 data with the 2024 data. At the retail level, it is a relatively straightforward comparison as the retail sales data for both years was total national retail pet food sales. For ingredients, however, the 2024 data includes 60 more "standardized" ingredients than the 2019 data and the change in the mix of ingredients used in pet foods also contributes to disparities when comparing ingredients to retail product sales. For example, in the 2024 data, there was significantly less corn (-23%) used in pet foods than in 2019 and significantly more chicken (+32%) used in 2024 than 2019. Corn is a dry ingredient, whereas chicken is a relatively wet ingredient. The differences in moisture content of the ingredients that are then processed into retail products can result in differences in tonnage of ingredients bought and used in the preparation of retail pet foods compared to the changes in tonnage of retail pet food sold.*

[5] See Appendix D for additional information regarding comparison between total reported volumes versus calculated ingredient volume.

[6] Cost of water was estimated as $0.008/gallon.

Additionally, in this current analysis, significantly more marine products were sufficiently high enough on the ingredient list of the retail products to be included in the ingredient analysis.

By name, at least, there are 364 ingredients in the current pet food study that were not in the prior study. Those 364 ingredients account for 532,671 tons (as sold) and account for 642,398 tons (as bought). That is 6.5% of the current study's ingredients. Of the top 25 ingredients in this study, there are 503,265 (8.7%) more tons used in the current study than in the prior study. Of the top 25 ingredients from the prior study that are in this study, there were 348,479 (5.4%) less tons on those ingredients used in the current study than in the prior study. There are 41 ingredients that were in the prior study that are not, at least by name, in the current study. In the prior study, those 41 ingredients accounted for 31,663 tons of ingredients. There are 602 ingredients in this study. Of the 237 ingredients that were in both this study and the prior study, there are 194,425 (-2.5%) less tons (as sold basis) used in the current study than the prior analysis.

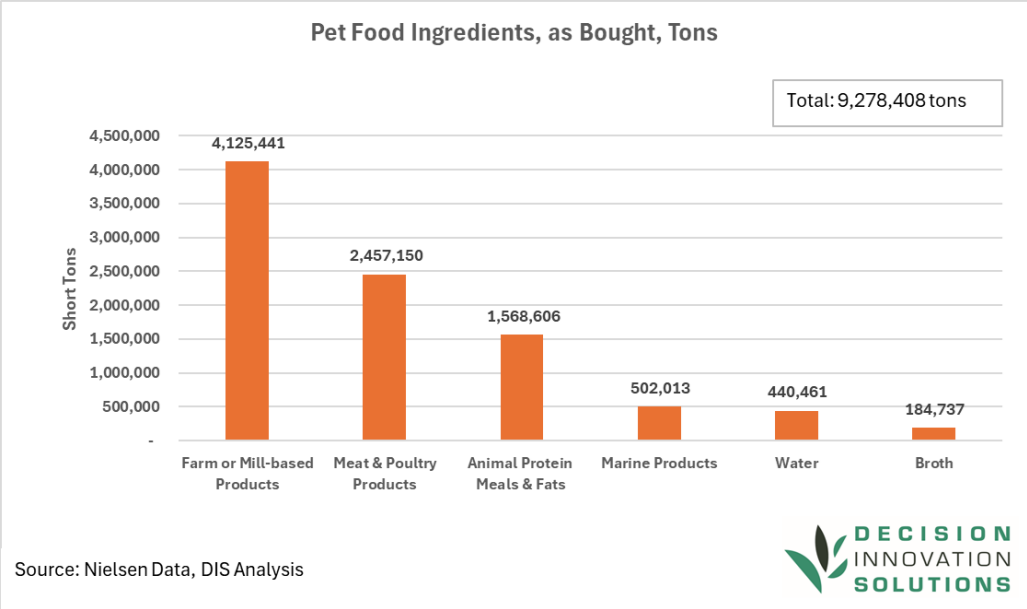

Figure 2. Pet Food Ingredients, as Bought, Tons

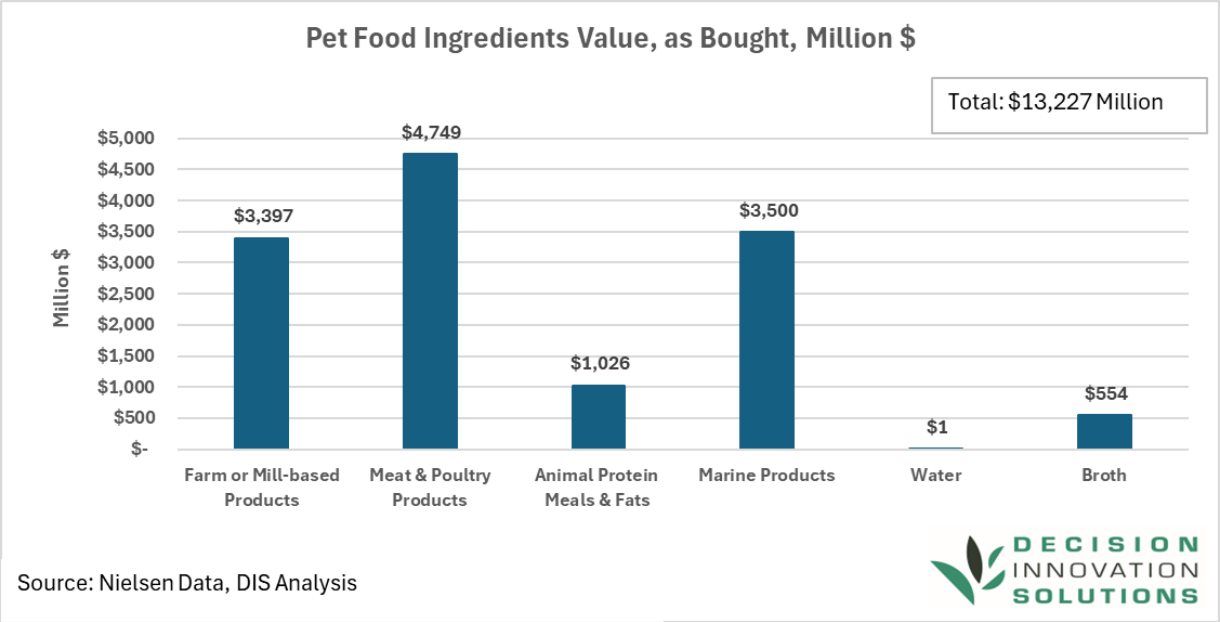

Figure 3. Pet Food Ingredients Value, as Bought, Million $

Farm or mill-based products make up 44.5% of the ingredient tonnage, but only 25.7% of the ingredient value (See Figure 4 and Figure 5). Meat and poultry products (i.e., fresh, frozen, dried and dehydrated meat and poultry products, which includes fresh meat and poultry byproducts and organ meats), make up 26.5% of tonnage and 35.9% of ingredient value. Animal protein meals and fats are 16.9% of tonnage but 7.8% of ingredient value. Marine products make up 5.4% of ingredient tonnage but 26.5% of ingredient value. Broth makes up 2% of tonnage and 4.2% of ingredient value. Water makes up less than 0.1% of the value.

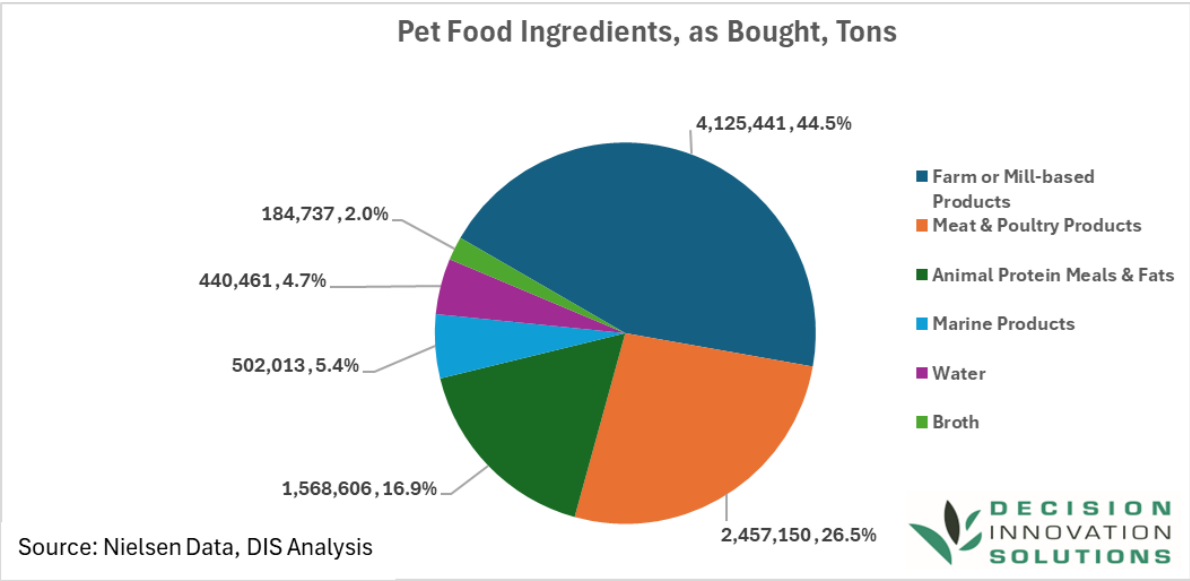

Figure 4. Pet Food Ingredients, as Bought, Tons

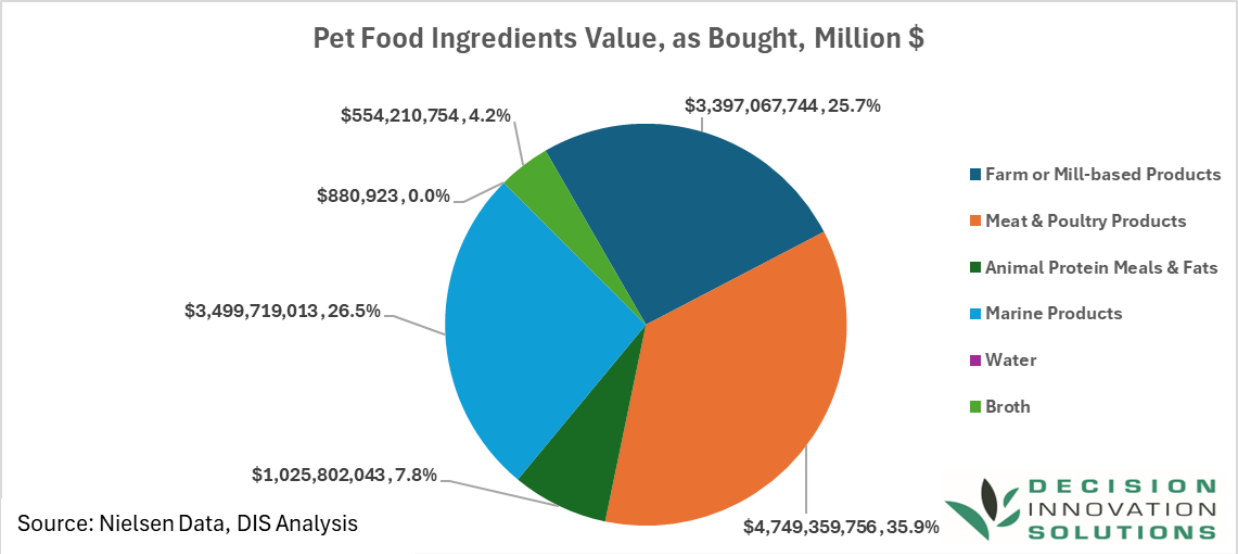

Figure 5. Pet Food Ingredients Value, as Bought, Million $

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Figure 6 shows the tonnage and percentage of total ingredients that are "upcycled" ingredients, which are ingredients that are coproducts from other industries. For pet foods, 44% of the ingredients are upcycled ingredients and add up to 4.1 million tons. Other ingredients used in pet foods are 5.2 million tons and make up 56% of the total food ingredients.

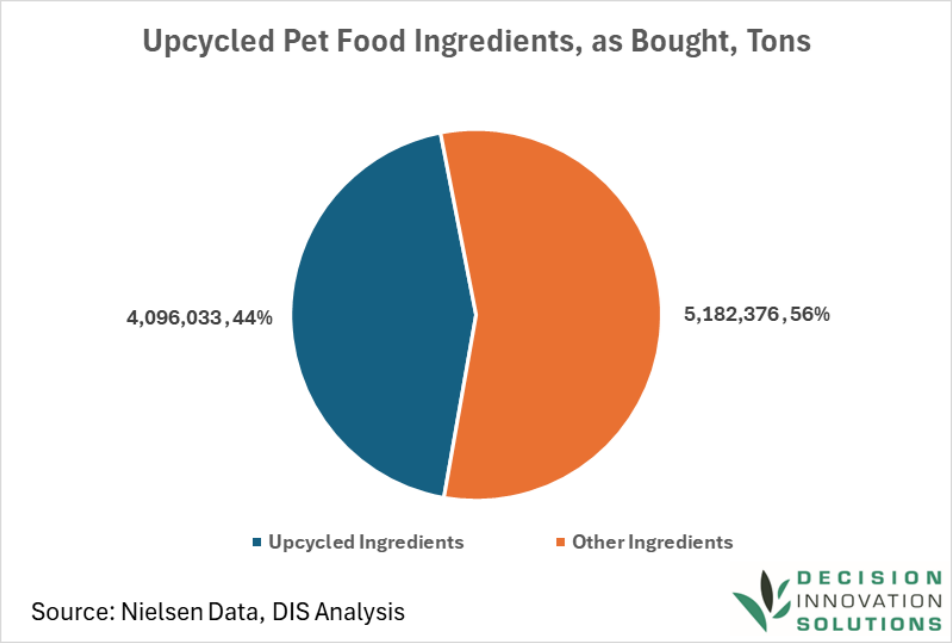

Figure 6. Upcycled Pet Food Ingredients, as Bought, Tons

The value of upcycled pet food ingredients is $3.4 billion and represents 26% of the value of pet food ingredients (Figure 7). Other ingredients are valued at $9.8 billion and represent 74% of the value of pet food ingredients.

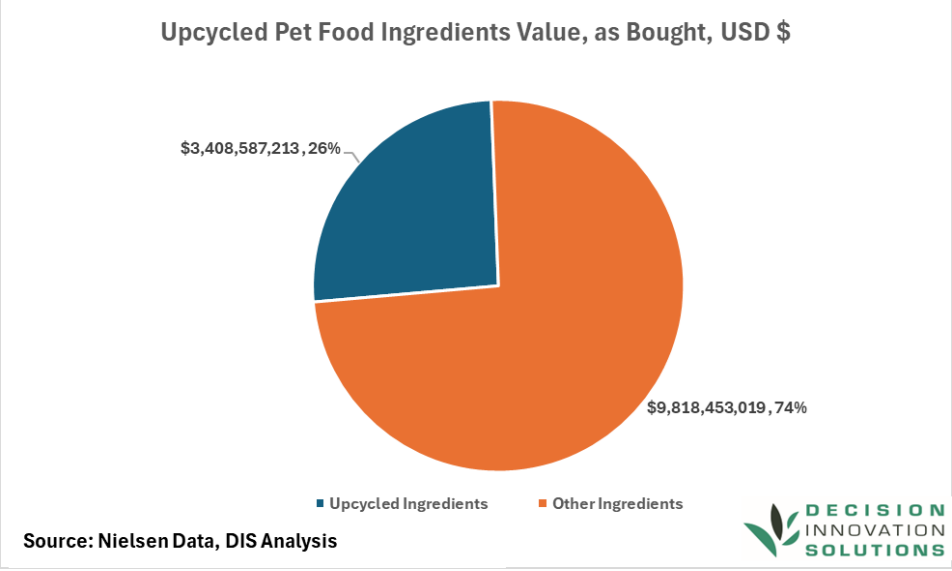

Figure 7. Upcycled Pet Food Ingredients Value, as Bought, USD $

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3.2.1 Summary of Pet Food Ingredients for Cats

A total of 2,218,528 tons of ingredients were used for cat foods (Figure 8). By volume, farm or mill-based ingredients (862,247 tons) were followed by meat and poultry products (501,936 tons), animal protein meals and fats (352,273 tons), water (255,470 tons), marine products (181,126 tons) and broth (65,486 tons).

The total value of ingredients used for cat foods was $3.169 billion (Figure 9). Marine products are the leading group by value at $1.501 billion, followed by farm or mill-based products ($655 million), meat and poultry products ($564 million), animal protein meals and fats ($253 million) and broth ($196 million).

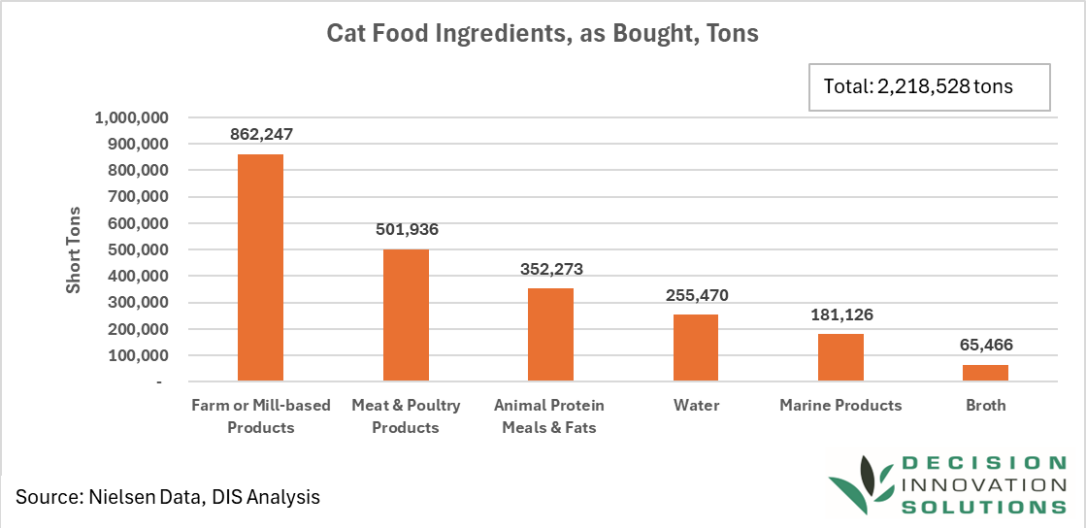

Figure 8. Cat Food Ingredients, as Bought, Tons

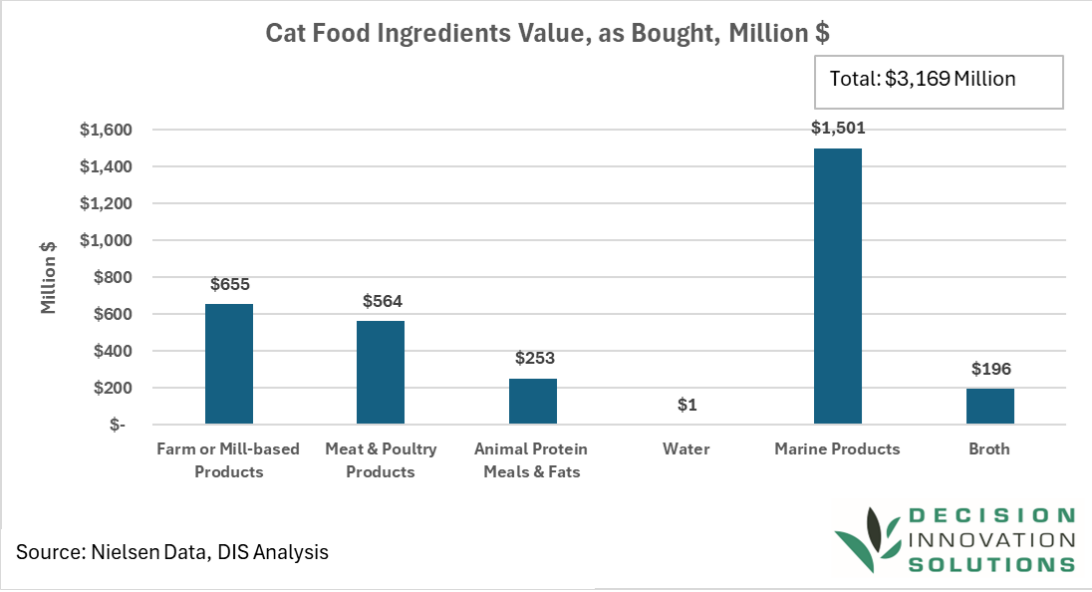

Figure 9. Cat Food Ingredients, as Bought, Million $

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3.2.2 Summary of Pet Food Ingredients for Dogs

A total of 7,059,890 tons of ingredients were used for dog foods (Figure 10). By volume, farm or mill-based ingredients (3,263,193 tons) were followed by meat and poultry products (1,955,215 tons), animal protein meals and fats (1,216,333 tons), marine products (320,886 tons), water (184,992 tons) and broth (119,271 tons).

The total value of ingredients used for dog foods was $10,058 million (Figure 11). Meat and poultry products are the leading group by value at $4.185 billion, followed by farm or mill-based products ($2.742 billion), marine products ($1.999 billion), animal protein meals and fats ($773 million), broth ($358 million) and water at less than $1 million.

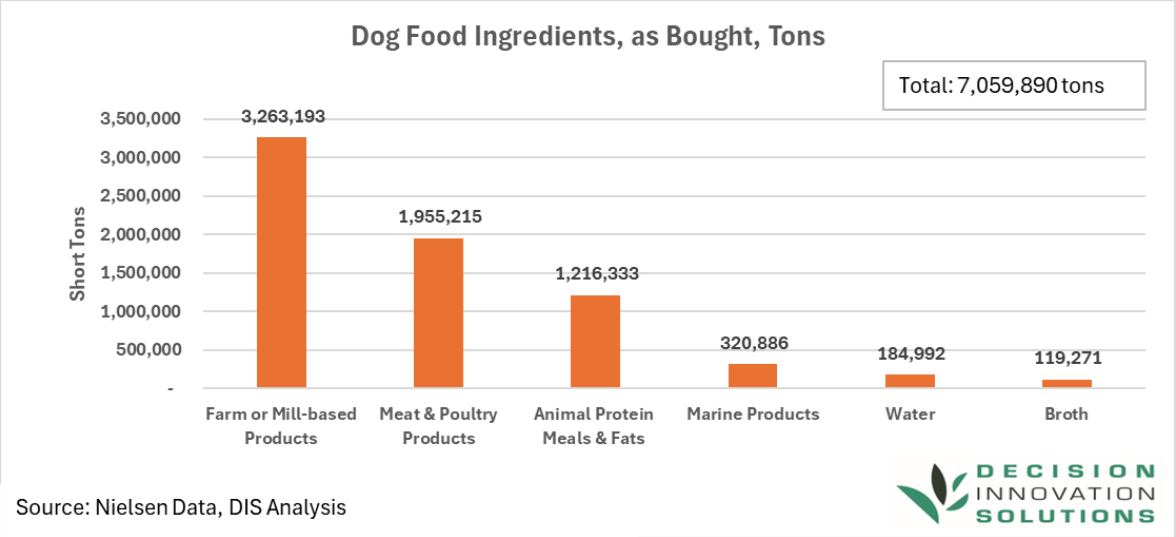

Figure 10. Dog Food Ingredients, as Bought, Tons

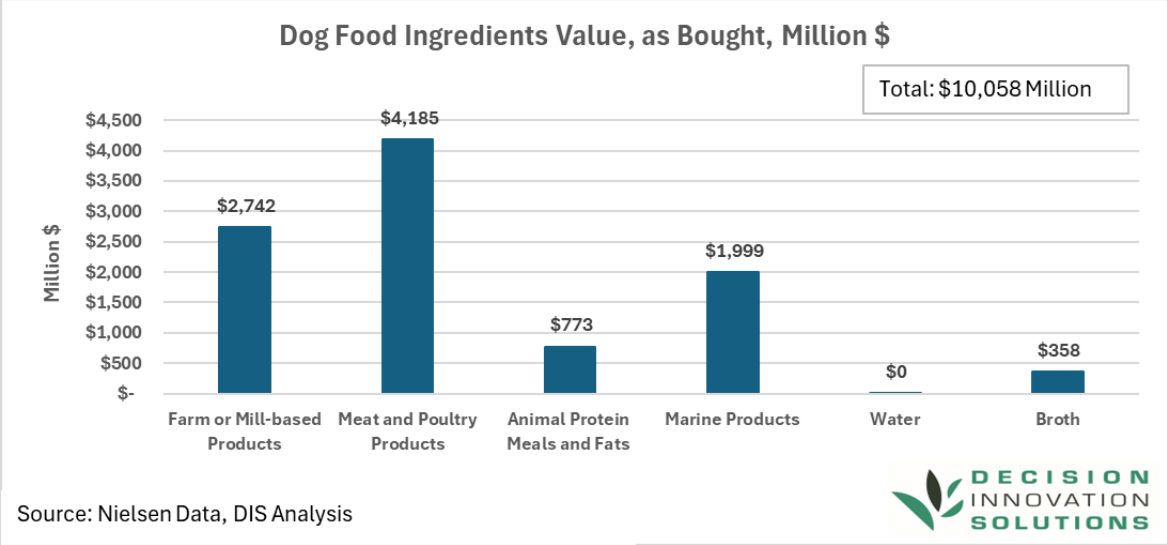

Figure 11. Dog Food Ingredients, as Bought, Million $

There was a total of 1,062,226 tons of upcycled ingredients purchased for cat foods, and 3,033,807 tons of upcycled ingredients purchased for dog foods (Figure 12). The value of upcycled ingredients for cat foods was $830 million and the value of upcycled ingredients for dog foods was $2.579 billion with an overall total value of $3.408 billion of upcycled ingredients purchased for pet foods (Figure 13).

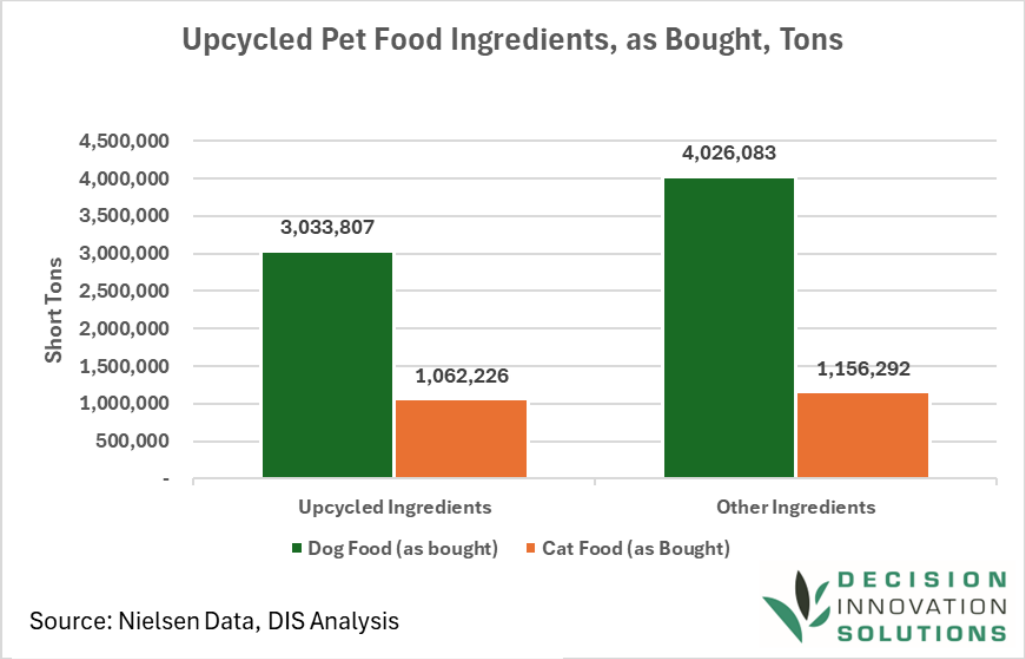

Figure 12. Upcycled Pet Food Ingredients, as Bought, Tons

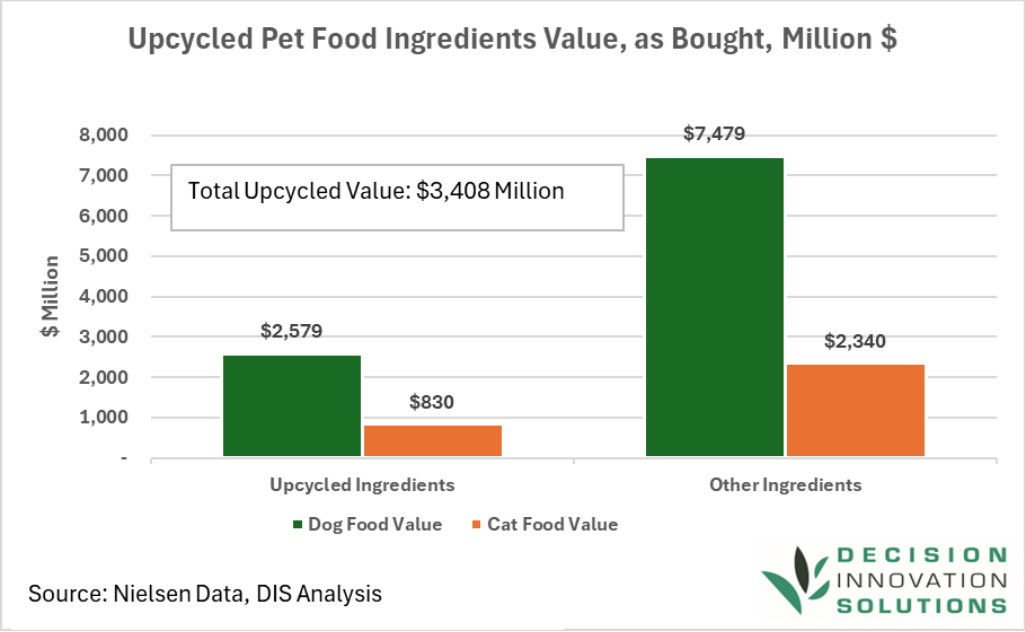

Figure 13. Upcycled Pet Food Ingredients, as Bought, Million $

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3.2.3 Pet Food Ingredients by Categories

Because of the prominence of animal-based ingredients in pet foods, a summary of the animal-based ingredients is shown. Animal-based products account for 4.3 million tons of ingredients with a total U.S. value of $6.44 billion (see Table 4, and Figure 14 and Figure 15). From the aggregation groups in Figure 10, the animal-based grouping contains the categories of meat and poultry products, animal protein meals and fats, and broth. A more detailed breakdown of the animal-based ingredients includes fresh, frozen, dried and dehydrated meat and poultry, broth, meat and poultry byproducts, and organ meats, rendered protein meals (i.e., poultry meal and animal meal), animal fats, poultry fats and fish meal. Dairy products, eggs and seafood are in other categories.

Table 4. U.S. Total Pet Food Animal-based Ingredients

U.S. Total Pet Food Animal-based Ingredients		
Ingredient Category	**Pet Total as Bought**	**Value Pet Total as Bought**
Poultry Fat	64,191	$72,620,432
Fish Meal	96,693	$106,168,303
Broth	184,737	$554,210,754
Animal Fat	214,929	$268,873,158
Animal Meal	419,881	$140,547,004
Other Animal Products & Organs	614,151	$571,139,349
Poultry Meal	869,607	$543,781,359
Meat & Poultry	1,843,963	$4,187,460,940
Grand Total	4,308,153	$6,444,801,299
Note: Data factored up from Nielsen data to represent national amounts		
Note: Commodity type of all ingredients are listed in the Appendix		

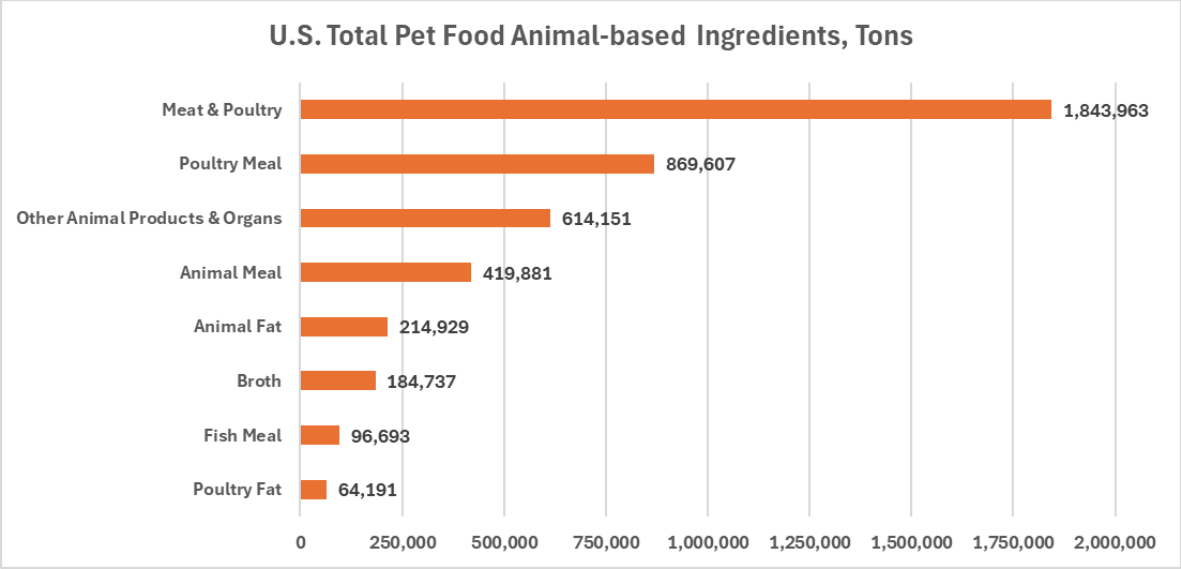

Figure 14. U.S. Total Pet Food Animal-based Ingredients, Tons

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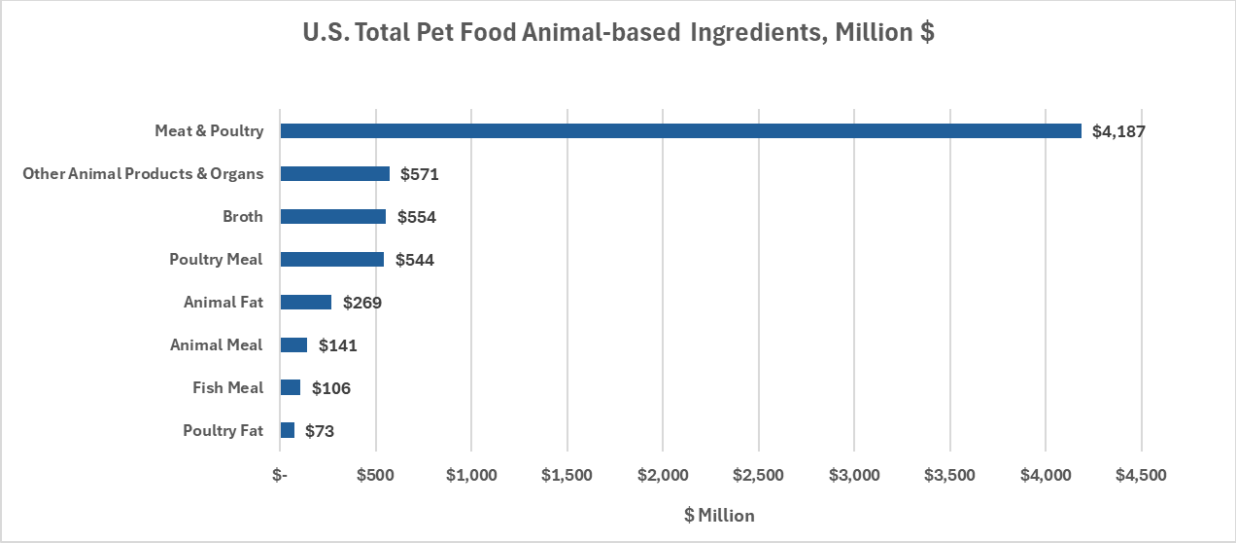

Figure 15. U.S. Total Pet Food Animal-based Ingredients, Million $

Animal protein meals and fats are made primarily from leftover nutritious ingredients from beef, pork, lamb, chicken and turkey production. The rendering processing takes a variety of nutritious animal and poultry ingredients with relatively low value and makes them into sustainable, higher-value feed products with relatively high protein content. There are 1.57 million tons of animal protein meals and fats from 33 different ingredients in pet foods with a value of $1,026 million (see Figure 2 and Figure 3). A more detailed breakdown of volume and values of animal protein meals and fats used in pet foods is in Figure 16 and Figure 17.

Chicken byproduct meal is the leading animal protein meal and fat ingredient by volume with 421,108 tons. It is followed by meat and bone meal (320,109 tons), chicken meal (300,815 tons), and poultry byproduct meal (111,669 tons).

Chicken byproduct meal is also the leader in value of animal protein meal and fat ingredients used in pet foods with $267 million in value. It is followed by chicken meal valued at $191 million, beef fat ($139 million and animal fat ($127 million).

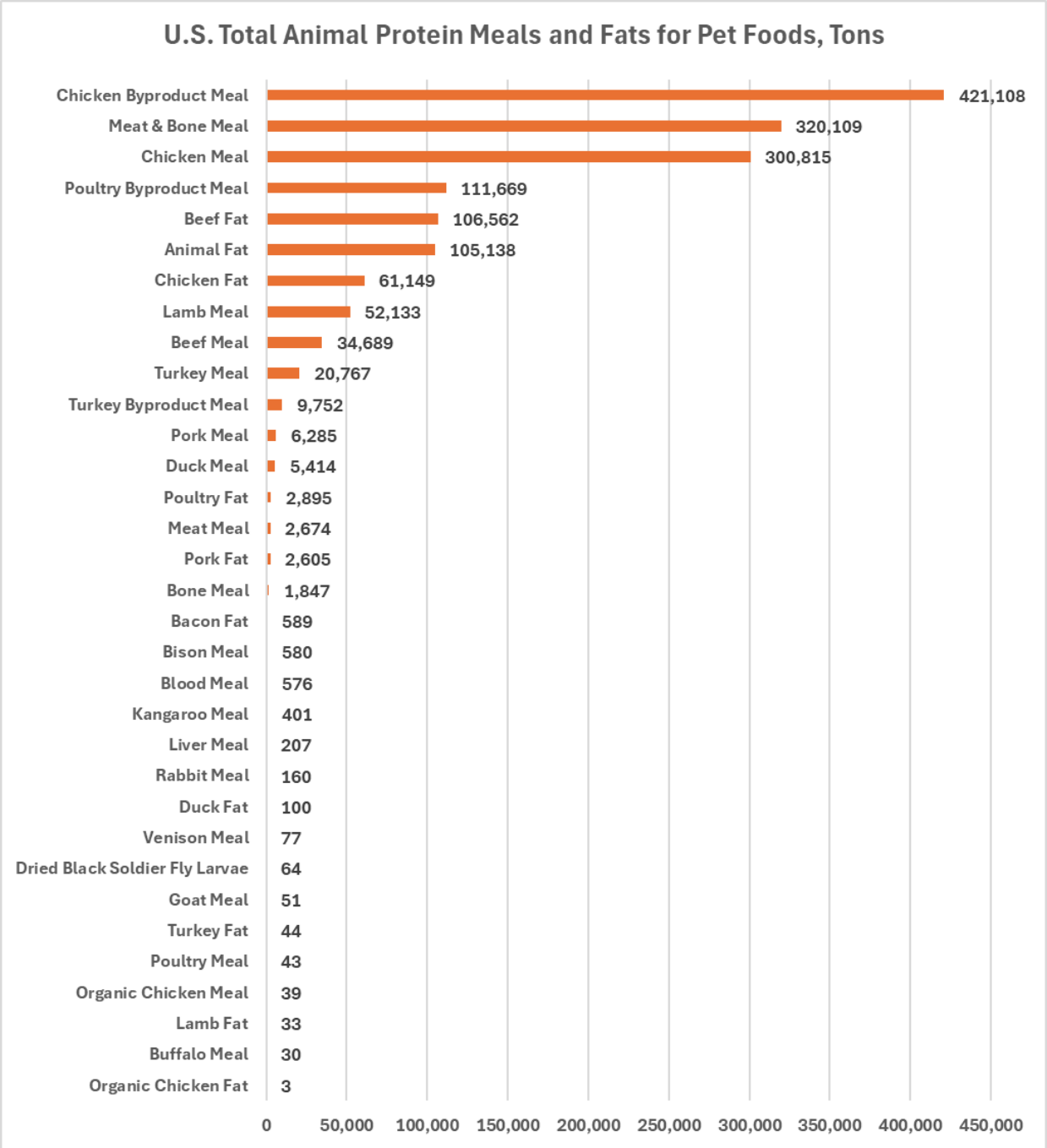

Figure 16. U.S. Total Animal Protein Meals and Fats for Pet Foods, Tons

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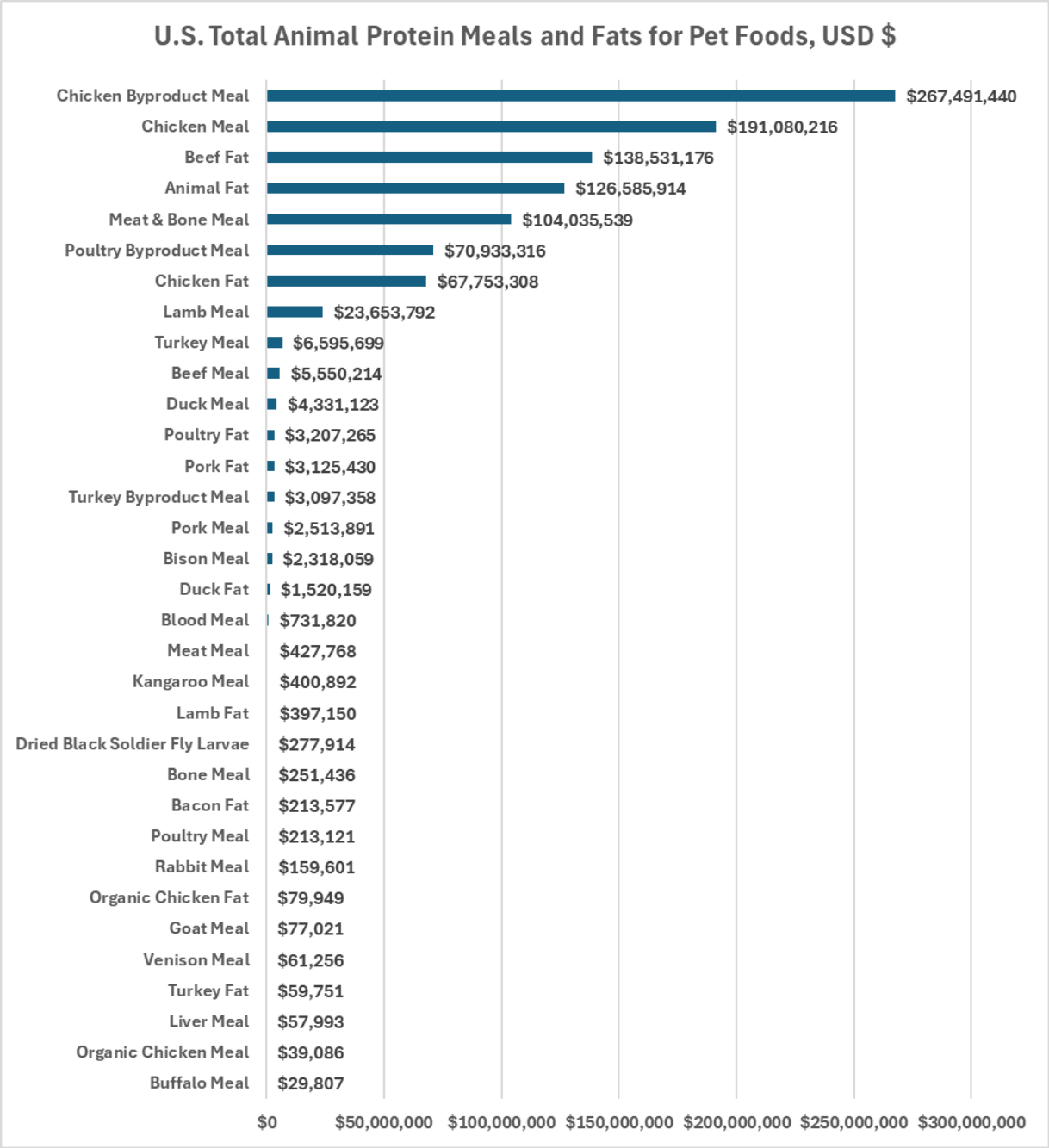

Figure 17. U.S. Total Animal Protein Meals and Fats for Pet Foods, USD $

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Another major category of animal based ingredients used in pet foods are those that come from slaughter and rendering facilities but are not processed into protein meals. This group includes fresh, frozen, dried and dehydrated beef, chicken, pork and a variety of other meats and coproducts from meat production.

The leading ingredient-species by volume of the 16 different species used in pet foods (there are also two generic categories: animal and poultry) are chicken (1,273,270 tons), beef (650,365 tons), unspecified animal products (354,856 tons), lamb (156,158 tons), turkey (121,184 tons) and pork (111,579 tons). (See Figure 18.) The total volume for the group is 2.46 million tons.

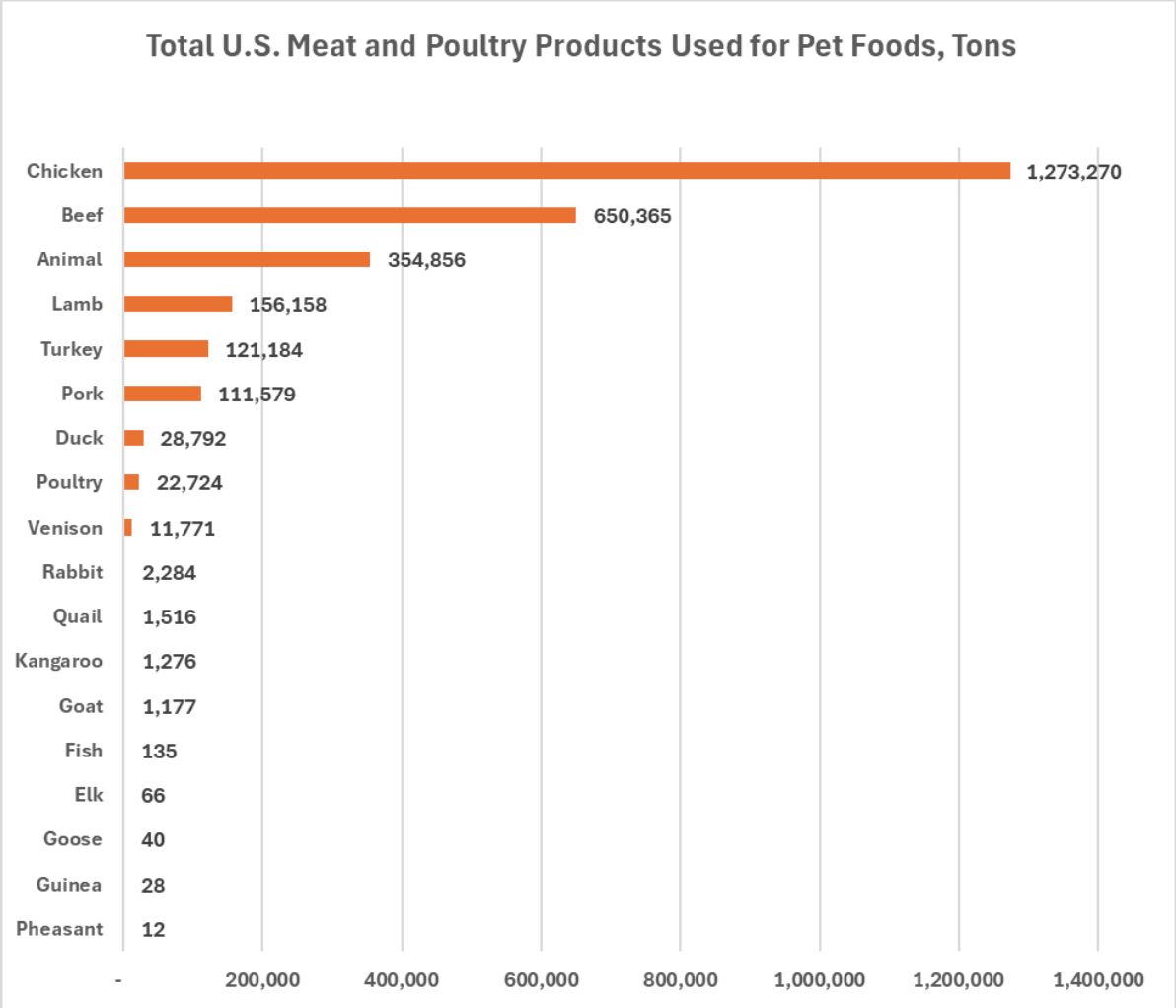

Figure 18. Total U.S. Meat and Poultry Products Used for Pet Foods, Tons

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The leading ingredient-species by value of the 18 different groups used in pet foods are beef ($2.1 billion), chicken ($1.0 billion), lamb ($808 million), pork ($406 million), turkey ($378 million), and unspecified animal products ($273 million). The total value for the group is $4.7 billion (Figure 19).

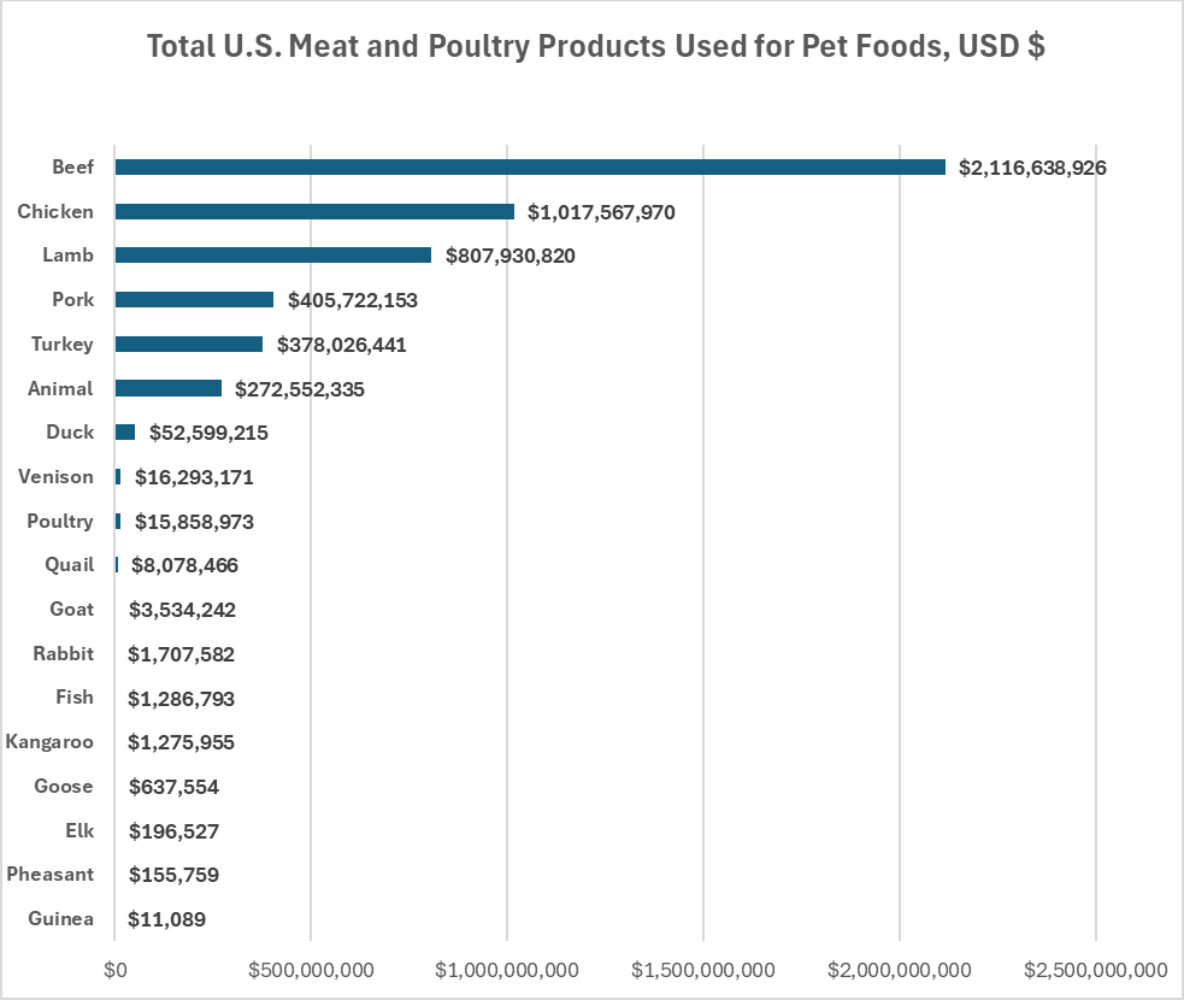

Figure 19. Total U.S. Meat and Poultry Products Used for Pet Foods, USD $

The 4,124,612 tons of farm or mill-based ingredients used in pet foods are valued at $3.4 billion. This category has 332 unique ingredients and includes unprocessed ingredients sourced directly from the farm, such as whole grains (e.g., barley, corn, oats and wheat), mill feeds (e.g., malted barley, corn protein feed, corn meal, rice flour, etc.), soy products (e.g., soybean meal, soy protein concentrates, etc.), fruits and vegetables (e.g., dried beans, carrots, green beans, celery, tomatoes, squash, etc.), dairy and egg products, root products (e.g., peanuts, peanut butter, chicory root, etc.), vegetable oils (e.g., soybean oil, canola oil, coconut oil, etc.) and sweeteners (e.g., sugar, corn sugar, etc.).

In the millfeed product category, there are three alfalfa products, four barley products, four coconut/palm products, 10 processed corn products and five milled oat products. Vegetable products include beets, broccoli, carrots, celery, pumpkin, tomatoes and yams, to name a few. The list of organic products

expanded significantly for this study compared to the prior study. There are 48 organic farm or mill-based products in this analysis. The full list of all farm or mill-based ingredients is in Appendix B.

Due to the number of ingredients in the farm or mill-based category, ingredients were sorted into nine sub-categories. The largest of these sub-categories is whole grains with 1,852,816 tons of ingredients. The next largest sub-category is mill-feed (1,183,705 tons), followed by soy products (378,875 tons), fruits and vegetables (332,880 tons), lentils and beans (174,401 tons), dairy and egg (122,984 tons), sweetener (32,000 tons), nut and root products (25,442 tons), and vegetable oils (21,509 tons) (Figure 20).

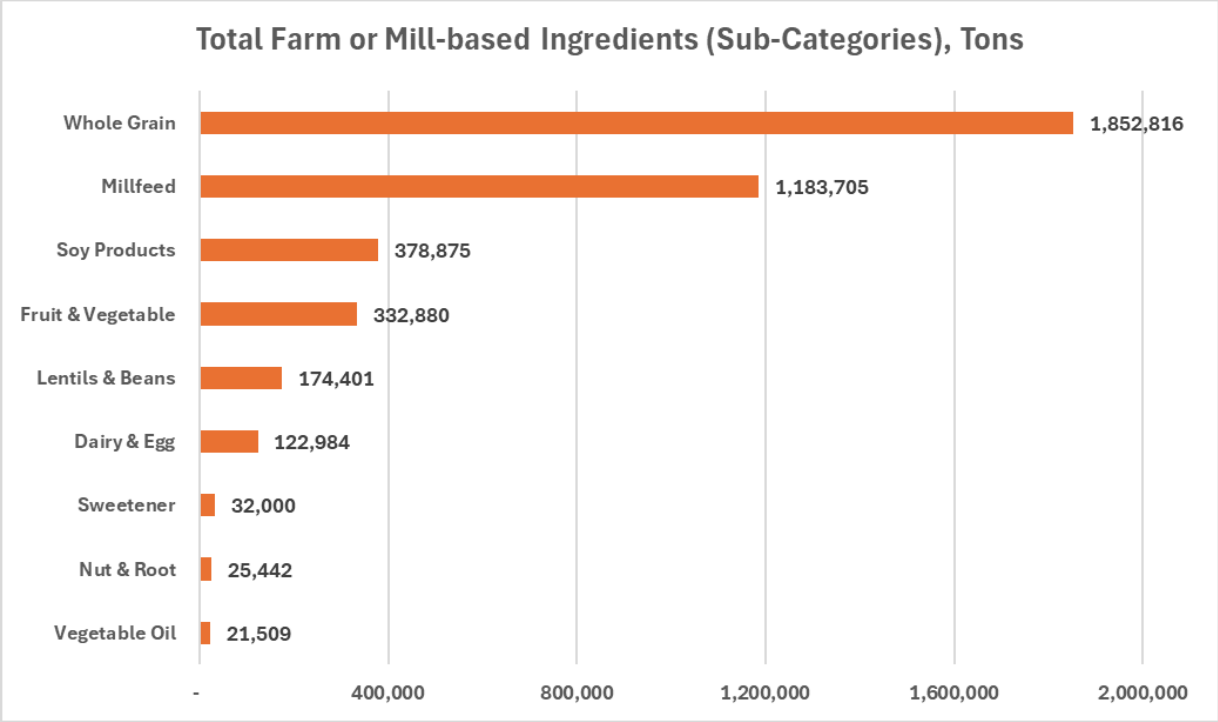

Figure 20. Total Farm or Mill-based Ingredients (Sub-Categories), Tons

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By value, the leading sub-category for the farm or mill-based group is whole grains with $912 million in value. This is followed by mill-feed ($839 million), dairy and egg ($497 million), fruits and vegetables ($494 million), lentils and beans ($322 million), soy products ($220 million), sweeteners ($40 million), nut and root products ($37 million) and vegetable oils ($28 million) (Figure 21).

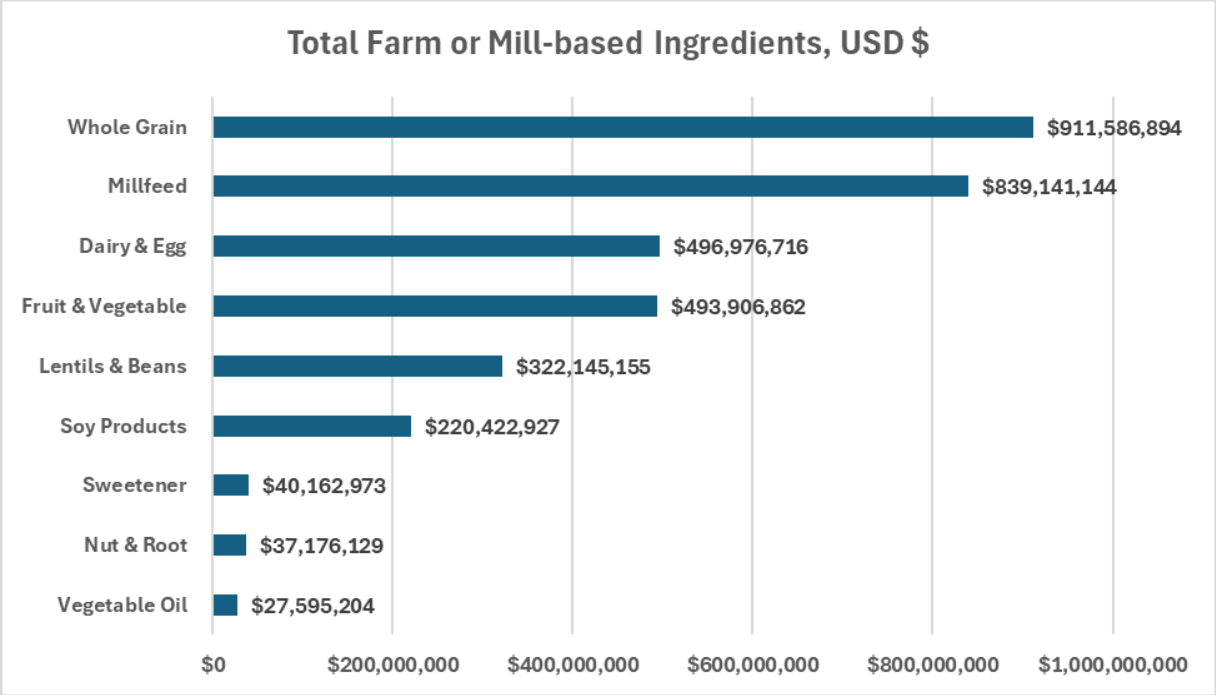

Figure 21. Total Farm or Mill-based Ingredients, USD $

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The volume of the "Top 30" ingredients in this category are shown in Figure 22. Corn is the leading ingredient in this category at 1,043,924 tons. It is followed by corn protein meal (523,769 tons), soybean meal (307,224 tons), wheat (207,924 tons), barley (203,470 tons), rice flour (148,995 tons), brown rice (148,960 tons), sweet potatoes (139,481 tons), and rice 122,850 tons).

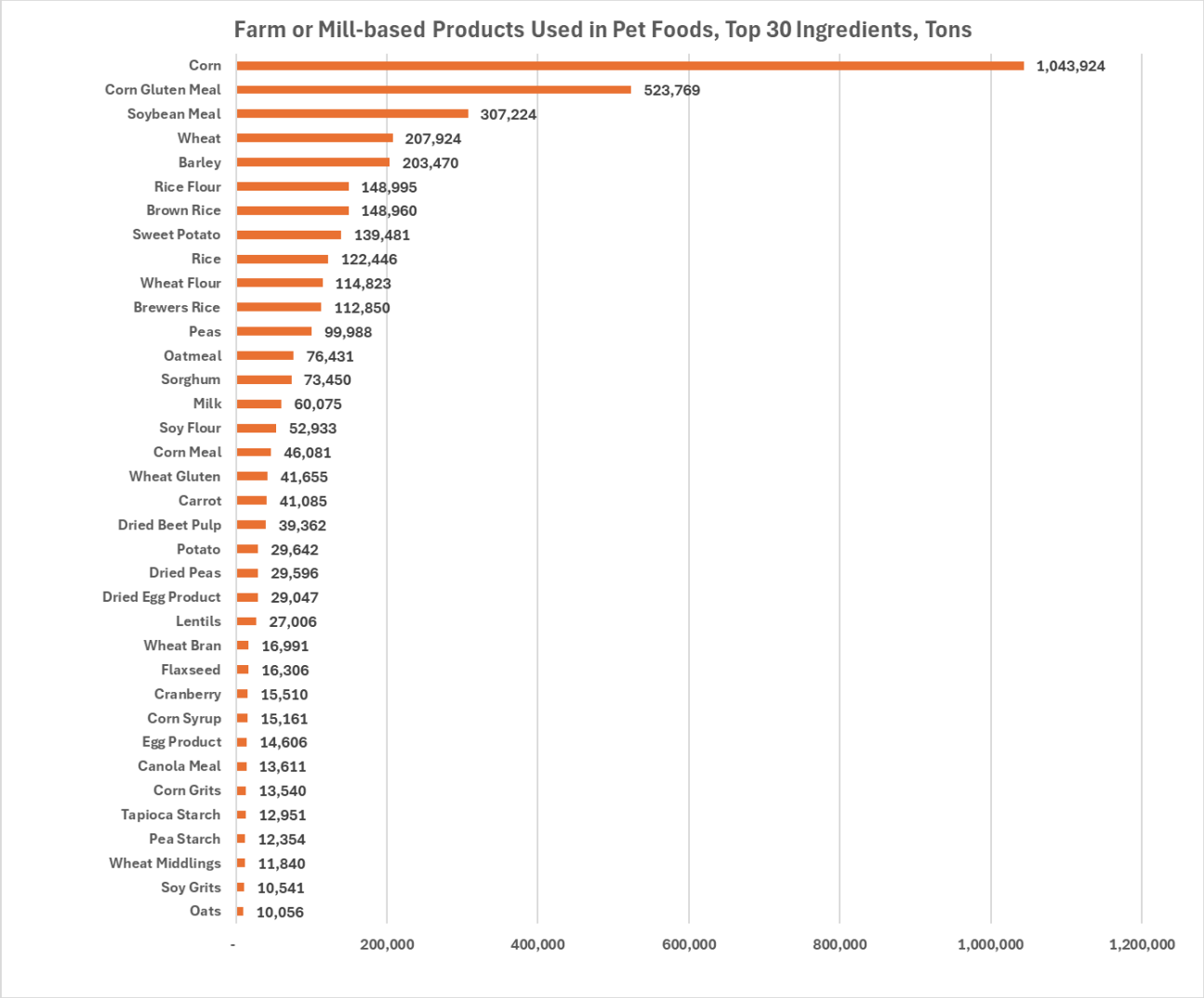

Figure 22. Farm or Mill-based Products Used in Pet Foods, Top 30 Ingredients, Tons

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The “Top 30” products by value in this category are shown in Figure 23. The leading ingredient by value in this category is corn at $334 million. It is followed by corn protein meal ($291 million), dried egg products ($251 million), peas ($231 million), rice flour ($179 million), sorghum ($142 million), soybean meal ($140 million), sweet potatoes ($132 million), and rice ($127 million).

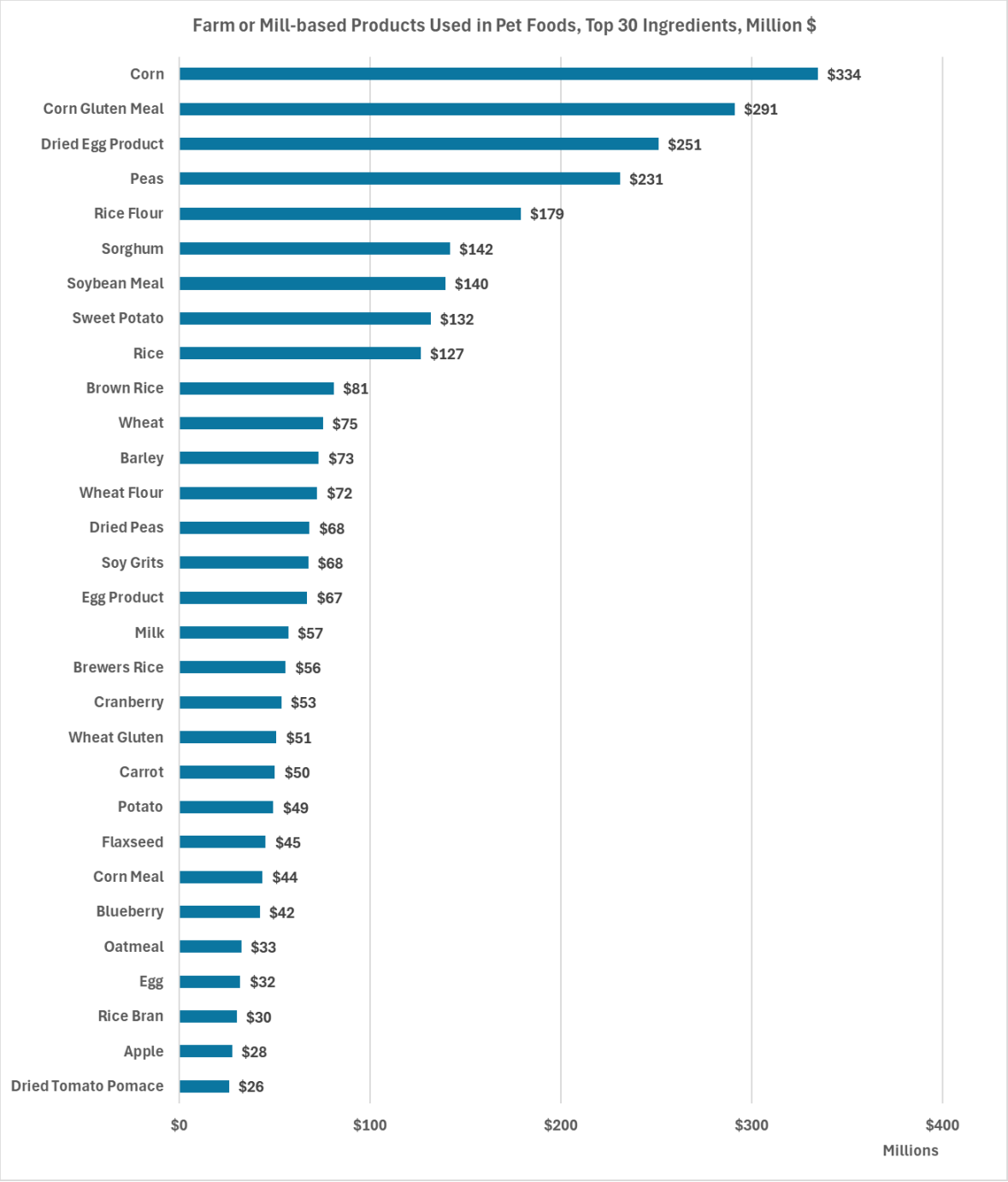

Figure 23. Farm or Mill-based Products Used in Pet Foods, Top 30 Ingredients, Million $

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Marine product ingredients used in pet food manufacturing total 502,013 tons (Figure 24). Salmon is the largest ingredient in the category at 203,307 tons, slightly more than half of all the tonnage in this category. The combination category of other fish and sea products is 105,781 tons, followed by fish meals (96,693 tons), cod (46,389 tons), whitefish (27,754 tons), tuna (13,133 tons), fish oil (6,352 tons) and shrimp (2,603 tons).

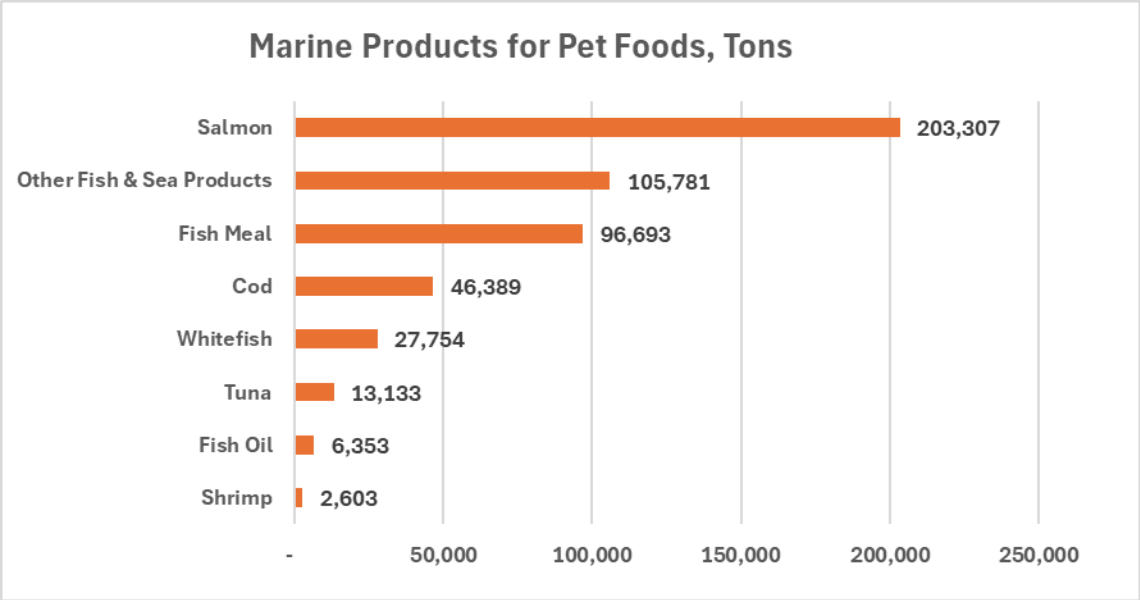

Figure 24. Marine Products for Pet Foods, Tons

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The value of marine products is $3.5 billion (Figure 25). Salmon is the ingredient with the highest ingredient value ($2 billion), followed by cod ($888 million), other fish and sea products ($339 million), fish meal ($106 million), whitefish ($66 million), tuna (43 million), fish oil ($42 million), and shrimp ($7 million).

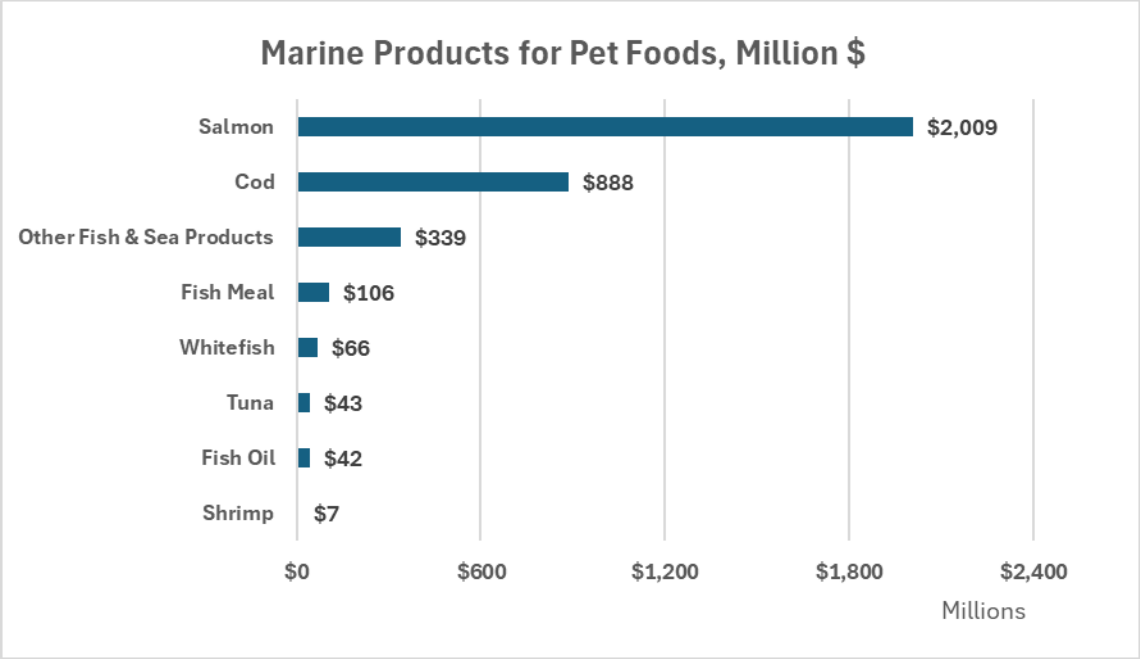

Figure 25. Marine Products for Pet Foods, Million $

A variety of broths are used for pet food manufacturing. The total volume of broths used for pet foods is 184,737 tons with a value of $554 million. There are 17 different types of broths used, and the details of broths are in Figure 26 and Figure 27.

The broths with the most volume are chicken broth (79,068 tons), beef broth (45,323 tons), fish broth (30,440 tons), unspecified poultry broth (13,812 tons) and turkey broth (5,743 tons). By value, the leading broths are chicken broth ($237 million), beef broth ($136 million), fish broth ($91 million), poultry broth ($41 million) and turkey broth ($17 million).

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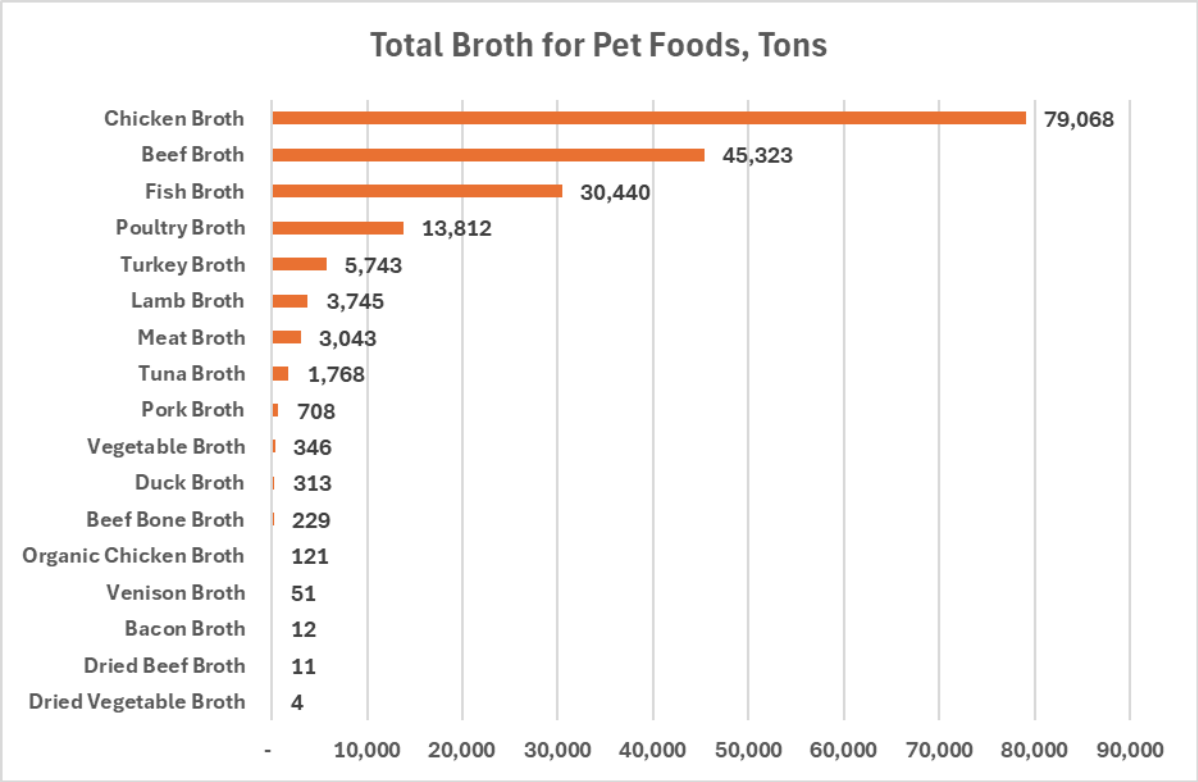

Figure 26. Total Broth for Pet Foods, Tons

Figure 27. Total Broth for Pet Foods, USD $

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3.2.4 Upstream Impacts of Ingredient Purchases by Pet Food Manufacturers

Pet food ingredients are sourced from a wide geographic and often multi-state area. While there are seven states that do not have pet food manufacturers registered in that state, there are crops and livestock produced in these states that are used as pet food ingredients. A full tracing of pet food ingredients to their sourcing was beyond the scope of this study; therefore, the value of ingredients processed in each state was the basis for allocation of upstream values.

Below are a few key measures of the impact of the cat and dog food manufacturing industry on the United States and on each state:

- **Farm and Farm-Product Processor Sales**[7]
  - A measure of ingredient purchases by pet food manufacturers is the sum of all pet food ingredients sold to pet food manufacturers of dog or cat food either directly by farmers or through farm-product processors.
- **Farm Input Purchases**
  - A measure of the materials and services that farmers purchase to produce the products that are sold to pet food manufacturers for use as ingredients in dog or cat food.
- **Farm-Supplier Input Purchases**
  - A measure of the materials and services that farm-input suppliers buy as they provide materials and services to farmers to produce the products that are sold to pet food manufacturers for use as ingredients in dog or cat food.

3.2.4.1 State and National

This allocation of ingredient purchases and values to individual states was based on each state's share of direct output from pet food manufacturing sales [from a 2024 analysis that DIS recently completed for the Institute for Feed Education and Research (IFEEDER)] multiplied by the U.S. total ingredient purchases as factored up to U.S. totals (see Section 5).

Farmers and farm product processors sell $13.2 billion worth of products to pet food manufacturers that they use as ingredients in dog and cat foods and treats. These sales by farmers and processors of farm products stimulate further upstream economic activity. Farmers buy $9.8 billion of inputs and services from farm suppliers (i.e., seed, fertilizer, fuel, labor, machinery, repairs, etc.) to produce the products that are used as pet food ingredients. In addition, these farm suppliers buy $7.6 billion in materials and services (i.e., fuel, fertilizer, equipment, labor, etc.) that they sell to farmers to produce the products for pet food ingredients.

Table 5 shows a summary of the ingredient purchases by pet food manufacturers, by state, with the number of FDA-registered pet food manufacturing facilities, pet food ingredient purchased (tons) and

[7] In the ingredient analysis, this "Farm and Farm-Product Processor Sales" refers to the "as-bought" quantities and values.

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resulting farm and farm-product processors sales (dollars), farm input purchases (dollars) and farm-supplier input purchases (dollars) that occur due to ingredient purchases by pet food manufacturers. Purchases of pet food ingredients are allocated to the state in which the processor is located. Farm input purchases and farm input supplier purchases are driven by the state-level allocation of pet food ingredient purchases.

The leading states for farm and farm-product processing sales to pet food manufacturers are Missouri ($1.6 billion), Kansas ($1.4 billion), Pennsylvania ($1.0 billion), Iowa ($821 million) and California ($739 million). Other states with more than $350 million in purchases of ingredients from farmers and farm-product processors by pet food manufacturers (in descending order) are: Nebraska, Wisconsin, Georgia, Arkansas, Texas, New York, Oklahoma, Utah, Illinois and Ohio.

Farm input suppliers are also positively impacted by the purchase of pet food ingredients. In economic terms, these are indirect impacts in that the sales of farm-based products, whether fresh or processed, require inputs to be purchased to support the production of those products. U.S. farm input purchases that happen due to pet food ingredient purchases total $9.8 billion. The leading states that drive farm purchases to support the production of pet food ingredients are Missouri ($1.05 billion), Kansas ($1.00 billion), Pennsylvania ($800 million), Iowa ($603 million) and California ($601 million). Other states where ingredient purchases by pet food manufacturers drive more than $250 million in farm input supply sales (in descending order) are: Wisconsin, Nebraska, Georgia, Arkansas, Texas, New York, Oklahoma, Illinois, Utah, Alabama, Minnesota and Ohio.

The production of farm-based products for pet food ingredients also results in purchases of supplies by farm suppliers. In the U.S., this totals $7.6 billion. The leading states for purchases by farm-input suppliers due to pet food ingredient purchases are Missouri ($811 million), Kansas ($782 million), Pennsylvania ($636 million), Iowa ($460 million) and California ($442 million). Other states with more than $250 million in purchases driven by farm-input suppliers to support the production of pet food ingredients (in descending order) are: Wisconsin, Nebraska, Arkansas and Georgia.

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Table 5. Impacts of Pet Food Ingredient Purchases on Farms, Farm Product Processors and Farm Suppliers

Impacts of Pet Food Ingredient Purchases on Farms, Farm Product Processors and Farm Suppliers					
State	Pet Food Manufacturers	Pet Food Ingredients Purchased (Tons)	Pet Food Processor Purchases of Farm and Farm Product Processor Ingredients (Dollars)	Farm Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)	Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)
Alabama	3	221,684	$ 316,026,146	$ 254,061,985	$ 219,472,645
Alaska	0		*Insufficient Data		
Arizona	16	92,395	$ 131,715,902	$ 102,779,505	$ 83,522,775
Arkansas	5	323,013	$ 460,478,468	$ 352,592,074	$ 287,274,141
California	19	541,212	$ 771,537,017	$ 600,846,453	$ 441,397,823
Colorado	11	205,581	$ 293,070,996	$ 221,052,935	$ 167,735,259
Connecticut	4	19,224	$ 27,405,839	$ 22,462,450	$ 18,956,842
Delaware	0		*Insufficient Data		
Florida	4	49,638	$ 70,761,885	$ 62,026,052	$ 50,662,884
Georgia	13	386,934	$ 551,603,032	$ 357,294,911	$ 275,956,149
Hawaii	0		*Insufficient Data		
Idaho	1	9,657	$ 13,766,115	$ 10,080,069	$ 7,569,475
Illinois	9	252,673	$ 360,204,011	$ 283,357,083	$ 190,400,604
Indiana	9	183,245	$ 261,228,775	$ 203,181,712	$ 155,894,841
Iowa	16	575,791	$ 820,832,042	$ 602,536,790	$ 459,384,393
Kansas	21	1,006,492	$ 1,434,827,203	$ 1,003,710,820	$ 782,039,927
Kentucky	8	112,909	$ 160,959,838	$ 129,978,170	$ 106,181,427
Louisiana	2	30,885	$ 44,028,211	$ 34,451,321	$ 29,334,109
Maine	2	490	$ 698,444	$ 568,878	$ 494,623
Maryland	13	41,228	$ 58,773,028	$ 46,775,822	$ 38,300,539
Massachusetts	0		*Insufficient Data		
Michigan	27	43,539	$ 62,067,908	$ 47,356,441	$ 36,160,122
Minnesota	27	217,551	$ 310,134,191	$ 252,503,681	$ 177,603,758
Mississippi	1	17,370	$ 24,762,469	$ 19,091,228	$ 16,313,413
Missouri	24	1,109,798	$ 1,582,097,205	$ 1,045,086,282	$ 810,206,382
Montana	1	8,933	$ 12,735,261	$ 9,634,736	$ 8,102,205
Nebraska	25	476,891	$ 679,842,127	$ 427,251,946	$ 312,979,604
Nevada	2	30,210	$ 43,065,996	$ 35,441,250	$ 30,540,955
New Hampshire	0		*Insufficient Data		
New Jersey	8	50,699	$ 72,274,736	$ 57,623,616	$ 46,450,434
New Mexico	1	8,197	$ 11,685,842	$ 8,709,951	$ 7,932,336
New York	9	265,769	$ 378,873,177	$ 297,093,639	$ 240,216,424
North Carolina	19	89,639	$ 127,786,759	$ 94,593,349	$ 75,369,998
North Dakota	4	460	$ 655,061	$ 583,663	$ 465,435

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Impacts of Pet Food Ingredient Purchases on Farms, Farm Product Processors and Farm Suppliers

State	Pet Food Manufacturers	Pet Food Ingredients Purchased (Tons)	Pet Food Processor Purchases of Farm and Farm Product Processor Ingredients (Dollars)	Farm Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)	Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)
Ohio	19	250,361	$ 356,907,925	$ 252,446,953	$ 182,109,000
Oklahoma	11	257,476	$ 367,051,009	$ 286,220,679	$ 240,691,869
Oregon	3	24,741	$ 35,270,127	$ 29,240,772	$ 23,579,691
Pennsylvania	57	727,077	$ 1,036,500,770	$ 798,821,309	$ 635,232,186
Rhode Island	0	*Insufficient Data			
South Carolina	10	202,912	$ 289,265,558	$ 231,855,197	$ 199,169,010
South Dakota	2	99,758	$ 142,212,542	$ 111,820,433	$ 89,857,025
Tennessee	9	201,356	$ 287,047,092	$ 203,006,476	$ 163,676,720
Texas	19	293,938	$ 419,029,193	$ 323,990,037	$ 233,781,132
Utah	13	255,906	$ 364,812,323	$ 280,313,788	$ 226,327,749
Vermont	2	3,841	$ 5,475,233	$ 5,120,495	$ 4,548,099
Virginia	16	103,622	$ 147,720,193	$ 110,033,848	$ 90,139,747
Washington	26	91,544	$ 130,503,282	$ 109,226,490	$ 78,338,042
West Virginia	1	441	$ 628,087	$ 583,152	$ 530,908
Wisconsin	26	393,329	$ 560,719,215	$ 433,914,536	$ 321,993,066
Wyoming	0	*Insufficient Data			
United States	**518**	**9,278,408**	**$ 13,227,040,232**	**$ 9,759,320,977**	**$ 7,566,893,763**

Notes: 1) There was insufficient data to allocate pet food ingredient purchases and upstream impacts to: Alaska, Delaware, Hawaii, Massachusetts, New Hampshire, Rhode Island and Wyoming; 2) Columns in this table are not additive.

Figure 28 through Figure 31 refer to data in Table 5. The amounts credited to each state are driven by pet food ingredient purchases in that state and do not necessarily reflect the amount of inputs sourced specifically within that state.

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Total Pet Food Ingredients Purchased, Tons

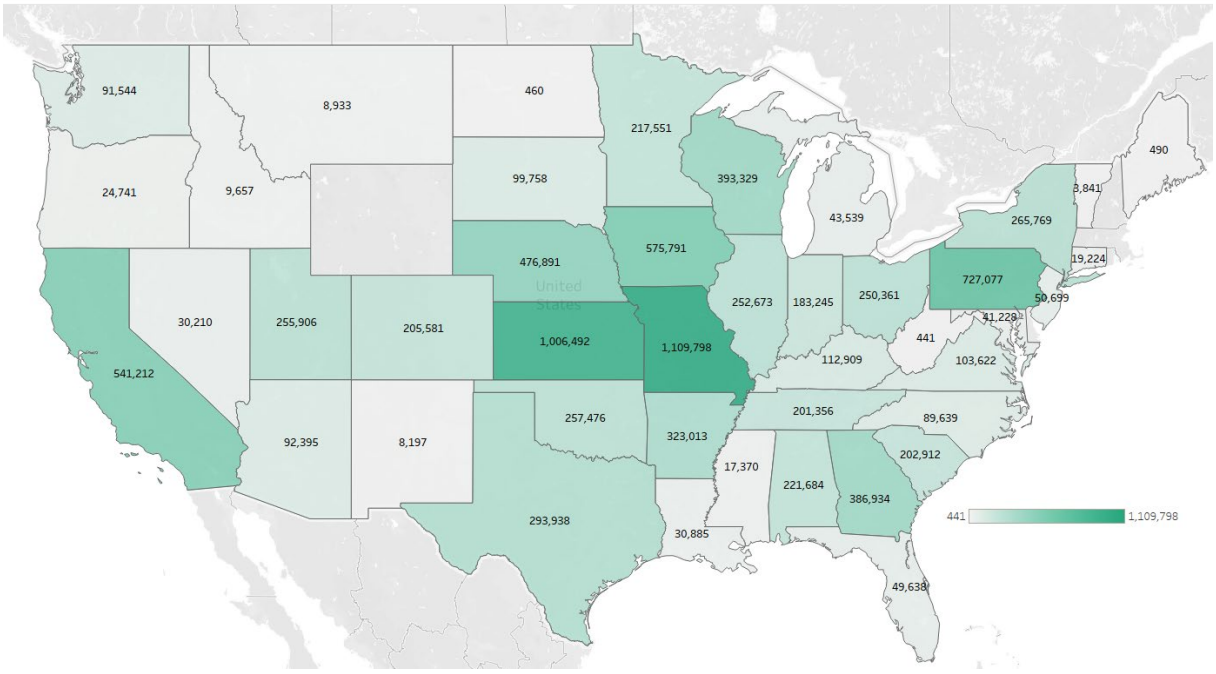

Figure 28. Total Pet Food Ingredients Purchased, Tons

Pet Food Processor Purchases of Farm and Farm Product Processor Ingredients, Million $

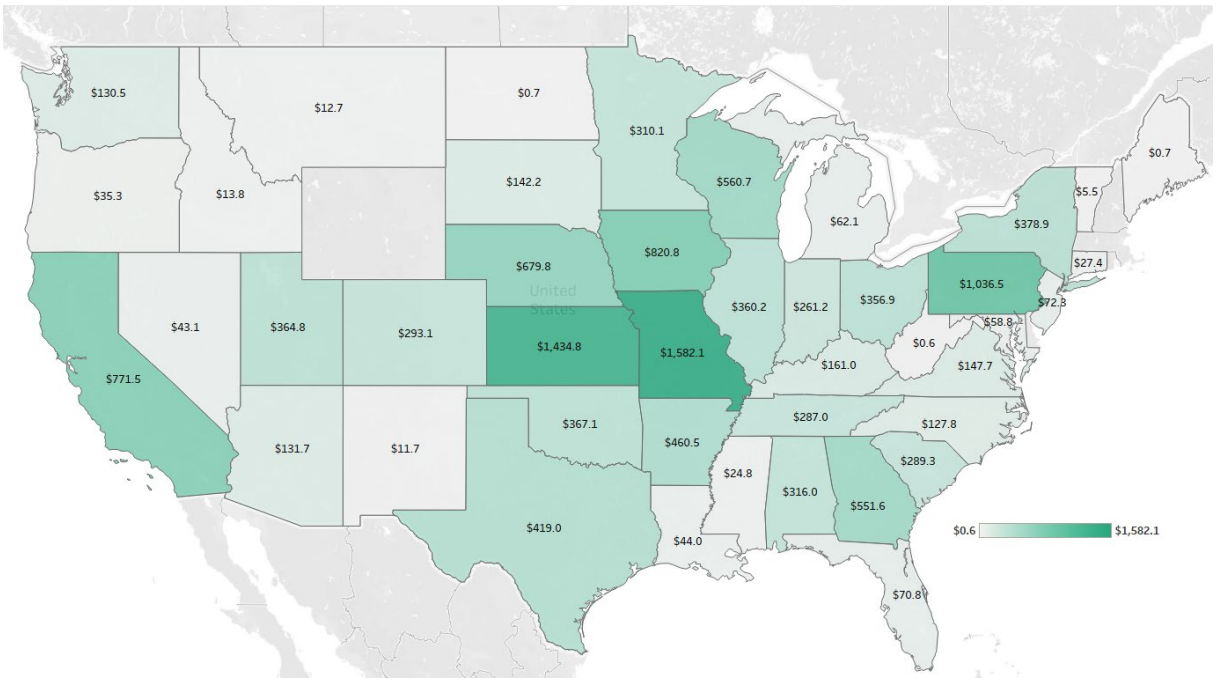

Figure 29. Pet Food Processor Purchases of Farm and Farm Product Processor Ingredients, Million $

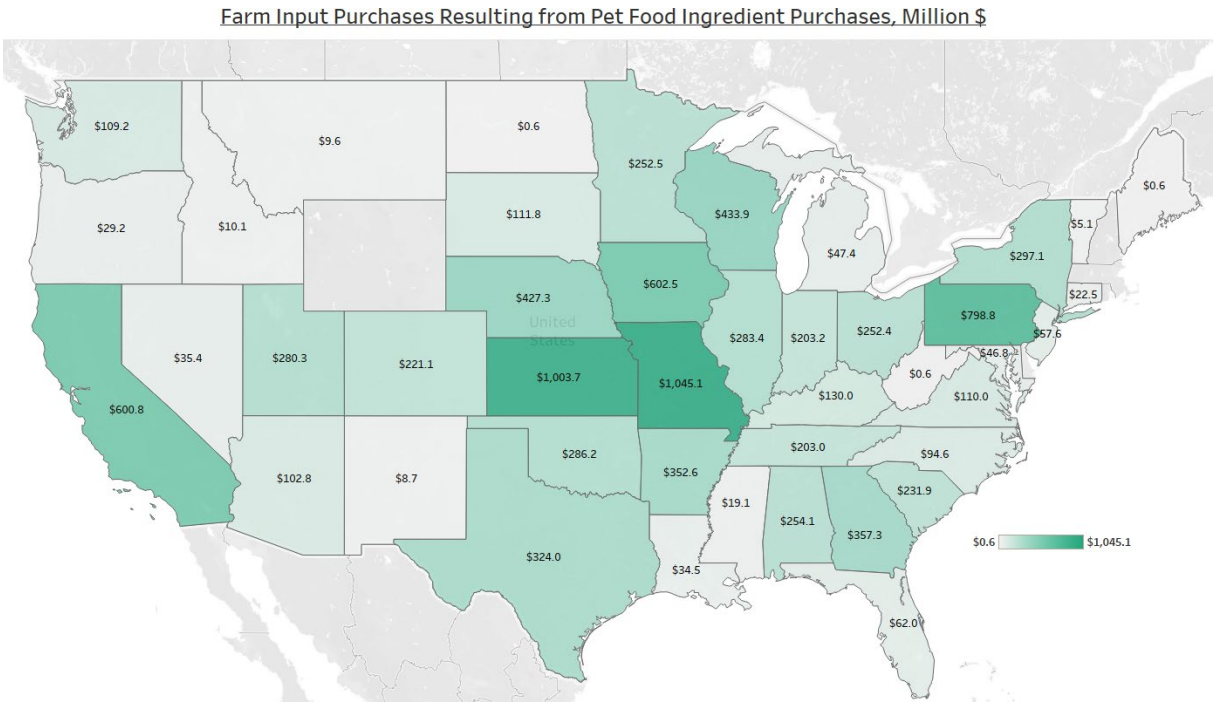

Figure 30. Farm Input Purchases Resulting from Pet Food Ingredient Purchases, Million $

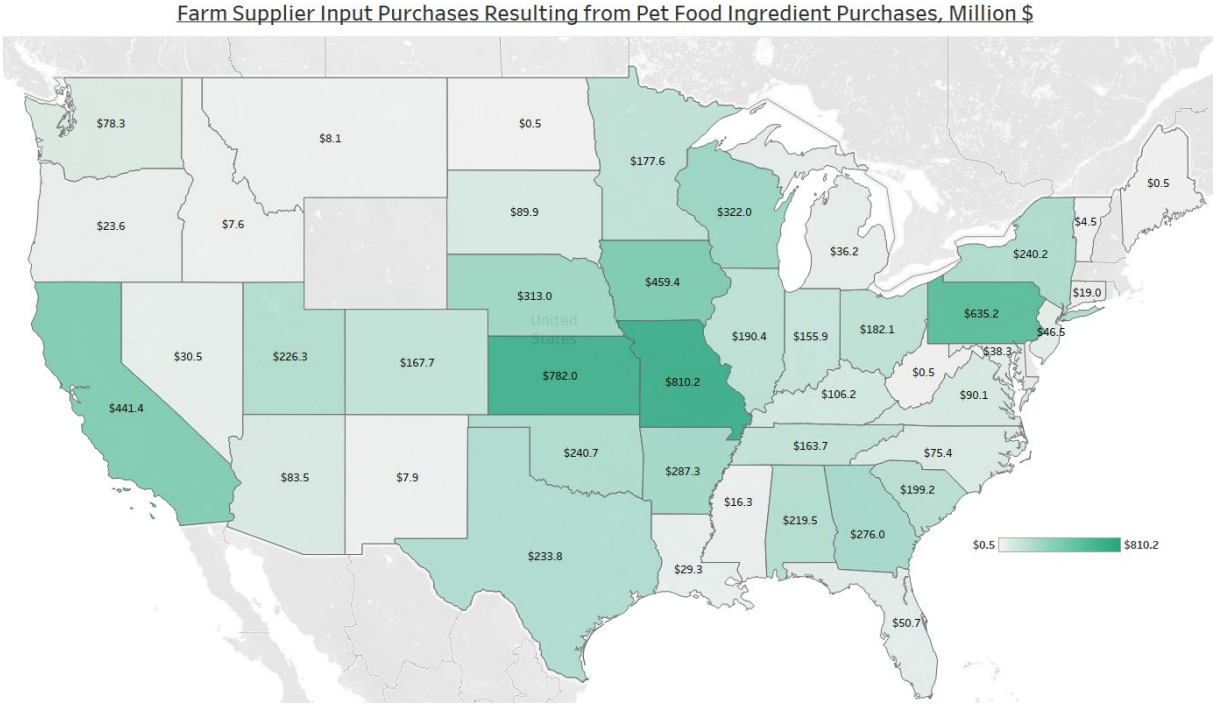

Figure 31. Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases, Million $

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3.2.4.2 Average Pet Food Manufacturer

Table 6 summarizes state-level average impacts per pet food manufacturing facility in the respective states, as well as at the national level. The averages are calculated by dividing the quantities or dollar impacts in Table 5 by the number of pet food manufacturing plants in each respective state.

In the U.S., there are 518 FDA-registered pet food manufacturing facilities that vary in size and production. Referring to Table 6, on average, a pet food manufacturing plant buys 18,277 tons of ingredients worth $25.1 million from farmers and farm-product processors. The pet food ingredient purchases for each national-average plant results in $19 million of farm input purchases across the country and results in $15.2 million in farm-input supplier purchases of materials and services.

Alabama ($100.8 million), Arkansas ($88.1 million), South Dakota ($68.1 million), Kansas ($65.4 million) and Missouri ($63.1 million) have the largest average per plant pet food ingredient purchases. Other states with average per-plant purchases of ingredients greater than the national average ($25.1 million) in descending order are: Iowa, Georgia, New York, California, Illinois, Oklahoma, Tennessee, Indiana, South Carolina, Utah, Nebraska and Colorado.

The averages in Table 6 provide more information about the relative size and scale of the pet food manufacturing industry in each state. For example, as in DIS's 2020 pet food report, Pennsylvania remains the third largest state with regards to overall pet food manufacturing, but that is due to the number of facilities in Pennsylvania (57), even though the average size of a pet food manufacturing facility in Pennsylvania is below the national average in size. On the other hand, South Dakota has just two pet food manufacturing facilities, but they are more than twice as large as the national average.

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Table 6. Average Impact Per Facility to Farms, Farm Product Processors and Farm Suppliers Due to Pet Food Ingredient Purchases

Average Impact Per Pet Food Manufacturer to Farms, Farm Product Processors and Farm Suppliers Due to Pet Food Ingredient Purchases				
State	Average Pet Food Ingredients Purchased (Tons)	Average Farms and Processors Sales Resulting from Pet Food Ingredient Purchases (Dollars)	Average Farm Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)	Average Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)
Alabama	73,895	$ 105,342,049	$ 84,687,328	$ 73,157,548
Alaska	*Insufficient Data			
Arizona	5,775	$ 8,232,244	$ 6,423,719	$ 5,220,173
Arkansas	64,603	$ 92,095,694	$ 70,518,415	$ 57,454,828
California	28,485	$ 40,607,211	$ 31,623,498	$ 23,231,464
Colorado	18,689	$ 26,642,818	$ 20,095,721	$ 15,248,660
Connecticut	4,806	$ 6,851,460	$ 5,615,612	$ 4,739,210
Delaware	*Insufficient Data			
Florida	12,409	$ 17,690,471	$ 15,506,513	$ 12,665,721
Georgia	29,764	$ 42,431,002	$ 27,484,224	$ 21,227,396
Hawaii	*Insufficient Data			
Idaho	9,657	$ 13,766,115	$ 10,080,069	$ 7,569,475
Illinois	28,075	$ 40,022,668	$ 31,484,120	$ 21,155,623
Indiana	20,361	$ 29,025,419	$ 22,575,746	$ 17,321,649
Iowa	35,987	$ 51,302,003	$ 37,658,549	$ 28,711,525
Kansas	47,928	$ 68,325,105	$ 47,795,753	$ 37,239,997
Kentucky	14,114	$ 20,119,980	$ 16,247,271	$ 13,272,678
Louisiana	15,442	$ 22,014,106	$ 17,225,661	$ 14,667,055
Maine	245	$ 349,222	$ 284,439	$ 247,311
Maryland	3,171	$ 4,521,002	$ 3,598,140	$ 2,946,195
Massachusetts	*Insufficient Data			
Michigan	1,613	$ 2,298,811	$ 1,753,942	$ 1,339,264
Minnesota	8,057	$ 11,486,452	$ 9,351,988	$ 6,577,917
Mississippi	17,370	$ 24,762,469	$ 19,091,228	$ 16,313,413
Missouri	46,242	$ 65,920,717	$ 43,545,262	$ 33,758,599
Montana	8,933	$ 12,735,261	$ 9,634,736	$ 8,102,205
Nebraska	19,076	$ 27,193,685	$ 17,090,078	$ 12,519,184
Nevada	15,105	$ 21,532,998	$ 17,720,625	$ 15,270,477
New Hampshire	*Insufficient Data			
New Jersey	6,337	$ 9,034,342	$ 7,202,952	$ 5,806,304
New Mexico	8,197	$ 11,685,842	$ 8,709,951	$ 7,932,336
New York	29,530	$ 42,097,020	$ 33,010,404	$ 26,690,714
North Carolina	4,718	$ 6,725,619	$ 4,978,597	$ 3,966,842
North Dakota	115	$ 163,765	$ 145,916	$ 116,359

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Average Impact Per Pet Food Manufacturer to Farms, Farm Product Processors and Farm Suppliers Due to Pet Food Ingredient Purchases				
State	Average Pet Food Ingredients Purchased (Tons)	Average Farms and Processors Sales Resulting from Pet Food Ingredient Purchases (Dollars)	Average Farm Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)	Average Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)
Ohio	13,177	$ 18,784,628	$ 13,286,682	$ 9,584,684
Oklahoma	23,407	$ 33,368,274	$ 26,020,062	$ 21,881,079
Oregon	8,247	$ 11,756,709	$ 9,746,924	$ 7,859,897
Pennsylvania	12,756	$ 18,184,224	$ 14,014,409	$ 11,144,424
Rhode Island	*Insufficient Data			
South Carolina	20,291	$ 28,926,556	$ 23,185,520	$ 19,916,901
South Dakota	49,879	$ 71,106,271	$ 55,910,216	$ 44,928,512
Tennessee	22,373	$ 31,894,121	$ 22,556,275	$ 18,186,302
Texas	15,470	$ 22,054,168	$ 17,052,107	$ 12,304,270
Utah	19,685	$ 28,062,486	$ 21,562,599	$ 17,409,827
Vermont	1,920	$ 2,737,616	$ 2,560,247	$ 2,274,049
Virginia	6,476	$ 9,232,512	$ 6,877,116	$ 5,633,734
Washington	3,521	$ 5,019,357	$ 4,201,019	$ 3,013,002
West Virginia	441	$ 628,087	$ 583,152	$ 530,908
Wisconsin	15,128	$ 21,566,124	$ 16,689,021	$ 12,384,349
Wyoming	*Insufficient Data			
United States	**17,912**	**$ 25,534,827**	**$ 18,840,388**	**$ 14,607,903**

Notes: 1) There was insufficient data to allocate pet food ingredient purchases and upstream impacts to: Alaska, Delaware, Hawaii, Massachusetts, New Hampshire, Rhode Island and Wyoming; 2) Columns in this table are not additive.

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Figure 32 through Figure 35 refer to the state figures in Table 6. The average values in Table 6 were calculated by dividing the values for each of the variables in Table 5 by the number of pet food manufacturing facilities in each state.

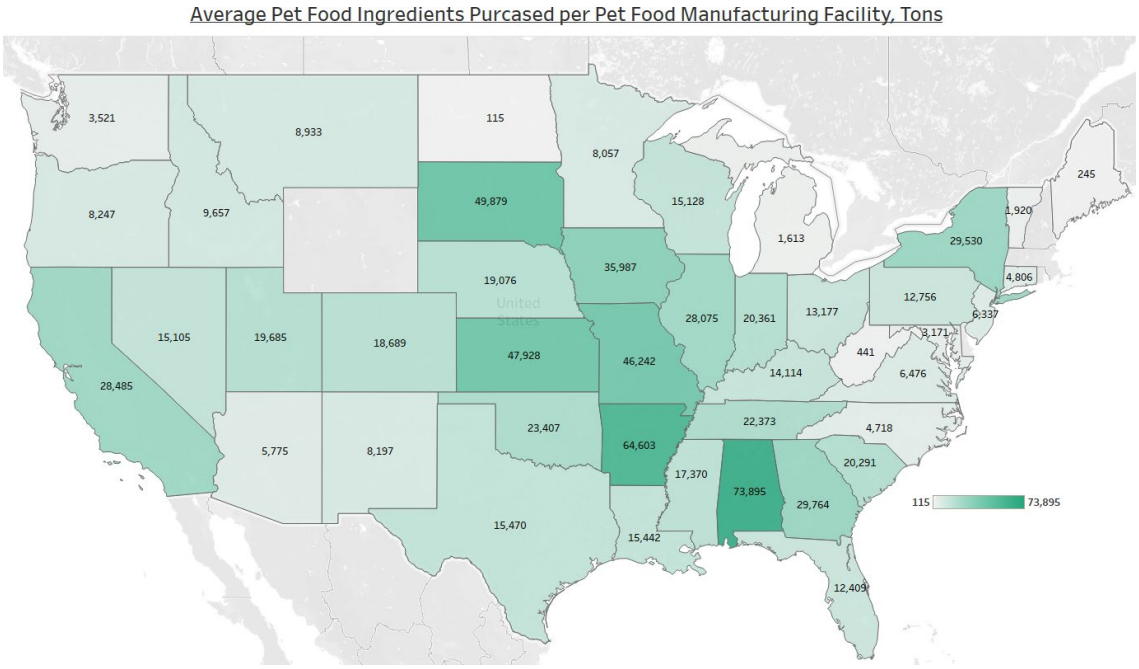

Figure 32. Average Pet Food Ingredients Purchased Per Pet Food Manufacturing Facility, Tons

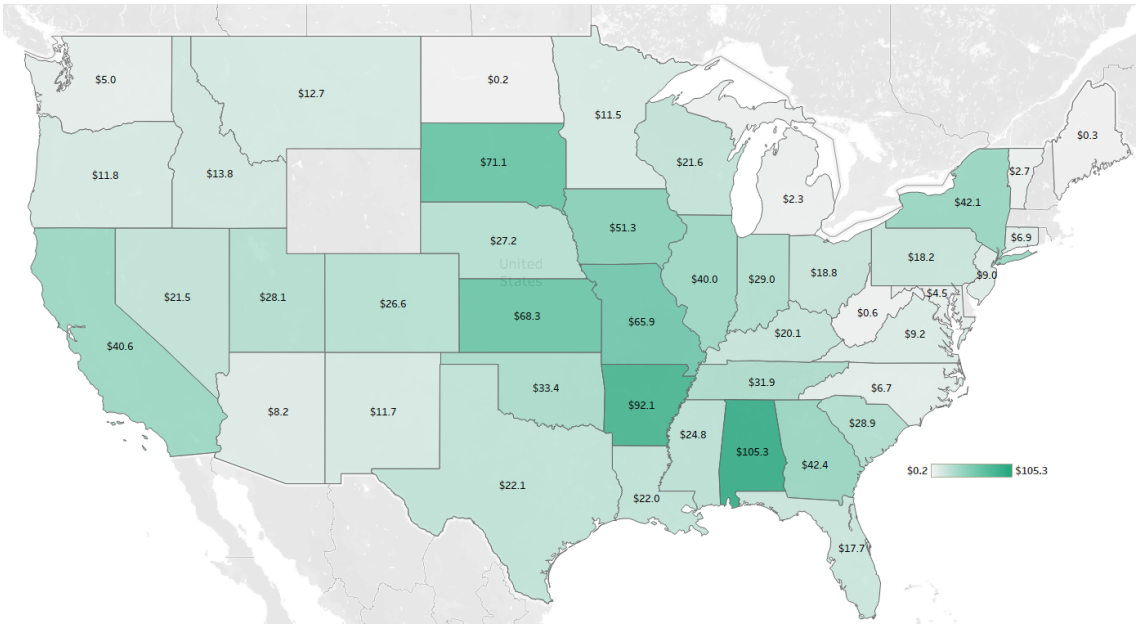

Figure 33. Average Farms and Processors Sales Resulting from Pet Food Ingredient Purchases Per Pet Food Manufacturing Facility, Million $

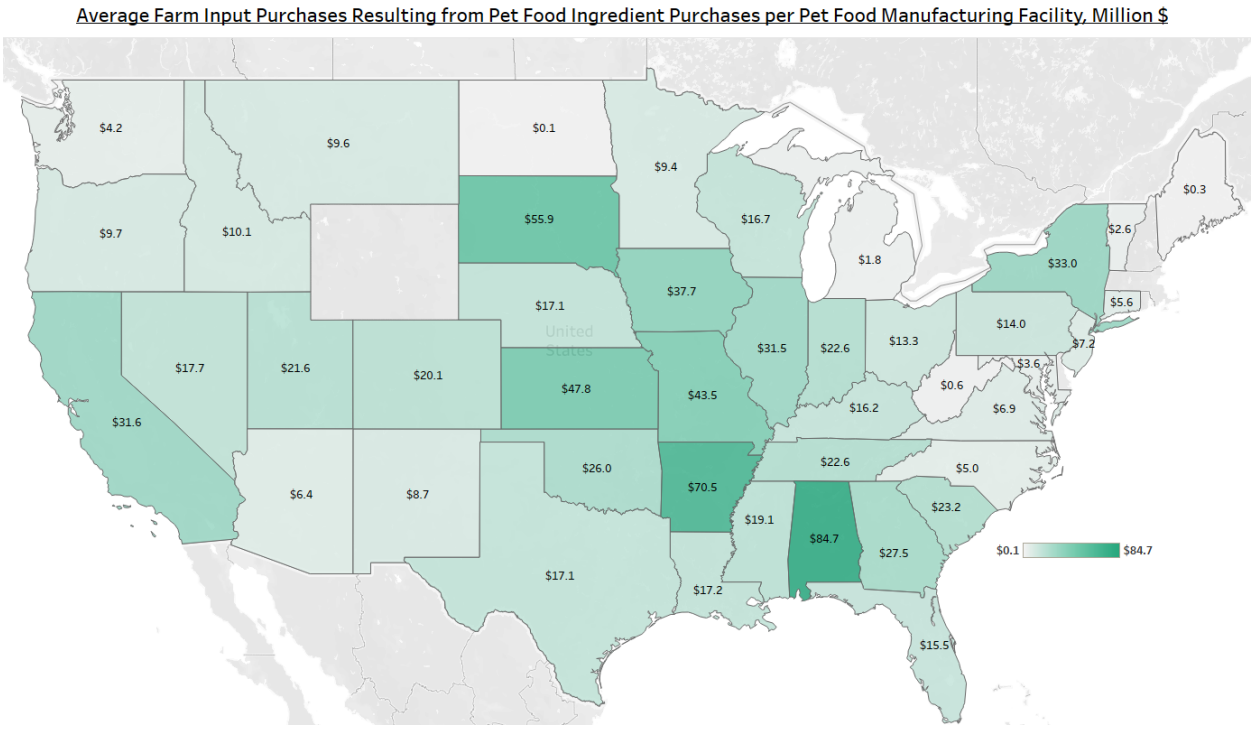

Figure 34. Average Farm Input Purchases Resulting from Pet Food Ingredient Purchases Per Pet Food Manufacturing Facility, Million $

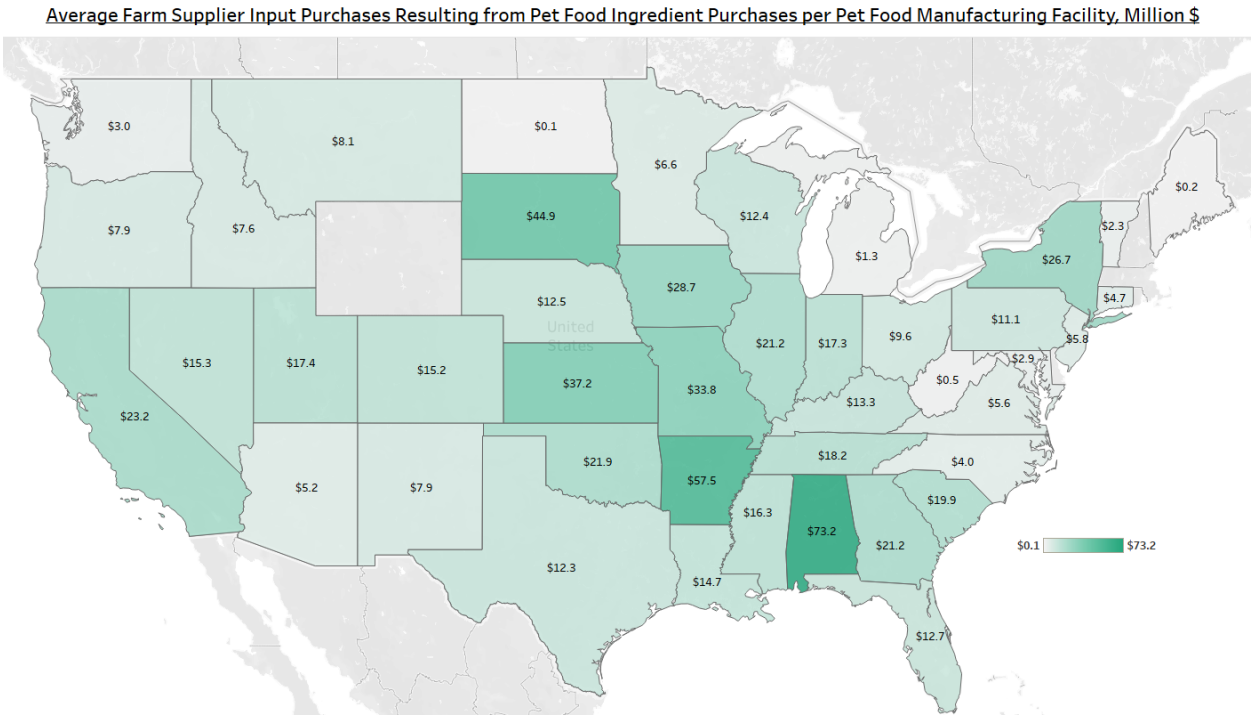

Figure 35. Average Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases Per Pet Food Manufacturing Facility, Million $

A comparison of the impacts of pet food ingredient purchase on U.S. farms, farm product processors and farm suppliers for 2025 versus 2020 is in Table 7. For the U.S., the tonnage of purchases of ingredients increased by 7.3% and the impact on purchases of farm and farm product processors increased by 92%; the impact on farm input purchases resulting from pet food ingredient purchases increased by 83%; and the impact on farm supplier input purchases increased by 84%.

Table 7. Comparison of Impacts of Pet Food Ingredient Purchases on U.S. Farms, Farm Product Processors and Farm Suppliers, 2025 vs. 2020

Comparison of Impacts of Pet Food Ingredient Purchases on U.S. Farms, Farm Product Processors and Farm Suppliers, 2025 vs. 2020					
Year	Pet Food Manufacturers	Pet Food Ingredients Purchased (Tons)	Pet Food Processor Purchases of Farm and Farm Product Processor Ingredients (Dollars)	Farm Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)	Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)
2025	518	9,278,408	$13,227,040,232	$9,759,320,977	$7,566,893,763
2020	519	8,646,211	$6,891,659,850	$5,342,053,032	$4,118,529,550
Percent change	-0.2%	7.3%	92%	83%	84%
Note: Columns in this table are not additive					

A comparison of the average impacts per pet food manufacturer on U.S. farms, farm product processors and farm suppliers due to pet food ingredient purchases for 2025 versus 2020 is in Table 8. For the U.S., average purchases of ingredients increased from 16,659 tons per plant to 17,912 tons, a 7.5% increase. The average farm and processor sales resulting from pet food

ingredient purchases at an average pet food plant increased from $13.3 million to $25.5 million, a 92% increase. The average farm input purchases resulting from pet food ingredient purchases at an average pet food plant increased from $10.3 million to $18.8 million, an 83% increase, and the impact on purchases of farm supplier input purchases due to pet food ingredient purchases by an average pet food plant increased from $7.9 million to $14.6 million, an 84% increase.

Table 8. Comparison of Average Impact Per Pet Food manufacturer to U.S. Farms, Farm Product Processors and Farm Suppliers Due to Pet Food Ingredient Purchases, 2025 vs. 2020

Comparison of Average Impact Per Pet Food Manufacturer to U.S. Farms, Farm Product Processors and Farm Suppliers Due to Pet Food Ingredient Purchases, 2025 vs. 2020					
Year	Pet Food Manufacturers	Average Pet Food Ingredients Purchased (Tons)	Average Farms and Processors Sales Resulting from Pet Food Ingredient Purchases (Dollars)	Average Farm Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)	Average Farm Supplier Input Purchases Resulting from Pet Food Ingredient Purchases (Dollars)
2025	518	17,912	$25,534,827	$18,840,388	$14,607,903
2020	519	16,659	$13,278,728	$10,292,973	$7,935,510
Percent change	-0.2%	7.5%	92%	83%	84%
Note: Columns in this table are not additive					

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3.3 Sales Analysis

The sales analysis results included here are based upon the purchased Nielsen data[8]. Data are summarized according to "sub-category" for:

- Total volume and value of cat and dog foods.
- Total volume and value of cat foods.
- Total volume and value of dog foods.

3.3.1 Total

U.S. retail pet food (defined as dog and cat foods) in 2024 is estimated at $51.7 billion and encompassed 9.8 million tons[9] of product sales (shown in Table 9). Cat foods make up 26.2% of retail sales volume and account for 29.7% of retail sales value. Dog foods make up 73.8% of retail sales volume and account for 70.3% of retail sale value.

Table 9. Total U.S. Retail Pet Food Volume and Sales

Total U.S. Retail Pet Food Volume and Sales		
Pet Food Category	**Tons**	**Value**
Cat Food Dry	1,599,606	$6,289,431,569
Cat Food Wet	852,081	$7,115,359,370
Cat Treats	113,680	$1,924,983,360
Dog Food Dry	5,364,697	$19,700,513,397
Dog Food Wet	799,837	$6,226,861,861
Dog Treats	1,071,550	$10,426,943,378
Total	9,801,451	$51,684,092,936
Note: Data factored up from Nielsen Data to represent National Data		

When the results of this study are compared to the study DIS completed in 2020, the total value of retail sales increased by $21.3 billion, a 70.2% increase. Retail sales volume, as represented by the Nielsen data, declined by 31,690 tons, a 0.3% reduction (Table 10). However, caution should be exercised when examining the increase in sales at face value from the 2020 study to this study, given myriad factors not accounted for in this study.

[8] All data in this report are factored up from Nielsen data to represent national data.

[9] Where data are reported in terms of weight throughout this report, "ton" is used, which is equivalent to 2,000 pounds.

Table 10. Comparison of Retail Pet Food Retail Sales, 2025 vs. 2020

Comparison of Retail Pet Food Sales 2025 vs. 2020			
Attribute	2025	2020	Percent Change
Cat Food Sales Volume (Tons)	2,565,367	2,705,868	-5.2%
Dog Food Sales Volume (Tons)	7,236,084	7,127,272	1.5%
Total Food Sales Volume (Tons)	9,801,451	9,833,141	-0.3%
Cat Food Sales Value ($)	$15,329,774,300	$9,328,123,193	64.3%
Dog Food Sales Value ($)	$36,354,318,636	$21,042,778,928	72.8%
Total Food Sales Value ($)	$51,684,092,936	$30,370,902,122	70.2%
Note: Data factored up from Nielsen Data to represent National Data			

Figure 36 and Figure 37 show the volume and value of total (both cat and dog) pet food products, by different food types (sub-category). Among all pet food products, the lead product was dry dog food by both volume and value at 55% and 38%, respectively. This suggests that while dry dog food comprises the majority of total cat and dog food sold by volume, its value per pound is less than other sub-categories of cat and dog foods.

The inverse of the volume to value comparison for dry dog food is also true. For example, both cat and dog treats comprise a small portion of total volume (1% and 11%, respectively), yet make up a much larger share of the total when summarized by value (4% and 20%, respectively).

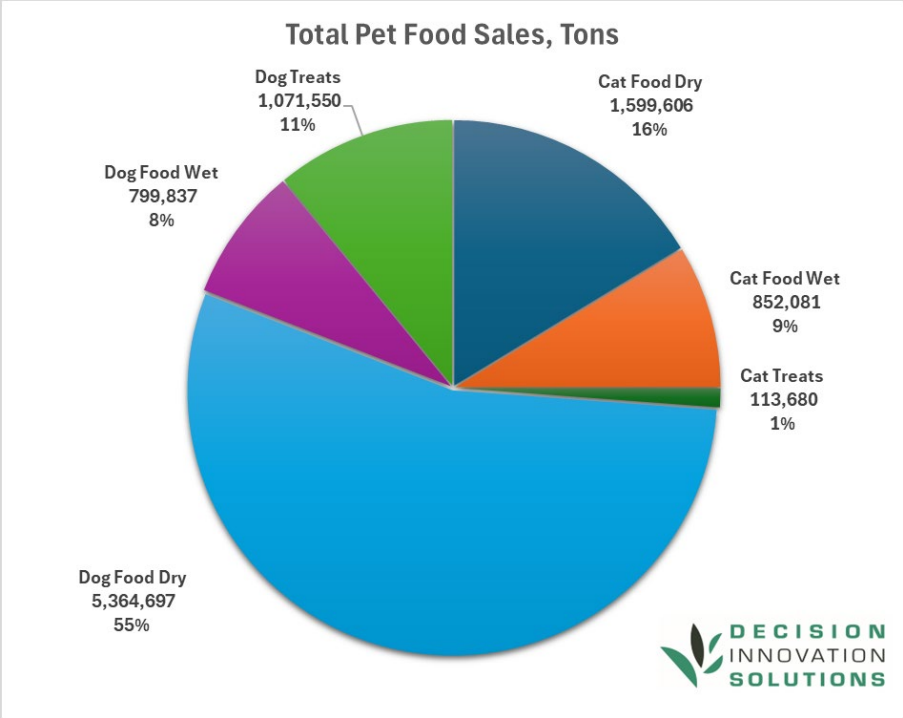

Figure 36. Total Pet Food Sales, Tons

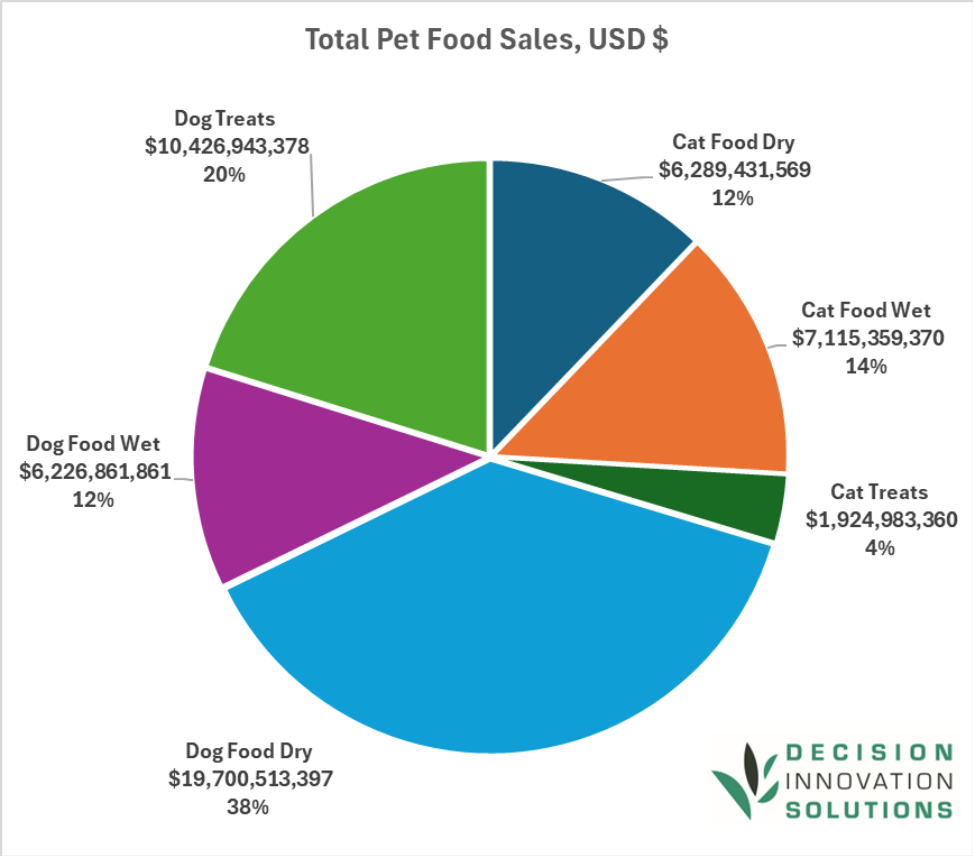

Figure 37. Total Pet Food Sales, USD $

3.3.2 Cats

Total cat food sales were 2.6 million tons with a value of $15.3 billion, factored up from Nielsen data to represent the national total. Figure 38 and Figure 39 show volume and value of cat food products by sub-category. By volume, the lead sub-category is dry cat food at 62% of total volume. By value, dry cat food and wet cat food stand at 41% and 46%, respectively.

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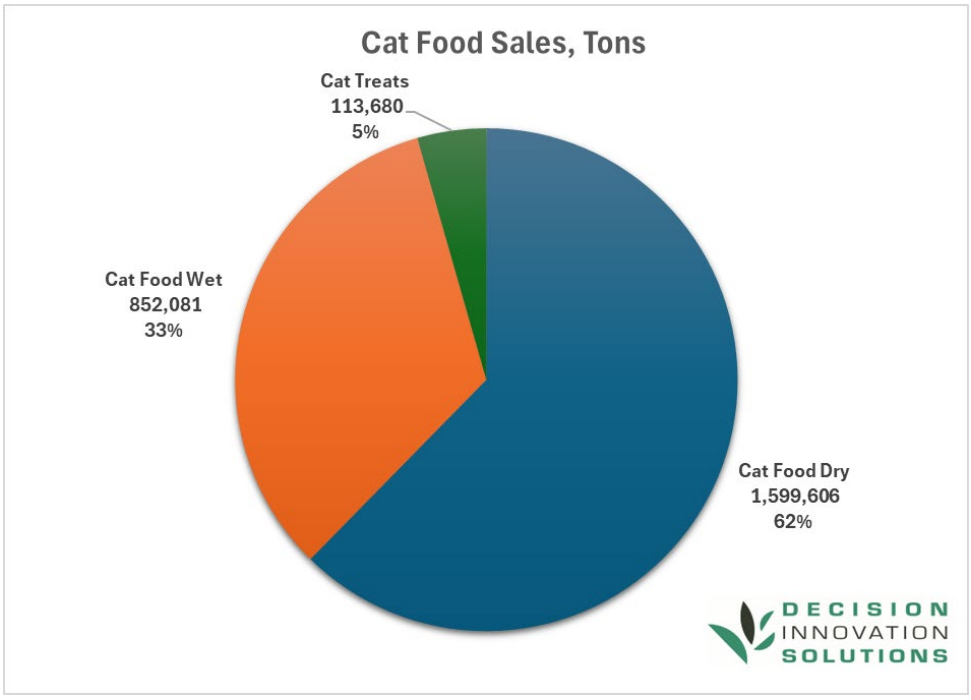

Figure 38. Cat Food Sales, Tons

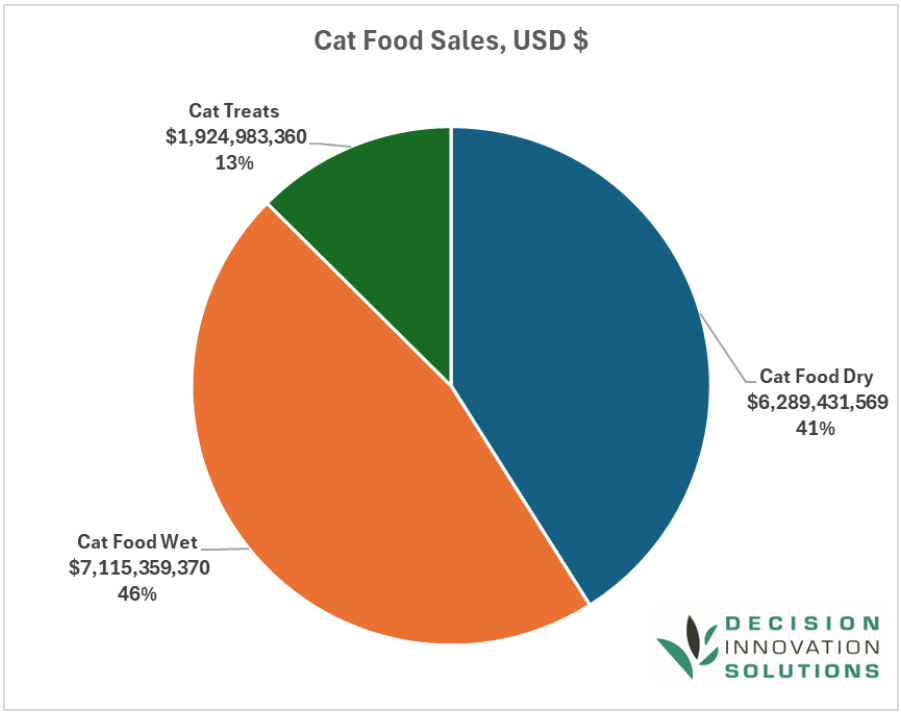

Figure 39. Cat Food Sales, USD $

3.3.3 Dogs

Total dog food sales were 7.2 million tons with a value of $36.4 billion, factored up from Nielsen data to represent the national total. Figure 40 and Figure 41 show volume and value of dog food products by sub-category. By volume, the lead sub-category is dry dog food, with 74% of total volume. By value, dry dog food accounted for 54%.

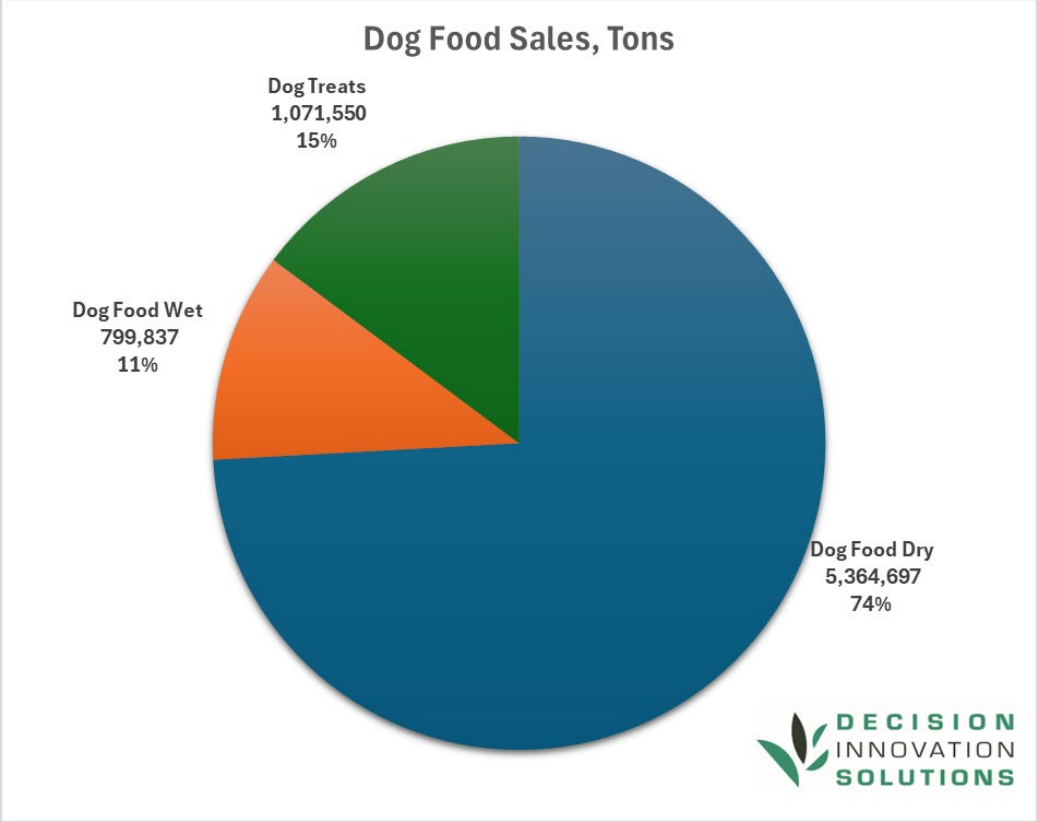

Figure 40. Dog Food Sales, Tons

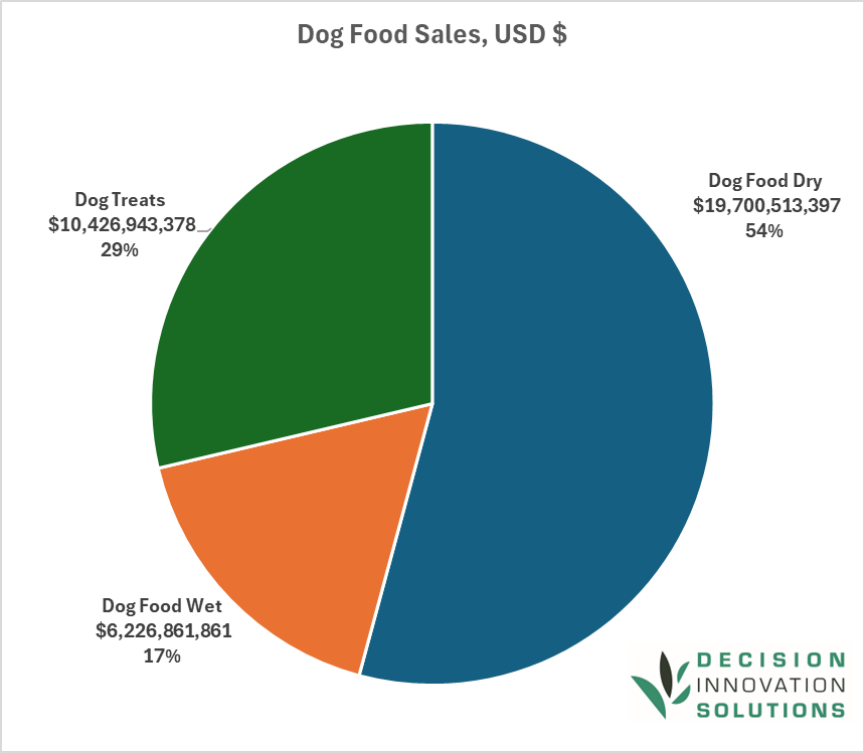

Figure 41. Dog Food Sales, USD $

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3.3.4 Fresh Pet Food Products

Due to the availability of "fresh" pet food products to consumers, six specified brands were brought up by clients. Among the six brands, the pet food product distribution is shown in Table 11. Fresh pet food in this context refers to pet food made with human-grade, fresh ingredients, often cooked at low temperatures, and delivered to the owner in a refrigerated or frozen state.

Table 11. Fresh Pet Food Product Brand Distribution from Nielsen Data

Brand	Brand A	Brand B	Brand C	Brand D	Brand E	Brand F	Total
Considered as "Fresh" cat food products	15	0	52	0	141	118	326
Considered as "Fresh" dog food products	149	3	134	13	178	225	702
Total	164	3	186	13	319	343	1028

Nationally, total fresh cat food products from the six brands were 4,344 tons (with sales value as $74.5 million) and the national total fresh dog food products from the six brands were 136,391 tons (with sales value as $1.46 billion). The total tonnages of the six brands make up about 1.4% of the national total sales volume, and the total value ($) make up 3% of the national sales value ($), shown in Table 12.

Table 12. Fresh Pet Food Product Sales Data

Attributes	Tons	Value	Volume (% of National Total)	Value (% of National Total)
US Total for 6 brands of "Fresh" cat food products	4,344	$ 74,476,116	0.2%	0.5%
US Total for 6 brands of "Fresh" dog food products	136,391	$ 1,458,024,406	1.9%	4.0%
US Total for 6 Brands of both "fresh" dog & cat food products	**140,734**	**$ 1,532,500,523**	1.4%	3.0%
Cat Food US Total	2,565,367	$ 15,329,774,300	--	--
Dog Food US Total	7,236,084	$ 36,354,318,636	--	--
Pet Food US Total	**9,801,451**	**$ 51,684,092,936**	--	--

3.4 Ingredient Analysis

From the purchased Nielsen data, there were 13,678 "In Store" cat food records, 2,939 "Amazon 1P" cat food records, 37,452 "In Store" dog food records, and 6,154 "In Store" dog food records – 60,223 in total. However, some of them shared the same Universal Product Code (UPC) and some had identical ingredients, form, etc., but are packaged in different sizes or quantities. Controlling for UPC and size, among all pet food products, 1,472 cat food products (1,342 unique cat food products) and 3,832 dog food products (3,297 unique dog food products) were selected for further analysis, which accounts for 95% by volume of total pet food products in the Nielsen data. To catch the 95% by volume from the two sale channels, "In Store" and "Amazon1P," some duplicates were involved, which means among the selected products, 130 cat food products and 535 dog food products were sold from both channels. These pet food products were assigned as our "study objects."

Among the study objects, 11.4% of cat food products and 16.5% of dog food products were identified as "private label," according to the raw data from Nielsen. Those products did not have enough information, such as ingredient labels, guaranteed analysis and calorie information to evaluate ingredient quantities based on the recipe reverse engineering procedure. By following the methodological framework (step 4) described in the methodology in Appendix 4.1.3, there were 26 and 177 products that were found to have approximate matches with non-private label food products for cat and dog food products, respectively.

Additionally, among the study objectives, 173 cat food products and 369 dog food products were not found to have appropriate matches via online research. Therefore, the size of study objects for cat and dog food products decreased to 1,297 and 3,073, respectively, which caused the estimated coverage by volume to be reduced from 95% to 86% (in store) and to 84% (Amazon1P) for cat food products; and from 95% to 80% (in store) and to 71% (Amazon 1P) for dog food products. Overall, the estimated coverage by volume to be reduced from 95% to 84% for cat food products and from 95% to 79% for dog food products.

3.4.1 Standardization of Pet Food Ingredients

To have a good understanding of the pet food ingredients used in diets, some associated ingredients were combined, and names were standardized. For example, "apple" and "apples," "beefhide" and "beef hide," and "soybean oil" and "soy oil," etc. Then, a statistical method called "text mining" was applied to visually extract patterns and prevalence. This process demonstrates the frequency with which each standardized food ingredient shows up on pet food product packages.

As shown in Figure 42 and Figure 43, the larger the font size of the words or phrases the more frequently (not necessarily total *use* of) an ingredient shows up on the product ingredient panels. Chicken and chicken-related food ingredients, such as "chicken," "chicken fat" and "chicken meal," etc., are present most often for both cat and dog food products.

Chicken, chicken meal and chicken fat are the top three commonly used animal related food ingredients; and corn protein meal, wheat and brewers rice are the top three most commonly used plant-related food ingredients for cat food products.

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Figure 42. Major Food Ingredients for Cats, by Mention on the Ingredient Label

For dog food products, chicken, chicken fat and chicken meal are the top three most commonly used animal-based ingredients; and flaxseed, carrots and peas are the top three most commonly used plant-based ingredients. Of note, while these “word clouds” indicate the frequency of these items showing up in various products, they do not necessarily represent volumes.

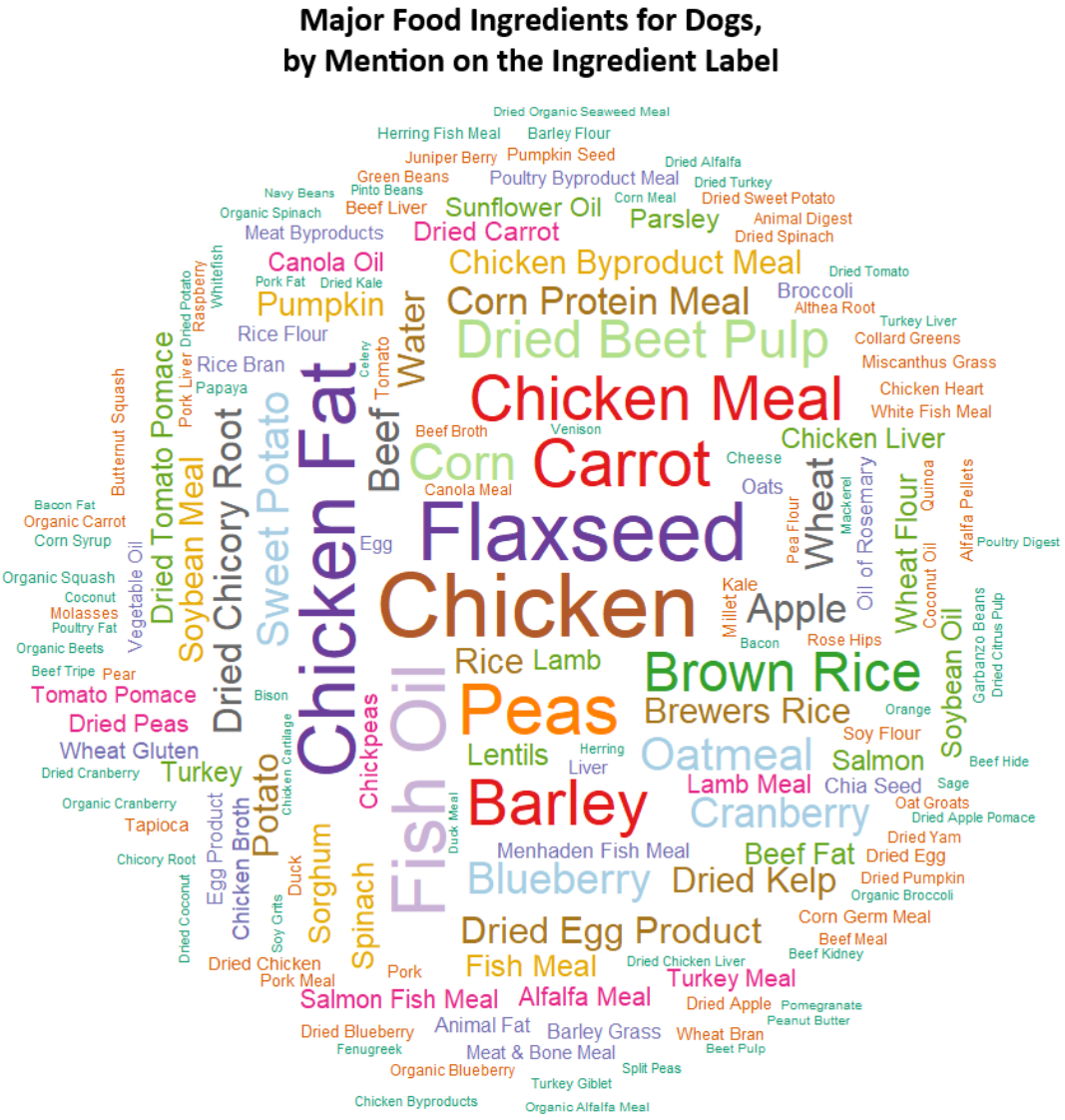

Figure 43. Major Food Ingredients for Dogs, by Mention on the Ingredient Label

All 602 standardized food ingredients were aggregated into nutrient groups, such as animal protein, animal fat, plant protein, plant carbohydrate, specialty, etc. These nutrient groups[10] were defined by the three organizations and the distribution of nutrient groups are shown in Figure 44. Animal protein ingredients comprised 275 of the total number of ingredients, followed by specialty products and 153

[10] The aggregation groups were developed by the three organizations in the 2020 study, when updating this study, since the pet food ingredient list was expanded from 300+ ingredients to 600+ ingredients, DIS used similar theory and adapted the same eight groups to the newly added food ingredients.

fruit, vegetable and other specialty ingredients. Plant carbohydrates were 79 of the ingredients, plant proteins 43 ingredients, plant fats 22 of the ingredients, and animal fats 13 of the ingredients. Animal protein-related ingredients made up most of the total ingredients, followed by specialty crop ingredients, such as apples, blueberries, peas, lentils, spinach, etc., shown in Figure 44.

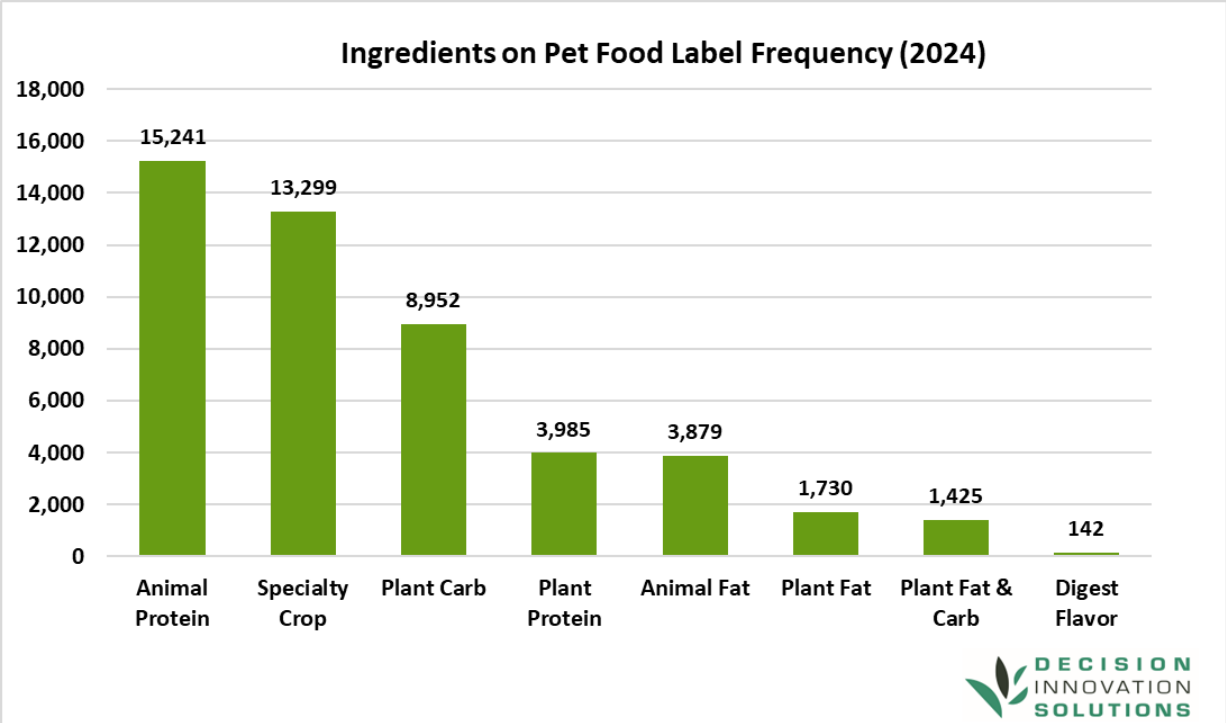

Figure 44. Distribution of Food Ingredients in Nutrient Groups

3.4.2 Ingredient Quantities

After the recipe reverse engineering was applied to all sampled products, the prevalent distributions of ingredients' inclusion rates, based on the corresponding placements, for all **subsegments** were calculated. According to the distributions, approximate recipes for the non-sampled products under each subsegment were estimated. After the recipes were reverse engineered, the equivalent sales data from Nielsen were utilized to determine the quantities of each ingredient for a given pet food product.

> **NOTE:** Data contained in all results in this "Ingredient Analysis" section of the report, represents the total volumes and values included in the purchased Nielsen data. The Nielsen data was received by two sections, "In Store" data versus "Amazon 1P" data. Nielsen claims that the "In Store" data represents the total U.S. in store sales records. While the "Amazon 1P" data only represents about one-third of the total U.S. online sales records. Thus, topline numbers have been "factored up" to estimate total U.S. sales of cat and dog food. The factors used are 1 and 3.333 for "In Store" data and "Amazon 1P" data, respectively.

Tree map charts, such as shown in Figure 48, and bar charts (i.e., Figure 49) show the summary of pet food ingredient quantities under different nutrient groups. In a tree map chart, a larger size

of the squares/rectangles represents a higher amount of the corresponding ingredient. There are 282 ingredients shared by both cat and dog foods. Total pet foods, cat foods and dog foods are denoted using orange, blue and green colors in the bar charts, respectively. The complete version of cat and dog food ingredient quantities for all aggregated ingredient groups can be explored with an interactive, online visualization tool **here**.

All consumption data in this section for total cat and dog food, cat food, and dog food are shown in an as sold basis.

3.4.2.1 Total

Figure 45 shows the tonnage and percentage of total ingredients that are upcycled ingredients. For pet foods, on an as sold basis, 50% of the ingredients are upcycled ingredients and add up to 4.07 million tons. Other ingredients used in pet foods are 4.12 million tons and make up the other 50% of the total food ingredients.

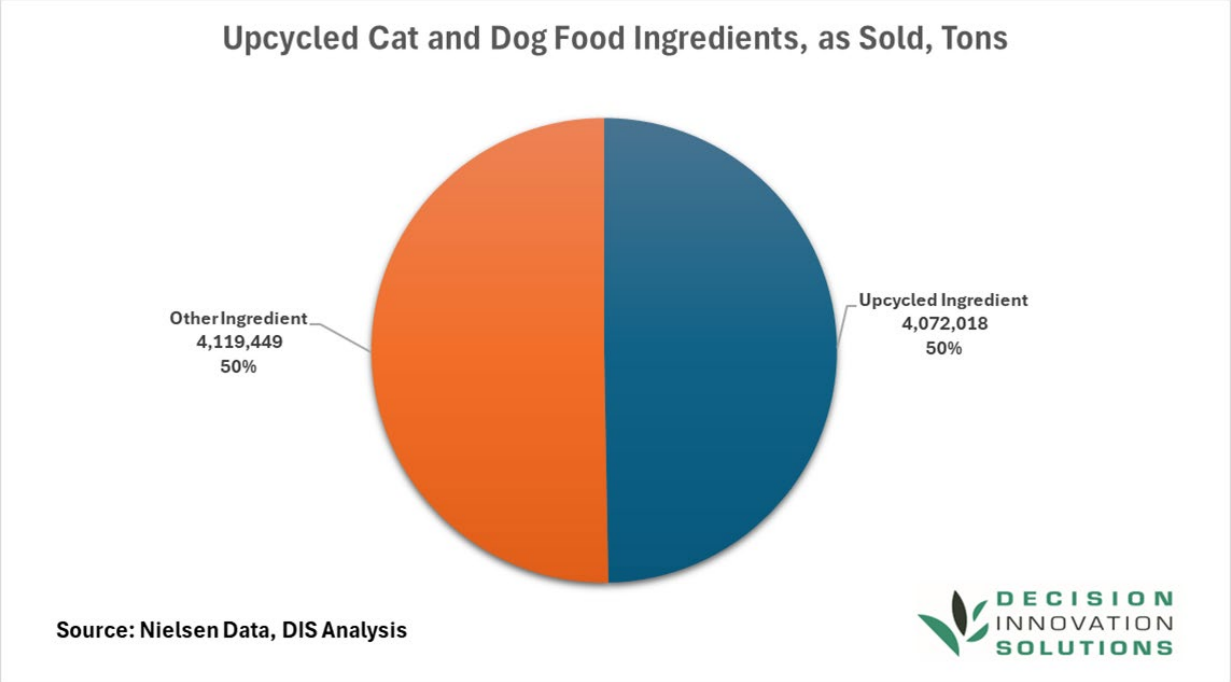

Figure 45. Upcycled Cat and Dog Food Ingredients, as Sold, Tons

A total of 8,191,467 tons of ingredients were used for total cat and dog foods. By volume, animal protein-related ingredients were 3,662,290 tons, followed by plant carbohydrates (2,338,722 tons), plant proteins (1,107,239 tons), water (440,461 tons), animal fats (311,914 tons), specialty crops (289,839 tons), plant fats (24,011 tons), and plant fats and carbohydrates (16,990 tons), shown in Figure 46.

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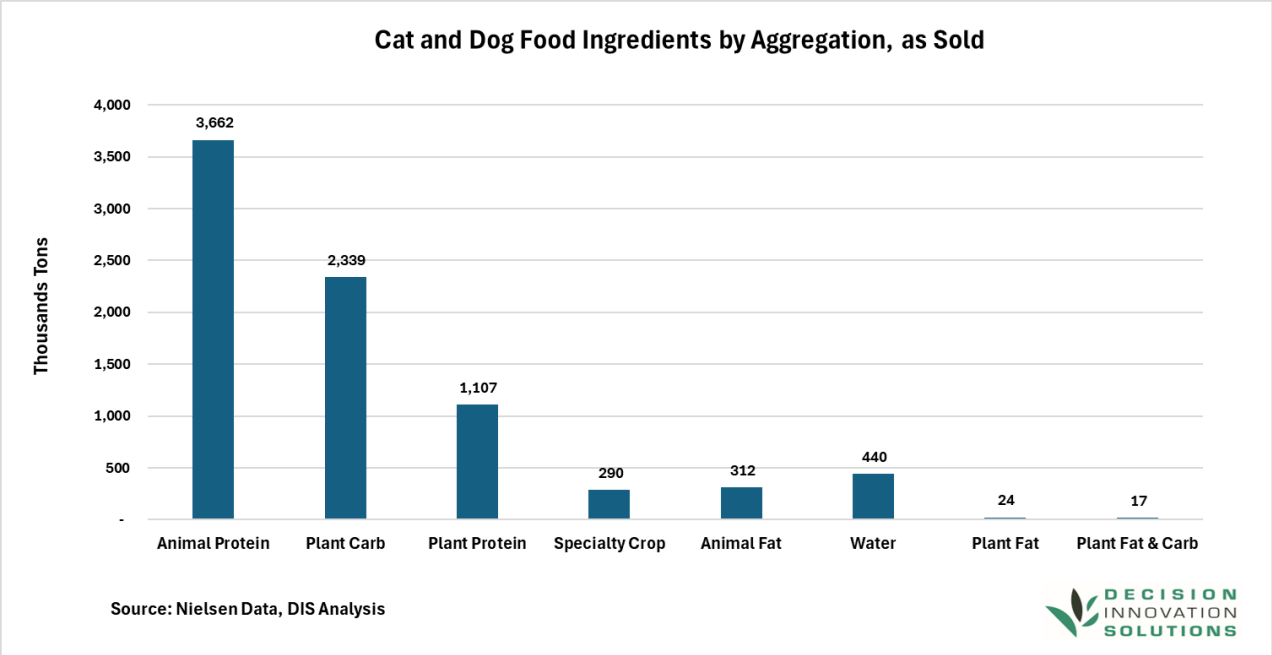
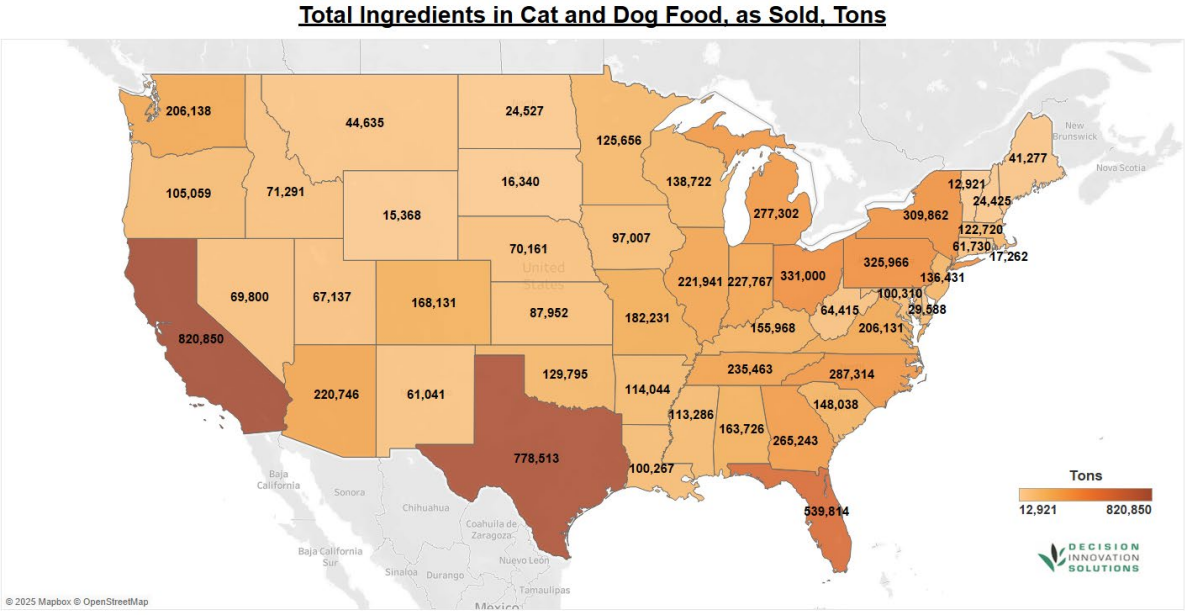


Figure 46. Cat and Dog Food Ingredient Consumption by Aggregation, as Sold

Shown below in Figure 47, total cat and dog food ingredient allocations are based on the number of pets by state, which shows the distribution of pet food ingredients as sold. Due to large pet populations, the leading states for pet food consumption include California, Texas and Florida. Individual ingredients by state can be seen in the online visualization tool here.



*Note: Data factored up from Nielsen Data to represent National Data

Figure 47. Total Ingredients in Cat and Dog Food, as Sold, Tons

Furthermore, these ingredients can be broken down by various nutrient groups. Figure 48 and Figure 49 show summary quantities of total pet food ingredients that belong to the "animal protein" nutrient group. Chicken is the lead ingredient with 758,459[11] tons used for total pet food products during the study period, followed by chicken byproduct meal, and meat and bone meal, with 432,986 tons and 342,369 tons, respectively.

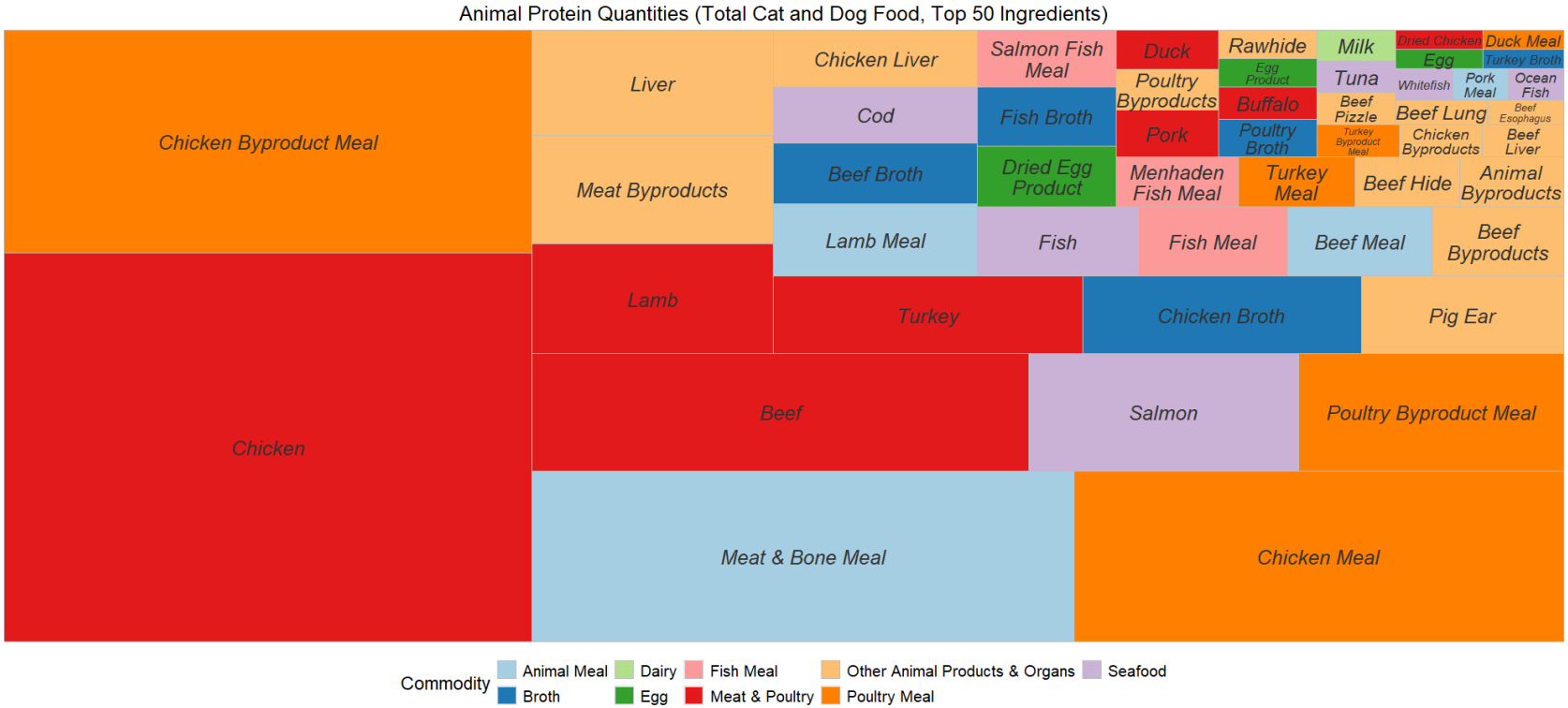


Figure 48. Animal Protein Quantities (Total Cat and Dog Food, Top 50 Ingredients)

[11]The tonnage here is different than the chicken 'as bought' volume, 1,129,216 tons, under the upstream analysis section, due to the water content changing during the food manufacturing process. Note that the 1,129,216 tons of chicken is the raw chicken as purchased. While the 758,459 tons of chicken is the "chicken" as an ingredient exists in finished pet foods as sold at retail, i.e., the moisture has been removed during the manufacturing process. Therefore, ingredients such as chicken, and other meats, seafood, and grains are purchased at higher moisture contents than the finished product, the ingredient quantities 'as bought' need to be adjusted for the moisture that is removed in the process of making the finished pet food product.

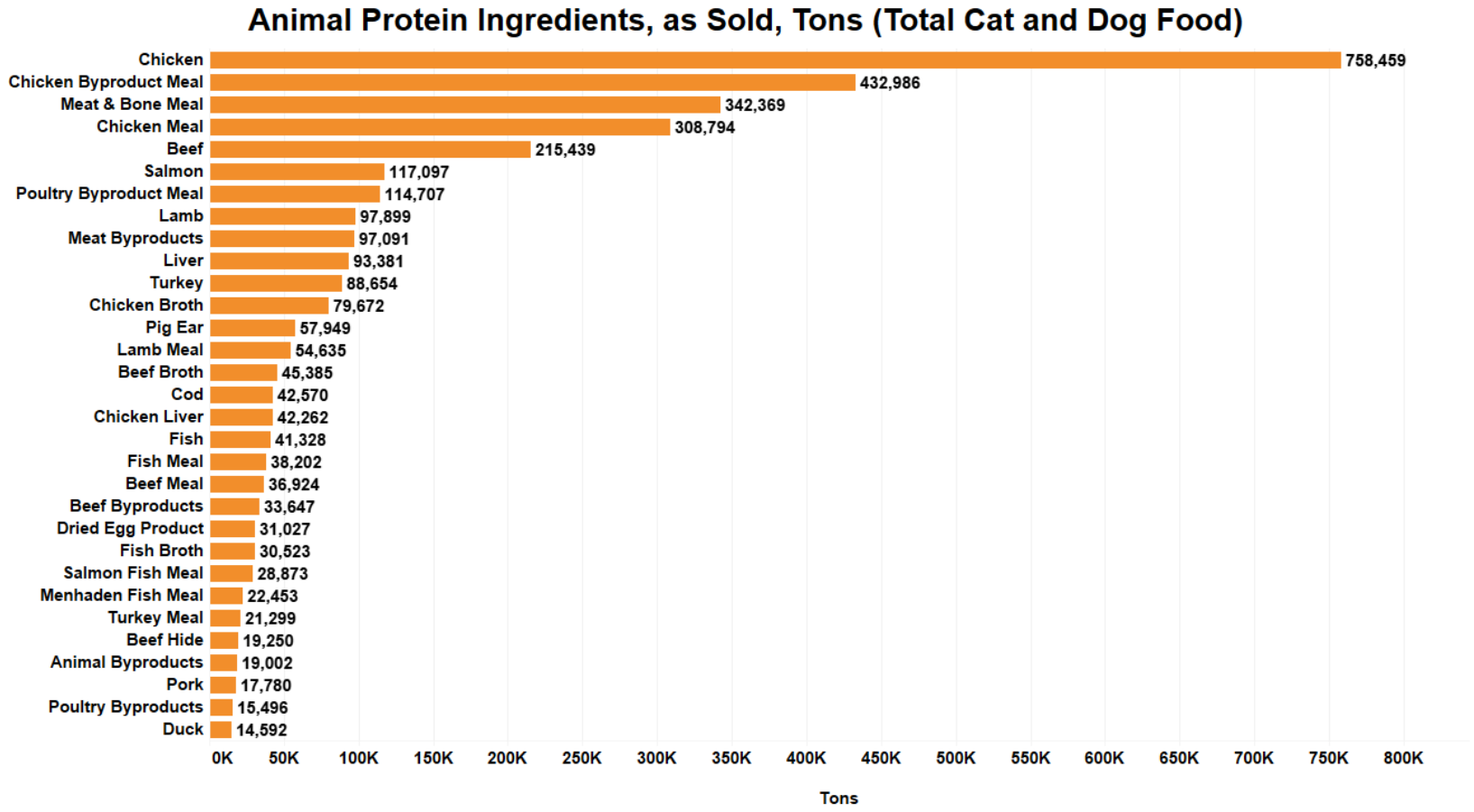


Figure 49. Animal Protein Ingredients, as Sold, Tons (Total Cat and Dog Food)

Figure 50 and Figure 51 show summary quantities of total pet food ingredients that belong to the “animal fat nutrient” group. Beef fat is the main animal fat ingredient used in pet foods with 118,773 tons used during the study period, followed by animal fat ingredients and chicken fat, with 112,034 tons and 67,845 tons, respectively.

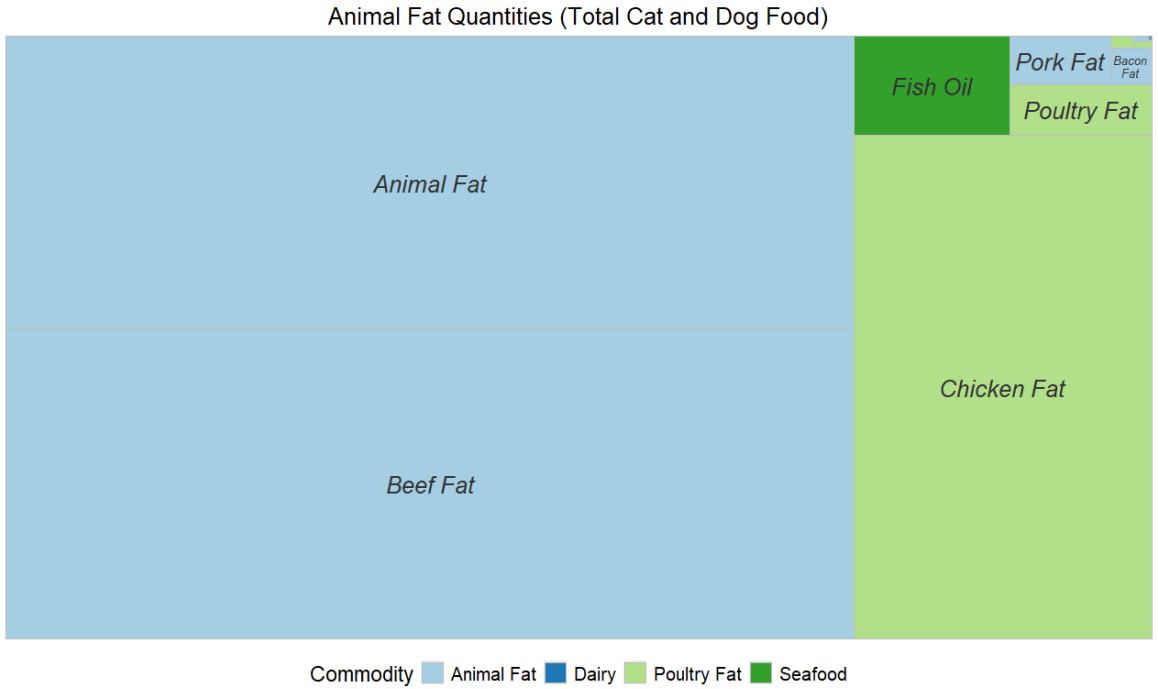


Figure 50. Animal Fat Quantities (Total Cat and Dog Food)

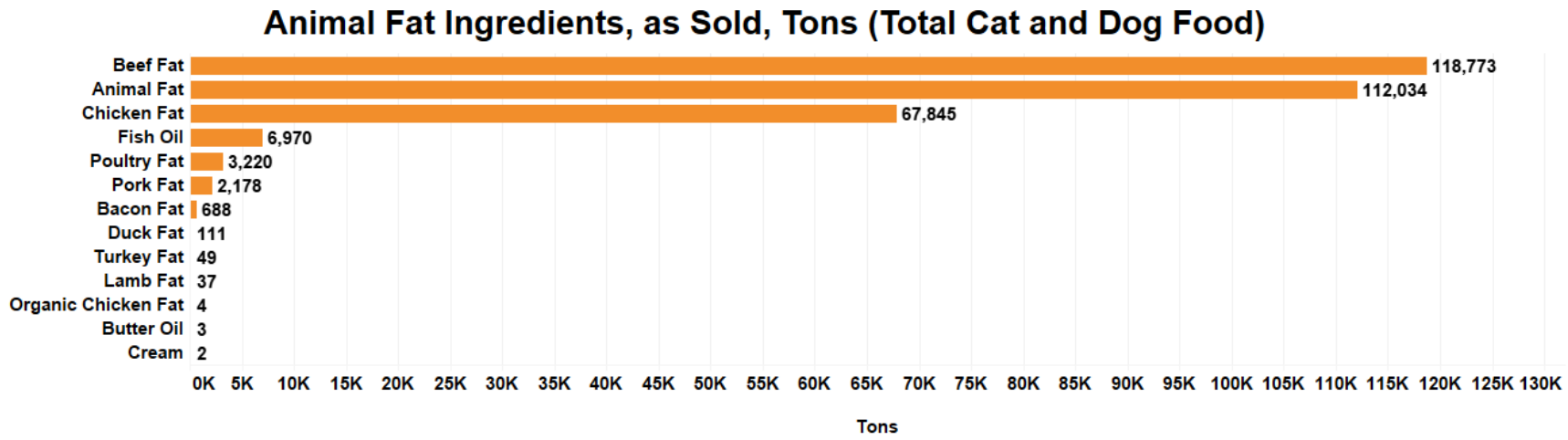


Figure 51. Animal Fat Ingredients, as Sold, Tons (Total Cat and Dog Food)

Figure 52 and Figure 53 show summary quantities of total pet food ingredients that belong to plant-related nutrient groups, which are “plant carbohydrates,” “plant proteins,” “plant fats” and “plant fats and carbohydrates.” Corn is the dominant ingredient, with 986,769 tons used for pet food products. Corn protein meal and soybean meal are the second and third largest ingredients, with 523,816 tons and 300,154 tons, respectively.

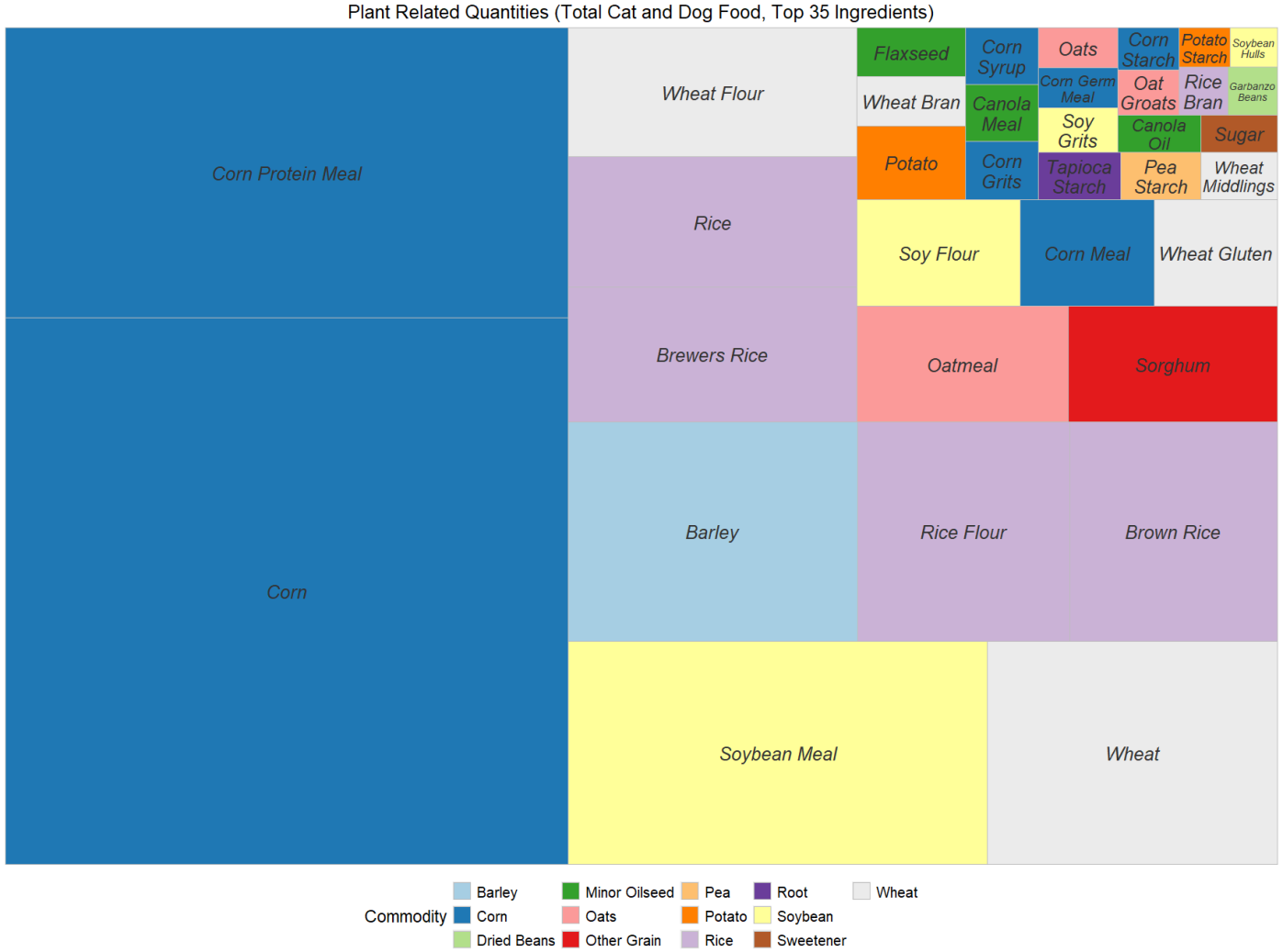


Figure 52. Plant Related Quantities (Total Cat and Dog Food, Top 35 Ingredients)

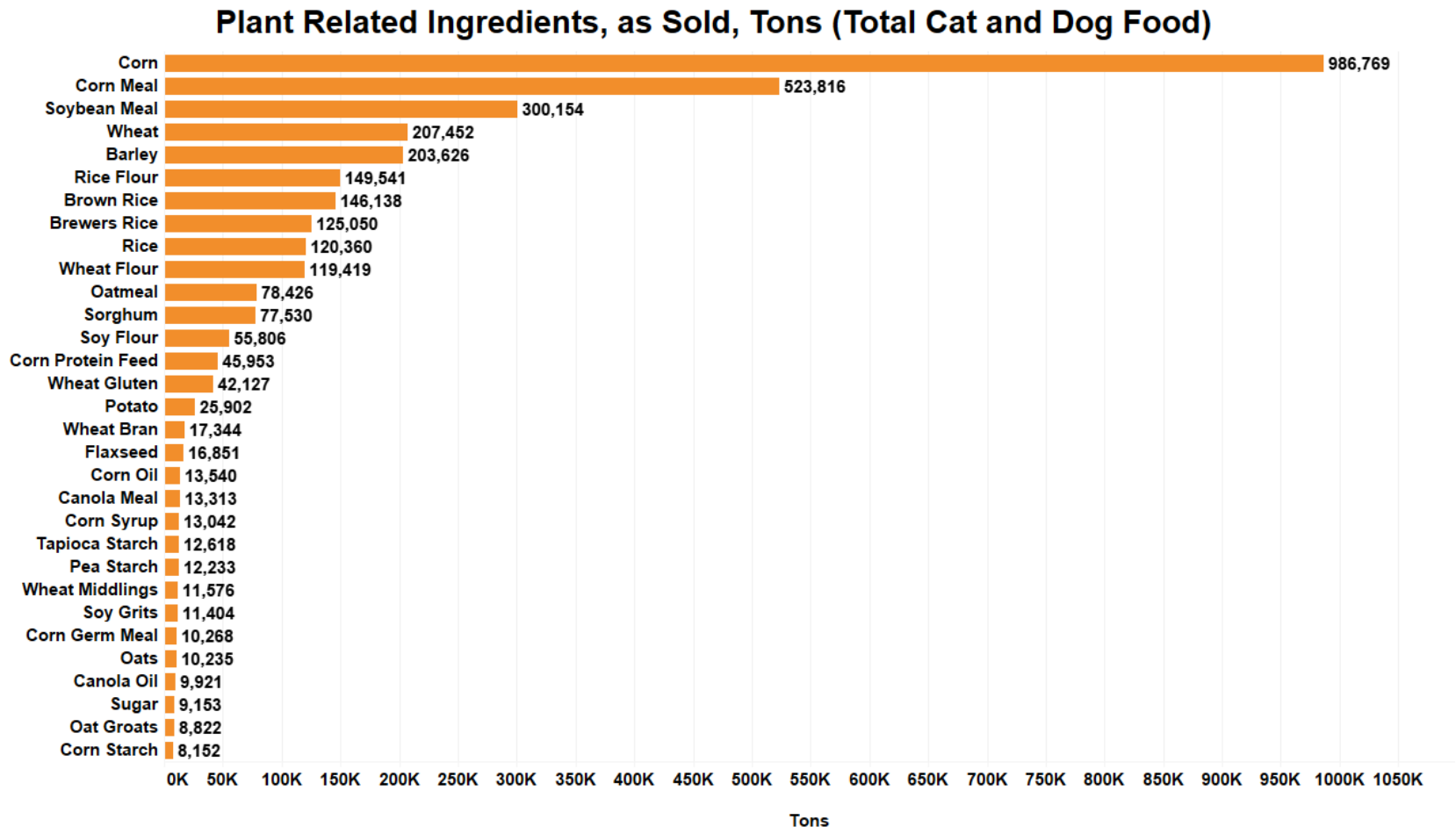


Figure 53. Plant Related Ingredients, as Sold, Tons (Total Cat and Dog Food)

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Figure 54 and Figure 55 show the summary quantities of total pet food ingredients that belong to the “specialty crop” category. Peas are the leading ingredient with 75,247 tons used for pet food products during the study period, followed by dried beet pulp and sweet potatoes, with 42,840 tons and 36,643 tons, respectively.

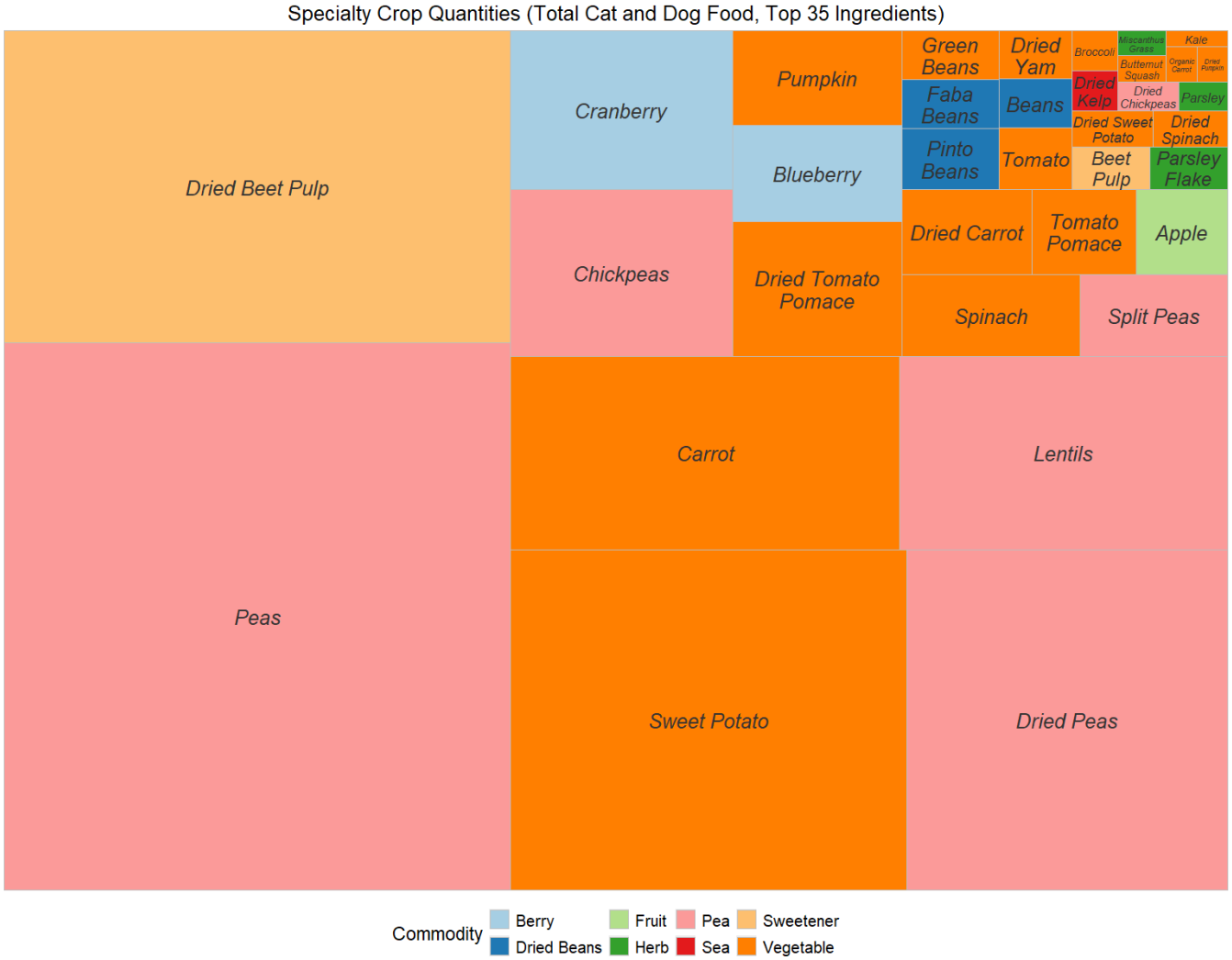

Figure 54. Specialty Crop Quantities (Total Cat and Dog Food, Top 35 Ingredients)

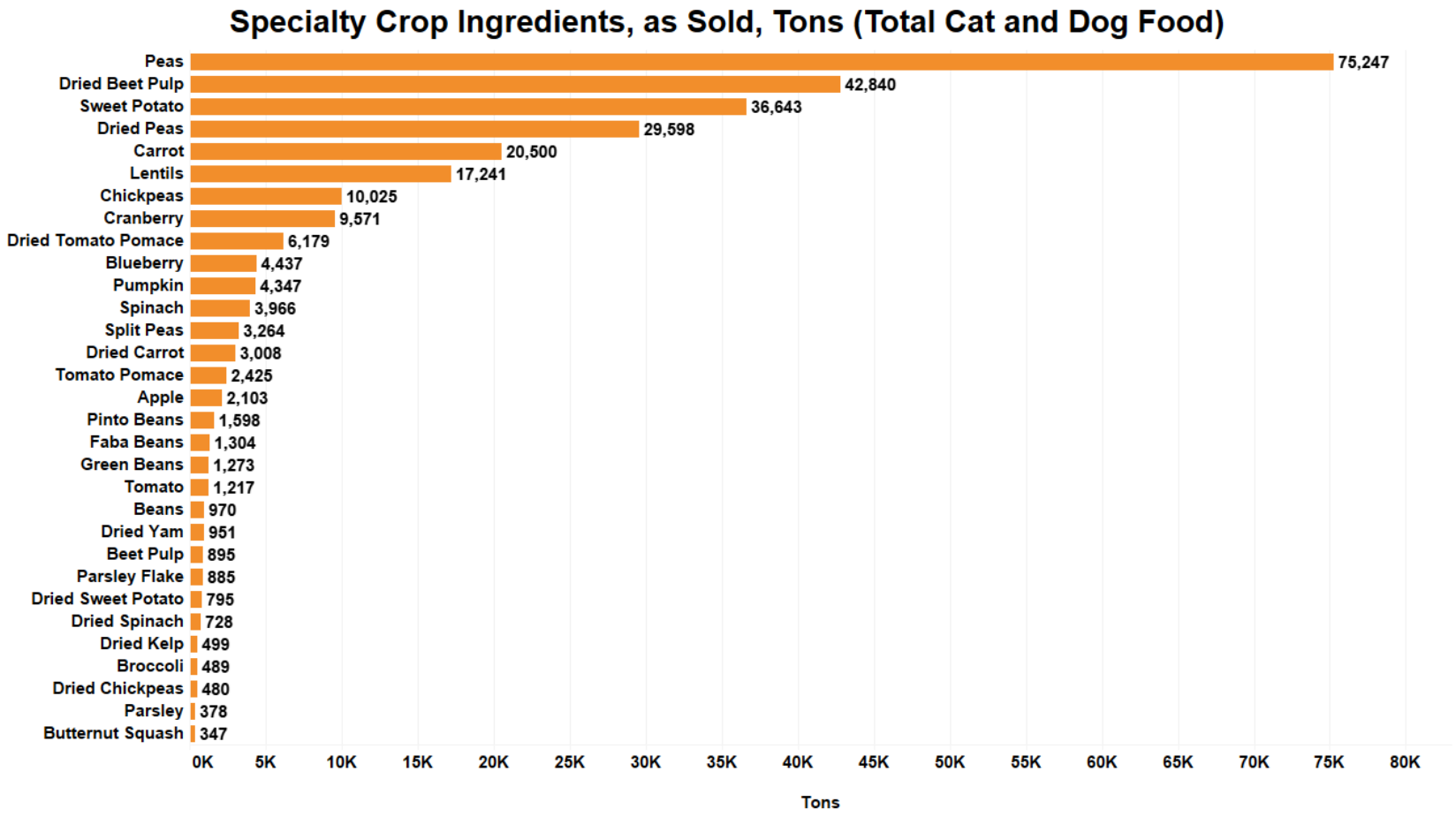

Figure 55. Specialty Crop Ingredients, as Sold, Tons (Total Cat and Dog Food)

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3.4.2.2 Cats

Figure 56 shows the tonnage and percentage of total ingredients that are upcycled ingredients. For cat foods, on an as sold basis, 51% of the ingredients are upcycled ingredients and add up to 1.1 million tons. Other ingredients used in cat foods are total just over 1 million tons and make up the other 49% of the total food ingredients.

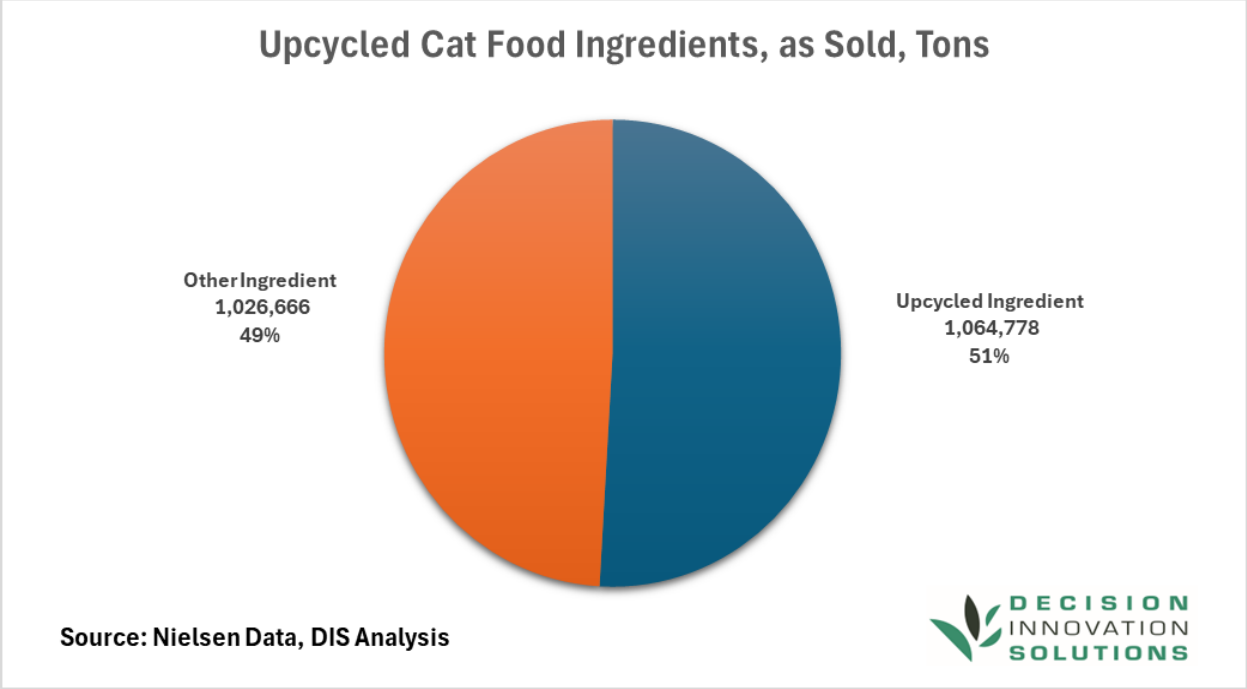

Figure 56. Upcycled Cat Food Ingredients, as Sold, Tons

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A total of 2,091,444 tons of ingredients were used for cat foods. By volume, animal protein-related ingredients were 950,218 tons, followed by plant carbohydrates (435,962 tons), plant proteins (343,544 tons), water (255,470 tons), animal fats (69,724 tons), specialty crops (32,022 tons), plant fats (2,711 tons), and plant fats and carbohydrates (1,793 tons), shown in Figure 57.

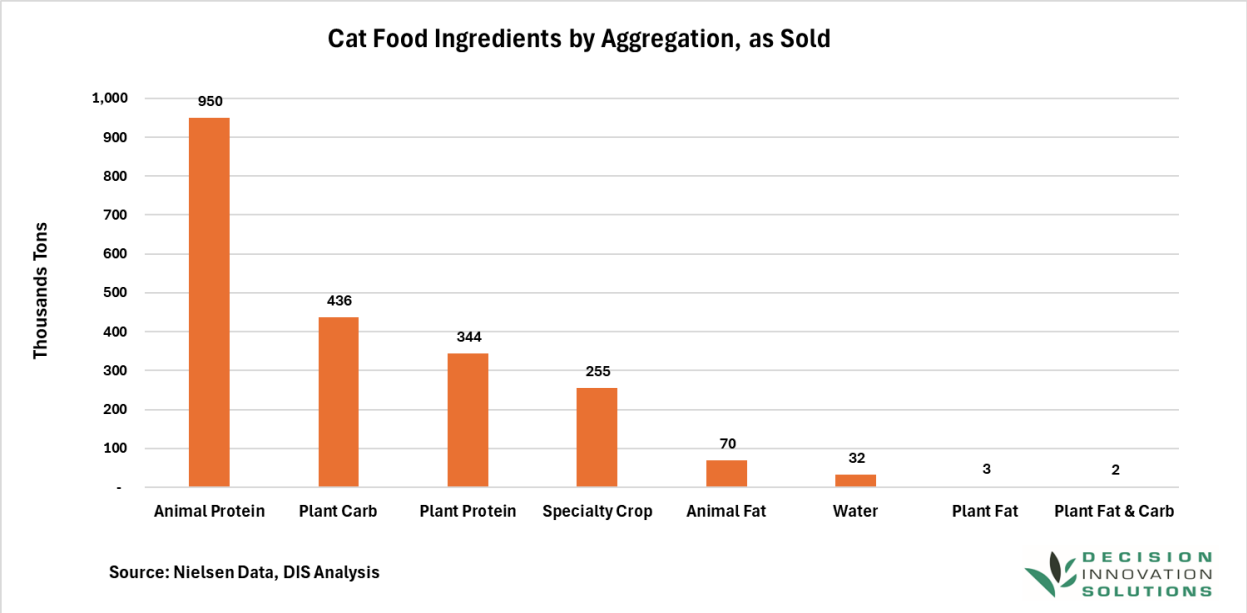

Figure 57. Cat Food Ingredient Consumption by Aggregation, as Sold

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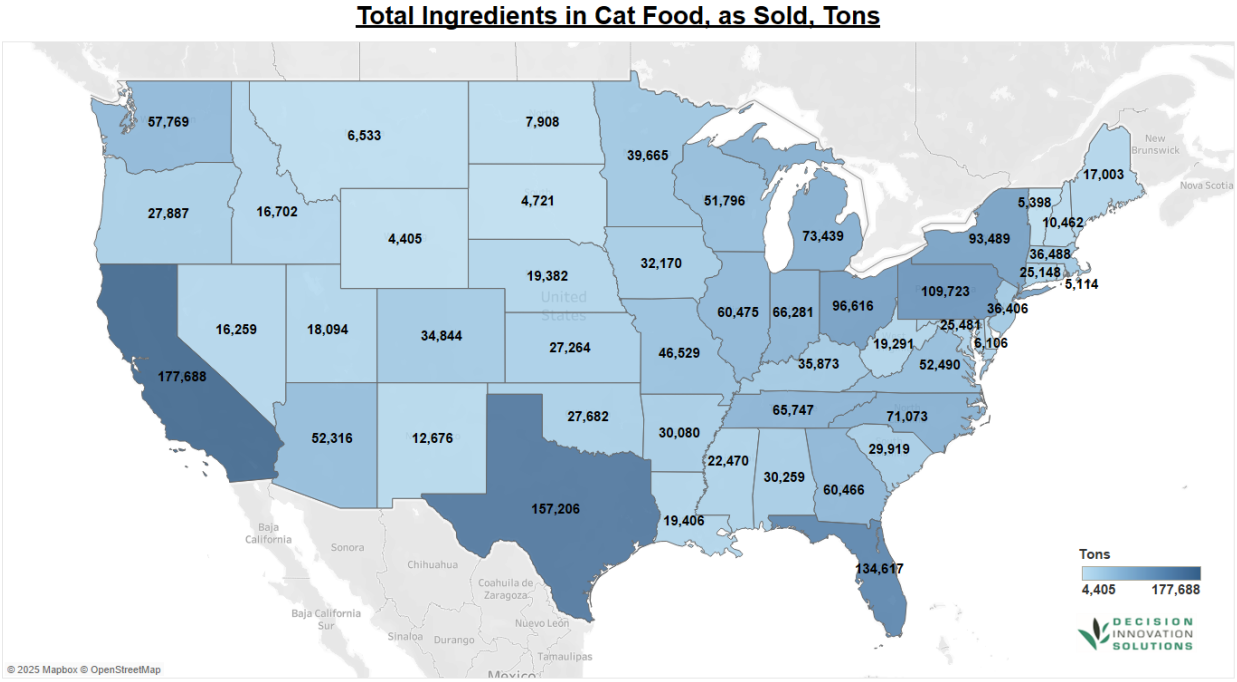
Shown below in Figure 58, total cat food ingredient allocations are based on the number of cats by state, which shows the distribution of pet food ingredients as sold. Due to large pet populations, the leading states for cat food consumption include California, Texas and Florida. Individual ingredients by state can be seen in the online visualization tool here.



*Note: Data factored up from Nielsen Data to represent National Data

Figure 58. Total Ingredients in Cat Food, as Sold, Tons

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Furthermore, these ingredients can be broken down by various nutrient groups. Figure 59 and Figure 60 show summary quantities of cat food ingredients that belong to the “animal protein” nutrient group. Chicken byproduct meal is the leading ingredient with 195,805 tons used for cat foods during the study period, followed by chicken and liver, with 170,041 tons and 74,324 tons, respectively.

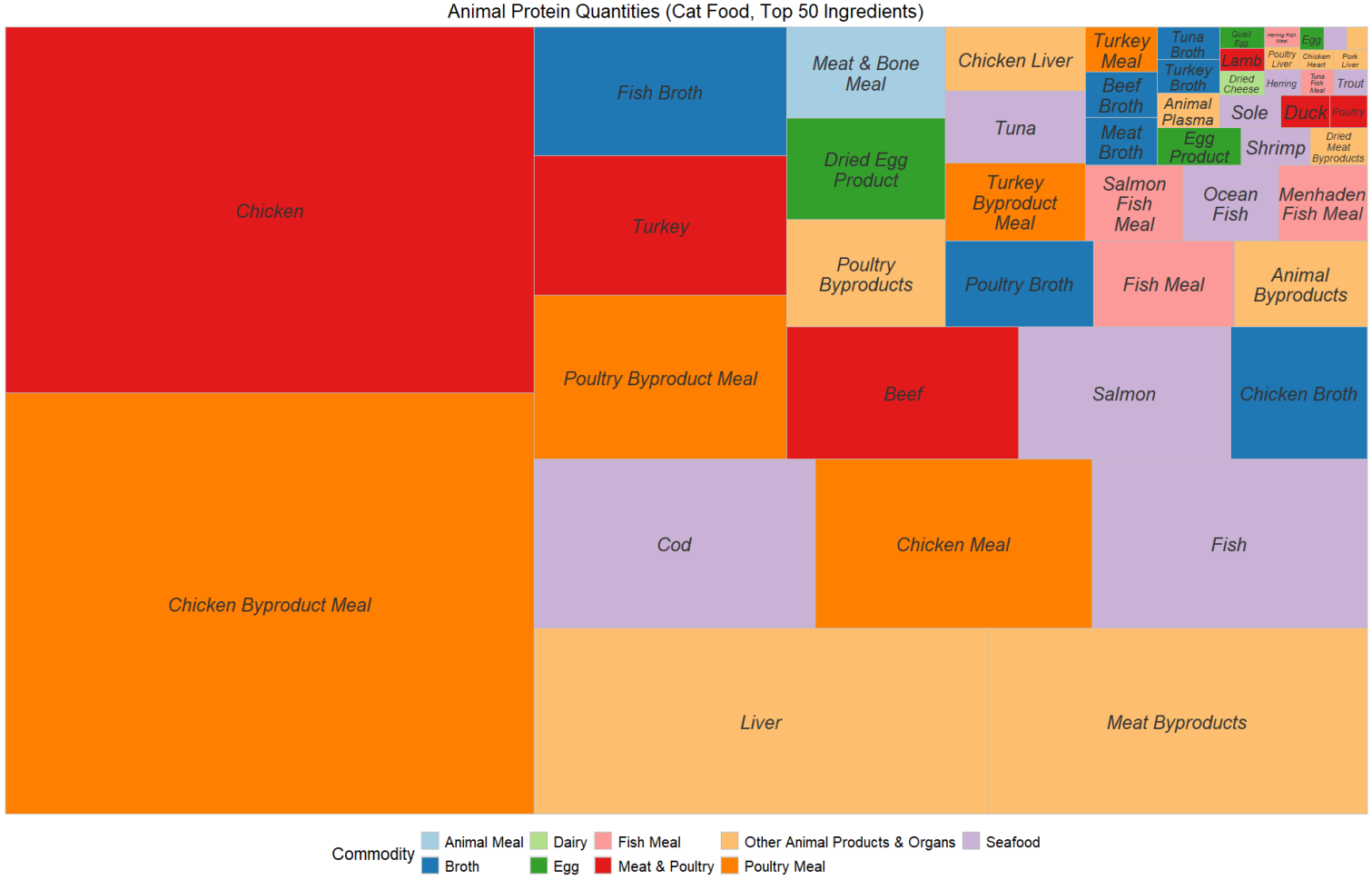

Figure 59. Animal Protein Quantities (Cat Food, Top 50 Ingredients)

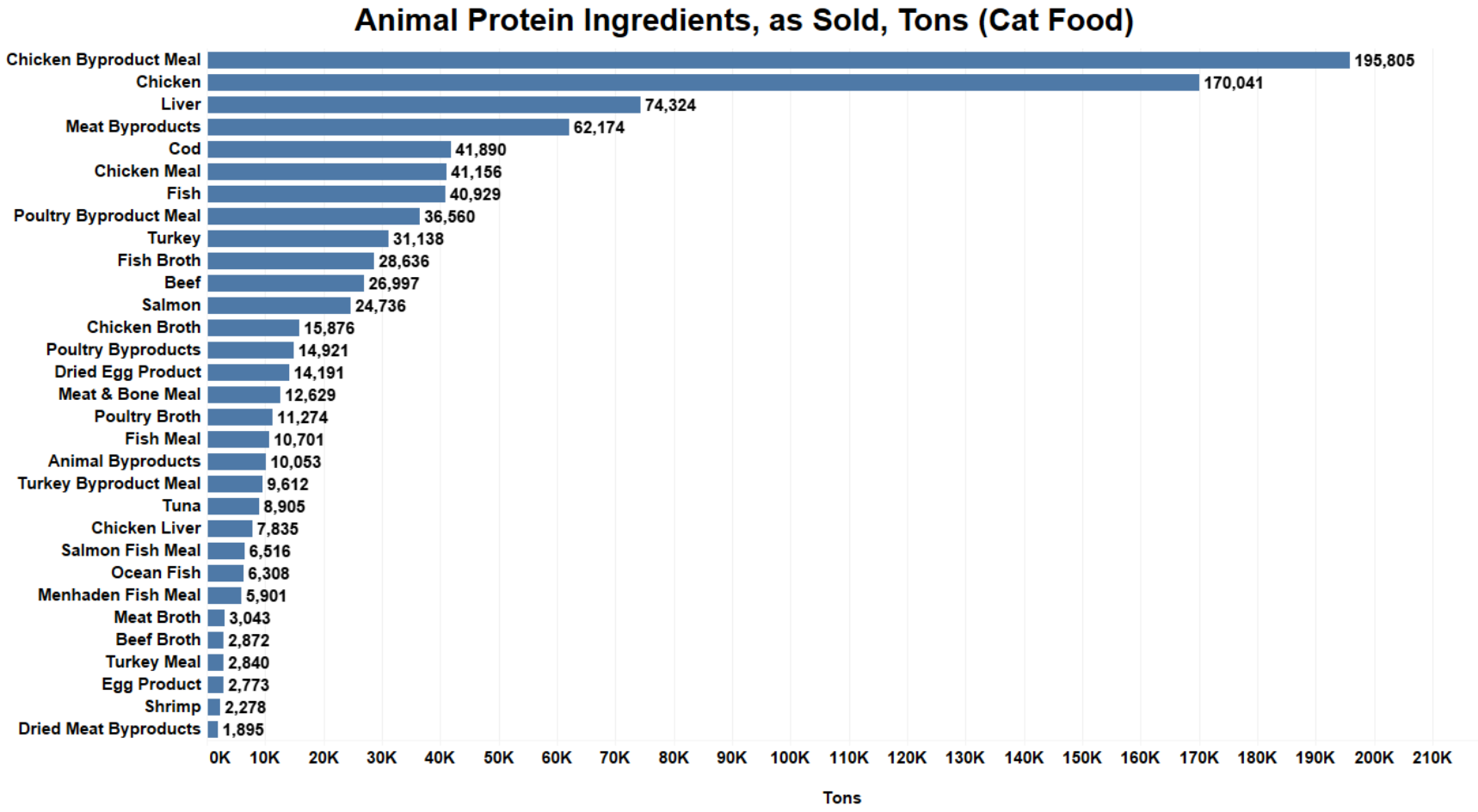

Figure 60. Animal Protein Ingredients, as Sold, Tons (Cat Food)

Figure 61 and Figure 62 show summary quantities of cat food ingredients that belong to the "animal fat" nutrient group. Beef fat is the top animal fat choice used in cat foods with 28,345 tons used during the study period, followed by animal fat and chicken fat, with 22,382 tons and 14,950 tons, respectively.

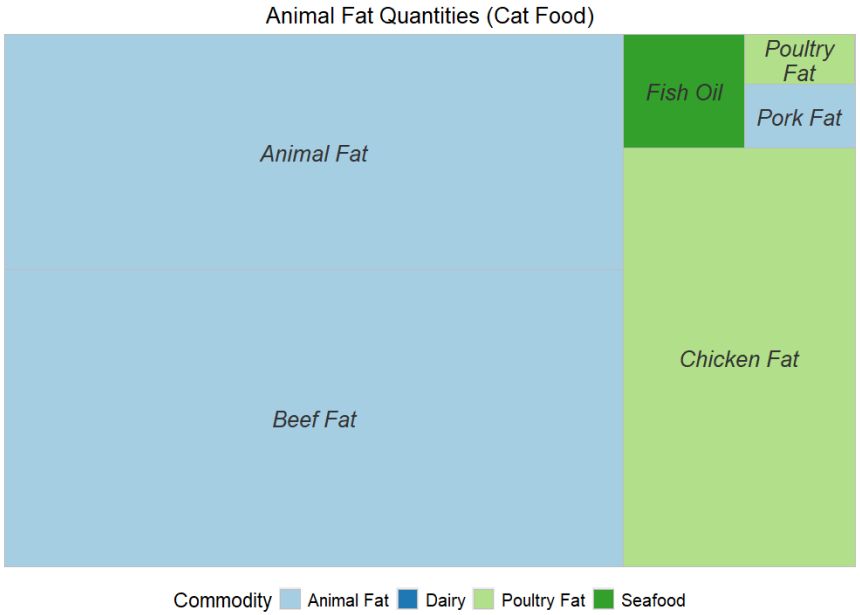

Figure 61. Animal Fat Quantities (Cat Food)

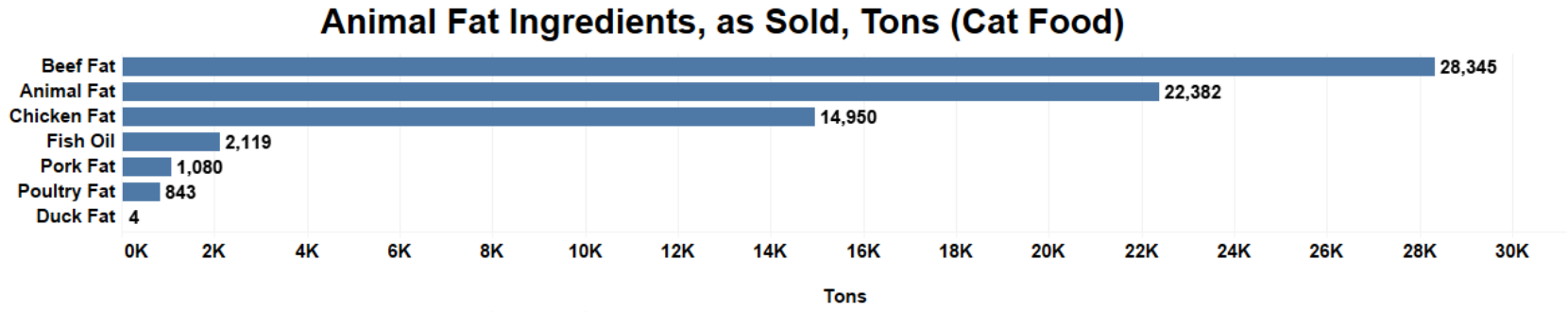

Figure 62. Animal Fat Ingredients, as Sold, Tons (Cat Food)

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Figure 63 and Figure 64 show summary quantities of cat food ingredients that belong to plant-related nutrient groups, which are plant carbohydrates, plant proteins, plant fats, plant fat and carbohydrate groups. Corn is the top ingredient under all plant-related nutrient groups, with 251,533 tons used for cat foods. Corn protein meal and soybean meal are the second and third largest ingredients, with 200,255 tons and 72,364 tons, respectively.

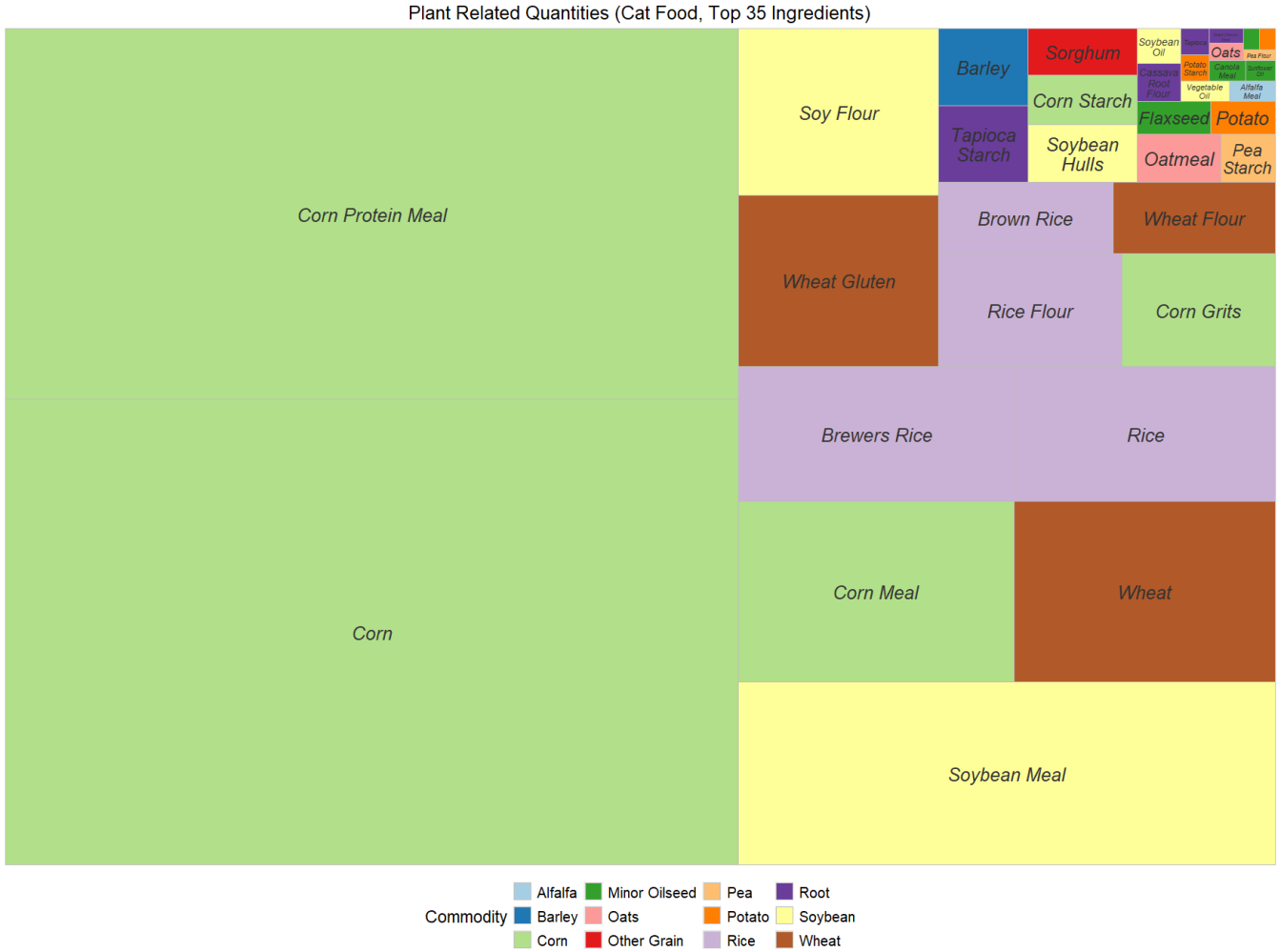

Figure 63. Plant Related Quantities (Cat Food, Top 35 Ingredients)

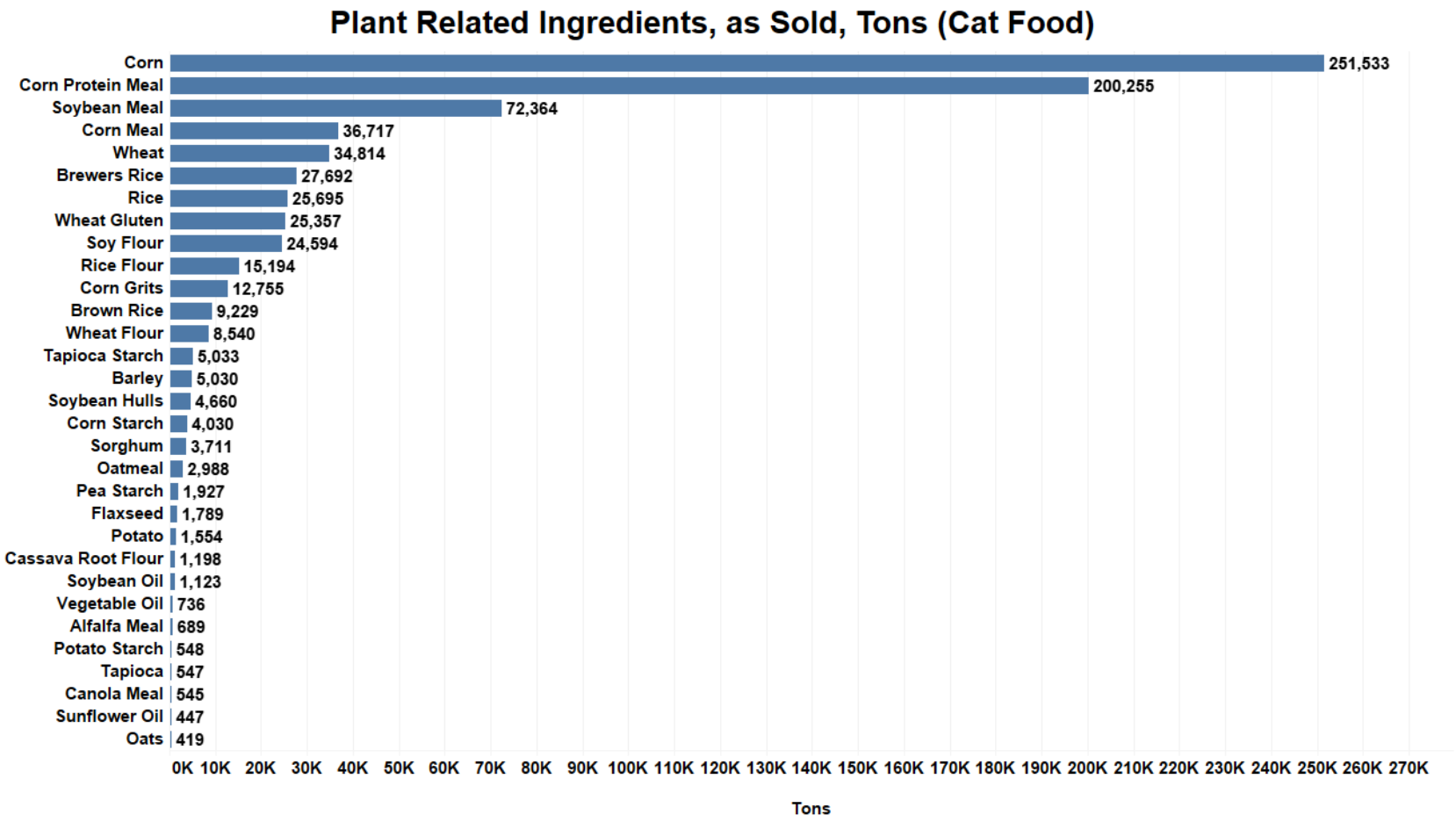

Figure 64. Plant Related Ingredients, as Sold, Tons (Cat Food)

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Figure 65 and Figure 66 show summary quantities of cat food ingredients that belong to the "specialty crop" category. Dried beet pulp is the leading ingredient with 7,846 tons used for cat foods during the study period, followed by peas, dried peas and lentils, with 7,758 tons, 4,807 tons, and 2,190 tons, respectively.

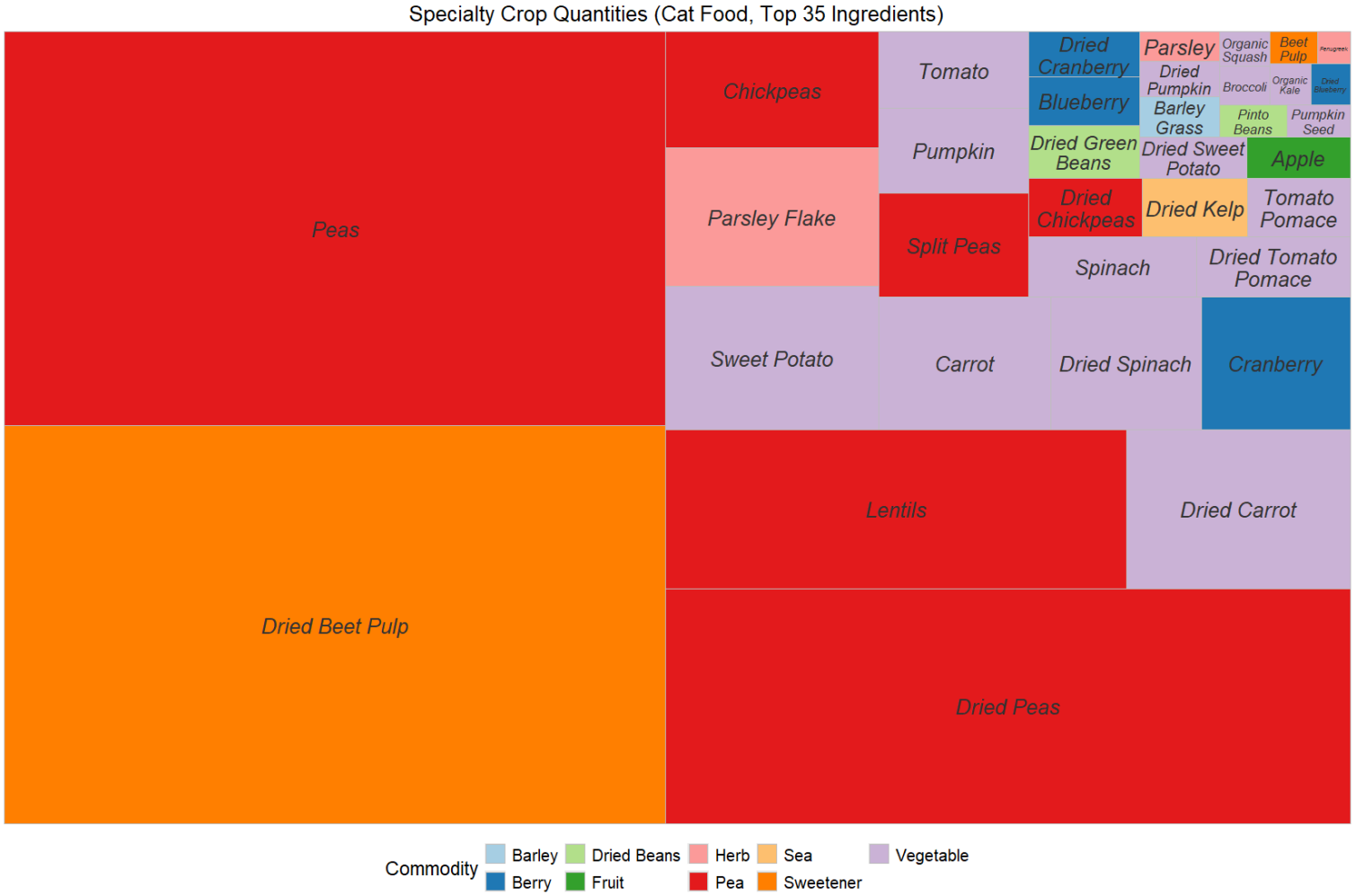

Figure 65. Specialty Crop Quantities (Cat Food, Top 35 Ingredients)

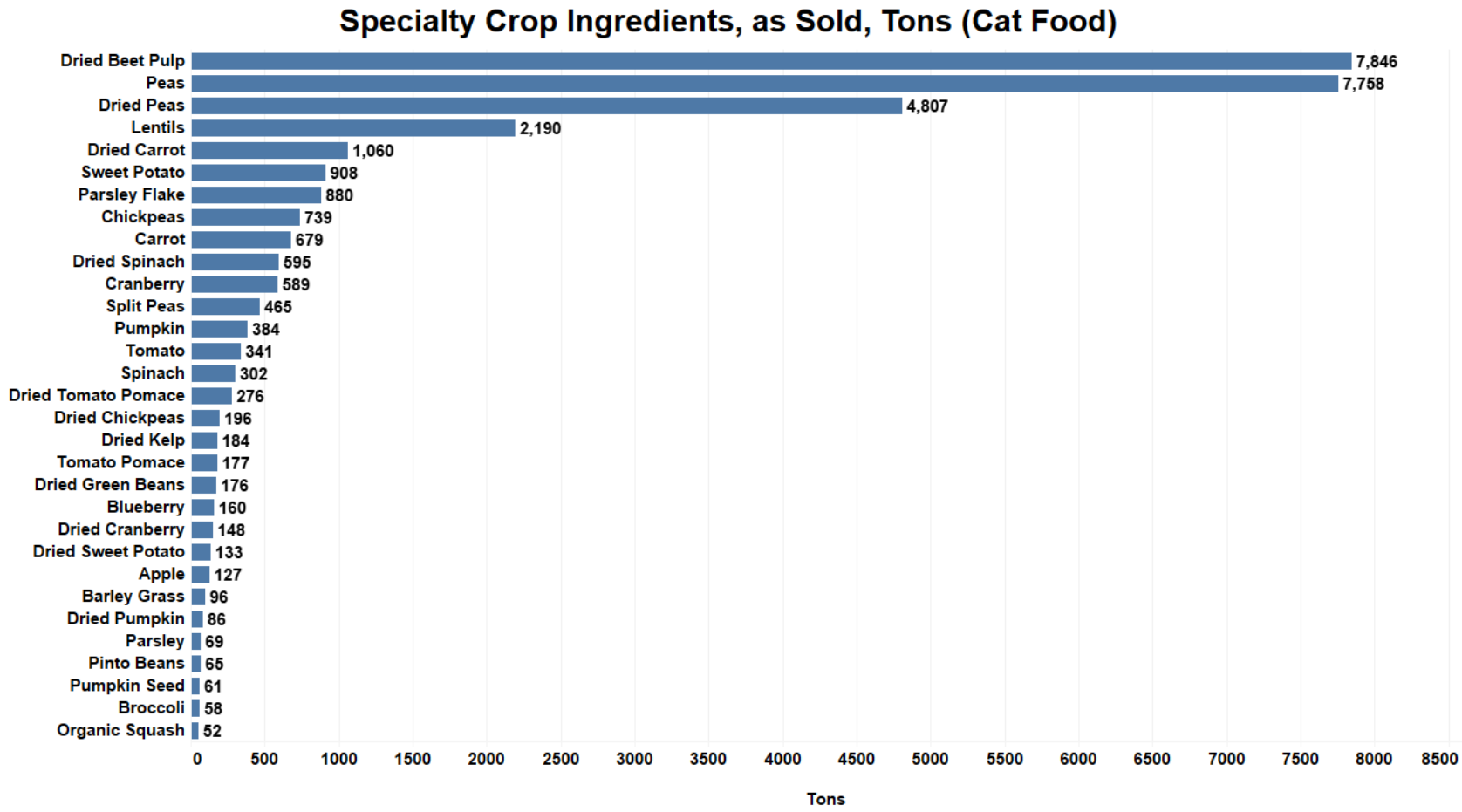

Figure 66. Specialty Crop Ingredients, as Sold, Tons (Cat Food)

3.4.2.3 Dogs

Figure 67 shows the tonnage and percentage of total ingredients that are upcycled ingredients. For dog foods, on an as sold basis, 49% of the ingredients are upcycled ingredients and add up to 3 million tons. Other ingredients used in dog foods make up the remaining 3.1 million tons, or roughly 51% of the total food ingredients.

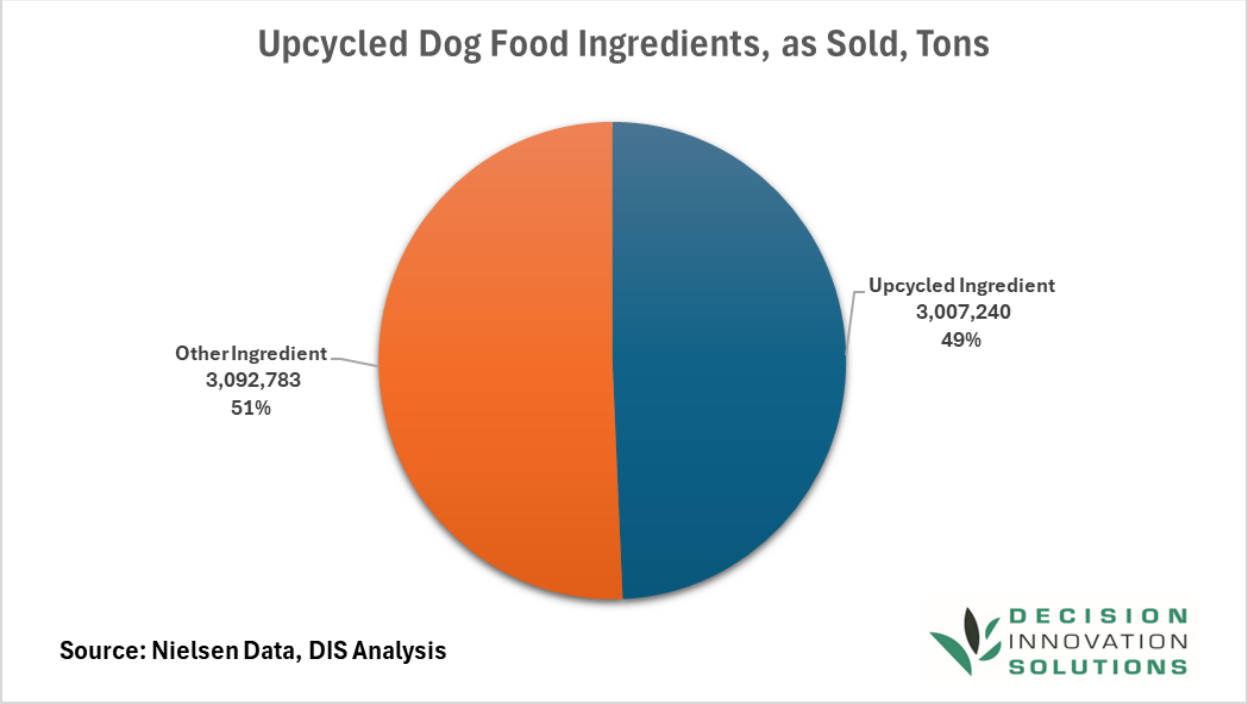

Figure 67. Upcycled Dog Food Ingredients, as Sold, Tons

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A total of 6,100,023 tons of ingredients were used for dog foods. By volume, animal protein-related ingredients were 2,712,072 tons, followed by plant carbohydrates (1,902,761 tons), plant proteins (763,695 tons), specialty crops (257,817 tons), animal fats (242,191 tons), water (184,992 tons), plant fats (21,300 tons), and plant fats and carbohydrates (15,197 tons), shown in Figure 68.

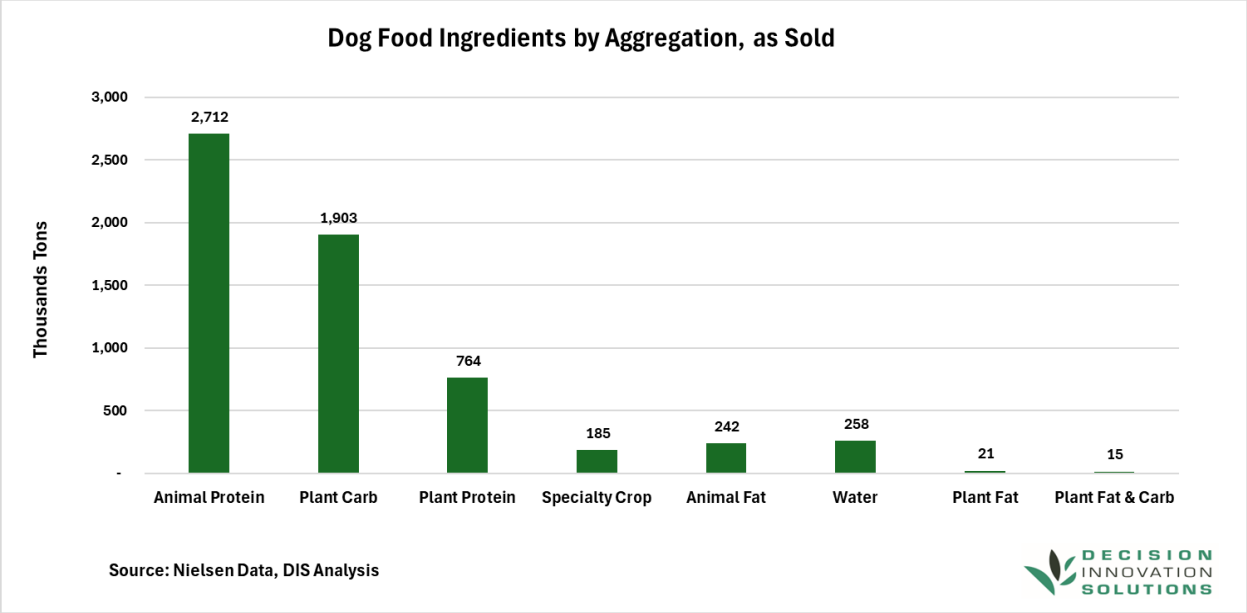
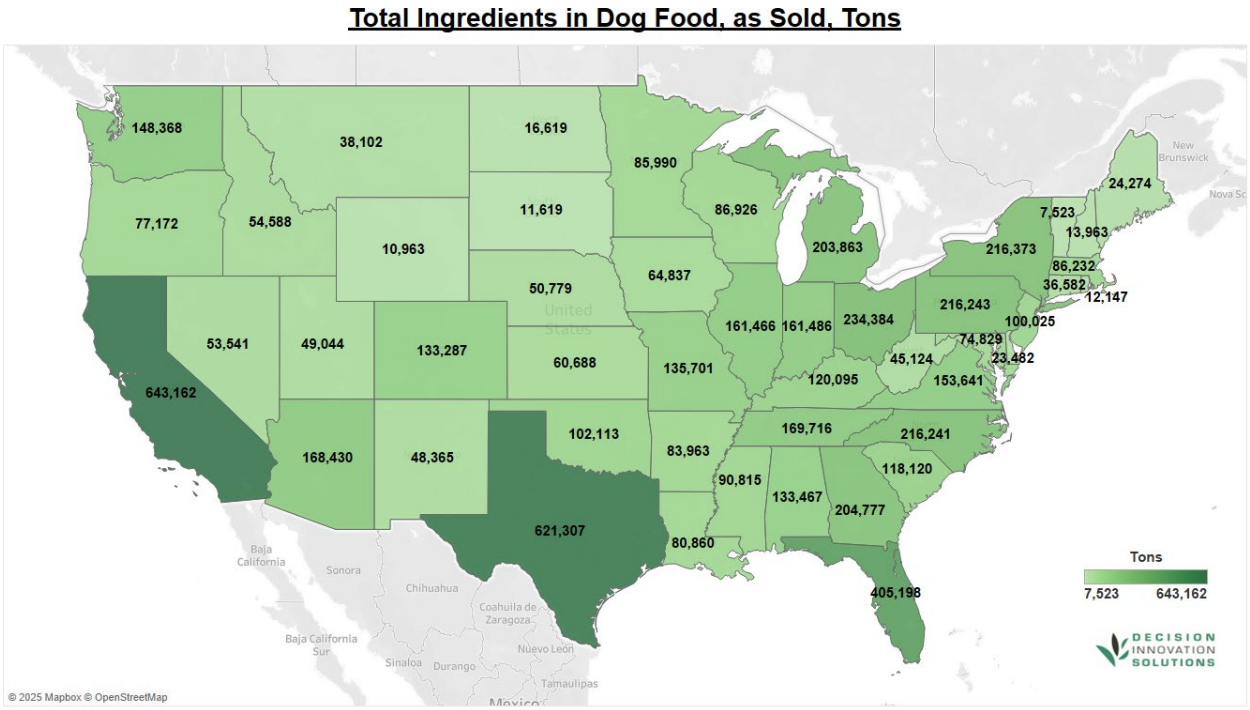


Figure 68. Dog Food Ingredient Consumption by Aggregation, as Sold

Shown below in Figure 69, total dog food ingredient allocations are based on the number of pets by state which shows the distribution of pet food ingredients as sold. Due to large pet populations, the leading states for dog food consumption include California, Texas and Florida. Individual ingredients by state can be seen in the online visualization tool here.



Note: Data factored up from Nielsen Data to represent National Data

Figure 69. Total Ingredients in Dog Food, as Sold, Tons

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Furthermore, these ingredients can be broken down by various nutrient groups. Figure 70 and Figure 71 show summary quantities of dog food ingredients that belong to the “animal protein” nutrient group. Chicken is the leading ingredient with 588,418 tons used for dog food products during our study period, followed by meat and bone meal, and chicken meal, with 329,741 tons and 267,638 tons, respectively.

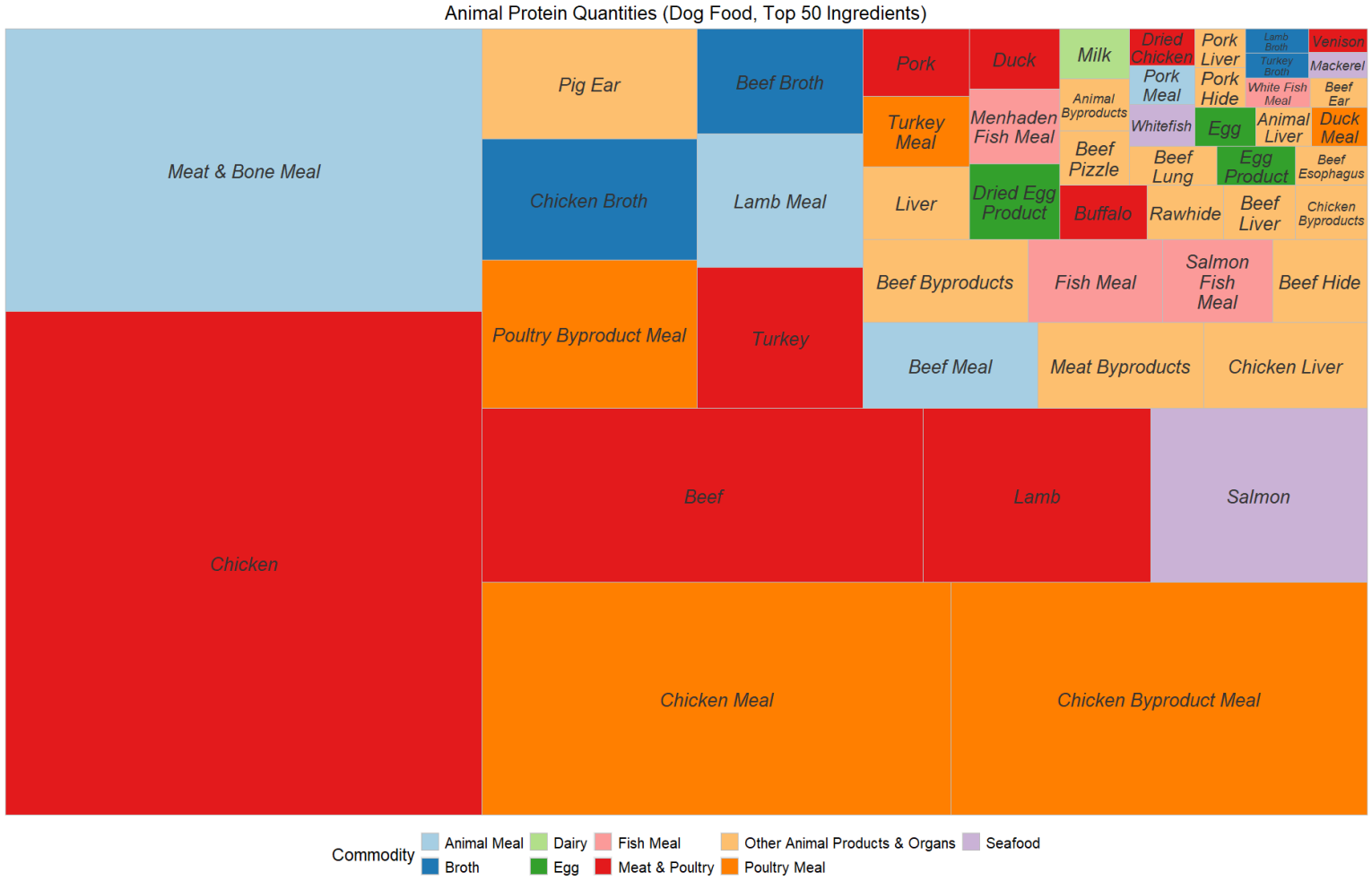

Figure 70. Animal Protein Quantities (Dog Food, Top 50 Ingredients)

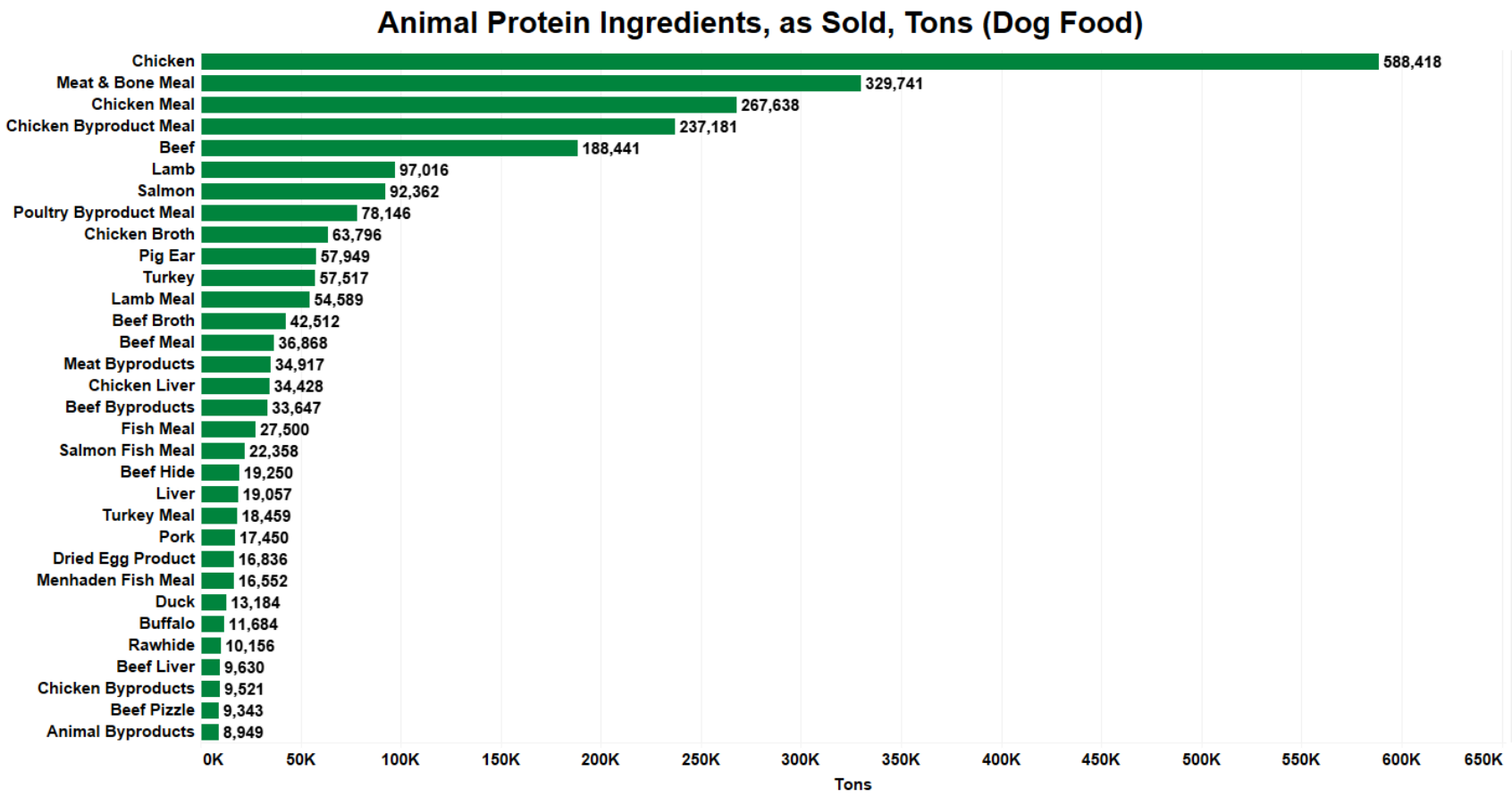

Figure 71. Animal Protein Ingredients, as Sold, Tons (Dog Food)

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Figure 72 and Figure 73 show summary quantities of dog food ingredients that belong to the “animal fat” nutrient group. Beef fat is the leading ingredient, with 90,428 tons used for dog foods, followed by animal fat, with 89,653 tons, and chicken fat, with 52,896 tons.

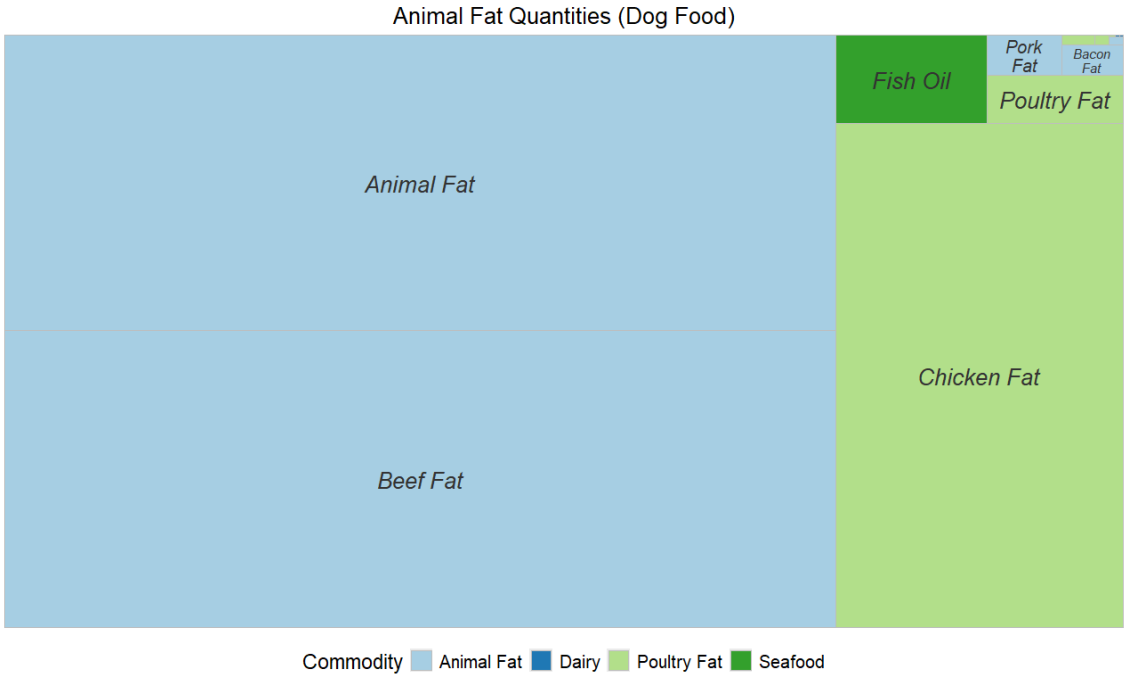

Figure 72. Animal Fat Quantities (Dog Food)

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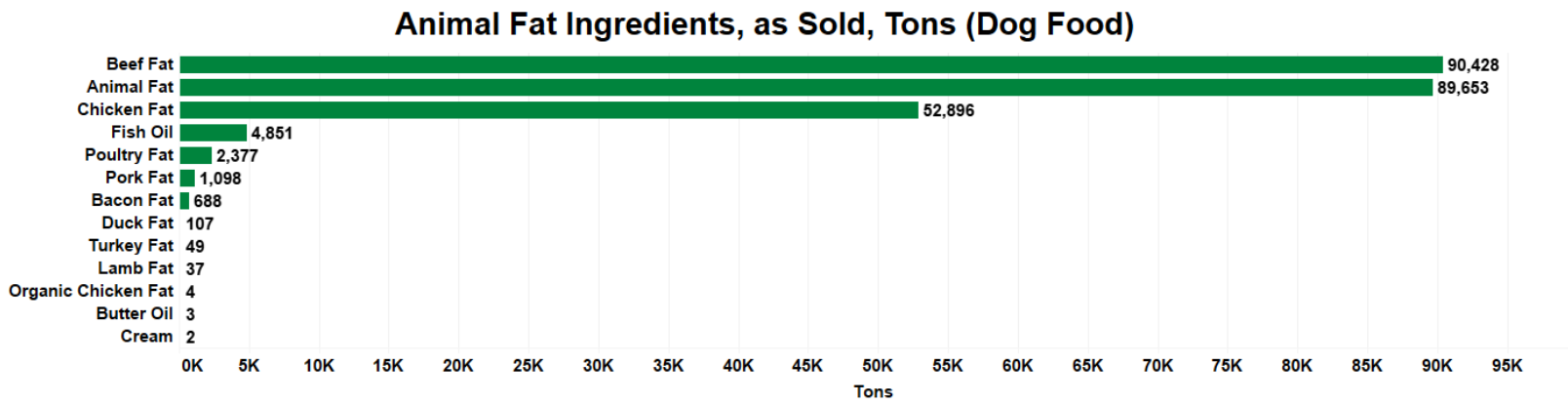

Figure 73. Animal Fat Ingredients, as Sold, Tons (Dog Food)

Figure 74 and Figure 75 show summary quantities of dog food ingredients that belong to the plant-related aggregation nutrient groups (plant carbohydrate, plant protein, plant fat, plant fat and carbohydrate groups). Corn is the top ingredient under all plant-related aggregated nutrient groups, and it is the largest ingredient compared with all food ingredients for dog food products. There are 735,236 tons of corn used for dog foods, followed by corn protein meal and soybean meal, with 323,561 tons and 227,790 tons, respectively.

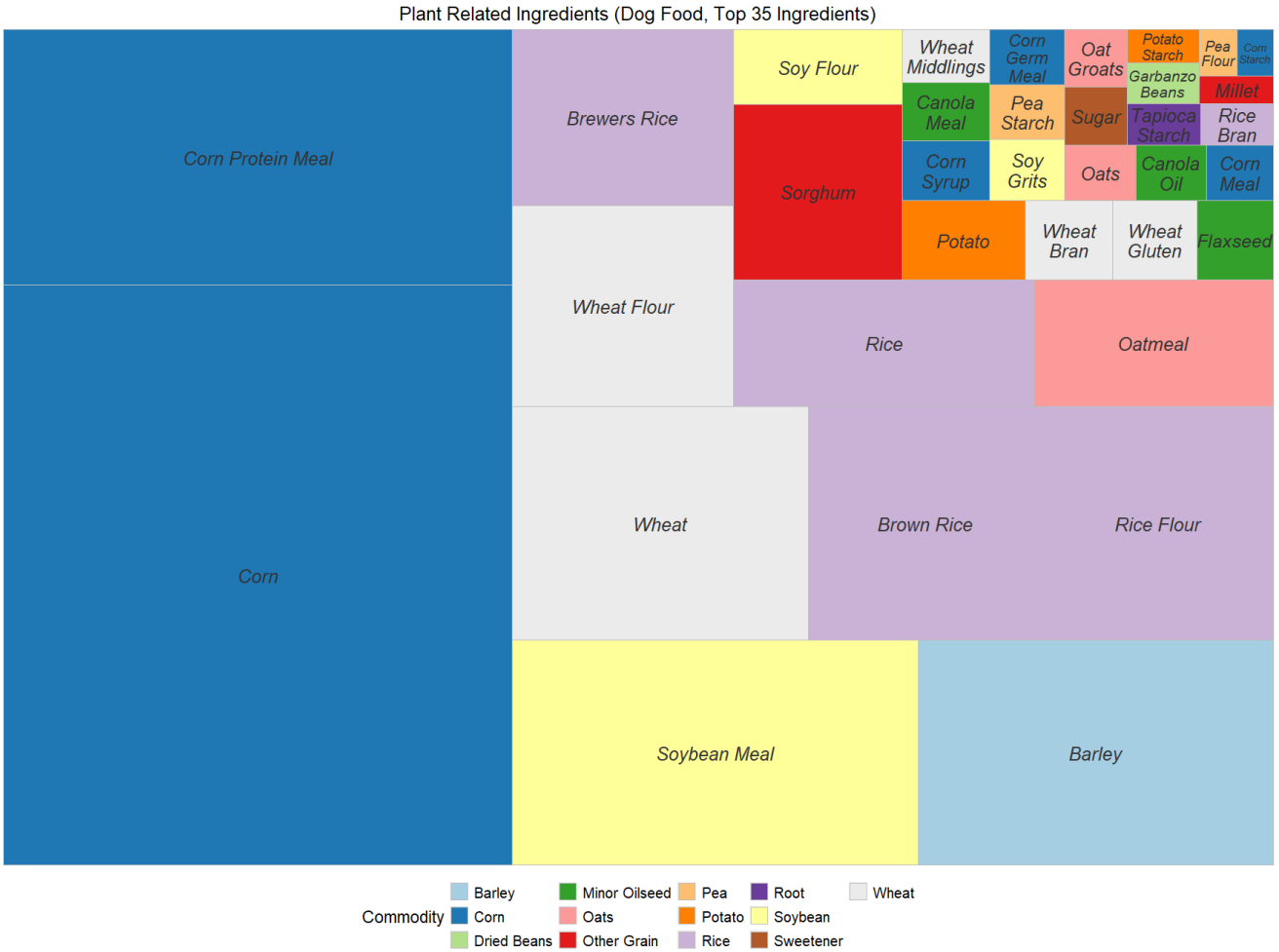

Figure 74. Plant Related Quantities (Dog Food, Top 35 Ingredients)

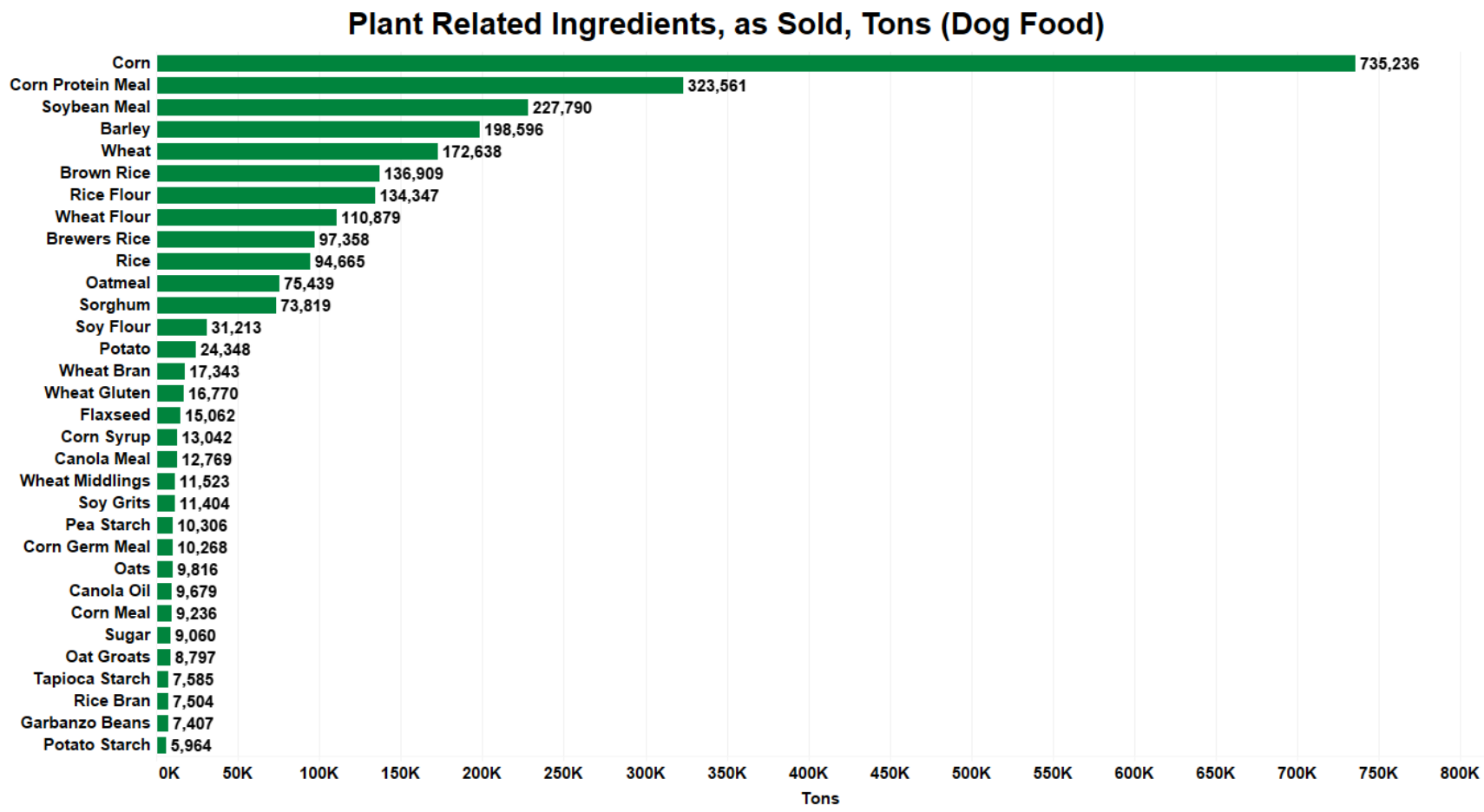

Figure 75. Plant Related Ingredients, as Sold, Tons (Dog Food)

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Figure 76 and Figure 77 show summary quantities of dog food ingredients identified as “specialty crop” category. Peas are the top ingredient under this category, with 67,489 tons used for dog foods, followed by sweet potatoes, with 35,735 tons, and dried beet pulp, with 34,994 tons.

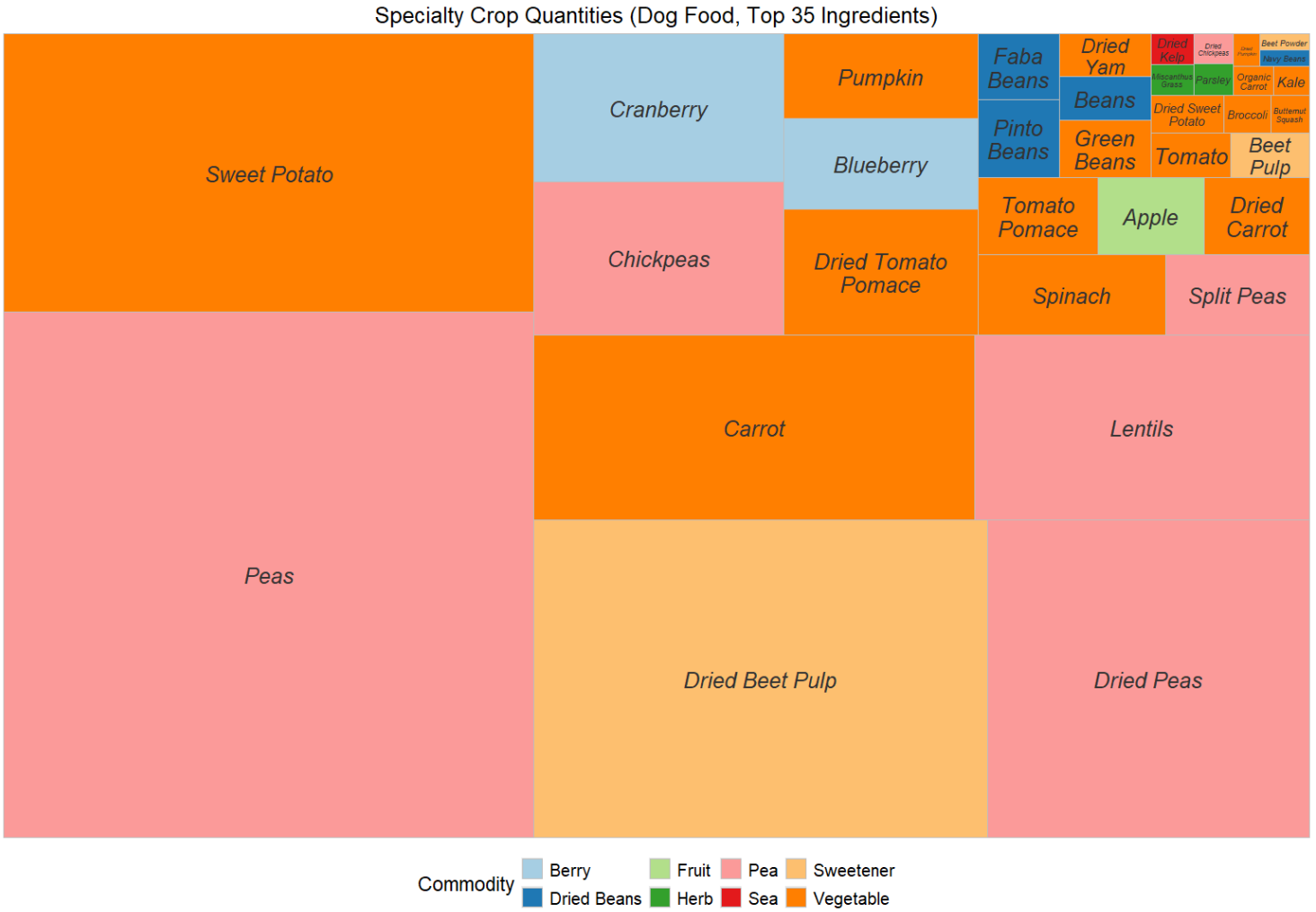

Figure 76. Specialty Crop Quantities (Dog Food, Top 35 Ingredients)

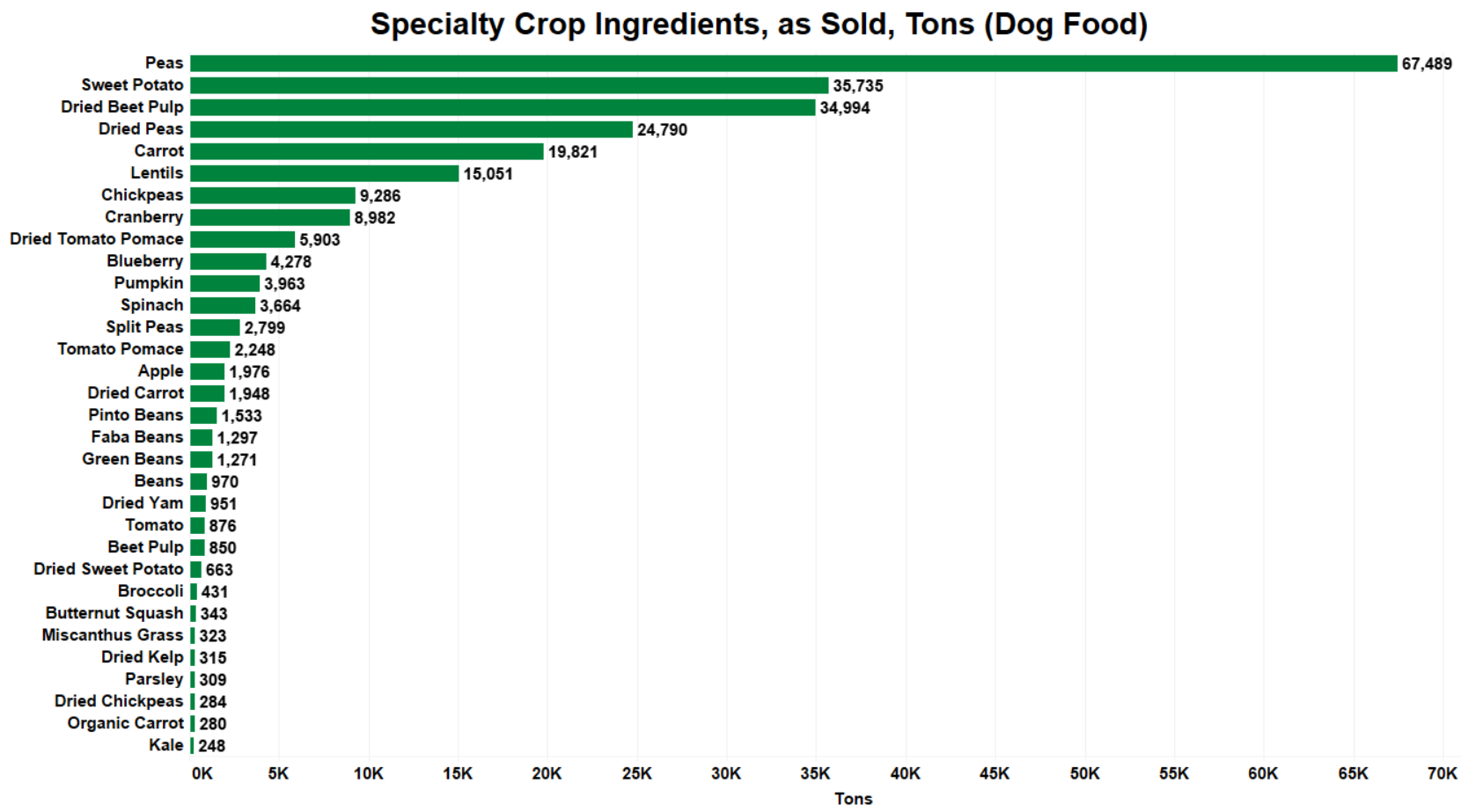

Figure 77. Specialty Crop Ingredients, as Sold, Tons (Dog Food)

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4 Appendix

4.1 Appendix A, Methodology

Methodology adopted to complete the related research falls into four categories; additional details for each follow:

1. Data acquisition.
2. Sales analysis.
3. Ingredient analysis.
4. Upstream volumes and values.

4.1.1 Data Acquisition

Nielsen was used to capture SKU/UPC level data in three sales channels for sales of cat and dog foods nationally, Total US Pet Retail, AOC (all other channels), and Amazon 1P, for the 52 weeks immediately prior to purchase (July 2024; "2024 data"). Many aspects of the sales were provided, which allowed classification of the pet foods to take place. Details related to the data purchase are listed below.

4.1.2 Sales Analysis

With the rich dataset purchased from Nielsen, summary statistics were desired to better understand the overall pet food market. This analysis was best handled from a volume and value standpoint. Within the data are standardized units of measure for volumes (weight) and value ($). Due to how the data was provided by Nielsen, results can be summarized in several ways. Because it offers the most insight into characteristics related to sales, DIS chose to present results here according to "sub-category." Other ways in which data could be summarized include:

- Brand.
- Flavor.
- Product size.
- Protein presence.
- Target group.
- Presence of a veterinarian claim.
- Presence of an organic claim.
- Form (bits, chunks, kibble, etc.).
- Value ($), current, year ago and % change.
- Volume, current year ago and % change.
- Units, current year ago and % change.
- Average unit price.

4.1.2.1 Volume

The following steps were taken to determine the volume of cat and dog foods:

1. Combined all data from all three sales channels
    a. Total US Pet Retail.
    b. AOC (all other channels).

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    c. Amazon 1P.
2. Summarize data using standardized (by package sizes and weight) volumetric measure ("EQ Volume")
3. Summarize by key variables, such as
    a. Brand.
    b. Flavor.
    c. Subcategory (wet, dry, etc.).
    d. Product size.
    e. Protein presence.
    f. Target group.
    g. Veterinarian claim.
    h. Organic claim.
    i. Form (bits, chunks, kibble, etc.).
    j. Volume, current year ago and % change.
    k. Units, current year ago and % change.
    l. Average unit price.
4. Create tables and charts as appropriate.

4.1.2.2 Value

The following steps were taken to determine the value of cat and dog foods:

1. Combined all data from all six sales channels.
2. Summarized data using standardized (by package sizes and weight) value measure ("$").
3. Summarized by key variables, such as
    a. Brand.
    b. Flavor.
    c. Subcategory (wet, dry, etc.).
    d. Product size.
    e. Protein presence.
    f. Target group.
    g. Veterinarian claim.
    h. Organic claim.
    i. Form (bits, chunks, kibble, etc.).
    j. Value ($), current, year ago and % change.
    k. Average unit price.
4. Created tables and charts as appropriate.

4.1.3 Ingredient Analysis

The most important component of this project was the development of a methodology to calculate 'as sold' ingredient weights and quantities for all cat and dog food products contained in the purchased Nielsen data. This was accomplished by taking the following summarized steps; additional detail for the most critical portion (recipe reverse engineering) of methodology follows:

1. By species (cat and dog), combined all sales channels within purchased Nielsen data and removed duplicates (by UPC and package size).
2. Determined which UPC codes represented 95% (by volume) for cat and dog foods.

3. Conducted online research for each product to obtain the corresponding ingredient panel, guaranteed analysis and calorie information.
4. Identified the products labeled as "private label," defined by the original Nielsen data, to find approximate matches to non-private label products. This was done using the following variables, also defined by the Nielsen data, in descending order of importance:
    a. Species: cat or dog.
    b. Food types: dry food, wet food and treat.
    c. Target group ages.
    d. Protein presence claim.
    e. Strategic ingredient presence claim.
    f. Organic claim.
    g. Veterinarian claim.
    h. Form.
5. Extracted all the ingredients from pet food ingredient panels, refined (standardized) ingredient names, assigned corresponding ingredient panel placement position and summarized the total frequency of each refined ingredient.
6. Obtained a prioritized ingredient list from research funding organizations.
7. Categorized/aggregated the prioritized ingredients into nutrient groups, such as animal protein, animal fat, plant protein, plant carbohydrate, etc.
8. Completed the pet food recipe reverse engineering:
    a. Created a database for all standardized ingredients, including their nutrient facts and national level annual average prices.
    b. Based on the database, applied recipe reverse engineering techniques on sampled products.
        - Sampled products were randomly selected by species, food categories (seven for cat foods and nine for dog foods) and dominant ingredients.
    c. Applied the distributions for the ingredient inclusion rates based on the corresponding placement in non-sampled products.
9. Combined estimated ingredient inclusion rates from Step 8 for all standardized ingredients, with the sales data from Nielsen, to calculate quantities of each standardized ingredient for a given pet food product.
10. By UPC, factored up total volumes by percent coverage within Nielsen data.
11. Summarized the total quantities for standardized ingredients and constructed data files, plots and other visualization tools.

4.1.3.1 Recipe Reverse Engineering

To estimate the quantities of food ingredients 'as sold' for all pet food products, DIS's recipe reverse engineering program was applied. The methodology behind this program is as follows:

1. Achieved all the guaranteed analysis and calories by using the ingredients shown on the ingredient panel for a given food product.
2. At the same time, maintained a relative low-cost level for the formulation while maintaining ingredient panel order.

Due to time limitations, applying the recipe reverse engineering on all the pet food products was not feasible. Therefore, a statistical methodology was developed to apply the recipe reverse engineering on

representative samples to determine "prevalence distributions" for ingredient placements and ingredients. These sampled result distributions were then applied to non-sampled products. To be more accurate, random samples were selected under **subsegments**, depending on different scenarios:

1. Food categories, defined by Nielsen data:
   a. For cat food products, three categories were considered: dry food, wet food and treats.
   b. For dog food products, 10 categories were considered: dry food, wet food, moist food, biscuit, dental, frozen, jerky, rawhide, refrigerated and soft treat.
2. Dominant ingredients, in this case, the first three ingredients were called the dominant ingredients:
   a. Within each food category, classified subgroups based on the first ingredients, chicken, beef, grains, broth, etc.
   b. For each subgroup, determined and categorized **subsegments** according to the combinations and relationships of the three dominant ingredients.

Therefore, **52 subsegments** for cat food products and **74 subsegments** for dog food products were established. Within each **subsegment**, representative sample(s) were randomly selected. Overall, there were 499 samples (approximately 37% of the 1,342 unique cat food products) for cat food products and 1,242 sampled products (approximately 38% of the 3,297 unique dog food products) for dog foods.

To have a good understanding of pet food ingredients, some associated ingredients were combined, and names were standardized. For example, "apple" and "apples," "beefhide" and "beef hide," and "soybean oil" and "soy oil," etc. Thus, 602 standardized food ingredients were finalized for this study.

To have a clearer view of the ingredient quantities in the summary plots, one more aggregation step on the ingredient name was completed. For instance, all livers, hearts and lungs were classified as "organ meat;" and all other animal-related food ingredients with less than 10 occurrences were combined, such as "other animal byproducts." This aggregation was done after the recipe reverse engineering to avoid miscalculation, for a given pet food product.

4.1.4 Upstream Volumes and Values

The first step in quantifying upstream quantities was to adjust ingredient quantities that were determined on an 'as sold' basis for moisture content. For example, the average moisture content of dry dog food is approximately 10% moisture. Ingredients, such as grains and meats, are purchased at higher moisture contents than the finished product, so ingredient quantities 'as bought' need to be adjusted for the moisture that is removed in the process of making the finished pet food product. This was done using the following steps:

1. Identified types of pet food products in need of moisture content adjustment:
   - Dry dog food.
   - Dog treats.
   - Dry cat food.
   - Cat treats.
   - No ingredient quantity adjustments due to moisture characteristics were applied to ingredients used in moist or wet dog food or wet cat food.
2. Average moisture content of the finished products used for this adjustment were:
   - Dry dog food (10%).

- Dog treats (15%).
- Dry cat food (10%).
- Cat treats (15%).

3. Using moisture content of the major ingredients that were developed as part of the ingredient analysis database in "Ingredient Analysis" Step 8.a., the quantity of raw ingredients was adjusted for the dry pet food products by the formula:

$$\frac{(\text{As Sold Ingredient Amount} * (1 - \text{Moisture of Pet Food}))}{(1 - \text{Moisture of the Raw Ingredient})}$$

4. Estimated prices of raw ingredients. Prices were collected from a variety of sources including:
   - USDA - AMS Market News
   - USDA NASS Crop Values 2023 Summary
   - USDA 2023 Poultry Production and Value Summary
   - USDA Market News - Fruits and Vegetables
   - USDA Market News - Dairy
   - FeedStuffs - Grains and Ingredients
   - FeedStuffs - Livestock and Poultry
   - University of Missouri AgEBB By-Products
   - FeedForLess.com
   - Alibaba.com Feed Products
5. Prices were converted to $/cwt and then to $/ton.
6. Determined the value of adjusted raw material ingredient amounts.
   - Adjusted raw ingredient amounts (in tons) were multiplied times the price ($/ton)
7. Categorized the standardized 602 ingredients from ingredient analysis step into seven sub-categories and into groups within the sub-categories:
   - Animal protein meals and fats: animal meals, poultry meals, animal fats and poultry fats.
   - Meat and poultry products: fresh, frozen, dried and dehydrated meats and poultry, and other animal products and organs.
   - Farm or mill-based ingredients: first-level aggregation categories: dairy and egg, fruit and vegetable, lentils and beans, millfeed, nut and root, soy products, sweetener, vegetable oil and whole grain.
     - A second-level aggregation was also used for 336 farm or mill-based ingredients. The aggregation categories for this level were: alfalfa, barley, berry, corn, dairy, dried beans, egg, fruit, herb, Mediterranean, minor oilseed, nut, oats, other, other grain, pea and lentil, peanut, potato, rice, root, soybean, sweetener, tropical (palm and coconut), vegetable and wheat.
   - Marine products: sea products, seafood and fish meals.
   - Water.
   - Broth.
8. Estimated aggregated tonnage and value for each of the seven sub-categories.
9. Estimates of state-level "as-bought" ingredients were calculated based on each state's share of direct output from pet food manufacturing sales (from the 2023 IMPLAN data analysis) multiplied times the U.S. total ingredient purchases as factored up to U.S. totals. The **average pet**

food ingredients purchased (tons) was calculated by dividing the state's **total pet food ingredients purchased** by the number of **pet food manufacturing facilities** in each state.

10. The **average value of pet food ingredients purchased (dollars)** was calculated by dividing **total value of pet food ingredients purchased (dollars)** by the number of **pet food manufacturing facilities** in each state.
11. State-level factors were calculated for **indirect output based on ingredient purchases** by dividing indirect output estimates from the 2023 IMPLAN dataset by the direct output for dog and cat manufacturing from the 2023 IMPLAN data. This factor was then multiplied against each state's share of **total value of pet food ingredients purchased** to estimate the state's level of **indirect output based on ingredient purchases.**
12. **Indirect value added based on ingredient purchases** is a measure of the value that is added to farm and commodity handling inputs as those ingredients are sold to pet food manufacturers. This variable was calculated by dividing the estimate of indirect value added for each state from the 2023 IMPLAN derived dataset by direct output and then multiplying that factor time each state's **total value of pet food ingredients purchased**.
13. **Average indirect output per mill based on ingredient purchases** was calculated by dividing each state's total **indirect output based on ingredient purchases** by the number of **pet food manufacturing facilities** in each state.
14. **Average direct value added per mill based on ingredient purchases** was calculated by dividing each state's total **direct value added based on ingredient purchases** by the number of **pet food manufacturing facilities** in each state.

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4.2 Appendix B, Ingredient List and Aggregation Schemes Used in Analysis

Results for this analysis have been summarized into five primary aggregations, as further defined in Sections 5.2.1-5.2.5:

- Broth Ingredients.
- Animal Protein Meals and Fats Ingredients.
- Marine Ingredients.
- Meat and Poultry Product Ingredients.
- Farm or Mill-based Ingredients.

4.2.1 Broth Ingredients

Broth Ingredients				
Ingredient	**Product Type**	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**
Bacon Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Beef Bone Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Beef Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Chicken Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Dried Beef Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Dried Vegetable Broth	Broth	Broth	Upcycled Ingredient	Plant Protein
Duck Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Fish Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Lamb Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Meat Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Organic Chicken Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Pork Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Poultry Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Tuna Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Turkey Broth	Broth	Broth	Upcycled Ingredient	Animal Protein
Vegetable Broth	Broth	Broth	Upcycled Ingredient	Plant Protein
Venison Broth	Broth	Broth	Upcycled Ingredient	Animal Protein

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4.2.2 Animal Protein Meals and Fat Ingredients

Animal Protein Meals & Fat Ingredients				
Ingredient	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Species**
Animal Fat	Animal Fat	Upcycled Ingredient	Animal Fat	Beef/Pork
Bacon Fat	Animal Fat	Upcycled Ingredient	Animal Fat	Pork
Beef Fat	Animal Fat	Upcycled Ingredient	Animal Fat	Beef
Beef Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Beef
Bison Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Beef
Blood Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Beef/Pork
Bone Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Beef
Buffalo Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Beef
Chicken Byproduct Meal	Poultry Meal	Upcycled Ingredient	Animal Protein	Chicken
Chicken Fat	Poultry Fat	Upcycled Ingredient	Animal Fat	Chicken
Chicken Meal	Poultry Meal	Upcycled Ingredient	Animal Protein	Chicken
Dried Black Soldier Fly Larvae	Animal Meal	Other Ingredient	Animal Protein	Other Animal
Duck Fat	Poultry Fat	Upcycled Ingredient	Animal Fat	Duck
Duck Meal	Poultry Meal	Upcycled Ingredient	Animal Protein	Duck
Goat Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Other Animal
Kangaroo Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Other Animal
Lamb Fat	Animal Fat	Upcycled Ingredient	Animal Fat	Other Animal
Lamb Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Other Animal
Liver Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Beef
Meat & Bone Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Beef
Meat Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Beef
Organic Chicken Fat	Poultry Fat	Upcycled Ingredient	Animal Fat	Chicken
Organic Chicken Meal	Poultry Meal	Upcycled Ingredient	Animal Protein	Chicken
Pork Fat	Animal Fat	Upcycled Ingredient	Animal Fat	Pork
Pork Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Pork
Poultry Byproduct Meal	Poultry Meal	Upcycled Ingredient	Animal Protein	Chicken
Poultry Fat	Poultry Fat	Upcycled Ingredient	Animal Fat	Chicken
Poultry Meal	Poultry Meal	Upcycled Ingredient	Animal Protein	Chicken
Rabbit Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Other Animal
Turkey Byproduct Meal	Poultry Meal	Upcycled Ingredient	Animal Protein	Turkey
Turkey Fat	Poultry Fat	Upcycled Ingredient	Animal Fat	Turkey
Turkey Meal	Poultry Meal	Upcycled Ingredient	Animal Protein	Turkey
Venison Meal	Animal Meal	Upcycled Ingredient	Animal Protein	Other Animal

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4.2.3 Marine Product Ingredients

Marine Product Ingredients				
Ingredient	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Sea Sub-Categories**
Algae	Sea	Other Ingredient	Plant Protein	Other Fish & Sea Products
Algae Meal	Sea	Upcycled Ingredient	Plant Protein	Other Fish & Sea Products
Algae Oil	Sea	Other Ingredient	Plant Fat	Fish Oil
Anchovy	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Arctic Char	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Catfish	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Catfish Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Cod	Seafood	Other Ingredient	Animal Protein	Cod
Cod Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Crab	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Crab Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Crab Meat	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Dried Algae	Sea	Other Ingredient	Animal Protein	Other Fish & Sea Products
Dried Cod	Seafood	Other Ingredient	Animal Protein	Cod
Dried Cod Liver	Seafood	Upcycled Ingredient	Animal Protein	Cod
Dried Herring	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Dried Kelp	Sea	Other Ingredient	Specialty Crop	Other Fish & Sea Products
Dried Kelp Meal	Sea	Upcycled Ingredient	Plant Protein	Other Fish & Sea Products
Dried Mackerel	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Dried Organic Kelp	Sea	Other Ingredient	Specialty Crop	Other Fish & Sea Products
Dried Organic Seaweed Meal	Sea	Upcycled Ingredient	Specialty Crop	Other Fish & Sea Products
Dried Pollock	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Dried Salmon	Seafood	Other Ingredient	Animal Protein	Salmon
Dried Sardine	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Dried Seaweed Meal	Sea	Upcycled Ingredient	Plant Protein	Other Fish & Sea Products
Fish	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Fish Oil	Seafood	Other Ingredient	Animal Fat	Fish Oil
Flounder	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Haddock	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Hake	Seafood	Other Ingredient	Animal Protein	Whitefish
Halibut	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Herring	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Herring Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Kelp	Sea	Other Ingredient	Specialty Crop	Other Fish & Sea Products
Kelp Meal	Sea	Upcycled Ingredient	Plant Protein	Other Fish & Sea Products
Mackerel	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Mackerel Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Manhaden Fish	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Menhaden Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Minnows	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Monkfish	Seafood	Other Ingredient	Animal Protein	Whitefish
Mussel	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Ocean Fish	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Organic Kelp	Sea	Other Ingredient	Specialty Crop	Other Fish & Sea Products
Oyster Shell	Sea	Upcycled Ingredient	Animal Protein	Other Fish & Sea Products

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Marine Product Ingredients				
Ingredient	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Sea Sub-Categories**
Perch	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Pilchard	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Pollock	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Pollock Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Pollock Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Redfish	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Salmon	Seafood	Other Ingredient	Animal Protein	Salmon
Salmon Byproducts	Seafood	Upcycled Ingredient	Animal Protein	Salmon
Salmon Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Sardine	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Sardine Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Scallop	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Seaweed	Sea	Other Ingredient	Specialty Crop	Other Fish & Sea Products
Shrimp	Seafood	Other Ingredient	Animal Protein	Shrimp
Shrimp Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Silver Hake	Seafood	Other Ingredient	Animal Protein	Whitefish
Sole	Seafood	Other Ingredient	Animal Protein	Whitefish
Trout	Seafood	Other Ingredient	Animal Protein	Other Fish & Sea Products
Trout Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Tuna	Seafood	Other Ingredient	Animal Protein	Tuna
Tuna Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
White Fish Meal	Fish Meal	Upcycled Ingredient	Animal Protein	Fish Meal
Whitefish	Seafood	Other Ingredient	Animal Protein	Whitefish

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4.2.4 Meat and Poultry Product Ingredients

Meat & Poultry Product Ingredients				
Ingredient	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Species**
Animal Byproducts	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef/Pork
Animal Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef/Pork
Animal Plasma	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef/Pork
Bacon	Meat & Poultry	Other Ingredient	Animal Protein	Pork
Beef	Meat & Poultry	Other Ingredient	Animal Protein	Beef
Beef Bone	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Byproducts	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Cartilage	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Ear	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Esophagus	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Gullet	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Hide	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Kidney	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Lung	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Pizzle	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Skin	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Spleen	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Stomach	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Trachea	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Tripe	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef Weas	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Beef with Ground Bone	Meat & Poultry	Upcycled Ingredient	Animal Protein	Beef
Bison	Meat & Poultry	Other Ingredient	Animal Protein	Beef
Boar	Meat & Poultry	Other Ingredient	Animal Protein	Pork
Boar Cartilage	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Boar Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Boar Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Buffalo	Meat & Poultry	Other Ingredient	Animal Protein	Beef
Buffalo Marrow Bone	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Chicken	Meat & Poultry	Other Ingredient	Animal Protein	Chicken
Chicken Back	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken Breast	Meat & Poultry	Other Ingredient	Animal Protein	Chicken
Chicken Byproducts	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken Cartilage	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken Feet	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken Giblet	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken Gizzard	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken Kidney	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken Necks	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Chicken with Ground Bone	Meat & Poultry	Upcycled Ingredient	Animal Protein	Chicken
Cooked Bone Marrow	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef

Meat & Poultry Product Ingredients				
Ingredient	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Species**
Dried Beef	Meat & Poultry	Other Ingredient	Animal Protein	Beef
Dried Beef Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Dried Beef Kidney	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Dried Beef Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Dried Beef Spleen	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Dried Beef Tripe	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Dried Boar	Meat & Poultry	Other Ingredient	Animal Protein	Pork
Dried Chicken	Meat & Poultry	Other Ingredient	Animal Protein	Chicken
Dried Chicken Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Dried Chicken Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Dried Duck	Meat & Poultry	Other Ingredient	Animal Protein	Duck
Dried Duck Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Duck
Dried Goat	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Dried Lamb	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Dried Lamb Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Dried Lamb Kidney	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Dried Lamb Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Dried Lamb Spleen	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Dried Lamb Tripe	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Dried Meat Byproducts	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Dried Pork	Meat & Poultry	Other Ingredient	Animal Protein	Pork
Dried Pork Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Dried Poultry Byproducts	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Dried Rabbit	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Dried Turkey	Meat & Poultry	Other Ingredient	Animal Protein	Turkey
Dried Turkey Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Dried Turkey Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Dried Venison	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Duck	Meat & Poultry	Other Ingredient	Animal Protein	Duck
Duck Cartilage	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Duck
Duck Feet	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Duck
Duck Gizzard	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Duck
Duck Head	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Duck
Duck Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Duck
Duck Necks	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Duck
Duck with Ground Bone	Meat & Poultry	Upcycled Ingredient	Animal Protein	Duck
Elk	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Goat	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Goose	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Ground Beef Bone	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Ground Chicken Bone	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Ground Lamb Bone	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Ground Pork Bone	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Ground Turkey Bone	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Guineafowl	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal

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Meat & Poultry Product Ingredients				
Ingredient	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Species**
Ham	Meat & Poultry	Other Ingredient	Animal Protein	Pork
Hydrolyzed Pork	Meat & Poultry	Other Ingredient	Animal Protein	Pork
Hydrolyzed Poultry Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Kangaroo	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Lamb	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Lamb Bone	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Lamb Cartilage	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Lamb Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Lamb Kidney	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Lamb Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Lamb Lung	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Lamb Spleen	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Lamb Tripe	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Meat	Meat & Poultry	Other Ingredient	Animal Protein	Beef
Meat Byproducts	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Organic Chicken	Meat & Poultry	Other Ingredient	Animal Protein	Chicken
Organic Chicken Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Organic Turkey	Meat & Poultry	Other Ingredient	Animal Protein	Turkey
Pheasant	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Pig Ear	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pig Skin	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pig Snout	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork	Meat & Poultry	Other Ingredient	Animal Protein	Pork
Pork Bone	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Byproducts	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Collagen	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Ear	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Hide	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Kidney	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Lung	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Plasma	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Skin	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork Spleen	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Pork
Pork with Ground Bone	Meat & Poultry	Upcycled Ingredient	Animal Protein	Pork
Poultry	Meat & Poultry	Other Ingredient	Animal Protein	Chicken
Poultry Byproducts	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Poultry Giblet	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Poultry Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Poultry Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Chicken
Quail	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal

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Meat & Poultry Product Ingredients				
Ingredient	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Species**
Rabbit	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Rabbit Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Rabbit Kidney	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Rabbit Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Rabbit Lung	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal
Rawhide	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Beef
Steak	Meat & Poultry	Other Ingredient	Animal Protein	Beef
Turkey	Meat & Poultry	Other Ingredient	Animal Protein	Turkey
Turkey Byproducts	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Turkey Cartilage	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Turkey Giblet	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Turkey Gizzard	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Turkey Heart	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Turkey Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Turkey Necks	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Turkey
Venison	Meat & Poultry	Other Ingredient	Animal Protein	Other Animal
Venison Liver	Other Animal Products & Organs	Upcycled Ingredient	Animal Protein	Other Animal

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4.2.5 Farm or Mill-based Ingredients

Farm or Mill-based Ingredients					
Ingredient	**Farm & Mill-based Sub**	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Commodity Aggregation**
Alfalfa	Millfeed	Alfalfa	Other Ingredient	Plant Protein	Forage
Alfalfa Meal	Millfeed	Alfalfa	Upcycled Ingredient	Plant Protein	Forage
Alfalfa Pellets	Millfeed	Alfalfa	Upcycled Ingredient	Plant Protein	Forage
Alfalfa Sprouts	Fruit & Vegetable	Alfalfa	Other Ingredient	Plant Protein	Forage
Almond Oil	Vegetable Oil	Nut	Other Ingredient	Plant Fat	Plant Oil
Almonds	Nut & Root	Nut	Other Ingredient	Specialty Crop	Tree
Althea Root	Nut & Root	Root	Other Ingredient	Plant Carb	Root
Annatto	Nut & Root	Root	Other Ingredient	Plant Carb	Specialty
Apple	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Apple Pomace	Fruit & Vegetable	Fruit	Upcycled Ingredient	Specialty Crop	Specialty
Artichoke	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Ashwag&ha	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Avocado	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Avocado Oil	Vegetable Oil	Fruit	Other Ingredient	Plant Fat	Specialty
Banana	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Banana Powder	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Barley	Whole Grain	Barley	Other Ingredient	Plant Carb	Grain
Barley Flour	Millfeed	Barley	Upcycled Ingredient	Plant Carb	Milled Grain
Barley Grass	Millfeed	Barley	Other Ingredient	Specialty Crop	Milled Grain
Barley Malt Syrup	Millfeed	Barley	Upcycled Ingredient	Plant Carb	Milled Grain
Basil	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Beans	Lentils & Beans	Dried Beans	Other Ingredient	Specialty Crop	Specialty
Beet Greens	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Beet Powder	Fruit & Vegetable	Sweetener	Upcycled Ingredient	Specialty Crop	Specialty
Beet Pulp	Fruit & Vegetable	Sweetener	Upcycled Ingredient	Specialty Crop	Specialty
Blackberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Blueberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Bok Choy	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Brewers Rice	Millfeed	Rice	Upcycled Ingredient	Plant Carb	Milled Grain
Brewers Rice Flour	Millfeed	Rice	Upcycled Ingredient	Plant Carb	Milled Grain
Broccoli	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Brown Rice	Whole Grain	Rice	Other Ingredient	Plant Carb	Grain
Brown Rice Flour	Millfeed	Rice	Upcycled Ingredient	Plant Carb	Milled Grain
Brown Sugar	Sweetener	Sweetener	Other Ingredient	Plant Carb	Specialty
Brussels Sprouts	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Buckwheat	Whole Grain	Wheat	Other Ingredient	Plant Carb	Grain
Burdock Root	Nut & Root	Root	Other Ingredient	Plant Carb	Specialty
Butter Oil	Dairy & Egg	Dairy	Upcycled Ingredient	Animal Fat	Dairy
Butternut Squash	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Cabbage	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Canola Meal	Millfeed	Minor Oilseed	Upcycled Ingredient	Plant Protein	Milled Grain
Canola Oil	Vegetable Oil	Minor Oilseed	Other Ingredient	Plant Fat	Milled Grain
Cantaloupe	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Carrot	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Cassava Root Flour	Nut & Root	Root	Upcycled Ingredient	Plant Carb	Specialty

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Farm or Mill-based Ingredients					
Ingredient	**Farm & Mill-based Sub**	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Commodity Aggregation**
Cauliflower	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Celery	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Cheddar Cheese	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Cheese	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Cherry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Chia Seed	Whole Grain	Other Grain	Other Ingredient	Plant Protein	Specialty
Chickpea Flour	Millfeed	Pea	Upcycled Ingredient	Plant Protein	Milled Grain
Chickpeas	Whole Grain	Pea	Other Ingredient	Specialty Crop	Milled Grain
Chicory Root	Nut & Root	Root	Other Ingredient	Plant Carb	Specialty
Coconut	Nut & Root	Fruit	Other Ingredient	Plant Fat	Tropical
Coconut Flour	Millfeed	Fruit	Upcycled Ingredient	Plant Carb	Tropical
Coconut Meal	Millfeed	Fruit	Upcycled Ingredient	Plant Protein	Tropical
Coconut Oil	Vegetable Oil	Fruit	Other Ingredient	Plant Fat	Tropical
Collard Greens	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Corn	Whole Grain	Corn	Other Ingredient	Plant Carb	Grain
Corn Distillers Dried Grains	Millfeed	Corn	Upcycled Ingredient	Plant Protein	Milled Grain
Corn Flour	Millfeed	Corn	Upcycled Ingredient	Plant Carb	Milled Grain
Corn Germ Meal	Millfeed	Corn	Upcycled Ingredient	Plant Protein	Milled Grain
Corn Protein Feed	Millfeed	Corn	Upcycled Ingredient	Plant Carb	Milled Grain
Corn Protein Meal	Millfeed	Corn	Upcycled Ingredient	Plant Protein	Milled Grain
Corn Grits	Millfeed	Corn	Upcycled Ingredient	Plant Carb	Milled Grain
Corn Meal	Millfeed	Corn	Upcycled Ingredient	Plant Protein	Milled Grain
Corn Oil	Vegetable Oil	Corn	Other Ingredient	Plant Fat	Milled Grain
Corn Starch	Millfeed	Corn	Upcycled Ingredient	Plant Carb	Milled Grain
Corn Syrup	Sweetener	Corn	Upcycled Ingredient	Plant Carb	Milled Grain
Cranberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Cream	Dairy & Egg	Dairy	Other Ingredient	Animal Fat	Dairy
D&elion Greens	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dehydrated Organic Honey	Sweetener	Sweetener	Other Ingredient	Plant Carb	Specialty
Dried Alfalfa	Millfeed	Alfalfa	Other Ingredient	Plant Protein	Forage
Dried Apple	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Dried Apple Pomace	Fruit & Vegetable	Fruit	Upcycled Ingredient	Specialty Crop	Specialty
Dried Apricot	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Dried Artichoke	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Banana	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Dried Beet Pulp	Fruit & Vegetable	Sweetener	Upcycled Ingredient	Specialty Crop	Specialty
Dried Beets	Fruit & Vegetable	Sweetener	Other Ingredient	Specialty Crop	Specialty
Dried Blueberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Dried Blueberry Pomace	Fruit & Vegetable	Berry	Upcycled Ingredient	Specialty Crop	Specialty
Dried Broccoli	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Cabbage	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Cane Syrup	Sweetener	Sweetener	Upcycled Ingredient	Plant Carb	Specialty
Dried Carrot	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Catnip	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Celery	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Cheddar Cheese	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Dried Cheese	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Dried Cherry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Dried Chickpeas	Lentils & Beans	Pea	Other Ingredient	Specialty Crop	Specialty
Dried Chicory Root	Nut & Root	Root	Other Ingredient	Plant Carb	Specialty
Dried Citrus Pulp	Millfeed	Fruit	Upcycled Ingredient	Specialty Crop	Specialty
Dried Coconut	Nut & Root	Fruit	Other Ingredient	Plant Fat	Specialty
Dried Corn Syrup	Sweetener	Corn	Upcycled Ingredient	Plant Carb	Milled Grain

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Farm or Mill-based Ingredients					
Ingredient	**Farm & Mill-based Sub**	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Commodity Aggregation**
Dried Cranberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Dried Cultured Milk	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Dried Cultured Skim Milk	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Dried D&elion	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Dried Egg	Dairy & Egg	Egg	Other Ingredient	Animal Protein	Egg
Dried Egg Product	Dairy & Egg	Egg	Other Ingredient	Animal Protein	Egg
Dried Egg White	Dairy & Egg	Egg	Other Ingredient	Animal Protein	Egg
Dried Green Beans	Fruit & Vegetable	Dried Beans	Other Ingredient	Specialty Crop	Specialty
Dried Honey	Sweetener	Sweetener	Other Ingredient	Plant Carb	Specialty
Dried Kale	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Lentils	Lentils & Beans	Pea	Other Ingredient	Specialty Crop	Lentil
Dried Lettuce	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Maple Syrup	Sweetener	Sweetener	Upcycled Ingredient	Plant Carb	Specialty
Dried Milk	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Dried Milk Protein	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Dried Mushroom	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Organic Coconut	Nut & Root	Fruit	Other Ingredient	Plant Fat	Specialty
Dried Papayas	Nut & Root	Fruit	Other Ingredient	Specialty Crop	Specialty
Dried Parsley	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Dried Peas	Lentils & Beans	Pea	Other Ingredient	Specialty Crop	Lentil
Dried Pomegranate	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Dried Potato	Nut & Root	Potato	Other Ingredient	Plant Carb	Potato
Dried Potato Product	Nut & Root	Potato	Upcycled Ingredient	Plant Carb	Potato
Dried Pumpkin	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Sage	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Dried Skim Milk	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Dried Spearmint	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Spinach	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Sweet Orange	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Dried Sweet Potato	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Swiss Cheese	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Dried Tapioca Syrup	Fruit & Vegetable	Root	Upcycled Ingredient	Plant Carb	Specialty
Dried Tomato	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Tomato Pomace	Fruit & Vegetable	Vegetable	Upcycled Ingredient	Specialty Crop	Specialty
Dried Tomato Puree	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Vegetable	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Watercress	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Yam	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Dried Yogurt	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Egg	Dairy & Egg	Egg	Other Ingredient	Animal Protein	Egg
Egg Powder	Dairy & Egg	Egg	Other Ingredient	Animal Protein	Egg
Egg Product	Dairy & Egg	Egg	Other Ingredient	Animal Protein	Egg
Egg Shell	Dairy & Egg	Egg	Upcycled Ingredient	Animal Protein	Egg
Egg White	Dairy & Egg	Egg	Other Ingredient	Animal Protein	Egg
Faba Beans	Lentils & Beans	Dried Beans	Other Ingredient	Specialty Crop	Specialty
Fava Beans	Lentils & Beans	Dried Beans	Other Ingredient	Specialty Crop	Specialty
Fenugreek	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Flaxseed	Whole Grain	Minor Oilseed	Other Ingredient	Plant Fat & Carb	Grain
Flaxseed Meal	Millfeed	Minor Oilseed	Upcycled Ingredient	Plant Protein	Milled Grain
Flaxseed Oil	Vegetable Oil	Minor Oilseed	Other Ingredient	Plant Fat	Milled Grain

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Farm or Mill-based Ingredients					
Ingredient	**Farm & Mill-based Sub**	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Commodity Aggregation**
Garbanzo Beans	Lentils & Beans	Dried Beans	Other Ingredient	Plant Protein	Lentil
Gla Safflower Oil	Vegetable Oil	Minor Oilseed	Other Ingredient	Plant Fat	Specialty
Goat Milk	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Other Animal
Green Beans	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Ground Pecan Shells	Nut & Root	Nut	Upcycled Ingredient	Plant Protein	Specialty
High Fructose Corn Syrup	Sweetener	Corn	Upcycled Ingredient	Plant Carb	Milled Grain
Hominy Feed	Millfeed	Corn	Upcycled Ingredient	Plant Carb	Milled Grain
Honey	Sweetener	Sweetener	Other Ingredient	Plant Carb	Specialty
Juniper Berry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Kale	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Lentil Flour	Lentils & Beans	Pea	Upcycled Ingredient	Plant Protein	Lentil
Lentils	Lentils & Beans	Pea	Other Ingredient	Specialty Crop	Lentil
Lettuce	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Lima Beans	Lentils & Beans	Dried Beans	Other Ingredient	Specialty Crop	Specialty
Malted Barley Flour	Millfeed	Barley	Upcycled Ingredient	Plant Carb	Milled Grain
Mango	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Maple Syrup	Sweetener	Sweetener	Upcycled Ingredient	Plant Carb	Specialty
Milk	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Milk Powder	Dairy & Egg	Dairy	Upcycled Ingredient	Animal Protein	Dairy
Millet	Whole Grain	Other Grain	Other Ingredient	Plant Carb	Grain
Milo	Whole Grain	Other Grain	Other Ingredient	Plant Carb	Grain
Miscanthus Grass	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Molasses	Sweetener	Sweetener	Upcycled Ingredient	Plant Carb	Specialty
Mushroom	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Mustard Greens	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Navy Beans	Lentils & Beans	Dried Beans	Other Ingredient	Specialty Crop	Specialty
Nonfat Milk	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Oat Bran	Millfeed	Oats	Upcycled Ingredient	Plant Carb	Milled Grain
Oat Flour	Millfeed	Oats	Upcycled Ingredient	Plant Carb	Milled Grain
Oat Groats	Whole Grain	Oats	Upcycled Ingredient	Plant Carb	Grain
Oat Hulls	Millfeed	Oats	Upcycled Ingredient	Plant Protein	Milled Grain
Oatmeal	Millfeed	Oats	Upcycled Ingredient	Plant Protein	Milled Grain
Oats	Whole Grain	Oats	Other Ingredient	Plant Carb	Grain
Oil of Rosemary	Fruit & Vegetable	Herb	Other Ingredient	Plant Fat	Specialty
Olive Oil	Vegetable Oil	Mediterranean	Other Ingredient	Plant Fat	Specialty
Orange	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Organic Alfalfa	Millfeed	Alfalfa	Other Ingredient	Plant Protein	Forage
Organic Alfalfa Meal	Millfeed	Alfalfa	Upcycled Ingredient	Plant Protein	Forage
Organic Apple	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Organic Ashwag&ha	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Barley	Whole Grain	Barley	Other Ingredient	Plant Carb	Grain
Organic Barley Flour	Millfeed	Barley	Upcycled Ingredient	Plant Carb	Milled Grain
Organic Beets	Fruit & Vegetable	Sweetener	Other Ingredient	Specialty Crop	Specialty
Organic Bilberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Organic Blueberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Organic Broccoli	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Butternut Squash	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Carrot	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Celery	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Chamomile	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty

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Farm or Mill-based Ingredients					
Ingredient	**Farm & Mill-based Sub**	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Commodity Aggregation**
Organic Chickpeas	Lentils & Beans	Pea	Other Ingredient	Specialty Crop	Lentil
Organic Cilantro	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Coconut Oil	Vegetable Oil	Fruit	Other Ingredient	Plant Fat	Specialty
Organic Collard Greens	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Cranberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Organic Egg	Dairy & Egg	Egg	Other Ingredient	Animal Protein	Egg
Organic Flaxseed	Whole Grain	Minor Oilseed	Other Ingredient	Plant Fat & Carb	Specialty
Organic Goji Berries	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Organic Kale	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Millet	Whole Grain	Other Grain	Other Ingredient	Plant Carb	Grain
Organic Molasses	Sweetener	Sweetener	Upcycled Ingredient	Plant Carb	Specialty
Organic Mushroom	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Oats	Whole Grain	Oats	Upcycled Ingredient	Plant Carb	Grain
Organic Papaya	Nut & Root	Fruit	Other Ingredient	Specialty Crop	Specialty
Organic Parsley	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Organic Passionflower	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Organic Peas	Lentils & Beans	Pea	Other Ingredient	Specialty Crop	Lentil
Organic Pineapple	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Organic Pomegranate	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Organic Pumpkin	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Pumpkin Seeds	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Quinoa	Whole Grain	Other Grain	Other Ingredient	Plant Carb	Grain
Organic Spinach	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Squash	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Sugar	Sweetener	Sweetener	Other Ingredient	Plant Carb	Specialty
Organic Sunflower Oil	Vegetable Oil	Minor Oilseed	Other Ingredient	Plant Fat	Milled Grain
Organic Sunflower Seed Meal	Millfeed	Minor Oilseed	Upcycled Ingredient	Plant Protein	Milled Grain
Organic Sunflower Seeds	Whole Grain	Minor Oilseed	Other Ingredient	Plant Protein	Milled Grain
Organic Sweet Potato	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Organic Tapioca	Nut & Root	Root	Other Ingredient	Plant Carb	Specialty
Organic Tart Cherries	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Organic Vegetable Oil	Vegetable Oil	Soybean	Other Ingredient	Plant Fat	Milled Grain
Organic Wheat	Whole Grain	Wheat	Other Ingredient	Plant Carb	Grain
Organic Yam	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Palm Oil	Vegetable Oil	Minor Oilseed	Other Ingredient	Plant Fat	Milled Grain
Papaya	Nut & Root	Vegetable	Other Ingredient	Specialty Crop	Specialty
Parsley	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Parsley Flake	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Parsley Seed Oil	Vegetable Oil	Vegetable	Other Ingredient	Plant Fat	Specialty
Parsnip	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Pasta	Millfeed	Wheat	Upcycled Ingredient	Plant Carb	Specialty
Pea Flour	Millfeed	Pea	Upcycled Ingredient	Plant Protein	Lentil
Pea Starch	Millfeed	Pea	Upcycled Ingredient	Plant Carb	Lentil
Peanut Butter	Millfeed	Peanut	Other Ingredient	Plant Protein	Specialty
Peanut Flour	Millfeed	Peanut	Upcycled Ingredient	Plant Protein	Specialty
Peanut Hearts	Millfeed	Peanut	Other Ingredient	Plant Fat	Specialty
Peanut Meal	Millfeed	Peanut	Upcycled Ingredient	Plant Protein	Specialty
Peanut Oil	Vegetable Oil	Peanut	Other Ingredient	Plant Fat	Specialty
Peanuts	Whole Grain	Peanut	Other Ingredient	Plant Fat & Carb	Specialty
Pear	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty

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Farm or Mill-based Ingredients					
Ingredient	**Farm & Mill-based Sub**	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Commodity Aggregation**
Peas	Lentils & Beans	Pea	Other Ingredient	Specialty Crop	Lentil
Pecan Shells	Nut & Root	Nut	Upcycled Ingredient	Plant Protein	Specialty
Pepper	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Pineapple	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Pinto Beans	Lentils & Beans	Dried Beans	Other Ingredient	Specialty Crop	Specialty
Pomegranate	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Potato	Fruit & Vegetable	Potato	Other Ingredient	Plant Carb	potato
Potato Flour	Fruit & Vegetable	Potato	Upcycled Ingredient	Plant Carb	potato
Potato Starch	Fruit & Vegetable	Potato	Upcycled Ingredient	Plant Carb	potato
Psyllium Seed Husk	Fruit & Vegetable	Other Grain	Upcycled Ingredient	Plant Carb	Specialty
Pumpkin	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Pumpkin Puree	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Pumpkin Seed	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Pumpkin Seed Flour	Fruit & Vegetable	Vegetable	Upcycled Ingredient	Plant Carb	Specialty
Quail Egg	Dairy & Egg	Egg	Other Ingredient	Animal Protein	Egg
Quinoa	Whole Grain	Other Grain	Other Ingredient	Plant Carb	Grain
Quinoa Seed	Whole Grain	Other Grain	Other Ingredient	Plant Carb	Grain
Raspberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Red Bell Pepper	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Rice	Whole Grain	Rice	Other Ingredient	Plant Carb	Grain
Rice Bran	Millfeed	Rice	Upcycled Ingredient	Plant Protein	Milled Grain
Rice Flour	Millfeed	Rice	Upcycled Ingredient	Plant Carb	Milled Grain
Rice Hulls	Millfeed	Rice	Upcycled Ingredient	Plant Carb	Milled Grain
Rice Pasta	Millfeed	Rice	Upcycled Ingredient	Plant Carb	Milled Grain
Rice Starch	Millfeed	Rice	Upcycled Ingredient	Plant Carb	Milled Grain
Rice Syrup	Sweetener	Rice	Upcycled Ingredient	Plant Carb	Milled Grain
Rose Hip	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Rose Hips	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Rosemary	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Rye	Whole Grain	Other Grain	Other Ingredient	Plant Carb	Grain
Rye Flour	Millfeed	Other Grain	Upcycled Ingredient	Plant Carb	Milled Grain
Safflower Oil	Vegetable Oil	Minor Oilseed	Other Ingredient	Plant Fat	Milled Grain
Sage	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Saskatoon Berry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Sesame Seeds	Whole Grain	Minor Oilseed	Other Ingredient	Plant Fat & Carb	Specialty
Skim Milk	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Sorghum	Whole Grain	Other Grain	Other Ingredient	Plant Carb	Grain
Soy Flakes	Soy Products	Soybean	Upcycled Ingredient	Plant Protein	Milled Grain
Soy Flour	Soy Products	Soybean	Upcycled Ingredient	Plant Protein	Milled Grain
Soy Grits	Soy Products	Soybean	Upcycled Ingredient	Plant Protein	Milled Grain
Soybean Germ Meal	Soy Products	Soybean	Upcycled Ingredient	Plant Protein	Milled Grain
Soybean Hulls	Soy Products	Soybean	Upcycled Ingredient	Plant Protein	Milled Grain
Soybean Meal	Soy Products	Soybean	Upcycled Ingredient	Plant Protein	Milled Grain
Soybean Mill Run	Soy Products	Soybean	Upcycled Ingredient	Plant Protein	Milled Grain
Soybean Oil	Vegetable Oil	Soybean	Other Ingredient	Plant Fat	Milled Grain
Soybeans	Soy Products	Soybean	Other Ingredient	Plant Protein	Milled Grain
Spinach	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Split Peas	Lentils & Beans	Pea	Other Ingredient	Specialty Crop	Lentil
Squash	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Starch	Millfeed	Corn	Upcycled Ingredient	Plant Carb	Specialty

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Farm or Mill-based Ingredients					
Ingredient	**Farm & Mill-based Sub**	**Commodity Type**	**Upcycled/Other Ingredient**	**Nutrient Category**	**Commodity Aggregation**
Strawberry	Fruit & Vegetable	Berry	Other Ingredient	Specialty Crop	Specialty
Sugar	Sweetener	Sweetener	Other Ingredient	Plant Carb	Specialty
Sunflower Meal	Millfeed	Minor Oilseed	Upcycled Ingredient	Plant Protein	Milled Grain
Sunflower Oil	Vegetable Oil	Minor Oilseed	Other Ingredient	Plant Fat	Milled Grain
Sunflower Seeds	Whole Grain	Minor Oilseed	Other Ingredient	Plant Fat & Carb	Milled Grain
Sweet Lupin Meal	Millfeed	Pea	Upcycled Ingredient	Plant Protein	Milled Grain
Sweet Potato	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	potato
Tapioca	Nut & Root	Root	Other Ingredient	Plant Carb	Specialty
Tapioca Flour	Nut & Root	Root	Upcycled Ingredient	Plant Carb	Specialty
Tapioca Starch	Nut & Root	Root	Upcycled Ingredient	Plant Carb	Specialty
Tea	Fruit & Vegetable	Herb	Other Ingredient	Specialty Crop	Specialty
Tomato	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Tomato Pomace	Fruit & Vegetable	Vegetable	Upcycled Ingredient	Specialty Crop	Specialty
Tomato Puree	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Turnip Greens	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Vegetable Oil	Vegetable Oil	Soybean	Other Ingredient	Plant Fat	Specialty
Vegetable Starch	Fruit & Vegetable	Vegetable	Upcycled Ingredient	Plant Carb	Specialty
Watercress	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Watermelon	Fruit & Vegetable	Fruit	Other Ingredient	Specialty Crop	Specialty
Wheat	Whole Grain	Wheat	Other Ingredient	Plant Carb	Grain
Wheat Bran	Millfeed	Wheat	Upcycled Ingredient	Plant Protein	Milled Grain
Wheat Flour	Millfeed	Wheat	Upcycled Ingredient	Plant Carb	Milled Grain
Wheat Germ	Millfeed	Wheat	Upcycled Ingredient	Plant Protein	Milled Grain
Wheat Gluten	Millfeed	Wheat	Other Ingredient	Plant Carb	Milled Grain
Wheat Middlings	Millfeed	Wheat	Upcycled Ingredient	Plant Protein	Milled Grain
Wheat Mill Run	Whole Grain	Wheat	Upcycled Ingredient	Plant Carb	Grain
Wheat Starch	Millfeed	Wheat	Upcycled Ingredient	Plant Carb	Milled Grain
Whey	Dairy & Egg	Dairy	Upcycled Ingredient	Animal Protein	Dairy
Whey Powder	Dairy & Egg	Dairy	Upcycled Ingredient	Animal Protein	Dairy
Whey Protein Concentrate	Dairy & Egg	Dairy	Upcycled Ingredient	Animal Protein	Dairy
Whey Protein Isolate	Dairy & Egg	Dairy	Upcycled Ingredient	Animal Protein	Dairy
Yam	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty
Yogurt	Dairy & Egg	Dairy	Other Ingredient	Animal Protein	Dairy
Zucchini	Fruit & Vegetable	Vegetable	Other Ingredient	Specialty Crop	Specialty

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4.3 Appendix C, Guaranteed Analysis for Pet Food Products

Both cat and dog food products were categorized into three types: dry food, wet food and treats. The three major guaranteed analysis variables are crude protein, crude fat and crude fiber for pet food products. A few key variables and associated ranges include:

For cat food products:

- The guaranteed minimum crude protein ranges from:
  - 11% to 59% for dry food.
  - 1% to 39% for wet food.
  - 3.4% to 75% for treats.
- The guaranteed minimum crude fat ranges from:
  - 4% to 31% for dry food.
  - 0.1% to 16% for wet food.
  - 0.1% to 31% for treats.
- The maximum crude fiber guarantee ranges from:
  - 0.9% to 12% for dry food.
  - 0.1% to 3.5% for wet food.
  - 0.3% to 10% for treats.

For dog food products:

- The minimum crude protein guarantee ranges from:
  - 5% to 60% for dry food.
  - 1% to 25% for wet food.
  - 1% to 80% for treats.
- The guaranteed minimum crude fat ranges from:
  - 0.2% to 36% for dry food.
  - 0.3% to 16% for wet food.
  - 0.1% to 26% for treats.
- The maximum crude fiber guarantee ranges from:
  - 0.5% to 20% for dry food.
  - 1% to 2% for wet food.
  - 0.1% to 11% for treats.

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4.4 Appendix D, Total Reported Retail Volume vs. Calculated Ingredient Volume

Note on pet food ingredient analysis: Because the additives, such as preservatives, flavors and colors, etc., were not estimated, the average weight percentage of calculated ingredients was 85% and 89% for cat and dog foods, respectively. The difference between the tonnage calculated from the Nielsen data and our ingredient data is 16.4%. Below is a dry dog food example.

> **Food ingredients**: Pork Liver, Pea Flour, Potatoes, Dried Whole Eggs, Flaxseed, Brown Rice, Sugar, Barley Flour, Tapioca Flour, Bacon, Sweet Potatoes, Chicken Fat, Coconut Oil, Salmon Oil, Dried Cultured Skim Milk, Cane Molasses, Cranberries, Blueberries, Carrots and Tomatoes.
>
> **Additives**: Glycerin, Natural Smoke Flavor, Salt, Calcium Lacate, Lactic Acid, Phosphoric Acid, Caramel Color, Mustard, Iron Oxide (A Color), Natural Flavor, Rosemary (A Flavor), Chamomile (A Flavor), Dandelion (A Flavor), Yucca Schidiegera Extract (A Flavor), Green Tea Extract (A Flavor), and Peppermint (A Flavor).

Summary: For this example, the food ingredients represented 84.7% of the total product weight while the additives were 15.3% of the total product weight based on the reverse engineering calculation.

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4.5 Appendix E, Additional Background on Substantial Changes in Included Value from 2019 to 2024

As presented in Section 3.1 (see Table 2 and Table 3), total retail pet food values and "as-bought" ingredient purchase values changed substantially between 2019 and 2024 (70.2% and 90.6% respectively). Many changes in pet food consumer behavior (e.g., trends toward online or convenience shopping during the COVID-19 pandemic) and/or other outside influences (e.g., high rates of inflation, increased shipping costs, etc.), contribute to these changes and would require further qualitative and quantitative analysis to paint a complete picture. While acknowledging these additional factors that contributed to changes in value for both retail pet foods and the ingredients used to produced pet foods, DIS could perform a closer analysis specifically on the top pet food ingredients used to produce pet food in 2024 and how the substantial increases in specific ingredients could have driven increases in "included value" since 2019.

Using the Top 5 (defined as "total quantity used in all pet food multiplied by respective price") ingredients used in all dog and cat food in 2024 that were also present in pet foods in 2019, there were sharp increases in the included value of these top ingredients in dog and cat food (Figure 78). Increases were particularly pronounced in several marine ingredients, such as salmon (367% increase) and cod (901% increase), as shown below. The total combined value change for these top five ingredients between 2019and 2024 was 103% ($3.1 billion in 2019to $6.2 billion in 2024).

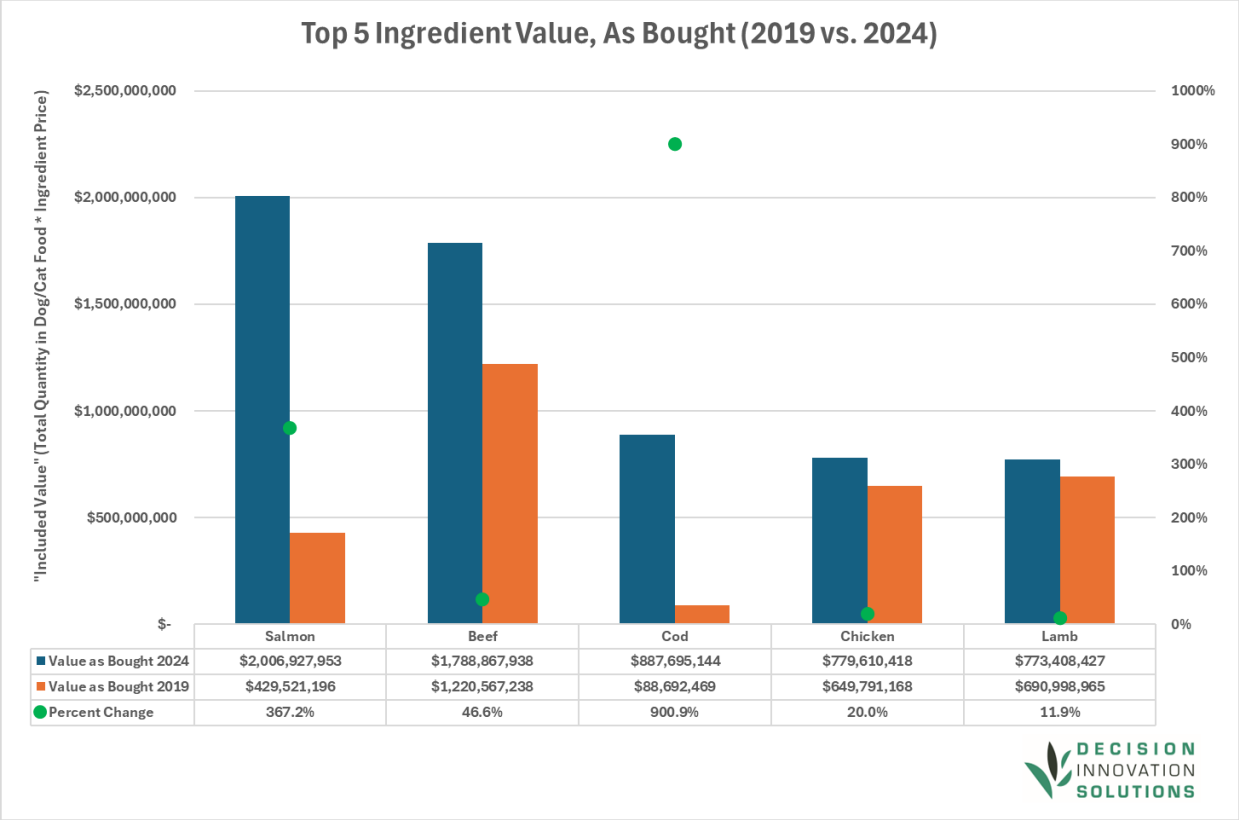
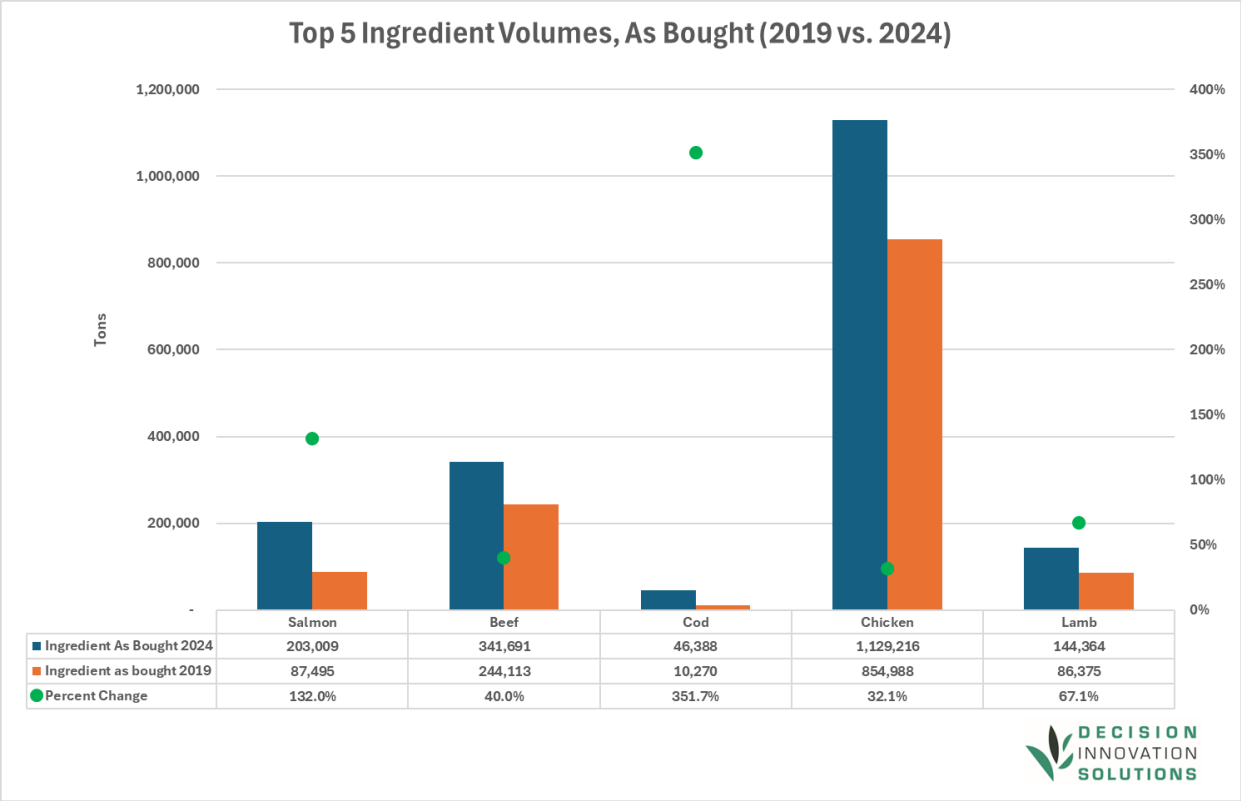


Figure 78. Top 5 Ingredient Value, As Bought (2019 vs. 2024)

Separating the product of price and quantity shown in Figure 78, Figure 79 shows the volume change for each of the top five ingredients from 2019 to 2024. While there were some substantial changes in volumes (i.e., 352% for cod), the combined increase in quantity for all five ingredients increased by 45.3% (from 1.283 million tons in 2019 to 1.865 million tons in 2024). The relatively lower percentage increase in total tonnage of the top five ingredients when compared to included value implies a larger driver of change came from price fluctuations of the top five ingredients.



	Salmon	Beef	Cod	Chicken	Lamb
Ingredient As Bought 2024	203,009	341,691	46,388	1,129,216	144,364
Ingredient as bought 2019	87,495	244,113	10,270	854,988	86,375
Percent Change	132.0%	40.0%	351.7%	32.1%	67.1%

Figure 79. Top 5 Ingredient Volume, As Bought (2019 vs. 2024)