

A Climate of Choice: Understanding the Environment that Shapes Decisions in Washington's Food and Grain Supply Chain

BACKGROUND AND CHALLENGE

Representing more than 1.4 million jobs and nearly \$130 billion in regional domestic product, freight-related industries represent a significant portion of Washington State's economy. The Washington State Department of Transportation (WSDOT) understands that freight plays a significant role in the health of the State's environment as well. WSDOT planners sought to identify opportunities to reduce greenhouse gas emissions within the freight transportation sector, including converting vehicles from traditional to alternative fuels or adding emission controls. However, to move forward, planners needed insight into impacts on the freight system of State policy scenarios aimed at reducing freight emissions.

WSDOT began by focusing on two of the State's major supply chains - wheat production and food delivery. The agency sought and received funding from the SHRP2 C20 Implementation Assistance Program to conduct a study, collecting and analyzing both quantitative and qualitative data, to gain an understanding of current issues and better anticipate a variety of potential future conditions.

APPROACH

Project goals included:

- Understand the interplay between public policy, market forces, and supply chain behavior, especially with regard to alternative fuel implementation and greenhouse gas reduction.
- Focus on food distribution supply chains in central Puget Sound as well as the cross-state wheat supply chains.
- Support freight trip modeling by collecting truck count data.
- Use interviews and surveys to collect information on key characteristics of related industries and likely behavioral responses (such as route and mode choice) to various policy and market conditions.



Project Type: **Innovations in Local Freight Data**

Grant Recipient Agency: **Washington State Department of Transportation**

Location: **Washington**

Duration of Activity: **2014 to 2016**

Budget: **\$150,000**

Objective	Work Approach	Outcome
Understand the wheat and food distribution supply chains.	Literature review.	Identified major actors and characteristics of the State’s wheat and food supply chains.
Collect data relevant to the supply chains.	Collect data via interviews, surveys, and truck counts.	Insight from major contributors in the relevant supply chains, better understanding of last-mile truck movements and issues.
Draw conclusions.	Review and analyze collected data.	Understanding of the target supply chains and the impact of public policy and market forces on them.

BENEFITS AND IMPACTS

Key elements that contributed to project outcomes and subsequent impacts include:

- Previous planning and research into Washington State’s freight system and critical supply chains.
- Existing relationships with relevant freight stakeholders in the region.
- Expertise in freight data collection.

Resources generated by the project include:

- Better understanding of influencing factors and pain points for decision-making in the wheat and food distribution supply chains.
- Sub-regional data illustrating the frequency and timing of freight deliveries at the user end of the food supply chain.
- An understanding of the wheat- and food-related supply chain responses to market conditions and potential policy changes aimed at reducing freight emissions.
- Recommendations for integration into statewide freight planning process.

Benefits

Benefits realized from this project include the ongoing use of the resources it created as well as the changes it may influence in stakeholder behavior. Specific outcomes are listed below:

Outcome	Evidence
Data collection completed.	Collected interviews, surveys, and site-specific truck counts at 12 grocery stores in the Puget Sound area.
Tools and models developed/enhanced.	Truck origin and destination information for planning purposes and identification of data needed and available to support the inclusion of wheat supply chain information in a statewide freight model.
Accurate representation of markets for both urban food distribution and wheat shipments.	Interviews, surveys, and truck counts resulted in good coverage of both the food distribution and regional grain supply chains. An illustration of the typical wheat and food distribution supply chains is shown in Figure 1 .

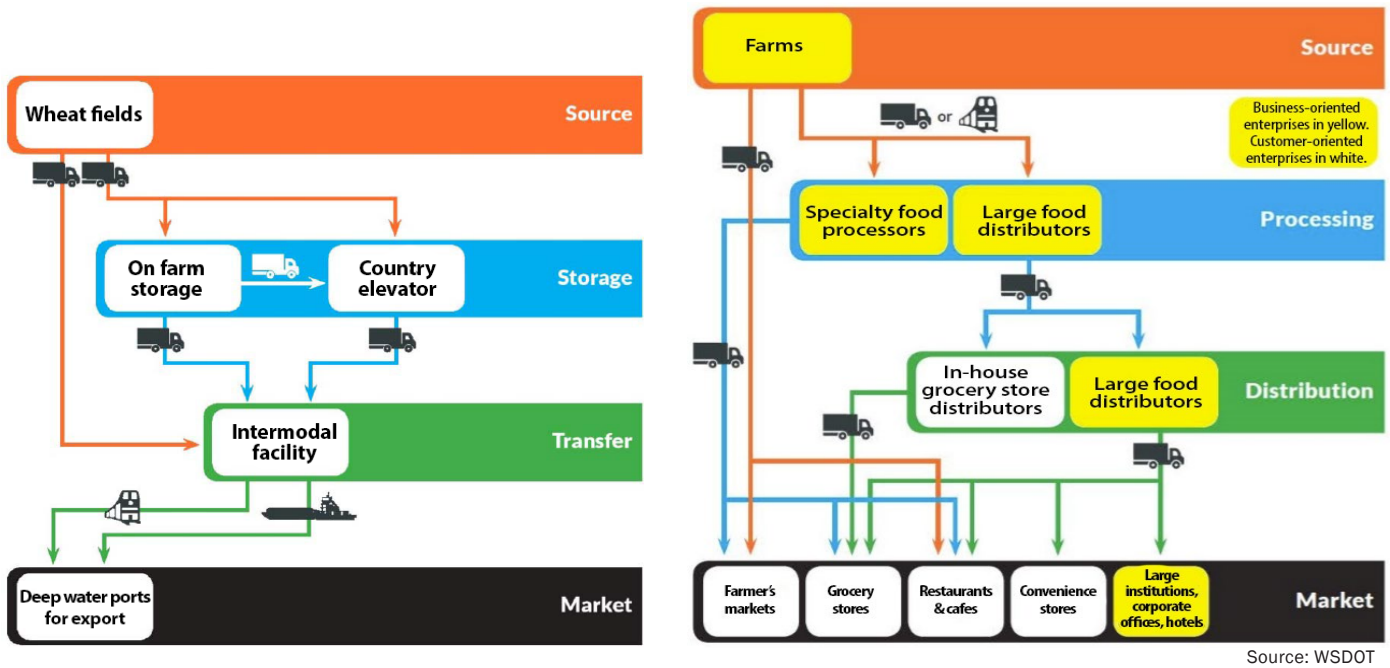


Figure 1. Typical Washington State Wheat Supply and Food Distribution Chains.¹

Figure 2 shows arrival rates of food deliveries to different grocery store types. The project team found that most deliveries occurred between 7:00 AM and 11:00 AM, and the peak average truck arrival rate occurred earlier for grocery stores in urban locations than suburban and rural locations.

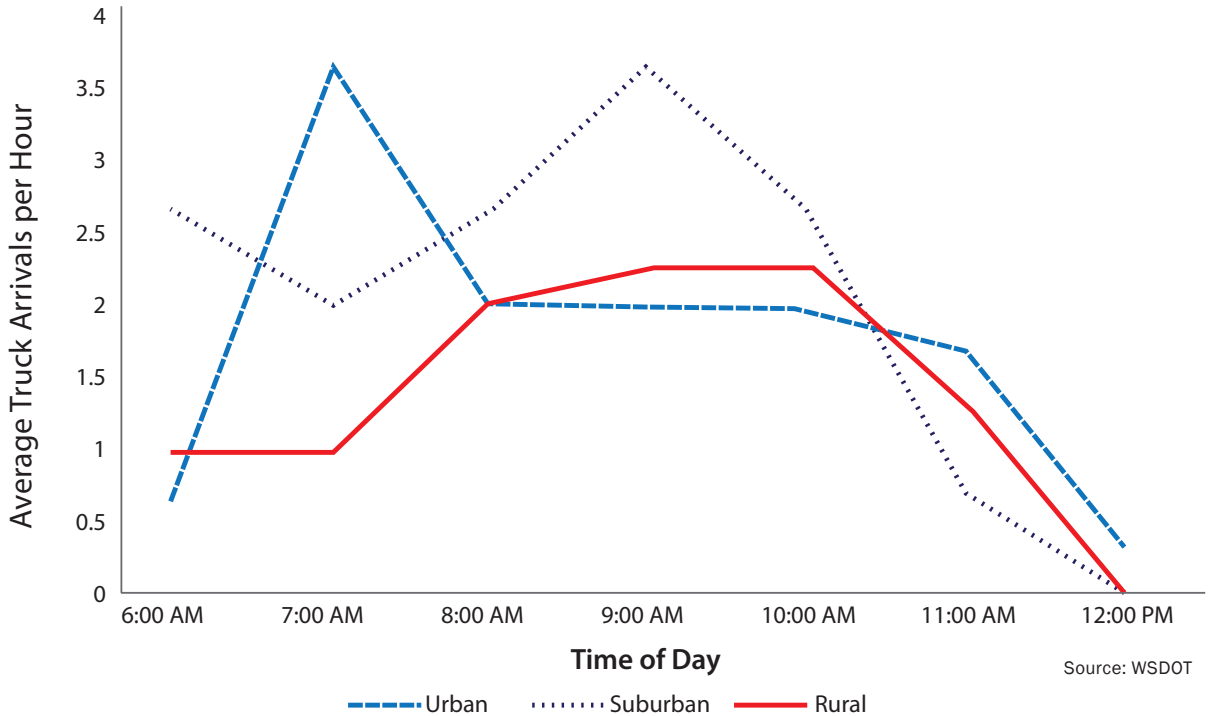


Figure 2. Food Delivery Truck Arrivals at Urban, Suburban, and Rural Grocery Stores.

¹ Washington State Department of Transportation (2016). Data Collection for Two Distinct Supply Chains: Food Distribution and Wheat, Olympia, WA.

Impacts

Impact measures are the ultimate benefits of using a product. These are longer term, value-added impacts of the product related to saving time, money, and lives.

Impact	Application
Better ability to anticipate changes in the State’s freight system as a result of new public policy.	Inform freight transportation planning to accommodate new public policy aimed at reducing emissions, based on data, experience, and insights collected throughout both wheat and food distribution supply chains.
Understanding of how the use of alternative fuel vehicles will play out within the State’s freight industry.	Identify several current technological and logistical challenges faced by wheat and food distribution supply chains in deploying alternative fuel vehicles allowing the State to choose the most effective path forward.

PARTNERSHIPS

Washington State Department of Transportation (WSDOT) – Provided project management and coordination.

Washington State University – Led research on the wheat supply chain.

University of Washington – Led research on the food distribution supply chain.

Federal Highway Administration (FHWA) – Provided coordination support as well as technical and administrative guidance.

FOR MORE INFORMATION

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Learn more about the SHRP2 program, its Capacity focus area, and Freight Demand Modeling and Data Improvement (C20) products at www.fhwa.dot.gov/GoSHRP2/

Image sources: Thinkstock



The second Strategic Highway Research Program (SHRP2) is a partnership of the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), and the Transportation Research Board (TRB). TRB completed the research, and now FHWA and AASHTO are jointly implementing the resulting SHRP2 Solutions that will help the transportation community enhance productivity, boost efficiency, increase safety, and improve the reliability of the Nation’s highway system.