



FREIGHT DATA PLAN

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Prepared for: Rhode Island Division of Statewide Planning



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1 DATA OBJECTIVES

The Rhode Island Freight Plan Update (June 2022) was based on a variety of public and commercial freight data sources. Most states approach their freight plans by considering the required and optional elements, collecting available public data, determining whether to purchase supplemental commercial data, and finally utilizing that data to develop the plan. These data represent a valuable source of information for ongoing planning and for sharing with other partners, either as a simple inventory or as a more evolved information ecosystem. Apart from purchases of commercial data, where continuing use by the purchasing agency and/or other public partners may be included in the negotiated purchase agreement, some – but not many – states consider what to do with that data following its use in the freight plan.

Building on the freight plan update and continuing freight planning, Rhode Island has the opportunity to:

- Use the data and information to support statewide and regional planning activities and initiatives involving consideration of freight issues, and partner agencies engaged in those efforts.
- Leverage tools and technologies to extract the most valuable insights from acquired data.
- Ensure continuity and currency of data and information products to support stability and robustness of planning efforts.
- Be on the forefront of emerging data sets and techniques.

2 EXISTING DATA SETS AND OPPORTUNITIES

2.1 RECENTLY UTILIZED FREIGHT DATA SOURCES

The Freight Plan Update referenced use of the following freight data sources.

Rhode Island Department of Administration, Division of Planning, Statewide Planning Program

- Freight Planning Needs Assessment (FNA), 2006, <http://www.planning.ri.gov/documents/trans/FreightNeedsAssessment.pdf>
- Rhode Island State Rail Plan (State Rail Plan), March 13, 2014, http://www.planning.ri.gov/documents/trans/Rail/RI_State_Rail_Plan_2014.pdf
- “Moving Forward Rhode Island 2040,” the State of Rhode Island Long Range Transportation Plan (LRTP), December 10, 2020, <http://www.planning.ri.gov/planning-areas/lrtp/index.php>
- Congestion Management Process Plan, August 2020, <http://www.planning.ri.gov/planning-areas/transportation/congestion-management.php>
- State of Rhode Island Highway Functional Classification System, Revised, February 2019, http://www.planning.ri.gov/documents/trans/2015/TP_165.pdf
- Rhode Island Airport System Plan (RI ASP), September 15, 2011, http://www.planning.ri.gov/documents/guide_plan/ASP_report_114.pdf
- Rhode Island State Energy Plan (State Energy Plan), October 2015. <http://www.planning.ri.gov/documents/LU/energy/energy15.pdf>

Rhode Island Department of Transportation

- Rhode Island Strategic Highway Safety Plan, October 2017, http://www.dot.ri.gov/documents/community/safety/Strategic_Highway_Safety_Plan.pdf
- Bridge Inventory Data Sheet, February 10, 2015, http://www.dot.ri.gov/documents/travel/bridgeinfo/Bridge_Inventory_Sheet.pdf

Federal Highway Administration (FHWA)

- National Highway System: Rhode Island Map, September 30, 2020, http://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps/rhode_island/ri_RhodeIsland.pdf
- Primary Freight Network: Rhode Island Map, https://ops.fhwa.dot.gov/freight/infrastructure/ismt/state_maps/states/rhode_island.htm
- Freight Analysis Framework (FAF), http://ops.fhwa.dot.gov/Freight/freight_analysis/faf/index.htm

Other Reference Sources

- Federal Motor Carrier Safety Administration (FMCSA), National Hazardous Materials Route Registry, July 14, 2014 - <http://www.gpo.gov/fdsys/pkg/FR-2014-07-14/pdf/2014-15861.pdf>
- The Rhode Island Bays, Rivers, and Watersheds Coordination Team, Rhode Island Ports: Opportunities for Growth, April 2011 <http://www.dem.ri.gov/bayteam/documents/riports.pdf>
- Rhode Island Airports Corporation (RIAC), Passenger Number Summaries, <http://www.pvdairport.com/corporate/ri-airport-corporation/passenger-numbers>
- US Bureau of the Census, USA Trade Online, Export and Import Data, <https://usatrade.census.gov>
- Rhode Island Airport Commission (RIAC), T.F. Green Airport Air Cargo Assessment, May 29, 2015
- Energy 2035: Rhode Island State Energy Plan, October 8th, 2015.
- Transearch, a commercial commodity flow dataset similar to but more detailed than FAF, which is currently produced by Standard and Poors
- Geotab truck telematics data, a series of results were extracted in support of the freight plan, including by expanding the Transearch data, quantifying truck parking demand, and evaluating truck electrification needs.
- The Surface Transportation Board Confidential Rail Waybill Sample, which was integrated within Transearch

2.2 A FREIGHT DATA FRAMEWORK

Even from a simple inventory, it is clear that freight data involves a broad range of sources, disciplines, data types, and applications. We can think about the universe of potential data sources more broadly on a number of dimensions, as summarized in Table 1 following.

Table 1. Framework for Transportation and Economic Data Supporting Freight Planning

Source	Description	Examples (Not a Complete List)	Readiness / Ease of Use
Federal	Datasets and analysis tools made available by various federal agencies, at nominal or no cost	Highway Performance Management Systems Data (HPMS) National Performance Monitoring Research Data Set (NPMRDS) and Bottleneck Analysis Tool Multimodal Data: FHWA Freight Analysis Framework, Census Commodity Flow Survey	Often available with bundled viewing/analysis software, but sometimes only as raw data requiring processing

		<p>Modal Data: US Army Corps of Engineers Waterborne Commerce, Bureau of Transportation Statistics T-100 Air Cargo, Surface Transportation Board Rail Waybill, US Energy Information Agency Pipeline</p> <p>Trade Data: Census Trade Data / USA Trade Online, BTS Transborder Surface Trade Data</p> <p>Economic Data: County Business Patterns (CBP), Quarterly Census of Employment and Workforce (QCEW), Federal Reserve Economic Data (FRED), American Community Survey (ACS), US Department of Agriculture, US Department of Energy, US Department of Commerce</p> <p>Integrated Platform: FHWA HEP-GIS</p>	
State	Datasets, data summaries, and analysis tools developed through state activities and programs	<p>DOT data and modeling tools for system, condition, performance</p> <p>State transportation and modal system plans and supporting data resources</p> <p>State economic development and environmental plans and supporting data resources</p> <p>State-led or supported studies and research efforts</p>	May be processed into tools and systems, or available unprocessed
Public Partner	Datasets, data summaries, and analysis tools developed through partner activities and programs	<p>MPO/Regional/Local data and modeling tools for system, condition, performance</p> <p>MPO/Regional/Local economic development and environmental data resources</p> <p>MPO/Regional/Local-led or supported studies and research efforts</p>	May be provided upward from MPOs and local governments, at varying levels of consistency and utility
Private Partner	Direct inputs from private carriers, terminal operators, and beneficial cargo owners	<p>Facility/network performance and improvement plans/needs</p> <p>Supply chain characteristics and other private activity data</p>	Generally requires specific collection efforts – surveys, interviews, engagement on RI Freight Advisory Committees

Commercial	Datasets and analysis tools typically with greater detail and recency than publicly-available information	<p>Commodity Flow: Transearch</p> <p>Telematics: INRIX, Geotab, Streetlight, Replica</p> <p>Land Use: Moodys, CoStar, InfoUSA, Freight Finder, et al</p> <p>Integrated Platform: University of Maryland RITIS</p>	<p>Requires purchase and agreement to applicable use and confidentiality restrictions; the broader the rights, the more expensive the purchase</p> <p>INRIX, Streetlight, Replica and RITIS offer bundled analytics platforms; other sources require extensive user processing resources</p>
Research	Emerging information, trends, and topics	<p>Transportation Research Board / National Cooperative Highway Research Program</p> <p>Investor Analytics: STIFEL, et al</p>	<p>From review of online data and academic literature, participation in conferences</p> <p>Most useful as background to other datasets</p>

3 DATA RECOMMENDATIONS AND OPTIONS

In advancing a data program, RIDOT needs to consider two primary and interrelated questions:

- What level of data program development is most useful?
- What level of commitment can be made for data collection, data analysis, and data distribution?

WSP recommends that as a first step, RIDOT formally convene an internal working group, with other agency and regional partners as appropriate, to evaluate the following options.

3.1 TYPES OF DATA PROGRAMS

Data programs can be arrayed according to their level of intensity – how demanding they are on the collectors/processors/distributors of information, and how useful they are likely to be to the state and its partners in return.

Level 1: Inventory and Link Library

The simplest and easiest data program to implement, and an essential precursor to more intensive data programs, is the creation of an inventory of relevant freight data sources and a centralized, well-annotated, regularly monitored and refreshed Link Library for the identified information. A Link Library could be made available and easily accessible through a webpage.

Level 2: Data Repository

The next level of program intensity would be to actually collect and house the inventoried data in a single location, making it safe from changes in access or availability based on the original links. This would require dedicated system space and more IT effort than a simple link library, but would not require detailed processing of the actual information.

Level 3: Proactive Data Collection and Procurement

The next level of intensity is a structured effort to identify data gaps based on emerging needs. For example, if the state wants to move towards a certain set of advanced performance metrics common to and shared by planning efforts at all levels (state/MPO/regional/local), it may need commercial commodity flow data (Transearch, et al) or commercial telematics data (Geotab, INRIX, et al) to support them, above and beyond what is available from NPMRDS and FAF. These resources can be available for state planning efforts as well as efforts by partner agencies, but the cost for use beyond a single user and single project is sometimes very substantial. An early work effort to advance Level 3 could be to identify user needs and data gaps, inventory potential datasets and possibly direct data collection activities, and determine an early purchase or action plan.

Level 4: Advanced Analytics

Many internal and external clients may not have the experience, skills, or resources to utilize advanced freight data in its raw form. In response, the most intensive data program adds another important layer

– the creation of advanced tools to analyze, display, and report freight data. FHWA and BTS have already made these kinds of tools available in online applications, using software packages such as Tableau and PowerBi. Simple custom applications can be created to allow a broad range of users to benefit from the available data, and more complex Application Program Interfaces (APIs) can be created to manage the exchange of information from large commercial and public datasets.

Mixed Approaches

These levels are, of course, only illustrative. In practice, they can be combined in different ways. For example, some states that have not implemented data inventories (Level 1) have been aggressive purchasers of commercial data (Level 3) for specific uses, and have developed custom applications (Level 4) to display freight and economic data (such as “FAF Dashboards”). However, these activities have typically been part of Freight Plan development, providing the information needed and tools needed to advance work on a timeline, rather than being part of a more formally structured data plan.

The opportunity for Rhode Island, in framing a Data Plan, is to develop a logical stepwise flow of activities, rather than responding to pressures of the moment.

3.2 IMPLEMENTATION CONSIDERATIONS

Each Program Level has associated considerations related to the level of organizational resources, in terms of staff time, information technology, and acquisition cost. Table 2 summarizes these considerations.

Table 2. Level of Data Program vs. Level of Effort

Level	Collection	Processing	Distribution
Inventory and Library	Moderate staff time	None other than monitoring and updating	Via web page or similar
Repository	Moderate to extensive staff time	IT resources to host data Monitoring and updating	Via web page or similar Additional outreach / notice to partners of availability
Procurement	Moderate to extensive staff time and data acquisition costs	IT resources to host data Monitoring and updating	Via web page or similar Additional outreach / notice to partners of availability
Advanced Analytics and Visualization	Moderate to extensive staff / consultant time and data/software platform acquisition cost	IT resources to host data and applications Monitoring and updating	Via web page or similar. RI Freight Scans Additional outreach / notice to partners of availability

3.3 SPECIFIC DATA RECOMMENDATIONS

3.3.1 Alignment with Performance Measures

One of the main uses of data is the calculation of performance measures that allow for tracking progress, identify needs, and meet federal requirements. Table 3 shows the performance measures from the 2022 state freight plan, including data sources. The following best practices could improve performance measurement by leveraging available data sources:

- The federally required truck congestion performance measures (truck travel time reliability and truck congestion on interstates) can be complemented by a set of broader congestion performance metrics that evaluates the National Highway System (NHS) in Rhode Island and calculates metrics that are more relevant to industry and are more useful for prioritizing bottlenecks. It is recommended that the congestion metrics recommended by NCHRP Report 925¹ be implemented. These metrics estimate the costs of congestion accrued to motor carriers and shippers by quantifying recurring and non-recurring congestion. These metrics can be

¹ <https://www.trb.org/NCHRP/Blurbs/180007.aspx>

calculated using NPMRDS, the same source used to estimate the federal congestion performance measures. These metrics are superior in that they estimate the costs of congestion on supply chains and the broader economy, which provides useful information for right-sizing projects, prioritizing needs, and demonstrating the broader benefits of projects in grant applications.

- The truck parking spaces metric should be complemented with a metric that reflects how easy truck drivers can find parking spaces in the state. This new measure could come from the statewide truck parking survey, which can be conducted every freight plan cycle, or it could come from the demand data generated from Geotab.
- The rail, marine, and air cargo tonnage should come from the Transearch database prepared for the state. This will ensure that tonnage is calculated using consistent methodology, avoiding double counting and other inconsistencies. Additionally, the Transearch database could also be used to calculate performance measures related to the direction of flows, or the amount of freight that stays in the state rather than passes through the state.
- Additional performance measures could include the number of electric truck charging stations in the state.

Table 3: State Freight Plan Performance Measures

Performance Metric	Mode	Data Source	Description
Travel Time Reliability	Truck/Highway	NPMRDS	Truck travel time reliability on Interstates
Congestion	Truck/Highway	NPMRDS	Truck congestion on Interstates
Oversize/overweight permits	Truck/Highway	RI DMV	# of permits issued annually
Truck parking spaces	Truck/Highway	RIDOT	# of truck parking spaces
Truck volumes	Truck/Highway	RIDOT	Truck counts at key locations
Annual rail cargo tonnage	Railroad	Association of American Railroads	Total annual tonnage
Annual marine cargo tonnage	Marine	Army Corps of Engineers	Total annual tonnage
Annual air cargo tonnage	Air	RI Airport Corporation	Total annual tonnage

3.3.2 Transearch

The Transearch data set provides a detailed description of commodity flows to/from counties in Rhode Island. The data set developed for Rhode Island also include the confidential waybill data, integrated into the Transearch file, for ease of use in conducting multimodal analyses. The Rhode Island Transearch data is also unique in that it includes records from Geotab to improve coverage of certain types of trucking that are not well captured by the default data set. These enhancements allowed for a more complete overview of commodity flows in 2021. It is recommended that this data set be used to update the Freight Scans. An interactive map can be generated that shows the commodity composition moving through the roadway network in Rhode Island. In other states this type of tool or analysis has been useful to describe the industries, economic activities, and businesses using infrastructure, in support of projects or corridor improvements.

3.3.3 Geotab

The Geotab data represents a unique source of data on truck operations and trips that can be used to answer a wide range of planning questions. The Geotab subscription that Rhode Island purchased expires at the end of the project contract, however all of the data extracts and results can be used in perpetuity. Geotab offers a recurring subscription that would allow Rhode Island to receive near real-time data to track how truck operations are evolving in the state. If this subscription is purchased, performance measures and other metrics could be calculated automatically to monitor the trucking sector. In addition to a subscription, Geotab also offers other data sets that were not purchased that could be of interest to Rhode Island. These include an analytical tool to investigate truck parking, a tool to assess truck electrification needs, and a tool to calculate roadway and intersection congestion/performance. Geotab data can also be used to identify truck activity related to direct-to-consumer logistics/e-commerce. All of these tools could be useful in the next freight planning process. The Geotab data represents the cutting edge of truck telematics data available, and its popularity has been increasing rapidly among State DOTs across the nation.