What Can We Do to Improve Urban Goods Movement Data Collection in Canada? (Findings of the TAC Project on the Framework for the Collection of High Quality Data on Urban Goods Movement)

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ABSTRACT

Urban goods movement contributes significantly to a region's economic development and wellbeing. However, much less attention is paid to this contribution, and to goods movement's impact on urban transportation problems and solutions, than to passenger movement. Related to this is the relative paucity of data that characterize urban goods movement.

To this end, in 2006 the Transportation Association of Canada (TAC) initiated a project that aims to develop a framework for collecting "high quality" urban goods movement data. The work was divided into two phases. Phase 1, completed in late 2007, reviewed existing data sources and identified needs as expressed in the literature. One key finding is that although the focus of the research is on urban goods movement, there is a strong interaction with inter-urban freight transportation, and so it is necessary to consider both. Despite the availability of several sources, a second key finding was that these data are disparate and often incompatible. Thus there are both many gaps and a lack of a single, nationwide source of data: to this end, Phase 1 also developed a user needs survey.

Phase 2 was initiated in late 2008. It administered the user needs survey to Canadian governments, participants in the supply chain and selected academics and others who are involved with urban goods data. Phase 2 also followed up with some recent developments in Canada and overseas, in order to develop the final study product: [a] a framework for collecting high quality urban goods data, and [b] a strategy for implementing the framework. The framework is a practical adaptation of a concept that has been proposed for the United States. At the core of the framework and the strategy is the need for a nation-wide commodity flow survey (CFS), which is intended [a] to meet a significant gap while [b] complementing existing urban and inter-urban data surveys within the context [c] of a systematic data collection framework.

Phase 1 was reported at the October 2007 TAC Annual Conference. This paper reports on the key findings of Phase 2, specifically, the framework and the strategy for implementing it. The paper considers the proposed CFS, but – given the comprehensiveness of a CFS and the need for some preparatory work – also identifies immediate, relatively low-cost actions that could do much to improve the state of urban goods movement data quickly and broadly.

1. INTRODUCTION

The Transportation Association of Canada (TAC) identified the need to improve goods movement (freight) data collection in Canada. To this end, TAC established the need to develop a framework to guide potential future goods movement data collection. The resultant research project, *Framework for High Quality Data Collection of Urban Goods Movement in Canada*, aims to provide an improved understanding of the characteristics, operations, issues and opportunities of urban and inter-modal goods movement as the basis for proposing a framework for collecting data and a strategy for implementing the framework. The initiative has been overseen by a Project Steering Committee (PSC), made up of representatives from several governments at all levels from across the country.

The project was conducted in two phases: Phase 1, completed in late 2007, reviewed existing data sources, identified needs as expressed in the literature, and reviewed

international 'best practices' in addressing these needs. One key finding is that although the focus of the research is on urban goods movement, there is a strong interaction with inter-urban freight transportation, and so it is necessary to consider both together. Second, several data sources are availability, but these data are disparate and often incompatible. Thus there are both many gaps and a lack of a single, nationwide source of data: to this end, Phase 1 developed a survey questionnaire to better grasp Canadian stakeholders' current needs and practices. Phase 2, which commenced in late 2008, administered the survey and integrated it with Phase 1, to develop an overall data-gathering framework for urban goods movement in Canada.

Phase 1 was reported at the 2007 TAC Annual Conference (Kriger, Tan and Clavelle, 2007). This paper reports on Phase 2. This paper reports on the key findings of Phase 2, specifically, the framework and the strategy for implementing it. The paper identifies the need for a nationwide commodity flow survey (CFS), but – given the comprehensiveness of a CFS and the need for some preparatory work – it also identifies immediate, relatively low-cost actions that could do much to improve the state of urban goods movement data quickly and broadly.

The paper is organized as follows: Section 2 outlines some key definitions. Section 3 presents a proposed conceptual goods movement data collection framework, based upon a similar framework in the United States. Section 4 describes some of the key building blocks that already exist and, accordingly, provide the basis for the framework. Section 5 identifies short and long term actions that can be used to meet these needs. Section 6 ends the paper with a summary.

2. SOME KEY DEFINITIONS

To begin, three key terms must be defined and clarified. These are:

- **Freight v. Goods Movement**. Although these terms are often used interchangeably, commonly the term "*goods movement*" is used in urban transportation, while "*freight*" is used in inter-urban transportation. Both refer to the carriage of "*commodities*" for a price, by any mode. Importantly, however, the broader term "goods movement" also includes the movement of people and goods in order to provide "*commercial*" services, for example, appliance repair.[1]

- **Commodities**. The term "commodity" refers to any tangible item that is transported by goods movement modes. Commodities are defined for all sectors of the economy, including both raw materials and finished products: standard classification systems, such as the NAICS (North American Industrial Classification System) are used to define these commodities. A commodity might be discrete – such as, a courier package or a piece of furniture – or bulk, for example, aggregate stone or oil. For the purposes of this research, the electronic transmission of documents was not included in this definition.

[1] A recent BESTUFS (Best Urban Freight Systems) report argues that the consumer's trip to purchase a good also should be included in the definition of urban goods movement, because it too involves the movement of that good (Patier, Routhier et al., 2008). However, for the purposes of this research, this definition was excluded. It might be treated best as a separate topic.

- **Movement v. Flow of Goods**. The *"movement"* of goods refers to a trip, while *"flow"* describes the good that is being moved.

  Specifically, ***goods movement*** describes the characteristics of the trip made by a vehicle(s) or person(s) to transport a particular good between a single origin and a single destination. The characteristics are depicted in terms of their origin-destination, the mode or modes used, trip start or end time, frequency, trip route or itinerary, cost, vehicle ownership, points of intermodal transfer, loading factors, etc.; that is, in terms that are typical of an *origin-destination survey*.

  The ***flow of goods*** describes the characteristics of the goods that are generated at a location for distribution to another location(s). The flow is expressed commonly in terms of economic activity or output, such as the type of good generated (i.e., the commodity; and typically according to a standard industrial classification), the total volume that is generated in a given period, its value and so on. In addition to the economic reference, the description might also be based in land use. Critically, however, there may be no reference to the actual movement of the good, nor is the description necessarily developed for purposes of transportation, nor might there be a reference to the actual movement of the good. However, flows are often translated into vehicle trips through the use of factors. These data are gathered through *commodity flow surveys*, which also are referred to in the literature as *shipper-based surveys* or *establishment surveys*.

3. A CONCEPT FOR A FRAMEWORK

In 2003, the US Transportation Research Board (TRB) proposed a conceptual framework for a national freight data collection programme for the United States. The framework was intended to provide a way of bringing together types of freight data and the associated collection activities in a cohesive and systematic manner. The concept is illustrated in Figure 1.

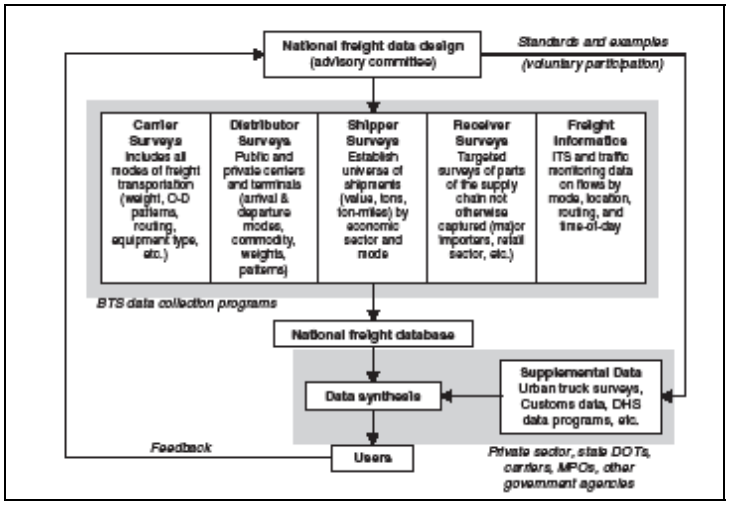

Figure 1. Proposed Framework of US National Freight Data Programme
(Source: Figure 3-1 from Transportation Research Board, 2003a)

As illustrated in Figure 1, the concept has several notable features (Transportation Research Board, 2003):

- The concept covers both urban and inter-urban data.
- The concept brings together several disparate types of surveys and data. Data are categorized according to individual actors along the supply chain. This reflects the fundamental recognition that no one single type of data source or collection activity can capture fully user needs or the means of meeting these needs.
- Several parties must be involved in providing the data. These include both the public and private sectors. The public sector includes all levels of government (the federal Bureau of Transportation Statistics [BTS], state departments of transportation [DOTs], Metropolitan Planning Organizations [MPOs] and other agencies). The private sector includes carriers of all modes. In other words, no single agency would be responsible for organizing or collecting the data, as this was considered to be impractical. Instead, a TRB advisory committee would provide technical direction, with a view to promoting common standards, data collection and survey forms (see next bullet), and best practices.
- The concept proposes to develop standards and common survey forms that can be used for data collection at all levels of geography (that is, from urban area to nationwide in scope). The idea is that the different surveys could be integrated in order to provide a common, nationwide database. A key aspect of this was the need to develop “data fusion” techniques (not noted in the figure) that would support the statistical and practical integration of the data.
- The framework incorporates a feedback mechanism, to ensure broad input (and, accordingly, buy in and collaboration) from users and providers of data, such as shippers, carriers and academics. This also helps to address critical issues such as ownership and availability of proprietary data, privacy and confidentiality.
- The concept recognizes that the framework could be populated only over time and, even so, that there would remain some data gaps. Accordingly, the concept proposed the development of data synthesis and imputation techniques to make up for data gaps as well as for missing or inadequate pieces of data within existing surveys and data collection programmes.
- Finally, the framework proposed the gradual inclusion of electronic data collection techniques (not illustrated in the figure), as a means of reducing the respondent burden through the use of passive data collection technologies, reducing costs and expanding data collection activities.

The TRB model provides a useful basis for a similar conceptual framework for Canada. However, from our perspective it remains an ambitious initiative, in several ways:

- The concept requires considerable detailing before it can be implemented. These details include the development of common standards and sample forms, stakeholder feedback, imputation and data synthesis, and the development of data fusion techniques (the means of achieving last point being controversial even at the conceptual stage [see Appendix D, Transportation Research Board, 2003a]). Over the past years, TRB has initiated several workshops as a means, among other purposes, of reaching out to and engaging stakeholders.
- The concept requires considerable research to achieve its full goals – in particular, on expanding the technical capabilities of electronic data collection technologies. This is a long-term concept.

- The TRB authors acknowledged the need to maintain and build upon existing data collection activities – in particular, the US nationwide Commodity Flow Survey – while recognizing the need to adapt to new needs and address issues such as respondent burden, the need to have disaggregated data (an issue, in part of confidentiality), the linkage of the CFS to other Census data collection (that is, participation in the CFS is mandatory, which significantly impacts response rate).[2]

For Canada, then, and given the specific requirements of the TAC PSC, we propose a more practical framework that generally is consistent with the US approach but focuses more on practical, tangible steps. This has the advantage of allowing for elements of the US approach to be integrated into the Canadian framework, as they are developed (e.g., research in the deployment of electronic data collection technologies) while moving forward on specific elements of the framework. In other words, Canada can take advantage of research activities that will be supported in the United States (e.g., through the National Cooperative Freight Research Program); and can even contribute to these as well. As important, this approach recognizes two realities that are specific to Canada:

- The absence of a nationwide presence in goods movement data collection in Canada that would encourage common, unified data collection (i.e., there is no parallel to the BTS or to the US DOT's funding of urban and inter-urban road infrastructure that could promote participation as somewhat more than voluntary). One possible imperative that would promote multi-level cooperation among different levels of government and jurisdictions are recent initiatives aimed at promoting trade and freight 'gateways.' However, these are still regional in coverage; and any associated data collection activities, while obviously helpful to the cause, necessarily would have to be specific to the purpose and so might be limited for broader application.
- The fact that several Canadian urban areas already are going ahead with what could be described as state-of-the-practice data collection activities, as described in Section 4 below. Moreover, these are continually evolving (i.e., each serves as the basis for subsequent improvements, for the collective benefit of everyone).

To this end, the proposed framework focuses on the development of two core data collection activities – namely, origin-destination surveys and commodity flow surveys – at two levels (urban and inter-urban, where 'urban' refers to activity within, to or from an urban region, and 'inter-urban' further being subdivided into Province[s]-/Territory[ies]-wide, nation-wide, cross-border and international data). The two core data types are supported by ancillary data, such as traffic counts and travel time surveys. The urban / inter-urban distinction recognizes that [a] Canada's urban areas are the country's economic engines; [b] inter-urban freight can be manifested anywhere in the country, at any level of geography (including within an urban area); so that [c] urban and inter-urban activities can be integrated.

4. BUILDING BLOCKS FOR A FRAMEWORK

As noted, the state of the practice recognizes that no single type of survey can describe fully either urban goods movement or inter-urban freight. Rather, complementary

[2] Although, even with mandatory participation, the 2002 CFS achieved only a 75% response rate.

surveys and data collection are required. At the core are two types of surveys – goods movement (origin-destination) surveys and commodity flow surveys.

In Canada, several recent initiatives provide the basic building blocks and demonstrate the practicality and viability of these surveys. The challenge now is [a] to integrate these two core survey types into a cohesive framework, [b] fill important gaps (i.e., a nation-wide commodity flow survey) and [c] add complementary pieces of data.

4.1 Urban Goods Movement

Three recent initiatives in Canada in urban goods movement data collection are described below. These are: Edmonton (and Calgary), Peel Region (Ontario) and Vancouver. A scan of the American and European literature indicates that these Canadian initiatives can be said to represent the state of the practice, at least in terms of content, coverage and approach; although one of them (Vancouver) is based upon recent US initiatives.

The Edmonton and Calgary urban goods movement data activities are widely cited in the international literature. Modelling efforts for the two cities have been conducted in parallel for several years, to take advantage of leading-edge research, combine the effort and make best use of resources. To this end, the two cities embarked on a comprehensive urban goods modelling initiative, which comprised both data collection and model development that used similar structures (Hunt et al., 2004a). The Calgary surveys were conducted in 2000, and the Edmonton surveys in 2001.

The Edmonton / Calgary approach combined a commodity flow survey with an origin-destination survey of truck drivers. The CFS captured the activities of a large sample of all business establishments in the respective city. Drivers of commercial vehicles leaving the establishment then were surveyed regarding the specifics of their goods movement over one weekday. These urban surveys were complemented by a roadside survey of trucks at external cordons surrounding each city, to capture inter-urban goods movement to, from and through each city.

This combination of surveys aimed to ensure a systematic and comprehensive coverage of goods movement to, from, within and through each urban area, with an approach designed specifically to get beyond the traditional, low-response focus on truck origin-destination surveys that used the truck fleet as the sample population, rather than the organizations that generate the activity. To that end, the municipal registers of establishments provided a complete and reliable sampling frame (as opposed to the more traditional approach of using vehicle registries, which may not reflect conditions accurately – e.g., a vehicle is registered in one place, but actually is used somewhere else) (Hunt et al., 2004a).

Other features of the CFS included (Hunt et al., 2004a):

- A focus on outbound activity only (except for transportation depots, for which both inbound and outbound activities were captured), thereby reducing the response burden.
- The provision of direct assistance to respondents (including face-to-face contacts, training and staff for data collection).
- Use of a special survey approach for establishments that had large numbers of small shipments and which allocate fleets of vehicles to routes to accommodate these shipments (e.g., postal services and refuse collection).

The resultant data sets have been used to calibrate a tour-based micro-simulation model, which accounts for both regular trips (i.e., allocated fleet trips) and irregular trips, as well as for externally-based trips (Hunt et al., 2004b).

The Peel Region, Ontario approach built upon the Edmonton / Calgary framework, but captured additional behavioural information. Notably, the survey asked respondents about the frequency of their activities, and how 'typical' their activities were on the survey date – thereby providing a measure of whether 'normal' activities were greater or lower. The survey also examined how these activities translate into a sequence of truck trips, and further examined the attributes of the actual trips, including route choice, stop durations and so on (Roorda, McCabe and Kwan, 2007a).

The Peel approach also examined two methods for conducting the joint surveys. Both methods used a mail-out mail-back form, but one method also added a GPS tracking device to the vehicle. The GPS has the potential advantages of higher accuracy (spatially and temporally) and passiveness (no explicit action is required by the driver to record information). The researchers found, overall, that a high quality of data was gathered from all sources. The paper (mailed) form had significant stop non-reporting problems, including truncated surveys, missing stops, or incorrectly or inaccurately recorded information. The GPS improved on this, but still had non-reporting problems associated with malfunctioning equipment and with a lack of precision (i.e., the ability to demarcate very short stop durations, very short distances between trips, or the exact spatial depiction of the actual stop location). Nonetheless, the GPS was found to provide detailed and precise data on various stop, tour, speed and engine performance characteristics [which could be used, for example, in air quality modelling] that are not observable using the paper-based form (Roorda, McCabe and Kwan, 2007b).

Finally, a 2006 study for TransLink adds another dimension to data collection, by focusing on the dynamics of the supply chain, which can extend well beyond an urban boundary. The study determined that international trade constituted a disproportionately large component of goods movement in Greater Vancouver, compared with similarly-sized urban areas, because of the importance of trade with Asia. Accordingly, as part of a multi-part goods movement data collection programme, the study proposed collecting data on the major global industry supply chains that used the region's international gateways (i.e., the marine ports, airport and rail terminals). This was to be done through a series of interviews with logistics and supply chain managers at the largest industries. The interviews would map the actual supply chains, and also solicit information about route choice, costs, performance metrics along each component of the chain (including inter-modal transfer points), and the variability of delay. A second interview was to ask about how the decisions were made about mode, route and gateway choice; the location and impacts of bottlenecks; and actions that were (or could be) taken to get around bottlenecks. The interview results were to be used to develop a spreadsheet model of how transport system performance would impact the supply chain performance, and how changes in supply chains could impact the local transportation network (Cambridge Systematics, 2006).

4.2 Inter-Urban Goods Movement

Several large-scale truck roadside origin-destination surveys have been conducted in Canada. Ontario's Commercial Vehicle Survey (CVS) has been conducted at regular

intervals since the 1980s. The CVS captures the trip, cargo, driver and vehicle attributes of heavy trucks at various locations throughout the Provincial highway network. These attributes include the trip origin and destination, the commodity being carried and its value. Border crossings and traffic at some inter-modal facilities also have been captured. Traffic counts are used to expand the survey sample.

In 1999-2000, a nation-wide truck roadside survey was conducted across Canada. The National Roadside Survey (NRS) was a cooperative effort among Transport Canada and several Provinces. Approximately 65,000 trucks were surveyed at 238 data collection sites, including border crossings (Transportation Research Board, 2003a). Data from a 2006-2007 update to the NRS currently are being analyzed.

The NRS provides a proven example of a nationwide programme for collecting inter-urban truck traffic. The NRS has been cited as an example that could be followed in the United States. A consistent survey form, a common general surveying procedure, and common classifications and terms were developed and used across the country. However, although driver interviews were conducted by local staff who were familiar with local travel and vehicle characteristics, some variations in the data collection were observed. Different groups having different objectives (e.g., enforcement, planning, policy development) gathered the data. This reflected each province's interest in participating in the NRS. However, as a result of these different interests, there was some variation in the focus of the interviews: some focused on vehicle weight and dimensions, which are important for enforcement, while others focused on trip details, which are important for planning. Although these differences must be captured, local nuances must be captured in a "well-planned and consistent manner when national data for a wide range of uses are collected" (Transportation Research Board, 2003a). A further complication arose in the expansion of the 1999-2000 NRS data, whereby Ontario, Québec and Transport Canada each used a different method. This means that the resultant travel characteristics and trip tables may differ for the same location, depending upon whose expansion method is used.

On the other hand, Canada lacks a national commodity flow survey; and there have been no provincial surveys either. In contrast, the US Bureau of Transportation Statistics and the Census Bureau have conducted Commodity Flow Surveys at approximately five-year intervals (1993, 1997, 2002, and most recently in 2007). The US CFS surveys is a nationwide survey of business establishments in selected industries (mining, manufacturing, wholesale trade and some types of retail). A sample of establishments is drawn across all 50 states and the District of Columbia. The CFS supplies data on the flow of goods by mode of transportation in the United States. Data are provided on tons, miles, ton-miles, value, shipment distance, commodity type and weight. All major modes of freight transportation are captured. The sampling frame is drawn from the Census Bureau's Business Register of 6 million establishments, of which approximately 750,000 were in industries covered by the CFS.[3] Funding constraints have caused variations in the sample size, from 200,000 in 1993 to 50,000 in 2002, but back up to 100,000 in 2007. Each of the four surveys used a mail-back document, with on-line assistance provided in 2002 and 2007. Respondents were asked to record the total numbers of their outbound shipments and, for a sample of these shipments, information on value, weight, commodity, domestic destination or port of exit (from the United States) and mode(s) of

[3] These numbers reflect conditions at the time of writing of the source report (2003). There were approximately 754,000 establishments in the candidate industries in the 2007 CFS.

transportation. Instructions were provided on how to sample the shipments. In the 2002 and 2007 CFS, each establishment was assigned a one-week reporting period every quarter, for a total of four weeks in the calendar year. Because different establishments were assigned different times, the sample covered all 52 weeks of the year (Transportation Research Board, 2003b).

The US CFS has the benefit of being the only nationwide source of goods movement data. However, it is limited in several ways (Transportation Research Board, 2003a and Transportation Research Board, 2003b):

- It covers only selected economic sectors.
- It does not cover all modes well – in particular, air cargo is not captured well and only some types of trucking activity are captured.
- There is a lack of geographic and commodity detail at the state and local levels. This constraint reflects both the stratification of the sample to ensure broad industry and geographic coverage, and the need to protect the confidentiality of individual establishments (some of whom, by their size and location, could be identified easily).
- There is no coverage of the external leg outside the US, beyond the ultimate destination. That is, only the mode to the port of exit is identified.
- The turnaround time for processing the data – of the order of two years – limits the timeliness and effectiveness of the data.
- The five-year cycle cannot capture rapid changes in economic cycles or the impacts of new technologies, policies, etc., that might take place in the intervening years.

There have been proposals to implement a rolling (that is, continuous) survey, so as to ensure timeliness and capture changing conditions (Transportation Research Board, 2003b). A Canadian CFS could incorporate something similar, thereby reducing the response burden: this is an important consideration given that the US CFS' historically high response occurs because participation is linked to the country's Economic Census and, accordingly, is mandatory. At that, the 2002 CFS recorded a response rate of 75%, meaning that a significant number of respondents could not provide the necessary information, even with online / telephone support and other guidance. A Canadian CFS also should capture external linkages (especially important given the dependence of the nation's economy on exports); should ensure that intermediate transportation depots and distribution centres are covered; and, should broaden the economic sectors that are included. The relatively high sample size, however, comes at a cost: of the order of $13 million (USD) for the 2002 survey, for example; and the budget for the 2007 CFS in fact was cancelled at one point.

4.3 Conceptual Framework

The resultant framework is depicted conceptually in **Figure 2**. The figure depicts current best practices for the two core survey types and by geography (urban and inter-urban), with the proposed CFS added. In sum, best practice examples of urban CFS and origin-destination surveys exist in Canada. Technically, these could be applied anywhere in the country. The best practice example of an inter-urban survey, the NRS, provides a complement to a nationwide (i.e., inter-urban) CFS.

	Commodity Flow Survey	**Origin-Destination Survey (Trips)**
Urban	Edmonton, Calgary, Peel	Edmonton, Calgary, Peel
Inter-urban	CFS (proposed)	National Roadside Survey

Figure 2. Conceptual Core Goods Movement Data Framework for Canada

Key points to note:

- The TransLink supply-chain initiative adds an additional dimension to urban goods movement data. The TransLink initiative also indicates the importance of including qualitative information in the data set.
- There are other complementary data that should be added to this core framework. These include (Allen and Brown, 2008):
  - Classified traffic counts
  - Travel time surveys, such as the GPS travel time and delay studies conducted in southern Ontario and at border crossings (Tardif, 2007).
  - Parking surveys
- Cost data also are important, including tariff and inter-modal transfer costs. Also important are value of time data.

Several challenges must be addressed. These include:

- An essential key to the success of the Edmonton and Calgary CFS was the availability of complete and up-to-date registers of establishments, which allowed sampling by economic sector. Not all municipalities or regions have such data. Provincial / Territorial and national business registries are maintained by the respective governments, and are detailed, complete and current. However, these data are kept confidential, and their availability for CFS is not immediately clear. Commercial versions of these data are available. However, they are not always up-to-date, complete or accurate.
- Methods to integrate urban and inter-urban data sets must be developed. Statistical methods exist to integrate different data sets; however, as noted, 'data fusion' techniques remain controversial (Transportation Research Board, 2003a).
- Sampling and survey expansion must be addressed and made consistent. Edmonton and Calgary provide useful models for stratified sampling for their CFS, and the sampling for the US nationwide CFS seems reasonable in concept. On the other hand, as noted, three separate methods were developed to expand the 1999-2000 NRS.
- The costs for each city of the complete packages of data collection for Edmonton and Calgary were of the order of $1 million. These costs are in line with those of household origin-destination surveys; however, they obviously are not trivial and so funding sources must be developed. As noted, the US CFS costs are of the order of $11 - $13 million (USD): these are funded, in part, under US Census programmes, but even at that, funding has not also been secure.
- Confidentiality remains a concern, which precludes the release of data for the small geographies that are critical to transportation planning. However, new methods are emerging to address confidentiality (Transportation Research Board, 2003b).
- Privacy and data ownership also are concerns, given that private commercial entities must be surveyed and the provision of data may be viewed as problematic in light of competitive concerns.

- Finally, as noted, the core framework is intended to provide the basis for complementary data collection, such as classification counts. However, urban counting programmes vary across the country in terms of regularity and temporal and spatial coverage. For example, whereas regular classification counting programmes have existed for several years in the Greater Toronto Area and Ottawa-Gatineau, classification counts in the Vancouver are irregular. Similarly, common definitions of vehicle types do not exist across the country (although the NRS obviously provides a basis). Inter-urban counting programmes vary by Province and Territory, in terms of frequency and coverage. Similarly, GPS travel time surveys are very useful, but have been conducted only selectively in different cities.

5. FIRST STEPS TOWARDS IMPLEMENTATION

The development of a nation-wide programme of urban and inter-urban CFS and surveys requires some preliminary steps. These include:

- Definition of common survey forms and other data collection forms. The Transportation Research Board proposed that it would be responsible for the technical definition of such forms (Transportation Research Board, 2003a). However, the mechanics of this activity are not clear – for example, how to achieve consensus? Accordingly, a possible alternative for Canada would be to develop a clearinghouse for best practice, which – within generally uniform parameters (which, in essence, covers most of the data types being collected) – allows for each survey to build upon its predecessor while maintaining a basic consistency.
- Definition of common terms, units of measure and performance indicators. Efforts in the European Union stress the importance of common definitions as a basis for high-quality urban goods data programmes. In part, this addresses the multitude of languages among European countries; more germane to Canada, however, is the assurance also of common technical terms and understanding. The desire for common performance indicators reflects the need to understand what type of information is desired from the data being collected and, in turn, helps define the data collection activities (Browne and Allen, 2006).
- Preparation of up-to-date establishment registries in urban areas.
- Development of common national standards for sampling and for survey expansion.
- Development of a profile of cost information, including tariffs, intermodal transfer costs and values of time.
- Quick actions that build upon and extend existing data collection programmes. For example, much urban trucking activity occurs at night; however, counting programmes typically are conducted only during the daytime. The extension of the daytime counts overnight (perhaps through a combination of data collection methods) would address this need. Another example is GPS travel time surveys. A third example is the conduct of truck trip generation counts at goods-generating establishments and at freight facilities (marine ports, intermodal terminals and airports).

6. SUMMARY

This resource paper develops a conceptual framework for the collection of “high quality” data on urban goods movement in Canada. The framework recognizes the relationship between urban and inter-urban goods movement and, accordingly, the need to account for both. It builds upon existing best practices in Canada; organizes these into core

activities for both urban and inter-urban areas; and proposes a national Commodity Flow Survey. Several challenges and proposed solutions to addressing these are described, along with long-and short-term preparatory implementation actions derived from Canadian, US and European practices.

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