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The Thin Case for Passenger Rail in Ontario’s Northern Regions

Lead Author: Al Phillips

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Our main offices:

- Thunder Bay on Robinson-Superior Treaty territory and the land is the traditional territory of the Anishnaabeg and Fort William First Nation
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- Both are home to many diverse First Nations, Inuit and Métis peoples.

We recognize and appreciate the historic connection that Indigenous people have to these territories. We recognize the contributions that they have made in shaping and strengthening these communities, the province and the country as a whole.

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About the Lead Author

Al Phillips

Al Phillips completed his M.Sc. in agricultural economics at the University of Guelph in 1981, focusing on resource economics and land use. Subsequently he was active in the agricultural marketing research sector where he expanded his skills in primary data collection procedures and research methods.

He joined the University of Manitoba Transport Institute in 1999, taking the lead in many of the Transport Institute's projects, and providing guidance in research techniques and analysis to the Transport Institute team. He remains an associate of the Transport Institute and is a retired Professional Agrologist in the Province of Manitoba.

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Executive Summary:

There is much to be said about infrastructure in Northern Ontario, especially with respect to transportation modes. In particular, passenger rail has been the subject of debate for the past several years. Given this, Northern Policy Institute posed the question: Does passenger rail make sense for Northern Ontario? To explore this question, the lead author analyzed passenger rail in thin and remote regions, while also discussing three key factors for passenger rail in such areas: complementary or supporting freight rail, volume and frequency, and subsidies. Finally, the paper addresses other rationale for remote passenger rail such as road congestion, environmental considerations and nation building. Overall, the study finds that there is no be-all and end-all definite answer. From an economics perspective, and in the context of allocation of resources, passenger rail does not appear to make sense for Northern Ontario. However, there is merit in the other rationale analyzed and further study is encouraged to fully flesh out the benefits and drawbacks.

Introduction

Objective:

The purpose of this study is to assess the parameters that would decide the practicality of passenger rail in Northern Ontario — more colloquially, whether passenger rail in the region "makes sense." In July 2017, the Ministry of Transportation Ontario and the then Ministry of Northern Development and Mines (now the Ministry of Energy, Northern Development and Mines) released a draft study designed to set the framework for further discourse regarding "transportation policy, program and investment opportunities for a modern and sustainable transportation system in Northern Ontario" (Ontario 2017,p. 1). This was a comprehensive document that called for input from invested players on a number of topics.

In referencing passenger rail, the document presents the objective to "reinvigorate passenger rail service where appropriate" (p. 20). In choosing the caveat of "where appropriate," the authors appear to assign conditional expectations on passenger rail in some markets and in the face of the expansion of alternate modes of transportation.

Background:

The ability to move commodities and persons is integral to the stability of an economy, and a robust transportation infrastructure is required to maximize opportunity for the economy. Transportation is, for the most part, a derived demand: transportation infrastructure expands or contracts in response to the needs of the economy — for example, industry locates along or near transportation routes to take advantage of such networks. Where existing infrastructure is well established or expensive to remove, however, transportation infrastructure in place can serve to support a network even if the economy's current demands would not necessarily support similar new development. Since the mid-1800s, rail has often provided the initial major way to and through remote areas of North America to facilitate expanding resource extraction and access to new markets.

The life expectancy of infrastructure of a transportation mode, particularly under relatively low usage, may exceed its place as the optimal choice. A mode might shift from being the best choice to a vestige of past market demands and a victim of changing relative costs, new ownership models, and changing consumer demands. For example, the demand for "just in time" delivery has shifted the advantage from rail to road (trucks) for many consumer goods. Similarly, the cusp for the modal shift from road to rail used to be around 30 miles (48 kilometres). In the early 1950s, if a shipment had to move more than about that distance, it was sometimes considered more efficient to move by rail. However, as the public road network expanded, and truck technologies advanced, that cusp moved outward. Now, with the exception of bulk commodity shipments, road is generally the preferred mode in North America. This shift has also been facilitated by changes in consumer demand and the just-in-time culture. Concurrently, brick and mortar warehousing has been consolidated, and augmented by warehousing provided by trucks on the road. These shifts, in their own time, might be replaced by newer transportation and warehousing models.

Both freight rail and passenger rail contribute extensively to meeting global demand for transportation, with passenger rail being particularly significant in areas of higher population density. In North America, freight rail dominates to a greater extent, particularly in Canada, where, in 2009, 68 per cent of freight was moved by rail, the highest share of any country at that time (OECD 2013). In terms of rail-passenger-kilometres per capita, however, Canada does not rank in the top 30 (International Union of Railways 2015), although some regional or municipal rail data are excluded from the data from which the rankings are sourced.

The Study Approach:

Canadian transportation policy, particularly rail policy, has been driven disproportionately by political or policy considerations outside the framework of economics and efficiency, but that tend to use regulation and/or subsidies as facilitators. This has been a driving force for a number of reasons, including to facilitate economic development in areas where critical mass might not support that activity or where population density does not support extensive transportation infrastructure. Canada's path has been largely determined by ongoing attempts to balance great distances with, in many areas, small populations. Policy will continue to be a main driver in forming Canada's future passenger rail services.

This study attempts, where possible, to inform policy by taking an operational approach to the role of passenger rail in thin markets. The analysis focuses on the economics and comparative costs of operations; acknowledgement of societal aspects; and comparison with other modes that also might meet passenger transportation requirements. It does not look at economic modelling or economic spinoff effects.

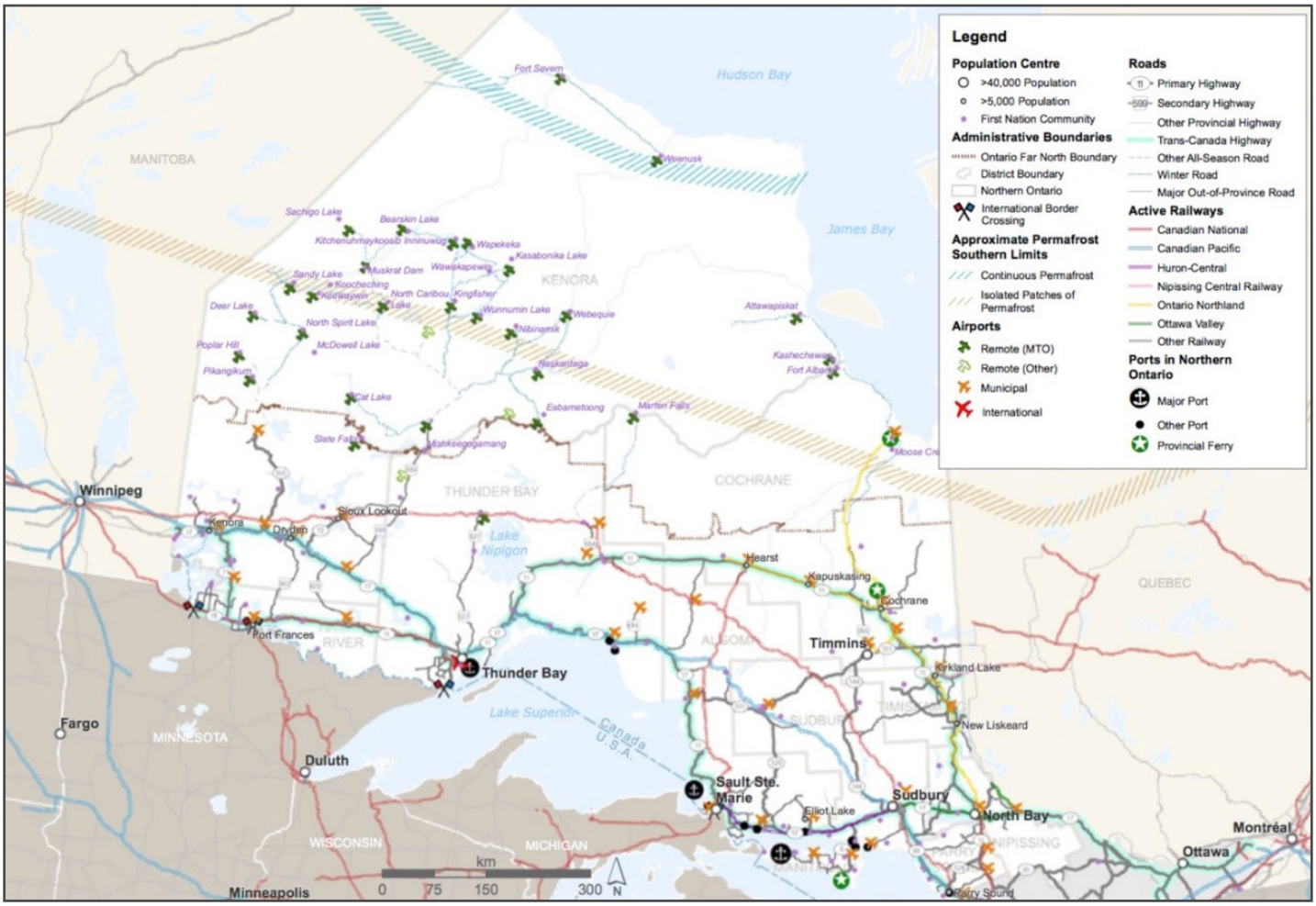
The following section reviews freight and passenger rail operating in thin and/or remote markets and summarizes key elements of those operations. The salient features of a representative group of railway operations will begin to frame the discussion around factors which determine the viability of remote rail. The third section builds on the traits of remote and thin market rail in order to highlight the conditions or circumstances that appear to be necessary for the viability particularly of passenger rail in such markets. The analysis is based upon a review of operational aspects of rail and feedback from rail practitioners. Key players have put forward a number of arguments for the adoption or reintroduction of passenger rail in thin markets. Some of the most commonly cited arguments could be best classified as societal or socio-economic, environmental, cultural, or associated with nation building.

The fourth section includes a review of these arguments as they pertain to the adoption or reintroduction of passenger rail to areas of Northern Ontario, as described in the Draft 2041 Northern Ontario Multimodal Transportation Strategy (Ontario 2017). While not necessarily an exhaustive list of rationales for the support of passenger rail, the arguments discussed in this section represent the main focus of efforts by various stakeholder groups advocating a resurgence of passenger rail in Northern Ontario.

Rail in Thin Markets and Remote Regions

"Remote" rail is a relative term, but this study considers "remote" rail as that travelling within or through areas or communities with relatively low population densities and sparse existing infrastructure. In the context of Canadian passenger rail, Northern Ontario accounts for 90 per cent of the provincial land area but only 6 per cent of Ontario's population (Statistics Canada 2016b). Nonetheless, in meeting the transportation needs of Northern Ontario, an extensive infrastructure has been built, as depicted in Figure 1.

Figure 1: Northern Ontario Transportation Infrastructure



Source: Ontario 2017, 3.

Table 1 lists a number of remote or thin market railways operating in North America and other regions around the globe. While some of these operations have a passenger component, for the most part they have been primarily associated with resource extraction (iron ore and coal). Other track has been laid to serve bulk freight handling or export markets. Where northern or remote passenger travel is involved, it generally is not undertaken without rail freight to contribute to offsetting fixed costs. Dedicated passenger rail (excluding the tourism or excursion market) is rare in thin markets.

Table 1: A Cross-Section of Remote Railways in Current Operation

Location	Name of Railway	Administrative Environment	Type of Transport	Track Capacity, Traffic load (frequency & tonnage)	Track Length +/- (KM)
British Columbia, Yukon, Alaska	White Pass and Yukon Route	White Pass &Yukon Route Railway; Heritage Railway status	Tourism	Summit Excursion: Daily early May to early October; Bennett Scenic Journey – 5 trips/week mid-May to early September	96 (both countries)
Alaska (Seward–Fairbanks and beyond)	Alaska Railroad Corporation	State of Alaska	Passengers and freight	415,500 passengers (2012), 5 MGT[1] Freight	760
Manitoba (Winnipeg–Churchill)	Hudson Bay Railway / VIA Rail	VIA / Arctic Gateway Group Limited	Passengers and freight (re-established December 2018)	2 trips/week	1,700
Manitoba (The Pas–Pukatawagan)	Keewatin Railway Company	KRC (3 partner First Nations)	Passengers and freight	2 trips/week, variable	329
Ontario (Sault Ste. Marie)	Agawa Canyon Tour Train	Agawa Canyon Tour Train / CN	Tourism, excursion	Daily (mid-June to mid-October)	185
Ontario (Cochrane–Moosonee)	Ontario Northland Railway	Government of Ontario	Passengers and freight	5 trips/week (summer)	300
Quebec, Newfoundland and Labrador (Schefferville–Emeril Junction)	Tshiuetin Rail Transportation	Transport Ferroviaire Tshiuetin Inc.	Passengers and freight	Sept-Îles–Schefferville (Monday, Thursday) Schefferville–Sept-Îles (Tuesday, Friday)	213
Sweden (Riksgränsen–Luleå)	Malmbanan	STA, LKAB, CargoNet,	Ore, passengers, and groceries	80,000 tonnes of iron ore products transported/day	473
Russia (Lake Baikal–Khabarovski Krai)	Baikal–Amur Mainline	Russian Railways	Passengers and freight	8–18 million tonnes of freight/year	4,325
China	Qinghai–Tibet Railway	Qingzang Railway Company	Passengers and freight	Avg. 2.1 million passengers/ year (2006–09); Avg. 2.8 MGT freight/year	1,955

Source: Various

[1] MGT = million gross tonnes

The White Pass and Yukon Route, initially laid to meet the needs of the Yukon gold rush, is a successful tourism and excursion route, and has Heritage Railway status. The Alaska Railroad Corporation is a Class 2 railway that offers a combination of excursion service, passenger rail service, and heavy freight throughout its network. The Hudson Bay Railway, serving Churchill, Manitoba, was initially completed in 1929 to provide tidewater access for bulk grain shipments to Europe in direct competition with port facilities on the St. Lawrence River. Freight and passenger rail followed, intended to serve the needs of the port community and to support short-sea shipping to communities in the Kivalliq region of what would later become Nunavut (Malone 2016).

There was no alternate access via an all-weather road. After being washed out in spring 2017, this rail line, the only surface link to the south from Churchill, was reopened to traffic in December 2018.

In Northern Ontario, the Agawa Canyon Tour Train provides seasonal tourism and excursion services from Sault Ste. Marie. Although road service is available in the area, it does not precisely follow the route of the rail, and therefore does not provide alternate access. Similarly, there is no road paralleling the Cochrane–Moosonee train operated by Ontario Northland Railway. That passenger and freight service is what remains of service that used to connect Cochrane to Toronto, which was discontinued in 2012, reportedly by some to be due to insufficient ridership (Ontario 2013, p. 7, p. 27), while others cite policy decisions as contributing factors.[2]

Elsewhere in eastern Canada, Tshiuetin Rail Transportation operates regular passenger and freight service between Emeril Junction and Schefferville, Quebec. The Quebec North Shore and Labrador Railway shifted its focus toward general freight in 2004, which made the line to Schefferville surplus. It was purchased in 2005 by Transport Ferroviaire Tshiuetin Inc. (Wheeler 2015). The track is the only ground access between Schefferville and Emeril Junction and Sept-Îles.

Looking at rail in Scandinavia, iron ore extraction has been a major influence in the role of rail in Sweden and Norway. The Malmbanan ("Iron Ore Train") has operated since 1888 and under LKAB since 1890 (LKAB 2017; Barrow 2019). Ore shipments are the rationale for the existence of the rail, but passenger service and other commodity shipments have been integrated into regularly scheduled service on the rail line.

[2] See "Passenger rail revival plan rolling out this fall," Northern Ontario Business, October 9, 2018, online at https://www.northernontariobusiness.com/industry-news/transportation/passenger-rail-revival-plan-rolling-out-this-fall-1078531 and personal communication with Ontario Northland Transportation Commission executive, June 2019.

As with the iron ore rail in Sweden, remote market passenger rail in Russia (for example, the Baikal–Amur Mainline) and China (the Qinghai–Tibet Railway) is of a different scale in comparison to that in Canada (save for geography). In Canada's remote rail, the discussion is about thousands of passengers or thousands of tons of freight per year, whereas in Russia and China the discussion is based on millions of both. Accordingly, comparisons with markets in Russia and China must be made with caution, particularly when considering the population base of the latter. As noted earlier, however, even when standardized on a per capita basis, Canada does not enter the top 30 countries in terms of rail passenger indicators.

There are few, if any, Canadian precedents of passenger rail in remote markets functioning without support of freight rail or the use of rail originally intended for freight use. While rail in remote and thin markets is unlikely to generate the activity required to create an economically viable stand-alone operation, there might be other variables in assessing the sustainability of passenger rail in certain circumstances. For example, in arguing for the expansion of passenger rail in Northern Ontario, some have suggested that the use of track associated with the Canadian Pacific Railway (CPR) rather than those operated by Canadian National (CN) would improve the chances of passenger rail success. Much of that argument deals with population centre opportunities along the CPR line and a perceived better fit for the long-haul "Canadian" routing (Budd 2018).

Key Factors for Passenger Rail in Remote Regions

Remote or thin market rail is usually distinguished as either freight based, freight/passenger based, or tourism passenger based. Within the freight-based classification, remote rail is primarily dedicated to resource extraction, where there tends to be a limited routing with a single extraction point (or very few points) connected by rail to other supply chain infrastructure. In this, it differs somewhat from freight rail in denser markets, where service is not specific to one access point, but is part of the greater supply chain.

In looking at passenger rail in general, we are reminded that "[t]rains are superb movers of large quantities of people and goods over certain distances and under very specific conditions. But rail is extremely capital intensive and it must be applied judiciously" (Gormick 2017, p.1). Indeed, in relatively sparse markets, such as those found in Northern Ontario, the amortization of infrastructure becomes a more important component, as fixed or semi-fixed costs tend to represent a greater share of total costs of providing service.

Passenger rail in remote regions revolves around the resupply of communities or tourism. Tourism-related rail in remote regions does not necessarily need to partner with freight rail as long as the tourism or excursion revenue stream is sufficient. Also, tourism rail is often seasonal, allowing operators to reduce or suspend operations when continuing to operate would jeopardize financial viability. This offers tourism rail a significant advantage over regular passenger rail, which would be expected to provide scheduling throughout the year. In reviewing existing passenger rail in more remote or inhospitable environments, there still appear to be some keys to success, such as complementary or supporting freight rail, volume and frequency, and subsidies.

Complementary or Supporting Freight Rail

A common theme in reviewing remote or thin market passenger rail is the apparent need for complementary freight rail activity. Further, industry sources suggest that, in Canada, regular freight rail activity is a prerequisite for a potentially viable passenger rail component due to relatively small, widely dispersed populations and difficult route conditions.[3] This assertion is based, in part, on the need to disperse the extensive fixed costs of track and rolling stock that passenger rail could not support on its own. This is corroborated by the extensive use of passenger rail subsidies and Train Service Agreements (TSAs) by VIA Rail Canada, Canada's main passenger rail provider. VIA Rail operates on a network comprising 7,417 route-miles,[4] but owns just 3 per cent of that network. The rest is owned by seven separate entities: CN, CPR, the Goderich-Exeter Railway, Hudson Bay Railway, Société de chemin de fer de la Gaspésie, Metrolinx, and Southern Railway of Vancouver Island (VIA Rail Canada 2017b). VIA Rail has asserted, however, that, despite having TSAs in place, it is in competition with freight rail for access to track:

> Infrastructure owners are mostly rail operators (primarily freight carriers) that conduct their own business on the same infrastructure. As a result, VIA Rail competes with the host for capacity. As freight traffic has increased drastically since the financial crisis of 2007–2008, VIA Rail has been unable to obtain the infrastructure access required for reliable, frequent, and on-time operations, which limits its competitiveness, cost recovery, profitability, and relevancy to travellers. This is a serious constraint noted by the Auditor General of Canada with its Special Examination Report that "existing rail service agreements with the main track-owning railway companies did not give VIA Rail trains the right-of-way" (VIA Rail Canada 2017b, 26).

[3] Personal communication with Canadian Class 1 rail executive, May 2018.

[4] Route-miles comprise the physical length of track over which trains in the network operate. Train-miles are the total number of miles that trains travel on the route. Simplified, five trains travelling over a 100-mile route would collectively log 500 train-miles.

Table 2 illustrates the distribution of VIA Rail's current usage of track by infrastructure owner. VIA Rail's own track ownership is all associated with traffic along the Quebec City–Windsor corridor. As Table 3 shows, 12 per cent of VIA Rail's 6,797,000 train-miles is over infrastructure it owns. There is a linkage between an asset's level of use and the rationale for ownership of the asset. Where usage is below a certain level, the logic for ownership gives way to entering into a TSA. Other variables are also at play in assessing feasibility, but level of usage is still a major component in the rationale for aspiring to track ownership. In the choice of asset ownership or TSAs, the presence of complementary asset use is key. In Canada, rail freight provides that asset use.

Table 2: VIA Rail's Route-Miles, by Type of Service and Infrastructure Owner

Service	CN	VIA	CP	GEXR	HBR	SCFG	Metrolinx	SVI	Total
Corridor	758	186	0.2	55			98		1,099
Long-haul	3,600						14		3,614
Regional and remote	1,833		301		570	0		0	2,704
Total	6,191	186	302	55	570	0	112	0	7,417
% of total	83	3	4	1	8	0	2	0	

Note: CN = Canadian National; CP = Canadian Pacific; GEXR = Goderich-Exeter Railway; HBR = Hudson Bay Railway; SCFG = Société de chemin de fer de la Gaspésie; SVI = Southern Railway of Vancouver Island.

Source: VIA Rail Canada, 2017b, 27.

Table 3: VIA Rail's Train-Miles, by Service Type and Infrastructure Owner

Service	CN	VIA	CP	GEXR	HBR	SCFG	Metrolinx	SVI	Total
(thousands of miles)									
Corridor	3,694	837	1	81			400		5,014
Long-haul	983						3		987
Regional and remote	524		94		179				797
Total	5,202	837	95	81	179		404		6,797
% of total	77	12	1	1	3	0	6	0	

Note: CN = Canadian National; CP = Canadian Pacific; GEXR = Goderich-Exeter Railway; HBR = Hudson Bay Railway; SCFG = Société de chemin de fer de la Gaspésie; SVI = Southern Railway of Vancouver Island.

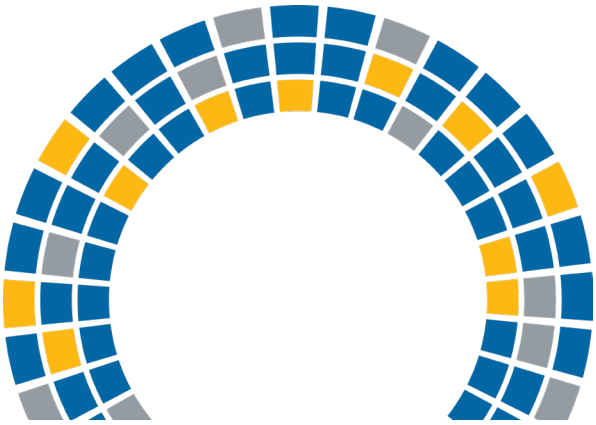
Source: VIA Rail Canada 2017b, 28.

Traffic along the Quebec City–Windsor corridor accounts for 94 per cent of VIA Rail's passengers, with the main function being to provide intercity rail services (VIA Rail Canada 2017b, 36). Long-distance services are in place primarily to provide coast-to-coast tourism and basic transportation as a public service, accounting for four per cent of VIA's passengers, leaving just two per cent of passengers of regional (and remote) services that exist mainly to connect remote communities (VIA Rail Canada 2017a, 2).

As freight rail grows, passenger rail is under increasing competitive pressures. The track needed to serve passenger rail becomes less available — a major constraint in high volume traffic areas — placing scheduling and operational challenges on the providers of passenger rail, particularly where they have to share with a freight rail infrastructure owner.

In areas where freight rail traffic has declined or has been discontinued, some proponents of passenger rail note that "the rail is already there," so passenger rail should have favourable access. Existing rail is not a free asset, however, and requires regular maintenance. In the absence of significant support activity by the rail owner (if the passenger rail provider does not buy the track outright), the passenger rail provider would be expected to enter into a TSA in which a large share of the maintenance costs would be borne by the passenger rail operator. Due diligence would be required before entering into such an arrangement, and the expected traffic load would factor into any discussions leading to a TSA. The passenger rail provider would have to consider if such an arrangement was in its best interests.

Also, freight rail and passenger rail do not interact with the track in exactly the same way. Optimal track geometry is different for freight rail and passenger rail, with the different axle loads — usually 25 tons for passenger rail and 36 tons for North American Class 1 freight — having different traits in vertical and lateral loading of the track, which, in turn, affect train movement characteristics.[5]



Volume and Frequency

Volume and frequency are not only prerequisites for passenger rail. Freight rail also needs to adhere to these requirements, and uncertainty is a great detriment to making rational rail investment decisions. The uncertainty is magnified when considering investment decisions in remote regions. For example, as recently as 2015, the Baffinland Iron Ore Railway was proposing to move iron ore from the Mary River mine site on northern Baffin Island to port facilities about 160 kilometres distant.[6] However, reduced expected mine production in response to lower world prices, in part, led to the choosing of an alternate road route to tidewater on the other side of Baffin Island. A key observation to be taken from this decision is that road quickly becomes the front-runner when there is insufficient expected rail traffic volume.

Therefore, decisions based on assumed volume and frequency should be tempered by the increased uncertainty of demand for transportation infrastructure in remote and thin markets. Further, volume and frequency are relative terms. Passenger rail operators in Canada's relatively thin markets are hard pressed to define thresholds where volumes or frequency are sufficient to warrant a passenger rail service. Passenger rail routes in other parts of the world, however, clearly exceed those thresholds, and give a sense of the scale in which passenger rail can operate efficiently. For example, about one hundred trains run each way every day over the Beijing–Hong Kong high-speed rail route, with a planned usage by over 80,000 passengers per day (Leung 2018). In Britain, "every day more than four million passenger journeys start, end or pass through the stations we manage" (Network Rail 2017). In 2017, Germany recorded slightly over 2.8 billion domestic rail passenger trips (Eurostat 2017).

Focusing on Northern Ontario, the region's thin population, spread out over 90 per cent of Ontario's land area, translates to a population density of about 1 per square kilometre. In contrast, the remainder of the province is home to about 12.6 million residents (Statistics Canada, 2016b), which translates into a population density of about 123 per square kilometre, while population density in the Toronto Census Metropolitan Area is approximately 1,000 per square kilometre (Statistics Canada 2016a). With these contrasts in population density, it is understandable that the challenges faced in the thin markets of Northern Ontario are distinctive, and the corresponding solutions, if any, would present a unique profile.

[5] Personal communication with Canadian Class 1 rail executive (retired), September 2018.

[6] Personal communication with Baffinland Iron Mines Corporation executive, May 2015.

In addition to complementary (and sometimes competitive) freight rail, relatively stable passenger rail service requires volume and frequency. Canadian passenger rail practitioners are aware of these considerations, in fact suggesting these are prerequisites to a rational decision to develop or expand passenger rail.[7] The required volume and frequency are provided by:

- A sufficiently large population in the origin/destination city pairs and/or along the passenger rail corridor; and

- A "cultural link" between origin/destination communities along the rail corridor, which creates the desire to take advantage of the rail corridor. It is noted that, despite the large size of both Toronto and Montreal, there is a smaller market for passenger rail between those two cities than would be expected given their respective populations. In contrast, the Ottawa–Toronto passenger rail corridor is in a growth position. Similarly, within VIA Rail Corridor traffic, the Ottawa–Montreal segment is disproportionately strong.[8]

Volume and frequency are complementary. By adding departures on the Ottawa–Toronto segment, the total passenger traffic on that route was increased, rather than experiencing simply a dilution of a fixed traffic volume across an increased number of departures (with corresponding reduced load factors). By providing more departure choices, passenger rail increased its market base by becoming a more convenient option.[9] Thin market passenger rail, however, might have difficulty in operationalizing that strategy.

The actual population threshold required to provide sufficient volume is the subject of debate, but a subsequent discussion of required subsidies will shed light on some operational thresholds. Similarly, the threshold for the frequency of departures is difficult to ascertain. VIA Rail suggests, however, that high-frequency rail routes with 12 to 15 departures normally generate progressively increasing return on investment, but beyond that frequency, only very large population origin/destination pairs are resistant to diminishing returns.[10]

In short, the economic imperatives of passenger rail in remote or thin markets appear to be, first, freight rail operations to offset fixed costs of rail and, second, volume and frequency.

[7] Personal communication with VIA Rail Canada executive, July 2018.

[8] Ibid.

[9] Ibid.

[10] Ibid.

Subsidies

Even where passenger rail is considered to be justified, it is heavily subsidized.[11] The story of Canadian rail, particularly passenger rail, is characterized by the need for subsidized operations. On a per passenger basis, larger subsidies are invariably associated with more remote or thin market rail. The economics, as discussed earlier, do not support these operations without subsidies.

The history and pattern of subsidies has led some to suggest that the precedent has been set, and that additional subsidies are required to support an expanded passenger rail network in Northern Ontario. There is no doubt that passenger rail subsidies are common in remote markets. For example, "Tshiuetin Railway from Sept-Îles to Schefferville, in Quebec, got $9.5 million in 2016 to carry 14,757 passengers — $643 per trip," and "The Keewatin Railway Company from The Pas to Pukatawagan, in Manitoba, took 11,279 passengers and got $1.7 million directly from the federal government, plus $2.9 million from VIA — $408 per rider" (Dehaas 2017). These are interesting precedents, but one should also consider that, in these cases, rail is the only land-based transportation option. There are no all-weather roads serving these communities.

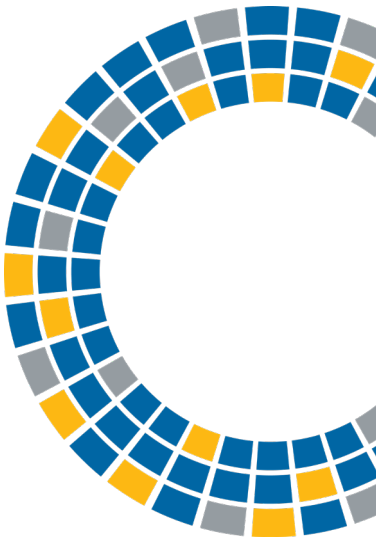
Subsidized passenger rail also occurs where rail is not the only option. The VIA Rail route from Montreal to Senneterre, Quebec (near the Val-d'Or airport) is subsidized, as is the branching of that line over to Jonquière. Other VIA Rail routes, particularly within VIA's long haul service model, are subsidized.[12] These are based on policy-driven decisions at the provincial and federal levels. It should be noted that increased passenger demand might be an additional factor. Specifically, VIA Rail posted a 10 per cent increase in traffic demand on its regional services in 2016 (VIA Rail 2017c), so there are other considerations in the mix.

With respect to routes in Northern Ontario, Dehaas (2017) reports that "[r]idership on the ACR [Algoma Central Railway] averaged only 7,400 per year from 2005 to 2013, with $2.2 million of its roughly $2.5 million in revenue coming from Transport Canada — a subsidy of $426 per trip based on 2013 passenger counts."Although the key termini of the ACR, Sault Ste. Marie and Hearst, are connected by road, numerous communities are more in alignment with the railway route, and not accessible by dependable roads. As such, the ACR is a bit of a "hybrid" when it comes to offering non-rail alternate modes.

Subsidies have also been made to facilitate rail infrastructure in thin markets: "In 2005, the Iron Ore Company of Canada sold the portion of the railway north of Emeril Junction to the Innu nations of Uashat Mak Mani-Utenam and Matimekush-Lac John and the Naskapi nation of Kawawachikamach for $1, and Tshiuetin Rail Transportation Inc. was born" (Ellingson 2019), thereby facilitating continued operation of passenger rail up to Schefferville via Tshiuetin Rail Transportation. Another example is that "[i]n 1997, the federal government brokered the sale of the CN track to Churchill (and the seaport) to OmniTrax of Denver, Colorado. The government invested in upgrades to the port and provided $16M to CN Rail. OmniTrax paid $11M for the track and $10 for the port" (Financial Post 2017). The level of subsidy required for passenger rail might, in some cases, appear independent of the ownership of the rail assets. Despite receiving ownership of the track for $1, the per passenger subsidy on the Tshiuetin Railway remains at least as high as for other subsidized operations. There are many variables, however, not the least of which is that the Tshiuetin Railway is totally isolated and not linked to other rail.

In higher-volume rail corridors, subsidies also serve system efficiency. By moving commuters off the roads, as in the case of GO Transit, there are benefits to the overall system of mobility. However, it has been suggested that GO Transit only broke even on operating costs because bus revenue was offsetting train costs.[13]

Subsidies have been shown to be integral to passenger rail, particularly in thin markets. That said, a broader strategy might be to consider the use of rail subsidies, and subsidies in other sectors, in the context of other possible uses of those funds.



[11] Personal communication with Canadian Rail Research Laboratory staff, June 2018.

[12] Personal communication with VIA Rail Canada executive, July 2018.

[13] Personal communication with Ontario Government staff (retired), May 2018.

Other Rationales for Remote Passenger Rail

As suggested earlier, a decision to support passenger rail in thin markets based solely on revenue efficiency is difficult to justify, even with subsidies. It is easier to support the concept if there is no surface alternative to rail. However, if those alternatives exist, rail's need for volume and frequency might make it difficult to conclude that Northern Ontario passenger rail is warranted.

In the face of these constraints, some advocates of passenger rail have proposed that decisions regarding passenger rail in thin markets should also consider other factors. On April 19, 2018, the Northeastern Ontario Passenger Rail Summit was hosted by the Northern & Eastern Ontario Rail Network, the Coalition for Algoma Passenger Trains, and other groups in Sault Ste. Marie. This summit provided a venue for the presentation of a number of other viewpoints and reasons to support passenger rail in thin markets (as proxied by Northern and Eastern Ontario). The majority of arguments presented fell into one or more of the following categories:

- road congestion and traveller safety;
- limited access to services, exacerbated by an aging population;
- environmental considerations and greenhouse gas (GHG) emissions; and
- connectivity with First Nations and the support of nation building.

Although other factors — such as changing demographics and emerging modifications to transportation modes — are involved in the discussion of rationales for remote passenger rail, this section discusses each of the above four aspects of the arguments for passenger rail in thin markets, with specific focus on the Northern Ontario framework. It is important to note the need for further analysis of these items (as well as of other social benefits), as the intended purpose of this study limits that task. The information in this study is still valuable, however, as it provides more context to the various factors that should be considered further for future policymaking decisions.

Road Congestion and Traveller Safety

Passenger rail is an effective tool to minimize road congestion in intercity travel between dense urban markets. It also contributes to reduce downtown parking congestion and improves productivity by reducing travellers' downtime during transit.[14] These and other benefits of passenger rail in dense markets are well documented, but their benefits in sparse markets with lower population densities might be more challenging to quantify.

Two-lane undivided highways, common in Northern Ontario, present challenges for the smooth movement of road traffic, particularly when there are highway closures due to crashes or other events such as winter blizzards or forest fires. Congestion is also understood as being an exacerbating factor. In a presentation, Mark Andrews, a former Ontario Provincial Police traffic expert, mentioned the importance of reducing congestion on Northern Ontario's road network. Specifically, he suggested that moving travellers out of their cars and onto passenger rail could be a good idea. However, he pointed out that there is a complex interaction on Northern Ontario roads: "[A]llow the transport trucks to do their job and allow the buses to do their job. They're professional drivers…Trucks are at fault 30 per cent of the time. It's the rest of us and our small cars that are doing the problem" (Andrews 2018)

It is unclear if Andrews was specifically citing northern Ontario data in indicating that trucks are "at fault 30 per cent of the time," but his assessment appears to be that passenger vehicles are a greater contributor to the problem than are trucks. He also pointed to concerns about capacity issues and the benefits of reducing the traffic load, particularly given the increasing average age of drivers in Northern Ontario and possible increased cognitive impairment among the driving population (Andrews 2018).

Andrews also suggested that, while the twinning of highways would be desirable, there is an increasing capacity issue, and alternate solutions such as rail could assist with these concerns. The related challenge is in determining how much road congestion could be reduced by the expansion of passenger rail. The passenger rail link from Toronto to Cochrane was cancelled in 2012. The ACR lost its operating subsidy in 2015 (after a one-year extension) because the federal

[14] Personal communication with VIA Rail Canada executive, July 2018.

government decided that it no longer qualified under Transport Canada's Remote Passenger Rail Program (Canada 2016). Indeed, the program itself ended on March 31, 2018 (Canada 2017).

One approach to estimating the effect on congestion of re-establishing the passenger rail route between Toronto and Cochrane or the ACR from Sault Ste. Marie to Hearst is first to evaluate the increase in congestion that took place after those services were ended. Using the Ontario Ministry of Transportation "Traffic Volumes on Demand" website (Ontario 2016), it is possible to track annual average daily traffic (AADT) on the various highway segments that would likely be used in the absence of a passenger rail option.

Considering the Toronto to Cochrane route, passenger rail was cancelled in September 2012, with the "before and after" time frames being of interest. In the Gravenhurst area, AADT on Highway 11 consistently rose by 1 per cent per year from 2012 to 2016, slightly lower than the 2–3 per cent annual increase that had taken place from 2009 to 2011. Slightly north, in the Huntsville area, Highway 11's AADT increases from 2014 to 2016 were from 1 to 2 per cent. During the period from 2005 to 2013, there was no strong pattern in AADT, with little evidence of a strong structural shift in traffic flows. The annual percentage increases in AADT prior to 2005 appear to have differed little from those experienced from 2014 to 2016. Considering the rail service between Sault Ste. Marie and Hearst, AADT on Road 631 linking Highway 11 with Highway 17 has showed little change since the end of rail service. However, the dataset is extremely sparse and applicable for only one calendar year, so any observations would be inconclusive.

This topline assessment covers only small segments of a subset of highways that could be affected by the loss of passenger rail traffic. A more in-depth analysis might be revealing, but, based on road traffic counts during and after the availability of a passenger rail alternative, it has been difficult to observe any significant increases in road traffic volumes as a result of the loss of passenger rail in the area. Given that passenger rail was, according to some, discontinued due to low ridership, it might be difficult to identify a major increase in road congestion after that service ended. An argument could be presented that the average load factor of automobile traffic has risen in response to the loss of passenger rail in the area (thereby masking increased demand on road usage), but exploring that hypothesis would also require further research. Also, the Ontario Northland Transportation Commission (ONTC) increased bus service to take some of the former rail passengers.[15] This could further mitigate observed changes in road traffic loads, and data on changes in bus ridership would be a key element of further research into load factors before and after the termination of passenger rail services.

In dense traffic corridors and areas of significant passenger movement requirements, passenger rail makes a significant contribution to the reduction of road congestion. However, given suggested previously low passenger rail ridership in Northern Ontario, and minimal observed shifts in the (albeit sparse) AADT data, restoration of passenger rail in the thin market of Northern Ontario might not reduce road congestion to any great degree. That said, any reduction in congestion would be a positive step in increasing highway safety in Northern Ontario. Further traffic study and rail ridership research is recommended to determine if a re-emphasis on passenger rail could contribute significantly to alleviating congestion in the region.

Increasing the number of departures on a route could increase the number of travellers who choose passenger rail by more fully meeting passengers' schedules.[16] If a lack of ridership was a major factor in the loss of Northern Ontario passenger rail, however, finding a rationale for increasing the frequency of departures in a restored service might be difficult. In-depth ridership modelling would be needed to determine if the catchment area provides the critical mass necessary to respond to enhanced departure time options.

Improving Limited Access to Services

Some invested players advocating a return of passenger rail suggest the need for Northern Ontario communities to have access to services that major centres in the region and in Southern Ontario enjoy. Access to health care services is understandably high on the priority list. Indeed, all Northern Ontario districts are experiencing an aging population and increasing ratio of dependents to the working-age population (Zefi 2018, 9). Rail advocates also suggest there is a higher incidence of age-related cognitive impairment among drivers in Northern Ontario than in Southern Ontario (Andrews 2018). There is also a growing market for retirement community living in the area. The net result is likely a higher per capita demand for third-party transportation services, including passenger rail.

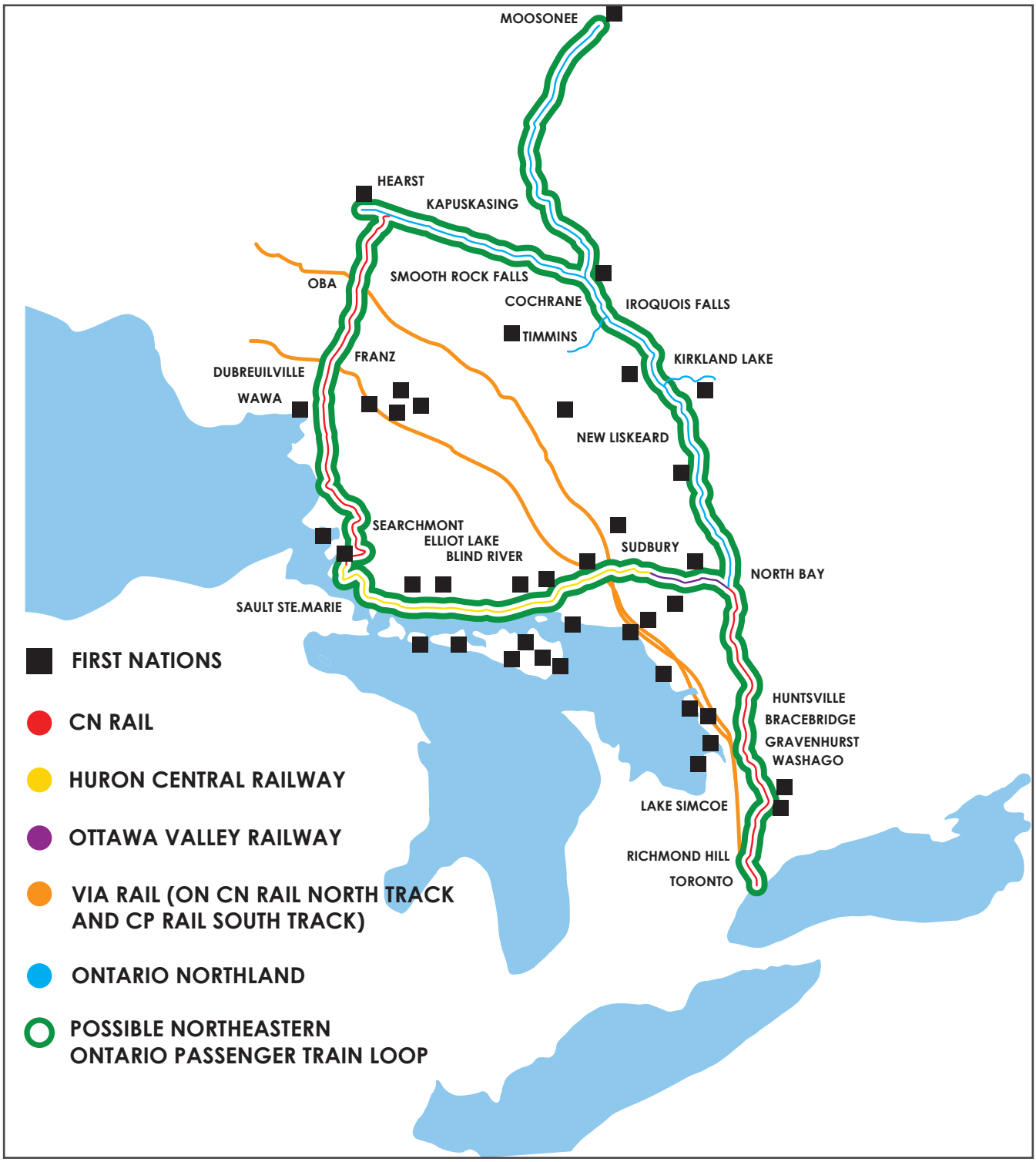
In Northern Ontario, a number of communities are served only by rail or air. Most of the population, however, has road access. Figure 2 presents the train loop proposed by the Northeastern Ontario Rail Network (NEORN) and the Coalition for Algoma Passenger Trains (CAPT), using existing track. Comparing it to Ontario Northland's current bus routing, match in the overlay of these routes, while not universal, is extensive.[17]

[15] Personal communication with ONTC executive, September 2019.

[16] Personal communication with VIA Rail Canada executive, July 2018.

[17] See Ontario Northland's Service Map. Available online at http://www.ontarionorthland.ca/en/service-map.

Figure 2: Possible Northeastern Ontario Passenger Train Loop



Source: Northeastern Ontario Rail Network. Modified slightly from original source.

Passenger rail and intercity bus serve similar functions, but are often not associated with the same markets, and in thin markets they are not positioned as direct substitutes for each other. In the rail excursion market, the trip is part, if not almost all, of the experience, but passenger rail in Northern Ontario is mainly seen as a mode for meeting the transportation needs of residents for example, by offering less travel fatigue and greater convenience for those with mobility issues.

Intercity bus, however, while perhaps considered less comfortable, offers better frequency and more connection points on most routes. Moreover, to "close the gap" with respect to services travellers might expect with a return of passenger rail, Ontario Northland, is continuing to purchase new bus equipment that is wheelchair accessible and capable of transporting mobility aids, including scooters.[18] The company has also purchased three fully wheelchair-accessible washroom buses that allow a passenger in a wheelchair to use the onboard facilities without the need to get off the bus at a rest stop, which takes time when using the wheelchair lift.[19]

Ontario Northland management recognizes the relative advantages of complementary passenger rail and intercity bus, suggesting that "in southern Ontario there is an issue of congestion. In Northern Ontario, there's an issue of connectivity" (see Moore 2018 presentation). Existing and planned changes to the ONTC bus fleet and services are targeted to improve connectivity in the network for a broader range of the travelling public. A collateral outcome, while not necessarily a driving motive, might be to narrow the perceived benefits of bus service vis-à-vis those provided by passenger rail.

How, if at all, do changes to bus service in Northern Ontario relate to the determination of the appropriateness of passenger rail service in the region? It is understood that bus and passenger rail are not direct substitutes, but they both facilitate public transit and, serving the public need in thin markets, invariably have a subsidy component. The subsidies they receive, however, are dramatically different on a per passenger basis. Earlier, passenger rail subsidies in the range of hundreds of dollars per rider were cited, and the Ontario Northland passenger rail subsidy of about $257 per passenger trip also appears to be in that range, although at the lower end. The ONTC bus subsidy in 2017, in contrast, was $2.16 per passenger trip.[20]

Certainly, there are standardization issues in comparing per capita passenger rail and bus subsidies. Bus services operate on public roads shared by other traffic. Quantification of costs associated with buses could be increased to include a congestion component and also to account for bus usage of a public roadway. Also, bus passengers outnumbered rail passengers in the Ontario Northland network in 2017 by a factor of about five to one. There are other factors to consider in comparing the costs of bus and passenger rail, but it is difficult to envision a scenario in which passenger rail with a low load-factor would gain the more financially advantageous position in those calculations.

Limited access to services, particularly for those with mobility issues, remains a significant issue in Northern Ontario, as in other regions with sparse populations. In assessing the strategies for meeting those transportation needs, both passenger rail and bus are considerations.

[18] Personal communication with ONTC executive, September 2019.

[19] Ibid

[20] Personal communication with ONTC executive, October 2018.

Environmental Considerations

Rail is considered the "greenest" land-based transportation mode. This assertion is primarily driven by tonnage per kilometre of commodities moved, and the low production of greenhouse gasses associated with both the former performance and the use of electrified rail.

Despite low point-of-use emissions, electrified rail's high infrastructure costs and technical limitations limit its application to remote, sparsely populated areas such as Northern Ontario. But the efficiency of rail's tonnage/kilometre is well documented. Once up to speed, the low rolling resistance of the wheel-rail interface facilitates high fuel efficiency. For example, "[o]n average, The Alaska Railroad can ship a ton of freight about 457 miles on a single gallon of fuel. Not only is this a greener option for the environment, its cost effective too" (Alaska Railroad 2019); and "[r]ail, with its steel wheels operating on steel rails, can move 1 ton of freight 200 km on 1 litre of fuel" (Miller 2014). This is one reason long-haul rail (with few if any stops or slow-downs) is best suited to fully capture those advantages. Most of the data highlighting the tonne-kilometre fuel economy and low GHG emissions of rail are based upon long-haul freight rail operating at high load factors.

Such advantages, however, do not apply to passenger trains operating at low load-factors: "A lightly loaded passenger train has to deal with moving a 130-ton engine (or two) pulling two 56-ton passenger cars … moving 40 or so passengers."[21] Accordingly, lighter power units and rolling stock could be better suited to thin market applications. The rail diesel car is a self-propelled "rail bus" that was designed as a cost-effective alternative to locomotive-hauled passenger cars. Its application in Canada's market might be limited, however, by the assertion that it "won't move in snow conditions."[22] That said, further research could be undertaken to assess different train set options.

It is unlikely that the fuel efficiency and GHG profile claims associated with freight rail are fully transferrable to passenger rail in thin markets because lack of ridership results in higher GHG production and higher fuel usage on a passenger-kilometre basis. As such, endeavours to build a more environmentally responsible Northern Ontario transportation infrastructure through the increased use of passenger rail in that thin market likely will fall short.

[21] Personal communication with Canadian Class 1 rail executive (retired), September 2018.

[22] Ibid

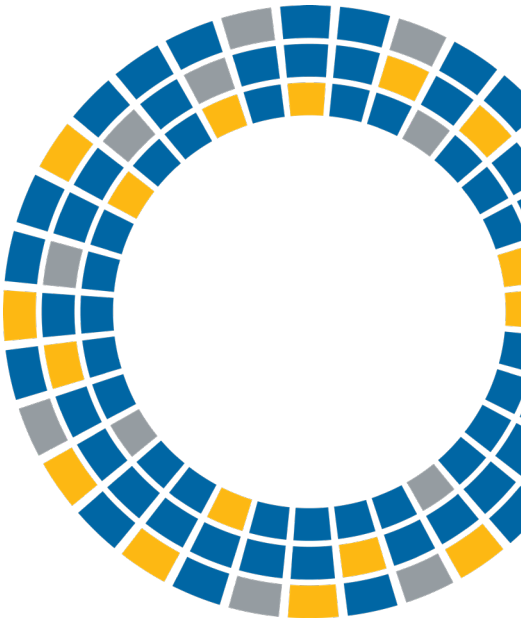
Connectivity with First Nations, Supporting Nation Building

First Nations in Northern Ontario have an established history of depending upon passenger rail for connectivity between their communities and with hub cities in the region. Unlike most other communities in the region, some First Nations communities lack dependable all-season road access. Consequently, there is no dependable surface-based transportation alternative at present for those communities.

The May 2017 loss of rail service to Churchill, Manitoba, served to isolate First Nations communities along the former Herchmer Subdivision from Gillam to Churchill. There is no surface-based backup, and communities in the area suffered hardship as a result. Ownership has since changed, however, and rail service to Churchill was re-established in December 2018 (CBC 2018). There are parallels with the challenges in Manitoba and those faced by First Nations communities in Northern Ontario. Parallels are also found with isolated First Nations communities in Quebec and Newfoundland and Labrador — the Schefferville to Emeril Junction passenger rail route was retained to provide connectivity in the area, as there is no alternate surface access.

Retaining connectivity for First Nations communities is perhaps the strongest argument for passenger rail in Northern Ontario. While passenger rail in the area falls short of any measure of "volume" or "frequency," it is still the only surface option for many of these communities. The failure to connect First Nations communities in the area with all-weather roads during the expansion of Canada's highway network has left Northern Ontario with a gap in transportation infrastructure. Moves, however, are being taken to restore rail connectivity. The Missanabie Cree First Nation has received its Rail Operating Certificate from Transport Canada, the first step in restoring full rail service from Sault Ste. Marie to Hearst (Hopkin 2018). Restoration of this segment could also provide significant collateral benefits for the business community and the tourism sector in the region, as a preliminary economic impact analysis conducted in 2014 suggests (BDO Canada LLP 2014). The authors note, however, the preliminary nature of their findings and the short timeline allowed for the work. The actual level of potential benefits notwithstanding, one could argue that beneficiaries of the return of passenger rail could provide at least some of the funding to restore the operating subsidy that was lost when Transport Canada cancelled the Remote Passenger Rail Program.

First Nations in Northern Ontario have had a complex relationship with rail access, in the past bringing both positive and negative influences to the region (Smith 2017). In the absence of all-weather road access, which could provide a better fit with traffic demands, the restoration of passenger rail to provide connectivity for First Nations communities is likely the strongest argument for the restoration of passenger rail service in certain areas, such as those in which the Algoma Central Railway operates.



Conclusions

Does passenger rail make sense in the thin market of Northern Ontario? Looking through the lens of the economics of rail operations, no. Rail is capital intensive and requires high traffic volumes. However, many areas of Canada are sparsely populated but still require transportation services. The delivery of those services, in the absence of the rationale of the economics of rail operations, involves elements of policy, economics, and evaluation of the trade-offs in meeting remote areas' transportation needs.

Most passenger rail in Canada, even in more densely populated areas, is subsidized already, which shows the decision to maintain passenger rail is driven by other than just the economics of rail operations. That said, the presence of alternate road-based transportation services for almost the entire Northern Ontario population would suggest that the existence of subsidized passenger rail elsewhere does not automatically justify passenger rail in Northern Ontario.

Do road congestion and traveller safety considerations justify passenger rail in Northern Ontario? Although any endeavour to improve safety and security is desirable, the loss of passenger rail does not appear to have appreciably increased road congestion. With that in mind, its reinstatement might have a correspondingly limited effect, although more detailed traffic analysis is recommended.

There is little evidence that the fuel efficiency and GHG profile associated with high-volume freight rail is transferable to the emissions profile of low-density passenger rail in Northern Ontario.

Bus and passenger rail are not equivalent services, but they serve similar functions. The expanding bus network and improvements to the on-board accessibility services in the Ontario Northland bus fleet appear, at least in part, to address the transportation needs of Northern Ontario's aging population. Also, the level of per passenger subsidy required by bus service is much lower than that required to maintain passenger rail service.

Finally, improved connectivity for First Nations communities would be a benefit of the restoration of passenger rail in parts of Northern Ontario. This is perhaps the strongest argument for a return to passenger rail in the region. In the long term, however, policymakers also might consider connecting more First Nations communities directly to the road and highway network.

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