

Identifying a Fly-in/Fly-out Source-Hub Community: The Case of Deer Lake, Newfoundland and Labrador (Preprint)

Leanna Butters, M.A. Environmental Policy
Grenfell Campus, Memorial University
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Abstract

Fly-in/Fly-out (FIFO) is a commuting arrangement involving the movement of employees to and from their place of work by airplane, often on a rotational basis. Extensive research on FIFO has been conducted in Australia where three community types have been identified: source (or home) communities, host (or work) communities, and hub communities (stop-over communities). An additional community type, the source-hub community, was identified in 2013. Though FIFO arrangements are important in facilitating intra- and inter-provincial ERGM, limited research on hub or source-hub communities has been conducted in Canada. Through a door-to-door census and key informant interviews, this study identified Deer Lake in Newfoundland and Labrador (NL) as a FIFO source-hub community. While airport access was an important factor influencing Deer Lake's source-hub development, as was the case in Australia, other significant factors included proximity to friend and family connections and employment. Overall, it is suggested that factors influencing the development of FIFO source-hub communities may be context-specific. While more research is needed to understand the emergence of source-hub communities, these findings contribute to dialogues around the nature of resource-dependent communities, including the study of compound community types and the relationship between FIFO workers and the communities through which they travel.

Keywords: source-hub community, fly/in-fly/out, employment-related geographical mobility, resource-dependent community

Abbreviations:

E-RGM: Employment-Related Geographical Mobility, “situations where workers regularly and repeatedly cross municipal, provincial or national boundaries to get to and from their place of employment” including work in mobile workplaces such as fishing vessels, planes, trucks, and cargo ships (Temple Newhook et al. 2011, p. 66-67).

FIFO: Fly-in/Fly-out, a long-distance commuting arrangement involving transportation by airplane.

1. Introduction

Fly-in/fly-out (FIFO) employment-related geographical mobility (E-RGM) is a commuting arrangement commonly used in natural resource sectors. FIFO employees move to and from their place of work by airplane, often working on a rotational basis. Extensive research on FIFO has been conducted in Australia where mining companies use FIFO arrangements to move their employees to work in remote areas. Here, three community types have been identified and studied: source (home) communities, host (work) communities, and hub (stop-over) communities. An additional community type, the source-hub community, was identified when it was noticed that FIFO workers and their families were relocating to communities with airport infrastructure and/or chartered flights to the regions in which they were employed. Being identified more recently, source-hub communities have received less academic attention and the vast majority of research has been conducted in Australia. For instance, Stawell in Victoria has been identified and studied as a source-hub community (McKenzie 2013, Victoria Department of Transport 2013). Source-hub communities have received limited attention in Canada; however, due to use of FIFO operations in natural resource sectors in Canada it was presumed that source-hub communities also existed in Canada and, therefore, warranted study.

In order to address this knowledge gap, this project sought to identify Deer Lake in Newfoundland and Labrador (NL) as a FIFO source-hub community. Through a combination of door-to-door census and semi-structured interviews, findings confirm Deer Lake is a natural source-hub community and provide insight into factors that influenced its development. Between 2000-2016, this study found that 28% new and significantly renovated homes in Deer Lake had one or more FIFO worker living in them. While some FIFO workers were native residents of Deer Lake, the majority of FIFO workers and their families moved to Deer Lake from outside communities, as has been seen in Australian source-hub communities. In-migrants noted that they were motivated to live in Deer Lake due to friend and family connections, access to the Deer Lake Airport, employment and sense of home. When compared with factors influencing the development of source-hub communities in Australia findings here reveal that, while airport access remains significant in the development of source-hub communities in Australia and Deer Lake both, other motivations and drivers for FIFO workers to move to source-hubs may be context specific. As such, this study contributes to studies on the evolving nature of resource-dependent communities, including the study of compound community types and the relationship between FIFO workers and the communities through which they travel.

2. In the Literature

Hannam, Sheller and Urry (2006) argue that a mobility turn has transformed the social sciences by presenting researchers with the task of re-evaluating established territorial and sedentary tenets. Employment-related geographical mobility (E-RGM) has established itself as one facet of mobility research. E-RGM is defined as “situations where workers regularly and repeatedly cross municipal, provincial or national boundaries to get to and from their place of employment” including work in mobile workplaces such as fishing vessels, planes, trucks, and cargo ships (Temple Newhook et al. 2011, p. 66-67). Under the umbrella of E-RGM, research on the impacts

of work-related mobility has been undertaken at several scales including national, provincial, community, family, and individual. The study of E-RGM is also a topic of international interest with research ranging from daily commutes to/from urban centers, to seasonal work between countries and long-distance commuting (Temple Newhook et al. 2011). Long distance commuting (LDC) includes non-residential workforce arrangements where workers regularly leave their usual place of residence to work and/or live at a distant place, often following a roster schedule such as fly-in/fly-out (FIFO), drive-in/drive-out (DIDO), and bus-in/bus-out (BIBO). (Storey 2001, Haslam McKenzie 2011, Hoath & Haslam McKenzie 2013). This study focuses on FIFO E-RGM.

2.1 FIFO E-RGM

FIFO emerged in the offshore oil industry in the Gulf of Mexico in the 1950s, when establishment of a permanent company town in proximity to the worksite was not an option (Storey 2001). FIFO, and related LDC models (DIDO, BIBO, etc.), have increasingly been adopted by land-based resource sectors in Russia, Australia and Canada as a more cost-efficient and flexible alternative to the development of permanent settlements or ‘company towns’ (Storey 2010, Vodden & Hall 2016, McDonagh 2007, Perry 2015). In instance, non-permanent FIFO arrangements have been found to be less costly for corporations to build, maintain and decommission than permanent settlements (Haslam McKenzie 2011). FIFO workers are transported to and from their place or region of work by airplane. Food and accommodations are typically provided for workers on-site, though these are not extended to the worker’s family (Storey 2001). As such, employees work on rotational schedules spending fixed periods of time at home followed by fixed periods of time at work. Despite the perceived advantages of corporate use of FIFO E-RGM, academics have suggested that FIFO presents a combination of socio-economic costs and benefits for regional host, source, and hub communities and/or regions, as well as for FIFO workers and their families.

2.2 The Impacts of FIFO on Communities

Three community types have come to be associated with FIFO operations: host, source, and hub communities. Host communities are communities that are often located near worksites employing FIFO workers. These communities may provide transportation and other services, amenities and/or accommodations to FIFO workers while they are at their place of work; however, it is important to note that communities may unwillingly become host communities, with workers living there due to proximity to a worksite rather than through formal negotiations with resource companies (Haslam McKenzie 2011). Source communities are the usual places of residence for FIFO workers (Hoath & Haslam McKenzie 2013). Families and/or social networks of FIFO workers are also present in their source communities (Vodden & Hall 2016). Hub communities are communities with a mobility infrastructure (e.g. airport) that facilitates movement of workers between their host and source communities or regions. These communities’ function as connection points for FIFO workers. Because of their differing relationships with FIFO, host, source and hub communities are each impacted by FIFO differently.

2.2.1 FIFO in Host Communities

Without the implementation of corporate-community benefit agreements, FIFO presents some economic and social opportunities for host communities but also several challenges (Story 2010). For instance, it has been suggested that host communities may benefit from an influx of workers, as FIFO can encourage cultural diversity and economic flows as well as attract a skilled population to communities which may have lacked these otherwise (Keough 2013, Vodden & Hall 2016). However, Haslam McKenzie (2011) argues that such benefits are often compromised by the challenges of FIFO, particularly the fly-over effect, which sees economic benefits flow outside the region due to a lack of local spending and through wages paid to non-resident FIFO workers (Storey 2010, Markey, Ryser & Halseth 2015). Other challenges include undermining of local workforces by hiring FIFO workers, use and degradation of community infrastructure, declines in social well-being (poor lifestyle choices), limited place attachment among the host population, and low rates of participation/volunteerism (Finnegan & Jacobs 2015, Storey, 2001, Haslam McKenzie 2011, Keough 2015).

2.2.2 FIFO in Source Communities

Source communities tend to benefit from FIFO operations economically but experience social challenges. For instance, Haslam McKenzie (2011) notes that the income of FIFO workers typically flows into source communities through local spending and taxation. McKenzie et al. (2014) found that FIFO workers in Busselton, Australia often have higher incomes than their locally employed counterparts. However, research also shows that relationships of FIFO for workers, couples and families may be challenged while one partner and/or parent are away (Lifeline WA 2013, Clover Taylor & Graetz Simmonds 2009, Meredith et al. 2014). FIFO work has also become associated with specific community costs such as the loss of local talent, volunteers and community leaders for long stretches of time as well poor lifestyle choices (e.g. spending on illicit activities) (Barrett 2019, Barber 2016, Storey 2010, Haslam McKenzie 2011).

2.2.3 FIFO in Hub Communities

I define hub communities in this study as communities with airports that allow them to function as connection points for mobile workers: hub communities allow workers to move between their host and source communities by airplane. Few studies identifying the impacts of FIFO on hub communities have been undertaken; however, there is evidence that in Australia, hub communities may provide an option for communities facing employment/economic challenges and with airport infrastructures to diversify their development options (Storey, 2016). While some hub communities are simply stopover communities for FIFO workers, others have a more complicated relationship to FIFO operations. Often, this relationship is made more complex by the long-term presence of FIFO arrangements. In these instances, hub communities may actually operate as compound communities by expressing characteristics of other community types. For instance, a hub community may also be a host community if mobile workers live in the community while employed at a worksite of close proximity. A hub community may also be a source community if it also has a permanent resident population of FIFO workers.

2.2.3 FIFO in Source-Hub Communities

In the literature, hub communities have been studied most often as source-hub communities, also referred to as source hub or FIFO source-hub communities in the literature (Haslam McKenzie 2011, Victoria Department of Transport 2013, Storey 2016). Being a compound community, source-hubs may experience some of the challenges and opportunities of being source communities (Haslam McKenzie 2011). This can include socio-cultural impacts, such as the loss of local talent and community leaders to host communities for significant periods of time (Storey 2010, Haslam McKenzie 2011) and economic impacts, such as benefiting from FIFO incomes through taxation and local spending (Haslam McKenzie 2011).

Most studies on FIFO impacts in source-hub communities seem to indicate that while FIFO may present social challenges in communities, it may also present opportunities for socio-economic development and community economic sustainability. In Stawell, for example, a study undertaken by the Victoria Department of Transport, Planning and Local Infrastructure (2013) argued that while FIFO may result in isolation, disruption of lifestyle patterns, and family burdens at the individual level (Houghton 1993), becoming a FIFO hub could potentially enable Stawell to retain youth and lessen out-migration in addition to capturing economic benefits via FIFO workers' wages. As such, it was argued that becoming a source-hub, in the case of Stawell, could improve the overall stability, and perhaps sustainability, of the community (Victoria Department of Transport, 2013).

This notion, however, has recently been challenged. Writing in the midst of an economic downturn, Storey (2016) has suggested that while it was hoped that drawing workers from dispersed geographical areas via hub and source communities would distribute the community impacts of a downturn rather than concentrate them, that may not actually be the case. He writes, "the emergence of targeted source communities or natural hubs has, to a degree, effectively re-created one of the most significant disadvantages of the single-industry community" (Storey 2016, p.8). While the source-hub community model has been presented as an opportunity for regional communities to sustain themselves amidst the challenges presented by FIFO E-RGM, the overall sustainability of these communities may still be subject to the ups and downs of natural resource sector economies. For example, the effects of the 2016 downturn were being felt in Newfoundland and Labrador (NL) where, in 2012, 7.9% of the province's employed labour force was employed in Alberta (Long, 2016); however, an understanding of the breadth of these impacts is only just emerging.

2.3 FIFO and Community Development in Newfoundland and Labrador

Workers in NL have long been engaged in E-RGM and LDC, particularly in natural resource sectors. Traditionally, E-RGM in NL is often linked to offshore fisheries work, but workers from NL have a long history of going away to work in regions such as New York, Boston, and Ontario (Storey 2010). Over the last decade or so, FIFO has been embraced increasingly by workers in NL as it has allowed them to maintain their places of residence in the province while providing access to well-paying jobs within and outside of the province, such as in Alberta (Keough 2015). Oil sands development and operations in northern Alberta increased significantly in the early 2000s. The construction boom occurred in 2003, at which time it became a destination for many FIFO workers from NL (Storey 2010). The oilsands continue to employ many workers from NL.

It has been suggested that FIFO work to Alberta has assisted in the sustaining of rural and outport communities in NL. This is because FIFO allows workers to live in communities that lack other employment options (Storey 2010). For instance, workers in Marystown have been known to commute regularly or periodically to Alberta when local employment in the offshore fishery and fish processing is not available (Storey 2010). It has also been suggested that ‘Alberta money’ has spurred development in FIFO source communities throughout the province. For instance, Town staff in Deer Lake stated that the community had seen an increase in housing development attributed to FIFO workers moving into the community for access to the Deer Lake Airport (Personal communication, Town Representative, 18 November 2016). To this end, it seems that FIFO has been a mechanism to allow rural source communities in NL to retain some of their population and potentially derive economic benefits from FIFO workers. In light of the post-2014 downturn, however, this idea was being re-thought as media reports suggested that NL may have been hit hardest by the collapse in oil prices and subsequent job losses (The Canadian Press 2015). As such, it is unclear at the current time how communities in NL that have benefited from incoming FIFO wages and/or experienced spatial growth associated with FIFO workers will fare moving forward.

2.4 Gaps in the Literature

With regards to FIFO, existing research comes primarily from Australia, particularly Western Australia and Queensland, Canada, particularly Alberta, the Canadian Arctic and NL, as well as Russia, the United States, South Africa, and Chile. Research on the implications of FIFO at the community level has been studied primarily in Australia and Canada. The bulk of research on FIFO hub and source-hub communities are further limited to studies from Australia. Literature on source-hub communities seem to indicate that the source-hub model can allow regional communities to capture the economic benefits afforded by FIFO (Victorian Department of Transport 2013, McKenzie et al. 2014); however, the long-term sustainability of these communities has been called into question (Storey 2016). As such, further study of the FIFO source-hub phenomena may contribute to the discussion of strategies to improve rural community sustainability and development into the future. In the context of NL, where many rural regions are perceived as being in decline, investigation into the impacts of FIFO on permanent residency and development in these regions may help inform community development discussions in the province.

3. Methodology

This project adopted a mixed-method case study approach, using both qualitative and quantitative research methods. The case study approach allowed for in-depth study of a possible FIFO source-hub community in NL. This included identification of Deer Lake as a FIFO source-hub community and investigation into built space change associated with FIFO, as well as identification of some broader community impacts of FIFO operations. The case study approach also allowed for comparison between Deer Lake and identified source-hub communities in Australia (See Victoria Department of Transportation 2013).

3.1 Data Collection

Data was collected using participant observation, media and document review, a door-to-door census, and semi-structured interviews with key informants and mobile workers. Participant observation began in June 2016 and ended in April 2017. Observations were collected while the author lived and worked in Deer Lake as an intern with the Town. Participant observation allowed the author to observe, first-hand, the Deer Lake context – who lives there, how they interact, what neighbourhoods exist, etc. – to better understand how E-RGM fits within these dynamics.

Media and document review began in October 2015 and June 2016 respectively. Media review was used to help guide and justify the research topic. Articles were collected from CBC.ca and the Western Star until April 2017. These two sources were selected to ensure local (Western Star) and provincial/national (CBC) media corporation perspectives were represented. Document review was undertaken throughout the project and included review of the Town of Deer Lake building permit registry, archival documents, photographs, aerial images, and municipal plans.

The door-to-door census was conducted between February and April 2017. The census population consisted of all new homes and homes with renovations over \$20,000 contained in the Deer Lake building permits for the years 2000-2016. The years 2000-2016 were selected to ensure addresses were included before and after increased engagement with FIFO in NL (which happened around 2003). In total, 556 addresses were visited by researchers who delivered surveys in person. If a resident was not encountered during the first visit to an address, researchers returned to that address a second time. If a resident was not encountered during the second visit, a mail-back kit with information letter, survey, and pre-paid envelope was left at the most accessible door of the residence. In total, 224 surveys were completed, and an additional 50 residents chose to answer whether a FIFO worker lived in their dwelling. As such, the response rate for the full survey was 35.4% and the response rate for the survey and FIFO question (whether or not there was a FIFO worker living in their dwelling) together was 43.3%.

Semi-structured interviews were conducted with key informants and residents expand on and provide context for findings of the door-to-door census as well as identify additional impacts of FIFO in Deer Lake. In total, 14 interviews were conducted, 12 with stakeholders and two with residents. In this study, stakeholders included individuals who held positions with the provincial government, municipal council members, community organization leaders/employees, and business owners/managers. Each interview was no more than 60 minutes in length and audio-recorded. These audio-recordings were then transcribed in preparation for analysis.

3.2 Data Analysis

After their collection, data from interviews, the door-to-door census and other relevant documents/images were compiled, organized and analyzed. Data collected via participant observation and semi-structured interviews were analyzed using Nvivo software for content analysis (thematic coding). Census data was analyzed using Microsoft Excel to generate descriptive charts and graphics to communicate findings related to the locations of new housing developments. To analyze the impact of FIFO workers specifically, census respondent addresses

were also separated by whether anyone living at that address engaged or did not engage with FIFO and then analyzed again.

3.3 Limitations of the Study

This project confirmed that Deer Lake is a source-hub community; however, findings are limited in that data was only collected for addresses with new and significantly renovated homes as opposed to the entire town of Deer Lake. It is possible that FIFO workers live at addresses not included in the census population. Surveys were distributed in February-May 2017. Some homes might have been vacated by residents who spend winter months away. This may have affected the ability of residents to participate in the census. Certain questions on the census, particularly demographic information such as household income, were not answered by all participants. As such, this research is unable to definitively address questions related to incomes of mobile workers in relation to non-mobile workers or correlate these numbers with built space changes in the community.

3.4 Case Study Profile: Deer Lake, NL

The Town of Deer Lake is an incorporated town located on the west coast of Newfoundland in the Grand Lake region. Deer Lake stands as the transportation gateway to the west coast of the island, being located at the intersection of the Trans-Canada Highway (TCH) and the Viking Trail (one must pass through the Deer Lake to continue north to the Northern Peninsula or south to Port aux Basques), and home to the Deer Lake Airport. Unlike many communities in Newfoundland, Deer Lake is not a coastal community. As such, Deer Lake's development is linked more closely to the Island's woods and pulp and paper industries than its ocean fisheries.

Deer Lake had a population of 5,249 in 2016 (Statistics Canada, 2016). In 2016, the majority of Deer Lake residents were of working age (15-64), making up 61.9% of the total population (Statistics Canada, 2016). Population growth in Deer Lake appears to have been driven primarily by older and younger demographic categories, while the number of working age adults has declined overall (Statistics Canada, 2016). It has been suggested by key informants that its interior placement and development trajectory may have aided Deer Lake in securing its place as one of the only towns in NL with a growing, rather than declining, population in recent years (Personal communication, Town Representative, 8 November 2016).

The median total income of private households in Deer Lake in 2015 was \$60,320, which had increased from \$49,787 in 2011 (21.2% change) (Statistics Canada 2016). The distribution of households by household 36 total income in Deer Lake showed that in 2015 a higher proportion of Deer Lake households had incomes of \$0-59,999 when compared to those of NL, while a lower proportion of Deer Lake households had incomes of \$125,000 to \$150,00 or more (see Table 1). Average incomes in the town have increased, and stakeholders believe this is due, in part, to the presence of FIFO workers (Personal communication, Town Representative, 5 October 2017).

Table 1: Distribution (%) of households by household total income, Deer Lake and higher-level geographies, 2015 (Source: Statistics Canada, 2016)

Geography	Under \$30,000	\$30,000 to \$59,999	\$60,000 to \$99,999	\$100,000 to \$124,999	\$125,000 to \$149,999	\$150,000 or more
<i>Canada</i>	17.8	24.7	25.0	10.4	7.2	14.7
<i>NL</i>	19.8	25.2	23.2	9.7	7.3	14.7
<i>Deer Lake</i>	22.5	27.3	23.8	9.7	6.3	10.9

With regards to employment, in 2016, the employment rate was 44.9 for the population aged 15 and over (Statistics Canada, 2017). The majority of residents were employed in sales and service occupations (635 of 2,400) and trades, transport and equipment operators, and related occupations (510 of 2,400). In terms of commuting, Statistics Canada data from the 2016 census suggests that 90 individuals of a sample of 1,400 in Deer Lake commuted to a different census division or census subdivision in 2016, while 65 individuals from this sample commuted to a different province or territory. Population growth and increased household incomes over time, coupled with data related to commuting were early indicators that Deer Lake could be a source-hub community for FIFO workers.

4. Results: Deer Lake, a Source-Hub Community

The Deer Lake Airport is perceived as playing a vital role in the growth and stability of the Town of Deer Lake. According to one participant, “The airport is hugely important to the town, economically and otherwise” (Personal communication, Town Representative, 8 November 2016). Prior to beginning this research project, employees at the Town of Deer Lake suggested that FIFO workers were moving to Deer Lake to be closer to the Deer Lake Airport. It was suggested that workers who lived elsewhere in the province, particularly in the Northern Peninsula region, and did not wish drive five or six-hours to get home might opt to live in the Deer Lake for more convenient airport access; however, it was also suggested that individuals living outside of Deer Lake continued to commute into Deer Lake to use the airport to get to and from work within and outside of the province (Personal communication, St. Anthony Town Council Representative, 18 November 2016). Through this project, the author sought to determine the validity of these perceptions by determining whether Deer Lake is both a hub community and a source community for FIFO workers.

4.1.1 Deer Lake as Hub Community

According to the literature, natural hub communities emerge when communities with an airport infrastructure see mobile workers come from outside communities to use the airport, often to access charter flights (Storey, 2016). The Deer Lake Airport has a catchment area from the Labrador Straits to the west, north to the Northern Peninsula, south to Port au Basques, and east to Grand Falls-Windsor (Personal communication, Deer Lake Airport Representative, 24 November 2016). The size of the catchment area may reflect the availability of more direct flights from Deer Lake to other parts of Canada than at smaller airports in the western part of the island (St. Anthony, Stephenville). For instance, according to one participant, people are going to Deer Lake because they can access direct commercial flights there that they cannot access in smaller airports like St. Anthony:

“And I guess, you know, we have everything that people would require and need for such a small region, a small rural area. And some people don’t realize it, but you know, like if you haven’t flown from Cuba or back in the 2007, 2008, 2009 years, we were getting charter flights from the UK, from Gatwick, Australia.” (Deer Lake Airport Representative 18 November 2016)

In 2016, the Deer Lake Airport housed 7 airline services: Air Canada Express, Air Canada, Air Canada (EVAS), Air Labrador, PAL (Provincial) Airlines, Sunwing Airlines, and Westjet (Deer Lake Airport Representative, 24 November 2016). Flights from the Deer Lake Airport in November 2016 included daily flights to Halifax NS, Toronto ON, St. John’s NL, Goose Bay/Wabush, as well as winter service to Cuba (Personal communication, Deer Lake Airport Representative, 24 November 2016).

Traffic statistics from the Deer Lake Airport over time demonstrate a growth trend in passenger traffic overall since 1975 (Personal communication, Deer Lake Airport Representative, 24 November 2016). A significant spike in traffic at the Deer Lake Airport occurred in 2007-12. The airport has identified several market drivers which have helped contribute to this growth including: commuting workers and related charter flights, local/regional tourism, increased airline capacity, new route networks, lower fares/competition, special events/meetings/conventions, and transportation links (i.e. to Labrador) (Personal communication, Deer Lake Airport Representative, 24 November 2016).

It is difficult to say what proportion of Deer Lake’s traffic might be due to a FIFO workforce and what proportion is due to other drivers, particularly tourism. For instance, a seasonal breakdown of flight traffic shows that flight traffic from 2014-2016 has been consistently higher in the summer months. While exit surveys in tourism were conducted at the Deer Lake Airport by the Department of Business, Tourism, Culture, and Rural Development in 2016, data on individuals travelling for work is not available due to travel for work being an exclusionary criterion for the survey. We do know, however, that charter flights to Alberta, a major destination for mobile workers in NL, were available in 2007-8 at a frequency of three charter flights a week. This would certainly have encouraged the use of the Deer Lake Airport by FIFO workers and likely contributed to an increase in passenger traffic at that time (Personal communication, Deer Lake Airport Representative, 24 November 2016). Charter flights were discontinued in 2009, coinciding with the recession and downturn in resource related activity in Alberta, but a representative from the Deer Lake airport suggested that FIFO demand at the airport has

continued with FIFO workers travelling on regular commercial flights rather than charters (Personal communication, Deer Lake Airport Representative, 24 November 2016).

While it is unclear what proportion of growth in Deer Lake passenger numbers were due to FIFO work from 2000-2016, we do know that FIFO contributed to increased passenger movements the Deer Lake Airport up to 2016. Annual tourism performance statistics published by the Department of Tourism, Culture, Industry and Innovation found that passenger movements at Deer Lake Airport were up 7.2% from 2015. The report credited this increase in movements to a strong tourism season and increased activity associated with the Muskrat Falls project, which is believed to have offset declines in traffic to Alberta (Department of Tourism, Culture, Industry and Innovation, 2017).

Expansion projects undertaken at the Deer Lake Airport also suggest that airport growth was driven, in part, by increased demand on the part of FIFO workers. In 2009-10, the Deer Lake Airport facility was expanded significantly, including the development of a bigger runway to accommodate larger planes, and a bigger building facility (Personal communication, Deer Lake Airport Representative, 24 November 2016). It was suggested by a representative from the Deer Lake Airport that, as part of the increased demand overall, use of airport facilities by FIFO workers contributed to this expansion (Personal communication, Deer Lake Airport Representative, 24 November 2016). Linked more decisively to the presence of FIFO workers, three consecutive expansions of long-term parking facilities occurred in 2011, 2012, and 2014. According to a news release from the airport in 2012:

“...the Deer Lake Airport has, once again, expanded its long-term parking area to help keep pace with growing demand. Jamie Schwartz, Airport Chief Executive Officer, indicated that the demand for parking is being driven, in part, by the mobile work force... ‘the demand for parking is increasing at a relatively faster rate than the overall passenger growth. We can only speculate that much of this increased demand is being generated by residents from the western Newfoundland region who are commuting to work in other parts of the country’”.

The above quote demonstrates that increased demand for long-term parking at the Deer Lake Airport in 2012 was linked to use of the facilities by a mobile workforce. A similar note was made in a news release following another expansion of long-term parking in 2014:

“The Deer Lake Regional Airport has completed a parking lot expansion to keep pace with the increasing demand experienced during the past year...Increased activity at the Muskrat Falls Hydro Project and a new Orlando flight this winter will continue to drive demand for parking. It is our hope that the additional parking spaces will see us through the next few years.”

Increased demand for long-term parking at the Deer Lake Airport, associated specifically with travelling to and from work on the Muskrat Falls hydroelectric project, in addition to snowbird traffic travelling to Florida, supported a third consecutive expansion of long-term parking. According to a representative from the Deer Lake Airport: “Really unique is that an airport this size would have 1,237 parking spaces...that’s really unusual. Counterparts across Canada for

doing the same level of traffic that we're doing would have 300-350 car parking spaces.” (Personal communication, 24 November 2016).

Of airports in Newfoundland, the Deer Lake Airport has the most long-term parking spaces and had the second-highest number of passenger movements in 2016 (see Table 2). In addition, the average number of vehicles in the parking lot over the last few years has averaged 800-900 vehicles a day (Personal communication, Deer Lake Airport Representative, 24 November 2016). And despite the 2015 downturn and provincial government cuts reducing non-essential travel for employees, this number was down by only 12-15% in 2016 (Personal communication, Deer Lake Airport Representative, 24 November 2016). This demand for parking suggests that FIFO workers from outside of Deer Lake park their cars at the airport when they are away at work. As such, consistent demand for long-term parking in Deer Lake is linked, in part, to the presence of a resident FIFO workforce within the airport’s catchment area.

Table 2: Long-term parking spaces available at airports in Newfoundland

Airport	Passenger Movements, 2016 (TCII, 2017)	Number of long-term parking spaces
St. John’s	1,568,950	950
Deer Lake	365,681	1,237
Gander	173,690	600
St. Anthony	20,285	Unknown
Stephenville	7,790	No answer provided

Participant accounts, passenger traffic data and infrastructural improvements at the Deer Lake Airport suggest that FIFO workers are using the Deer Lake Airport to get to and from a place of work within and/or outside of the province in significant numbers. The presence of charter flights to Alberta in 2007-8 in NL from 2007-11 confirm that FIFO workers used the Deer Lake Airport to get to and from work during that time. A significant airport expansion in 2009-10 was driven, in part, by increased use of the airport by FIFO workers with demand for long term parking linked specifically to FIFO workers. Also, in 2016, FIFO movements were partly responsible for an increase in traffic at the Deer Lake Airport. Based on this evidence, Deer Lake is a hub community for FIFO workers and has been for the last decade, at least.

4.1.2 Deer Lake as Source Community

Stakeholders associated with the Town suggested Deer Lake was indeed a place of permanent residence for FIFO workers and their families. All interview participants believed that Deer Lake was home to FIFO workers, with predictions ranging from ‘a few’ to ‘half of the families in Deer Lake’ (Personal communications: Business Owner, Town Council Member, and Resident, 5 December 2016; Town Representative, 8 November 2016). Some participants believed that FIFO workers were moving into Deer Lake from outside communities, primarily from the Northern Peninsula region of Newfoundland. It was suggested that a lack of employment opportunities in this region may lead individuals to engage with FIFO employment (Personal communication, Town Representative, 8 November 2016; Business Owner, Council Member, and Resident, 5

December 2016). This working arrangement coupled with proximity of the airport was seen as a motivating factor for FIFO workers to relocate to Deer Lake (Personal Communications: Town Representative, 8 November 2016; St. Anthony Town Council Representative, 18 November 2016). It was also suggested by some interview and census participants that individuals may be more likely to engage with FIFO work if they have another family member (e.g. father, father-in-law) also doing FIFO work (Personal communication, Business Owner, Council Member, and Resident, 5 December 2016). In this way, it was suggested that FIFO may also be an intergenerational phenomenon in Deer Lake and that FIFO workers may choose to maintain their place of residence in Deer Lake because of these familial connections.

Results from the door-to-door census reveal that Deer Lake is a place of permanent residence for FIFO workers and their families. Of the 224 completed surveys, 70 households were found to have one or more resident FIFO worker. In addition, of the 50 respondents who chose not to answer the survey but did identify whether anyone in their home engaged with FIFO work, seven households had one or more resident FIFO worker. Overall, of the total 274 respondents, 77 households had one or more resident engaged with FIFO work, representing 28% of addresses surveyed. This indicates that 28% of all new homes and homes renovated for more than \$20,000 in Deer Lake between 2000 and 2016 have a FIFO worker living in them. As such, FIFO workers reside in Deer Lake and the community does function as a FIFO source-hub.

4.1.3 Motivations for Living in Deer Lake

With Deer Lake confirmed as a source-hub community, other questions on the census were designed to shed light on why Deer Lake developed into a source-hub community. As mentioned earlier, Storey (2016) states that natural FIFO hubs emerge when they have an airport infrastructure to conduct mobile workers between their host and source communities. The Australian literature has identified factors that may contribute to source-hub development by attracting FIFO workers and their families as permanent residents. These include access to an airport and/or chartered flights, availability of affordable housing and access to services, (Haslam McKenzie, 2011). The door-to-door census included used these factors in order to determine if the same factors influenced Deer Lake's development.

As part of the door-to-door census, respondents were asked to indicate whether or not they relocated to Deer Lake from somewhere else. If they had relocated, they were asked to note from where they moved. Respondents were then provided with a selection of motivations that may have contributed to their decision to move to or continue to live in Deer Lake. Respondents were asked to select all motivations that applied them and could volunteer alternate motivations in the 'other' category. Motivations provided to participants were: Access to the Deer Lake Airport, Affordable housing options, Access to natural/outdoor amenities, Access to community services and activities, Access to retail shopping, Access to government services, Access to the Viking Trail highway, and Friend or family connections.

4.1.3.1 Moving to Deer Lake

Of the 224 completed surveys, 152 respondents had moved to Deer Lake from another community in NL or from elsewhere in Canada. The motivations for relocating to Deer Lake

that were selected most often were: 'Other' (32.1%), Friend or family connections (27.6%), and Access to the Deer Lake Airport (12.5%). Within the Other category, the motivations volunteered most often were Employment (47.7%) and perception of Deer Lake as Home (26.1%). Responses for Deer Lake as home included: 'my hometown', 'where I grew up', or 'home'.

When FIFO respondents who had relocated to Deer Lake from another community are isolated, data from the census revealed that motivations of these individuals were largely consistent with those of the larger population who relocated to Deer Lake. For the 70 respondents who engaged with FIFO work, 48 had moved to Deer Lake from another community within the province or within Canada. Motivations most often selected within this group were: Other (28.4%), Friend and family connections (26.1%), and Access to the Deer Lake Airport (21.6%). Further analysis of the 'Other' category revealed Employment (51.8%) and Home (22.2%) as the motivations volunteered most often.

In addition to motivations, this study hoped to reveal from where FIFO workers were moving. This study showed that FIFO respondents who relocated to Deer Lake came primarily from the western region (51%) and, within the western region, primarily from the Northern Peninsula (72%). This confirms the suggestions study participants that FIFO workers were relocating from the Northern Peninsula region; however, it also demonstrates that Deer Lake has drawn FIFO residents from across the province. The remaining fourteen census respondents had not relocated to Deer Lake from another community within NL but had relocated from another province within Canada. Of these respondents, the majority had relocated to Deer Lake from Alberta (57.1%), while others came from Ontario (14.3%), Nova Scotia (7.1%), New Brunswick (7.1%), and Manitoba (7.1%). Overall, Deer Lake has seen new residents move into the community related to their employment, a trend that was also noted in Australia.

4.1.3.2 Staying in Deer Lake

Of the total 224 respondents, 60 indicated that they had not moved to Deer Lake from another community. The reasons why these respondents chose to stay in Deer Lake followed a similar trend to those who had relocated to Deer Lake. The motivations for remaining in the community selected most often by all census respondents were Other (36.7%) and Friend or family connections (32.2%). Within the 'Other' category, Deer Lake as Home (55.3%) was the most motivation volunteered most often for staying followed by Employment (31.6%).

Of these 60 respondents originally from Deer Lake, 19 were FIFO households. The motivations for staying in Deer Lake selected by the FIFO group had less variation than the FIFO respondents who relocated to Deer Lake. Friend or family connections was the motivation selected most often (38.7%) followed by Other (25.8%), Access to natural/outdoor amenities (16.1%) and then Access to the Deer Lake Airport next (12.9%). Access to the Viking Trail, Access to community services and amenities, and Access to retail shopping were not selected as motivations at all by those who grew up in the community. A breakdown of the 'Other' category revealed that Home as the motivation for remaining in Deer Lake volunteered most often (50%) followed by Great place to live (25%), Employment (12.5%) and Lifestyle (12.5%). While sense of home was volunteered as a motivation by both groups, it seems that employment-related

motivations were more often cited by FIFO workers who relocated to Deer Lake than it was for those who remained in Deer Lake which, perhaps, is not surprising.

Overall, with regards to motivations for living in Deer Lake, the census data reveals that FIFO workers who moved to Deer Lake from other communities were most often motivated by Friend or family connections, Access to the Deer Lake Airport and, within the 'Other' category, Employment. FIFO workers who did not move to Deer Lake from another community (i.e. grew up in Deer Lake) were most often motivated to stay in Deer Lake because of Friend or family connections, Access to natural and outdoor amenities, Access to the Deer Lake Airport and, within the 'Other' category, because Deer Lake is Home.

Findings also confirm that FIFO workers have moved to Deer Lake from all regions of the province. However, the majority of FIFO workers moved to Deer Lake from within the western region of Newfoundland and, within that group, from the Northern Peninsula. This suggests that a lack of employment opportunities in the Northern Peninsula coupled with the convenience of living near the Deer Lake Airport may be encouraging the relocation of FIFO workers from this region to live in Deer Lake, confirming the views of stakeholders in both regions.

Access to airport infrastructure was valued by FIFO workers as a motivation for both continuing to live in and relocating to Deer Lake. This suggests that the development of Deer Lake into a source community is linked closely to the presence of the Deer Lake Airport. This is consistent with the development of natural hubs, as described by Storey (2016), and also consistent with findings in the Australian literature (Haslam McKenzie 2011, Victoria Department of Transport 2012). However, results of this study also suggest that, unlike the Australian experience, access to affordable housing and services were not significant factors in the development of Deer Lake as a source-hub community. More important to resident FIFO workers in Deer Lake were Friend and family connections, Employment, and sense of Home.

5. Discussion & Conclusions

Overall, this study demonstrates that Deer Lake is a source-hub community. The Town operates as a source-hub, seeing FIFO workers from outside communities using the Deer Lake Airport to get to work. It is also home to several FIFO workers, with 28% of all new and significantly renovated homes in Deer Lake having one or more FIFO workers living in them. Some FIFO workers and their families relocated to Deer Lake from outside communities, as has been seen in Australia source-hubs. Of the 70 census respondents who had a FIFO worker living at their address, 48 (69%) had relocated to Deer Lake from another community and, 34 of these had relocated from another community in NL.

Findings have confirmed the natural development of Deer Lake into a source-hub community, with in-migrants being encouraged to move to Deer Lake largely because of Family and friend connections, Access to the Deer Lake Airport, Employment, and sense of Home. When compared to factors influencing the development of source-hub communities in Australia, findings here reveal that, while airport access remains significant in the development of communities, there are other motivations and drivers for individuals to move to source-hubs that appear to be context-specific. For instance, in Australian communities, affordable housing and

service access were noted as drivers for the development of source-hubs, while in Deer Lake social bonds and attachment to place appear to be more significant in influencing the decisions of FIFO workers to live in Deer Lake.

It is important to note that FIFO workers were not the only census respondents who had relocated to Deer Lake from another community. Of the 224 full census respondents, 150 listed a former location of residence on their survey (67%). Of these, respondents, 113 had relocated to Deer Lake from another community in NL, 31 (27%) had moved from another province or territory within Canada, and 8 (7%) had moved to Deer Lake from another country. Of the 113 respondents who moved to Deer Lake from another community in NL, 58% moved from the western region, 20% moved from the central region, 11% moved from Labrador, 8% moved from the Avalon, and 4% moved from the eastern region. Of those that moved to Deer Lake from within the western region, 57% moved to Deer Lake from a community north of Deer Lake (including the Northern Peninsula region), and 43% moved from a community south of Deer Lake.

These findings demonstrate that the growth of the Town of Deer Lake cannot be attributed to FIFO alone. It appears that FIFO is one of several forces of mobility influencing the growth of the town, including, as suggested by stakeholders, an aging demographic moving to the Town for access to services/recreation and younger families moving in to access services/recreation for their children (Personal communications: Town Representative, 5 October 2016; Business Owner, Town Council Member, and Resident, 5 December 2016; Stakeholder and Resident, 10 May 2017). These findings also show that the proportion of FIFO respondents that relocated to Deer Lake from another community in NL is slightly higher than the proportion of all respondents who relocated to Deer Lake from another community in NL. This may suggest that more FIFO workers from the Northern Peninsula have chosen to live in Deer Lake because they want to avoid the long drive between home and their point of departure/arrival, as suggested by several interviewees. Perhaps this is an indicator of a lack of local employment opportunities in the Northern Peninsula making FIFO work more appealing and/or viable, again, as suggested by some study participants (5 October 2016). Unfortunately, the data available cannot verify such conclusions, but it raises questions for further research regarding the reasons individuals decide to engage with FIFO work and how they organize their lives around FIFO operations as a result. This study also raises questions around the evolving nature of resource-dependent communities, including the study of compound community types. Continued investigation on this topic is needed if we are to better understand the relationship between FIFO workers and the communities through which they travel.

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