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Fly-in/Fly-out: Implications for Community Sustainability

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Abstract: "Fly-in/fly-out" is a form of work organization that has become the standard model for new mining, petroleum and other types of resource development in remote areas. In many places this "no town" model has replaced that of the "new town." The work system has both beneficial and adverse implications for the sustainability of both existing communities near new resource developments and for the more distant communities from which workers are drawn. This paper explores these outcomes drawing upon examples from North America and Australia.

Keywords: fly-in/fly-out; community sustainability; commute work

1. Introduction

"Fly-in/fly-out" is one of a several terms used to refer to a set of work arrangements for resource operations that are typically located at a distance from other existing communities. The work involves a roster system in which employees spend a certain number of days working on site, after which they return to their home communities for a specified rest period. Typically the employer organizes and pays for transportation to and from the worksite and for worker accommodations and other services at or near the worksite. While most remote operations fly their workforces to and from their worksites, other modes of transport may be used. Fly-in/fly-out is used here as a generic term for these types of commute work arrangements.

This form of work organization is now the standard model for new mining, petroleum and many other types of resource development in remote areas. Over the past twenty-five years, and in Canada and Australia in particular, the "no town" model has replaced that of the "new town." In some recent developments this "temporary community" model is now being used in or adjacent to established

communities to accommodate project labour, suggesting that it is not "remoteness" that is necessarily the principal driver in decisions regarding the use of this approach.

Fly-in/fly-out can have both beneficial and adverse implications for community sustainability both in the communities in the regions where it is used, referred to here as the "host" regions, and in those more distant communities from which much of the workforce is typically drawn, the "source" regions. Both beneficial and adverse outcomes can often be seen in the same communities at the same time. There is no simple answer as to whether these work arrangements are "good" or "bad" in community sustainability terms. What does seem certain is that use of fly-in/fly-out will continue to grow in the foreseeable future. This paper explores this complexity, drawing upon examples mainly from Canada, but also Alaska and Australia, in the hope that by identifying potential effects it will help key stakeholder groups—communities, governments and the resource companies—in negotiating strategies that will optimize outcomes for those affected.

2. Fly-in/Fly-out

Fly-in/Fly-out and the establishment of temporary accommodations at the worksite has its origins in the 1950s in the offshore oil industry in the Gulf of Mexico, where increasing distance of the work from the shore made daily commuting impractical [1].

Onshore use of fly-in/fly-out gathered momentum in the 1970s in both Canada and Australia, encouraged by the expansion of mining activity into increasingly remote areas at a time when corporate interests were focusing on "lean" and "flexible" modes of production and when governments were unwilling to support the development of new single-industry communities in remote areas [2]. While these same driving forces remain important today, labour shortages and strong and rapid growth in demand for labour in the construction, mining and petroleum production sectors have further encouraged fly-in/fly-out as a solution to delivering labour to remote locations.

3. Community Sustainability

Both "community" and "sustainability" are contested ideas and "community sustainability" is a term that compounds a number of vague and ambiguous concepts. In summarizing views on the concept Scanlon [3] notes that while the sustainability notion generally has been most extensively developed in relation to environmental concerns, community sustainability is a more recent derivation that has become increasingly broad in scope. The concept has become increasingly specific in that it looks at the practices and actions that are needed at the micro-level that contribute to or hinder sustainability, and more expansive in that it has moved beyond solely the economic dimensions of development, to encompass the social and cultural aspects of how communities cohere through time [4].

However, Scanlon also suggests that outside of an ecological or economic framework, little research work exists on the potential of cultural practices in strengthening communities and even within these frameworks there seems to be little agreement on what community sustainability entails beyond a very general level. Despite a growing literature on community sustainability, and while noting many of its positives including the emphasis on communities as agents of change and sites of participatory decision-making, Voth and Moon [5], conclude that "the idea of community

sustainability *per se* hardly exists … Vague abstractions like "social capital" are discussed, but few details are provided about what really makes a community sustainable in terms of infrastructure, economics, culture, decision-making processes, and so on".

It is not the purpose of his paper to try to remedy this perceived deficiency, rather the purpose is to discuss the ways in which fly-in/fly-out work arrangements add to or reduce the challenges that people face in living in remote areas. For the purposes of this paper and acknowledging the limited scope of the definition, "community" here is used in the sense of "people living within a specific area, sharing common ties and interacting with one another" [6], while "sustainability" is taken to imply endurance and the long-term maintenance of wellbeing; "[i]n this sense it is a goal for the future, a prediction" [7].

Community sustainability implies that there is some sense of common goals and values with respect to wellbeing, progress toward achieving which can be measured. Herein lies one of the problems in that those common goals and values, where they exist, are more often implicit rather than explicit. The implications of fly-in/fly-out for community sustainability are not simply the net of the perceived pluses and minuses of the system. The effects are complex and whether over time the net result will mean improved or reduced prospects for community sustainability is not possible to say without a better understanding of what it is that makes a community sustainable. However, the conclusions drawn here may help point to actions that could be taken that can preserve or reinforce those characteristics that are valued by at least some community members, which in turn may contribute to the capacity for their communities to endure.

4. Fly-in/Fly-out and Host Regions

4.1. Fly-over Effects

Regional strategy documents, media reports and other materials repeatedly emphasize the view that resource development companies which operate in rural regions benefit from the resources in those regions but, by accessing their workforces and buying supplies and services from the larger metropolitan centres, they give little back to the regions [8]. These "fly-over" effects [9] are perceived to harm rural regions by failing to provide employment or training opportunities for people in those regions. As such it effectively encourages young people to leave their communities to find work elsewhere which, ironically, could mean back flying back to their own region, and by so doing, inhibits population growth or leads to population decline in rural communities.
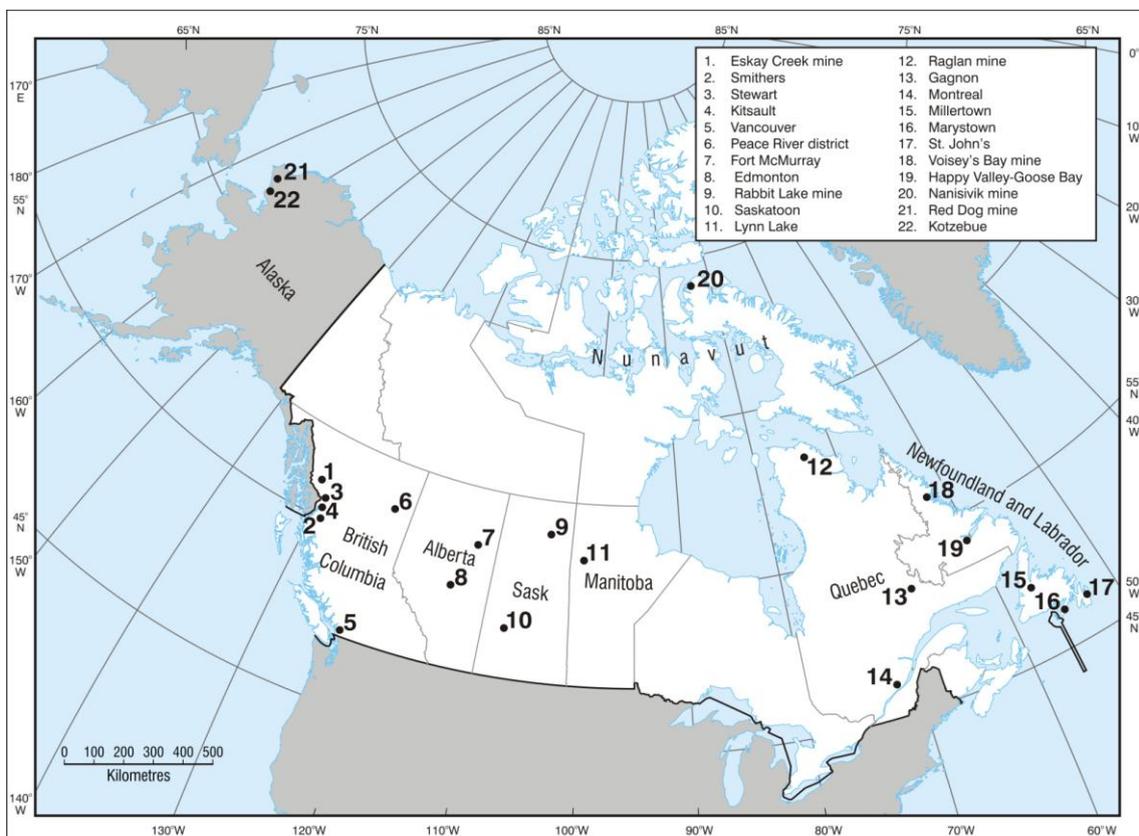
Population decline in turn is reflected in business and government decisions that affect the regions negatively. Furthermore, the system is seen to decrease the share of the benefits to local communities from resource developments and effectively helps to undermine government policy with respect to decentralization and regional economic stability or growth. In Australia these perceived effects have led fly-in/fly-out operations to be referred to as the "cancer of the bush" [10].

Fly-over effects mean that many of the benefits of resource developments in remote areas accrue to the larger, distant, metropolitan urban centres. This is particularly evident in Western Australia where most commute workers live in the Perth region. Furthermore, the smaller regional centres not only fail to capture many of the benefits of development within their own regions [11], but often experience additional cost burdens resulting from the need to provide services for transient workers and operators with little return for their investment. This issue is discussed further in Section 4.2.

Government policy can go a long way to address these concerns by ensuring that development approvals are closely tied to industrial benefits planning strategies and impact benefits agreements that seek to maximize local area benefits from resource projects [12]. Fly-over effects can be mitigated by the inclusion of adjacency principles in impact agreements signed between the resource developer and local groups or governments in which hiring and purchasing preferences are given to local workers and businesses, providing that they meet certain capability and cost requirements. Such agreements are standard practice in Canada, but appear somewhat less well developed in Australia. At the same time communities need to clearly understand both industry requirements and their own capacities to ensure that the benefits they would like to see for their communities are realistic and achievable [11]. Benefits Agreements are discussed in greater detail in Section 4.4.

In the absence of a benefits planning process local community impacts may be significantly influenced by company decisions. For example, the Eskay Creek gold and silver mine in northwest British Columbia (1995–2007) operated a fly-in/fly-out operation with pick-up points in Vancouver, Penticton, Kelowna, Kamloops, Prince George and Smithers. Barrick Gold, the operator chose to establish a regional pick-up point at Smithers rather than Stewart (see Figure 1), which effectively eliminated the latter from capturing some local benefits from the mine [13].

Figure 1. Location of Canadian Sites Referenced.

That said, even with the best of intentions companies may not be able to deliver local benefits as communities might wish. For example, in 2006 Aur Resources, when developing a copper-zinc deposit in central Newfoundland, proposed to base its workforce in the nearby community of Millertown

(see Figure 1). However, workers were unwilling to relocate there and instead, over the protests of the local community, a commute operation with a camp near the mine site was established [14].

A similar issue was experienced by the Voisey's Bay mine/mill operation in Labrador. In an attempt maximize project benefits to Labrador, the company (now Vale Inco) tried to encourage workers from outside of Labrador to move into the region by initially agreeing only to pay for travel to the mine site from Happy Valley-Goose Bay in central Labrador (Figure 1). However, insufficient workers were willing to agree to these terms and given the short supply of labour the company had to back down from its original position and agree to payment of full transport costs for those living outside of the region. Once again the local community vigorously opposed the revised arrangements, but was unable to stop them [15].

4.2. Over-development

If lack of project-community interaction is a concern for some, too much interaction is a problem for others. For example, the pace and scale of oil and gas exploration and operations in northern British Columbia and oil sands development and operations activity in northern Alberta in Canada has increased significantly in the last decade, much of which has involved fly-in/fly-out or other types of commute work. Accompanying these developments have come community concerns about environmental disturbance, including ground water use, noise, dust, flaring and gas emissions, and other types of pollution. Aboriginal groups in particular have been concerned about the disturbance of spaces and places with spiritual value or the potential for hunting, fishing and other traditional activities to be adversely affected.

Concerns have also been expressed about the costs of development associated with a large transient population which makes little contribution to the community, but which may have high social costs as a result of increases in crime, drug use, prostitution, gambling and similar activities. These activities also have economic consequences as increased demands are placed upon infrastructure and services, the cost burden of which tends to fall on the community rather than the resource developer.

The growth of oil and gas activity in the Peace River District of northeastern British Columbia (see Figure 1) illustrates this type of problem and an approach to its resolution. The local economy has undergone a significant restructuring over the past two decades. Traditionally based on forestry and agriculture, a 40% growth in the oil and gas sector between 2001 and 2006 means that this sector now represents 30% of the regional economy [13]. This shift has placed significant demands on local physical and social infrastructure and services, demands on which local authorities have been unable to keep pace, largely because of their inability to raise revenue beyond property taxes. While forestry and mining activities often fell within municipal boundaries and were subject to local taxation, oil and gas activities generally take place either on private land or on crown lands beyond municipal control. Though not subject to local taxation, resource developers still benefit from the use of local infrastructure and services.

In 1993 the Province of British Columbia recognized the fiscal imbalances that development could cause and began negotiations for what would become the Fair Share Agreement (FSA). A memorandum of understanding was developed between the Province and local municipalities acknowledging that local governments should be compensated for services and infrastructure costs

associated with resource developments taking place within their regions. The Agreement was renegotiated in 1998 and again in 2005. The current agreement is for a 15-year period and indexed against the 2004 rural industrial assessment base.

The FSA approach is one that has not been replicated elsewhere in British Columbia. It helps to address some of the direct costs incurred by local municipalities, but tensions remain about the effects of development on the environment, health and safety and lifestyles. The commute work approach to development is not seen as conducive to community stability, growth or long-term development. For many local residents there is considerable frustration with the responses of the industry to local concerns and with the apparent lack of planning for resource development generally. These frustrations have been manifested in the most extreme sense by a series of bomb attacks on gas pipelines in the region since October 2008 [13].

The problems of rapid growth and fly-in/fly-out are even more pronounced in the Regional Municipality of Wood Buffalo and Fort McMurray its main urban centre (see Figure 1), though to date responses have not been as extreme. Commercial development of the oil sands in the region began in the early 20th century, but activity levels have fluctuated over time. The "modern" oil sands era began in 1978 with the official opening of the Syncrude Project, but further stagnation in investment is reflected in the limited (1.1%) population growth in the area between 1986 (36,810) and 1996 (37,222). A revitalized interest in oil sands projects in the next decade saw the area population more than double (103%) by 2006 (75,717) and increase by another 36% to an estimated 103,334 by 2008. At the same time the number of fly-in/fly-out and other "mobile" workers in the area, those working in the municipality but with permanent residences elsewhere, increased from 3,568 in 1996 to 10,442 in 2006 and to 26,284 in 2008 [16].

The Municipality has struggled to keep pace with the growth in population and the associated growth in demand for all types of infrastructure and services. While fly-in/fly-out workers who live in camps place fewer demands on infrastructure and services than those who have migrated to the area and live in the community, their impacts and those of the projects where they work is not insignificant.
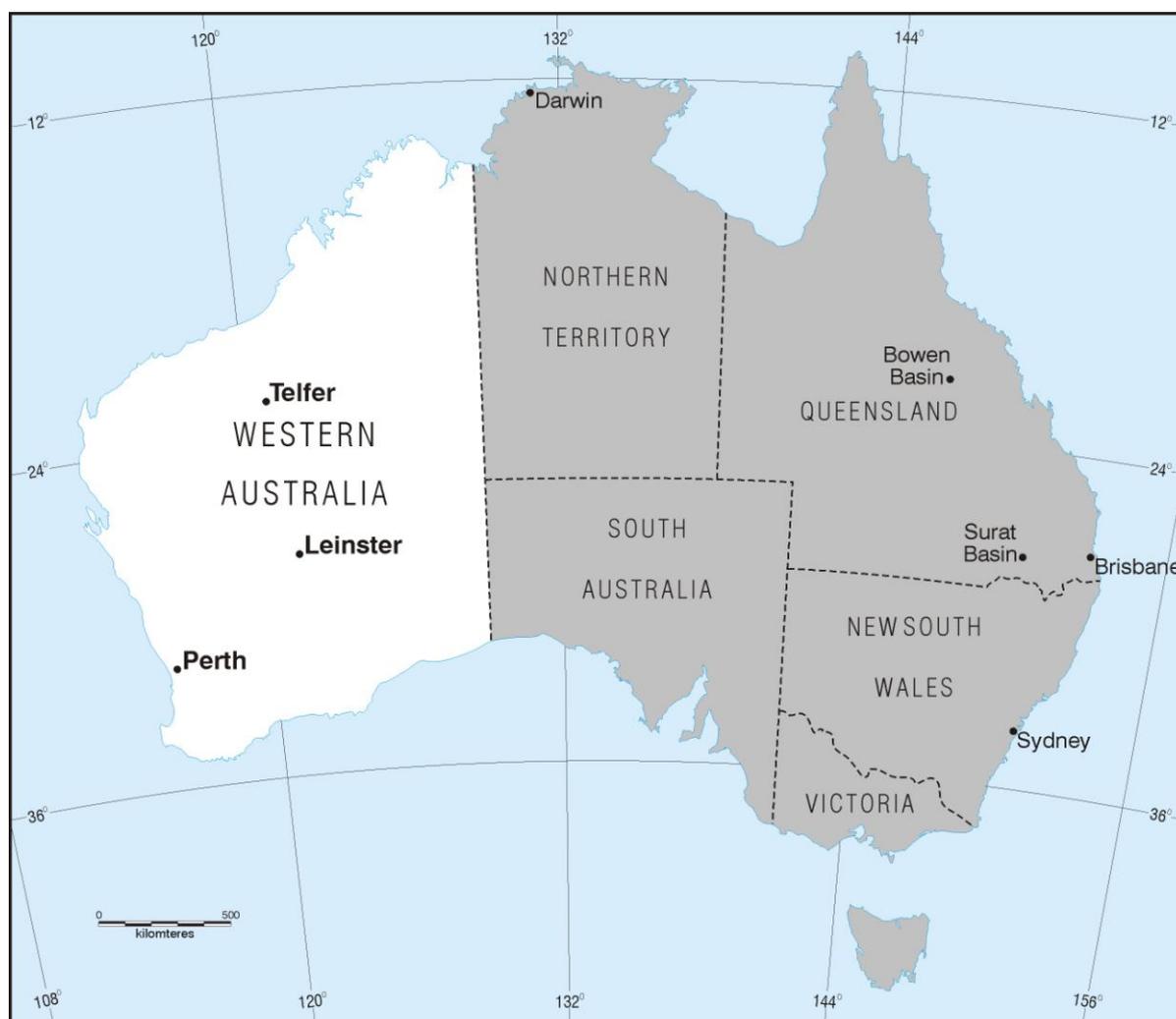
For example, the 435 km of Highway 63 between Fort McMurray and Edmonton to the southwest is the main route between the two centres. Project traffic and workers commuting to and from their work sites and their homes use it. It has some of the highest tonnage per kilometer of highway in Canada, among the largest and heaviest loads, and is among the most dangerous. Locally dubbed, the "Highway of Death" [17], there were 1,011 collisions between 2001 and 2005 in which 25 people died and 257 were injured. Increased activity in the area and greater highway use saw 22 people killed on the highway in 2007 alone. Provincial funding saw twinning of the highway begin in 2007 but the province has been criticized for not expediting the work while at the same time approving new projects in the area [18].

New project applications frequently use the argument that fly-in/fly-out will minimize demand on local infrastructure and services [19,20], however, the cumulative effects of multiple developments and growth of the community of Fort McMurray have meant that demands on medical and other services used by the local and transient populations have exceeded local capacities. With decisions regarding development of oil sands projects being made at the provincial level, but responses to those decisions expected to be addressed at the municipal level, the absence of an overall planning and funding process has meant that growth has outpaced the ability of the municipality to adequately

respond. The economic downturn experienced in 2008 was, in the view of the Mayor of Fort McMurray, a welcome respite from the pace of growth that had been experienced and an opportunity to perhaps regroup and catch up with some of the demand on municipal infrastructure and service before the next growth phase [21].

Notwithstanding some evidence of forward planning efforts [22-25], similar problems of overdevelopment seem to be in store for the Surat Basin in southeast Queensland (see Figure 2). The Queensland government has identified mining and energy production as priority sectors, and the Surat Basin will play an increasingly important role in this development because of its large coal and gas resources. Nearly 50 mine and energy projects were expected to be up and running in the Basin by 2011, with a number of companies planning or developing coal seam gas, underground coal gasification and liquefied natural gas projects [26].

Figure 2. Location of Australian Sites Referenced.

Within the Surat Basin there are a number of relatively remote communities based on agriculture. Towns in the area are generally small and serve as community hubs for their rural catchment areas as well as centres for administration and commerce, and most have established infrastructure and service delivery networks that reflect their past roles and population distributions.

Prolonged periods of drought over the past two decades and rising fuel and labour costs have adversely affected the profitability of agriculture. Many younger people have left the area for larger urban centres or for better paid employment elsewhere, including the mining industry of central Queensland. In addition, a growing number of older people have moved to coastal areas and larger regional centres on retirement. As a result, the size of the populations of most of the smaller communities in the region fell between 1981 and 2007 [27].

The recent large scale and rapid resource development-led change has, not surprisingly, resulted in the emergence of numerous new social issues including employment and skills shortages, a shortage of affordable housing, social inequities and lack of appropriate infrastructure and services [27]. The adjacent Bowen Basin (see Figure 2) has faced similar transformations due to the exploitation of coal reserves in the recent past. The resulting socio-economic transformations included significant benefits, but also unintentional and socially undesirable effects that communities in the Surat region would like to avoid. Given the willingness of the State government to fast-track developments, this may be difficult. While there is local concern about the use of fly-in/fly-out [28], it appears that skills shortages and lack of local infrastructure to accommodate the required workforce means that there may be little choice but to use fly-in or drive-in roster arrangements if the proposed development schedule is to be maintained.

Some resource developers in the region, such as Arrow Energy, plan to draw on local or locally resident labour, arguing that living in the area and having a more settled career with the opportunity for good family life will prove more attractive to prospective employees than commuting [29]. Others are less convinced that this will be possible. The Curtis Island LNG project is expected to create some 5,000 direct jobs, however, a spokesperson for Australia Pacific LNG, the project developers, indicated that: "We are planning … to have up to 80 per cent of our workforce fly in and out because we think we will only be able to attract 20 per cent of a local workforce" [29].

Even Government is anticipating infrastructure needs to facilitate fly-in/fly-out. As a spokesperson for Energy Skills Queensland noted: "The geographic spread of potential CSG/LNG sites means that jobs will be available from locations west of Toowoomba as far north as Townsville, with opportunities to either live in rural… locations or to fly in, fly out from coastal centres" [25].

Notwithstanding an apparent realization of the need for impact management planning to maximize the benefits and minimize the costs of resource development in the Surat Basin, it is difficult to imagine that, given the scale and rate of development proposed, investment in community and regional infrastructure and services will be able to keep pace with development, or that fly-in/fly-out will be the solution to minimizing local infrastructure and service demands. If so, little will have been learned from the Bowen Basin experience or from elsewhere.

4.3. Aboriginal Communities

Where the scale and pace of fly-in/fly-out activity has been more modest, host regions can benefit in ways that may be different from those associated with traditional town site development. Fly-in/fly-out was, for example, originally seen as a potentially valuable component of government affirmative action programs designed to encourage participation of Aboriginal peoples in resource development. The commute system allowed Aboriginal people to participate in the resource-based

activity while at the same time minimizing potential adverse social interactions through the separation of home and workplace and allowing them to maintain elements of their traditional lifestyle [30].

In Canada the first fly-in/fly-out program specifically designed to incorporate Aboriginal labour was the Panarctic Oil Project, which included a commute for Aboriginal workers from (the former) Pond Inlet and Arctic Bay, Baffin Island, to exploration sites in the Arctic Islands. In 1974 Gulf Minerals Canada Ltd. established a fly-in/fly-out system between Aboriginal communities in the Athabasca/Fond du Lac River region in Northern Saskatchewan and its Rabbit Lake uranium mine (see Figure 1). Commuting from communities in this region to various uranium operations in northern Saskatchewan continues to this day [13].

In Canada in particular, the fly-in/fly-out model has been seen as a means of incorporating Aboriginal workers into the industrial work world. Experience in Saskatchewan serves to illustrate this [13]. In the 1970s mining companies in northern Saskatchewan saw the opportunity to tap into an undeveloped "local" labour source when they found themselves competing for labour in the north with the petroleum industry and an expanding potash sector and while employment levels were high in southern Saskatchewan [31]. From a government perspective, integration of northern Aboriginal peoples into the economic mainstream was consistent with policy, while at the same time there was little appetite for supporting the cost of development of new resource towns [32]. Furthermore, from an Aboriginal resource worker perspective, work that required relocation to towns was not an attractive proposition, while fly-in/fly-out work allowed participation without permanent relocation [33].

Both levels of government have supported and facilitated Aboriginal involvement in northern resource development projects. In Saskatchewan, the provincial government funded improved transportation infrastructure in the north, and both the federal and provincial governments have invested heavily in Aboriginal education and training programs.

4.4. Benefits Agreements

The past twenty-five years has seen significant changes in the political power of Aboriginal groups. In Canada, as a result of Aboriginal title decisions, land claims agreements, statutory requirements or government policy, Impact Benefits Agreements (IBAs) of various types have become a recognized part of the package of regulatory requirements associated with major resource projects [34]. Similarly, in Australia, Indigenous Land Use Agreements (ILUA), agreements on State land where native title has not been extinguished, may be signed between the proponent and the affected indigenous group as one of the conditions for development [35]. These are intended to address the concerns of Aboriginal people and other local residents regarding the potential adverse effects that large-scale development could have on their communities, while at the same time ensuring that local people and communities have the opportunity to benefit from the developments occurring in their region.

IBAs and ILUAs are legally enforceable, usually confidential, contracts in which the local group promises to support a proposed project in return for the developer's commitment to local benefits, environmental and cultural protection and other terms. Increased political power on the part of landowners and residents, and a greater awareness on the part of resource development companies of the need to demonstrate social responsibility have encouraged the negotiation of benefit agreements

with (primarily indigenous) groups adjacent to new developments. The benefit of investing in "a social license" to conduct business can facilitate and help maintain local support for the project that might otherwise be affected through, for example, delays due to local resistance.

The nature of these agreements has changed over time [13]. In Canada, for example, in the 1970s and early 1980s they were mainly between industry and government, e.g., Surface Lease Agreements in Northern Saskatchewan, in which government was acting on behalf of the residents, particularly Aboriginal residents, in the region affected by the project. Today most agreements now take the form of IBAs and are made directly between industry and Aboriginal groups. Non-Aboriginal people, businesses and communities adjacent to the project may benefit from commitments made by the resource developer through preferential hiring of local workers or contract awards to local companies, but these commitments are usually to government and are made on behalf of rather than by those directly affected.

In Saskatchewan the first Surface Lease Agreement with Amok in 1979, included a requirement to employ 50 per cent "northerners." In order to facilitate this, a free 7/7 fly-in/fly-out schedule was to be established between the minesite and at least five points in northern Saskatchewan. Once established the schedule could only be altered if necessary and if approved by the employees.

Since then fly-in/fly-out systems have since become the standard model for delivering Aboriginal workers to Saskatchewan uranium and other northern resource operations, and there are now a variety of agreement mechanisms from Impact Benefits Agreements to Joint Venture Agreements designed to encourage northern Aboriginal employment, business development and other socio-economic effects of potential benefit [36]. While the involvement of Aboriginal people in northern resource development may not have grown as much or as quickly as was perhaps originally hoped, there has nonetheless been a significant increase in the number of Aboriginals working in the sector. In Saskatchewan, for example, overall employment of "northern residents" in northern mining operations increased from 18.5%, in 1989 to 34.2% in 1991 [37], and to 51% in 2006. In the latter case, 85% of northern resident employees were of Aboriginal ancestry [38].

In the early days expectations for Aboriginal involvement in mining and other resource developments were often unrealistic. The formal education and training requirements required for many positions could not be met by most Aboriginals given their low levels of education and training, and limited experience in working in a cash income economy. For example, at the start of production in 1976, the Nanisivik zinc mine (see Figure 1) had hoped for a 60% Aboriginal workforce, but by 1992 had settled for 25% or less, though it was still at the time seen as "one of the best hiring records in the Canadian North" [39].

Similarly, at the Cominco Red Dog mine north of Kotzebue, Alaska (see Figure 1), under the agreement negotiated in 1982, first preference in hiring was given to Northwest Alaska Native Association (NANA) Regional Corporation shareholders with the objective being to have 100% shareholder employment by 2002. In spite of on-site and off-site education and training programs, by this date only 50–60% of Red Dog employees were NANA shareholders and the 100% goal continues to remain elusive [39].

These earlier experiences have, however, benefited recent operations. Employment quotas are now less likely to be specified, but demonstration of "best efforts" to hire Aboriginal workers is required. Expectations for local hiring may now better reflect different regional conditions. For example, the

Agreement between the Makkivik Corporation and Falconbridge for the Raglan nickel operation in northern Quebec (see Figure 1) relies on best efforts with respect to Aboriginal hiring and here Inuit hires represent about 16% of the 300-person workforce [40]. By contrast, at the Vale Inco Voisey's Bay Mine/Mill in Labrador (see Figure 1), and even though Aboriginal hiring quotas are non-enforceable, the minimum expectation was for 25% Aboriginal hires, with 50% as the objective. In 2008 Innu and Inuit hires in fact represented 54% of the workforce [36].

While impact benefit agreements may give priority to hiring individuals from within the project region, there is no guarantee that income and other benefits will continue to flow to the communities from which they were hired. Most commute arrangements see workers travelling from designated pick-up points or their travel costs paid for from a variety of locations. This gives workers a greater choice over where they choose to live at no cost to themselves in terms of journey-to-work transportation costs.

In Saskatchewan, McBain [37] found that 36% of "northern hires" working in the north were living in the south. The definition of a "northerner" had changed over time and so not all of these may have been relocations, nevertheless, this out-migration represents a loss of key working members of northern Aboriginal communities and a reduction in potential multiplier effects of income expenditures in those communities [13]. A variety of reasons have been offered for the moves. For example, some had moved to larger southern centres to provide better opportunities for their families, while others had moved to avoid pressures from family and other community members to share the income that they had earned [31].

While over the last 40 years Aboriginal involvement in fly-in/fly-out work has increased significantly, industrial careers may not necessarily be what many are seeking. Aboriginal workers at Red Dog describe jobs at the mine as welcome opportunities, but mining may less often be considered as a career. Punctuality, consistency and hierarchical control structures, all common feature of industrial work, may not match traditional life characteristics [39]. Education achievement levels among Aboriginal people are still low compared with the rest of the Canadian and Australian workforces and many of those leaving school often lack the academic proficiencies to qualify for training programs or jobs in the professions or trades [41].

For some Aboriginal workers commute work is important in helping to support traditional lifestyle activities. Where work schedules are permissive or organized to allow absence from the workplace during important hunting or harvesting times, or during important ceremonial and spiritual events, conflict between the industrial work culture and Aboriginal culture can be minimized. At the same time cash income can facilitate ongoing engagement in traditional activities through the increased ability to purchase equipment and pay travel costs to access hunting, fishing and gathering areas more efficiently [31].

4.5. Community Re-designation

Single industry communities, particularly those based on non-renewable resources, often do not survive the depletion or decline in viability of their resource base. The mining "ghost towns" of the early 20th century bear are testimony to this. In Canada, closures followed by abandonment (e.g., Lynn Lake Manitoba), demolition (e.g., Gagnon, Quebec), or sell-off (e.g., Kitsault, BC) (see Figure 1),

have been among the ways of dealing with traditional resource communities that are no longer viable. While fly-in/fly-out has been seen as a way of avoiding establishing "permanent" settlements with potentially short life-expectancies it has also been used as a transitional phase in the life-cycle of a number of permanent settlements.

There are few remaining "company towns" in Canada, but in Australia companies have been able influence community sustainability by choosing whether or not remain as "closed" towns with restricted residential access and whether or not to use fly-in/fly-out arrangements. The town of Telfer, WA, for example, was built in 1976 by Newmont Mining to accommodate workers at the Telfer gold mine (see Figure 2). By the early 1990s the population had grown to almost 1,000 and community services included a supermarket, police station, bank, community hall, library and sporting facilities. At this time the community had all of the characteristics of a remote mining town with a male/female ratio of 2.4/1, 50 per cent of the population under the age of 35 and an annual turnover in population of 20 per cent [42].

In 1996 the mine owners (now Newcrest Mining) made the decision to switch to fly-in/fly-out. The rationale was to give the mine access to a larger supply of skilled workers and to those who would otherwise have been unwilling to relocate to Telfer. The change in work arrangements resulted in all commercial services being withdrawn, only the recreational facilities were kept, and existing housing was used to accommodate fly-in/fly-out workers. In 2000 operations were suspended because of high operating costs, but in 2002 Newcrest announced a redevelopment plan and the mine reopened in 2004, once again as a fly-in/fly-out operation.

Leinster, also in WA (see Figure 2), has experienced a less dramatic, but for those permanent residents there, perhaps a crueler fate. Established as a "closed" or company town in 1976 to provide accommodation facilities for workers at the nearby Agnew nickel mine, it struggled for financial viability in the early 1980s and was eventually closed and both the mine and the town were placed under "care and maintenance". In 1989 the new owner WMC Resources (now part of BHP Billiton) recommenced mining and repopulated the town, providing accommodations for workers at its Leinster Nickel and Agnew Gold operations.

The town's status as a closed, company town added to its attractiveness as a residential option. Pattenden [43] reports that the metaphor of "an oasis in the desert" was a recurring theme in residents' description of the town. However, the situation changed in the 1990s when WMC offered workers the opportunity to either be resident in the town or work fly-in/fly-out rosters. By 2000 the population consisted of approximately 1,400, of whom 587 were residents (workers, children and non-working spouses) and the remaining two-thirds fly-in/fly-out workers. What had been a planned 210 residential unit community in 1977 had become a 1,100-person, predominantly fly-in/fly-out accommodation village.

The effects of this shift in the workforce balance are not surprising. Material infrastructure in the residential part of the town was less utilized and deteriorated. Town shops lost a large part of their client base and service to residents declined. There was a significant reduction in the number of people who had any involvement in the organization of and participation in community activities such as sport or social functions. The number of school children declined bringing into question the viability of schooling in the community and further reduced the opportunities for interaction activity and stimulation that parents regarded as necessary for healthy child development. Furthermore, the decline in the number of social contacts added to the "burn-out" factor associated with the intensity of living,

working and socializing in close proximity with the same group of people and turnover in the residential workforce increased [43].

In 2000–2001 WMC conducted a review of the town's future. This created further tension and uncertainty with many residents believing that the outcome of the review would be the dismantling of the town's residential infrastructure and a conversion to fly-in/fly-out only. As yet that has not happened and workers still have the choice of being resident in Leinster or fly-in/fly-out commuters. How the current owners, BHP Billiton, see the future of the community is unknown. While the town is dependent on the life of the mine, the same cannot be said of the reverse. The mine could easily be sustained with an entirely fly-in/fly-out workforce and so the future of the town and that of its residents is far from clear. While there was never any indication that Leinster would ever have been "normalized" or that if it had it would have been sustainable, by switching to the fly-in/fly-out model either of those possibilities seems likely to have gone for ever.

5. Fly-in/Fly-out and Source Regions

5.1. Income and Lifestyle Support

Fly-in/fly-out can also have important consequences for source regions from which workers are drawn. In Saskatchewan, for example, the face of rural agriculture has been changing for many years and the family farm has been in decline. For some farmers wishing to retain their farms and stay in agriculture, the opportunity to work on a 7/7 roster at a uranium mine in northern Saskatchewan can fit well with wheat or other grain farming activities. Annual leave time can be combined with the leave period of the roster during planting and harvesting periods, the net effect being that commute work for some can effectively act as a *de facto* agricultural support program [44], while for others the farm can be a tax right-off against their mine income.

In Newfoundland and Labrador and other parts of the Atlantic Provinces of Canada, commute work has become an opportunity for many to be able to earn an income, or a higher income than would normally be possible locally, while at the same time maintaining their residence and family life in their home communities.

Until recently Newfoundland and Labrador has traditionally been the poorest of the Canadian provinces and unemployment rates at 15.3 per cent (September 2009) are still twice that for Canada as a whole [45]. Workers from the province have had a long history of going away to work, whether to the Labrador for the summer fishery, the north-east USA in the 19th and early 20th centuries to help build the skyscrapers of New York and Boston, since the 1950s to the Great Lakes to crew bulk carriers, or, most recently, to help construct oil sands processing facilities in Alberta. Data are poor and estimates vary, but in the order of 6–7% of the workforce are currently thought to be "mobile workers", workers who live in Newfoundland or Labrador but who work outside the province.

This migratory workforce exhibits a wide variety of work arrangements. Some are involved in seasonal work and may be absent from their home communities for several months at a time on no fixed roster, others work in the offshore petroleum sector either locally or internationally on regular 21/21, 28/28, or similar rosters. The majority however, travels to Alberta for construction work.

The Marystown area, on the Burin Peninsula in the southern part of Newfoundland (see Figure 1), exemplifies the current practice. Local industrial employment opportunities have traditionally been in

the offshore fishery and fish processing, and more recently at the Marystown Shipyard and the Cowhead Marine Facility. The collapse of the fishery in 1992 saw the end of the offshore fleet and significant reductions in fish processing employment, while employment at the shipyard and at Cowhead over the years has at best been sporadic. When there is work, as was the case from April 2004 to August 2005 with the outfitting of the FPSO for Husky Oil's White Rose offshore oil project, local workers were able to stay at home and find employment. During times when there is no local work, they commute either regularly or periodically to places like Fort McMurray in Alberta and find work on the oil sands projects.

With local economic well being intimately connected to activity in the fishery and at the shipyards, employment and income levels can be highly volatile. Incomes flows from outside the province associated with commute work are therefore essential in helping to sustain the local economy on an ongoing basis. How long this will continue remains to be seen. Younger people may be more likely to weigh the trade-off between the perceived benefits of "home" and living a more settled existence elsewhere in favour of the latter, and indeed there has been a steady loss of population (19.4 per cent) from the area since 1996 [46,47]. Whether commute work in the absence of stable local employment can continue to sustain communities like Marystown over the long term is a question that as yet to be fully answered.

The boom in oil sands construction in Alberta between 2003 and the economic downturn in 2008 provided many workers with significant income earning opportunities. To date there have been no formal studies of commute work effects on source communities, but there is considerable anecdotal and visual evidence of local spin-off benefits in terms of new house construction and sales of trucks and recreational equipment such as snowmobiles and all-terrain vehicles.

5.2. Community Costs

While employment and income opportunities represent the upside for source communities, loss of local trades people, local volunteers and community leaders is part of the downside. Members of these groups are in increasingly short supply in rural Newfoundland in any event as a result of out-migration and an aging population. Temporary migration associated with commute work only serves to exacerbate the problem. Work away can mean on-the-job training for some and added experience for all. It can also mean that younger workers leave training programs before they complete them, lured away by the immediate income opportunities, with little thought for the future when formal qualifications might be a necessity.

Higher incomes can also bring with them imported issues associated with poor lifestyle choices such as increased drug and alcohol usage, gambling and increased incidences of sexually transmitted diseases. Likewise for some separation of work and home may place pressure on family relationships and contribute to family break-ups and family violence.

Much is made of these potential negative outcomes in the media, but there is only limited empirical to support these contentions. Newfoundland has a large number of mobile and commute workers, but overall divorce and separation rates continue to be the lowest in the country [48]. Similarly, research in Australia that examined the impact of commute work on children found nothing to substantiate that the work had any significantly different negative effects from "normal" work arrangements [49]. What is

often ignored is that while commute workers may be away from the home and family for extended periods and while they may miss important family events, they also have extended periods at home and the opportunity to spend blocks of quality time with their families, something that may not be available to others who work a regular work week [44]. Other work arrangements, such as shift work, may have more negative consequences for workers and their families, and by extension their communities, but there is little comparative work to demonstrate this.

6. Conclusions

Fly-in/Fly-out can have both positive and negative effects on community sustainability and both may occur at the same place and at the time. While fly-in/fly-out use for land-based resource projects were established somewhat earlier in Canada than Australia, there are now significantly more such operations in Australia [50]. These differences notwithstanding, the evidence suggests that there are a number of significant common experiences with respect to fly-in/fly-out effects on community sustainability.

Scale of activity and proximity to existing communities are perhaps the most important factors influencing the effects of fly-in/fly-out on host region communities. The examples from Northern British Columbia, Northern Alberta and the Surat Basin Queensland illustrate how the cumulative effects of multiple projects without adequate planning and investment in infrastructure and services can adversely affect local communities.

In project host regions the nature of the economic effects of fly-in/fly-out resource development is largely a function of the degree of control that can be exercised by the local community or group over the resources in question. Where there is full land and resource ownership, as in the case of the NANA Regional Corporation in Alaska, control over the pace and scale of development can be exercised locally and the allocation of costs and benefits negotiated and more equitably distributed. IBAs in Canada and ILUAs in Australia may allow local Aboriginal groups to exercise similar control. However, as discussed earlier, even in these circumstances community sustainability may not be guaranteed if, for example, workers choose to relocate to other communities.

Where resource control is not the case, communities and groups may be dependent on government, acting on their behalf, to broker arrangements with the resource companies; Surface Lease Agreements in Saskatchewan are one such example. In other cases communities may have to depend on government to help them meet the incremental costs of development as in the case of the FSA in British Columbia. Where government objectives appear to be directed more to resource revenue generation than community impact management, as in the case of the Regional Municipality of Wood Buffalo and Fort McMurray in Alberta, and the Surat Basin in Queensland, then the community or regional authority may be largely on its own when trying to deal with demands for additional infrastructure and services to cope with development-related demands.

Fly-in/fly-out offers workers the opportunity for well-paid jobs without the need to permanently leave their home communities. For Aboriginal workers in both Canada and Australia it may be one of the few opportunities to be involved in the industrial wage economy without having to leave their particular social and cultural environments. Earned incomes mean taxes for government, and where incomes are spent locally there will be spin-off employment and income benefits for other community

members and local businesses. For non-Aboriginal communities that have suffered employment losses in other sectors, as in rural Newfoundland and Labrador and Canada's Maritime provinces, these income opportunities may be, at least temporarily, what help to sustain those communities.

The downside of this may be the question of what happens to workers when the mine or other resource development closes. For Australian workers, particularly those from Western Australia, who may have access to a number of mine sites within range of Perth or other regional centres, switching workplace destinations may be relatively easy. In the Canadian North where there are fewer fly-in operations, distance and cost may make it impractical to draw on workers who had formerly worked at other fly-in/fly-out sites. In addition, jobs will likely first go to workers closer to the new operation under local hiring agreements. This was illustrated when the Nanisivik and Polaris zinc operations in Nunavut closed. The local economic effects were significant as local Inuit workers in the area lost their jobs, but did not have the opportunity to fly-in to work at other mining operations or to use their acquired skills (often not formally accredited) elsewhere in Nunavut or the Northwest Territories [51].

For many individuals fly-in/fly-out work offers opportunities for on-the-job training and career advancement at a faster rate than might be the case in more traditional workplaces. Particularly in Canada, where fly-in/fly-out employment is often associated with lack of opportunities in the home region, the skills and experience acquired may be repatriated to those home regions when opportunities arise. Depending on the particular roster arrangements, fly-in-fly-out can also provide the opportunity for all participants to spend extended quality time with family members during non-work periods and allow continued involvement by Aboriginal employees in traditional pursuits such as hunting and fishing, and participation in special community events.

At the same time, fly-in/fly-out work can be disruptive for communities where workers choose to relocate and live elsewhere while continuing to work fly-in/fly-out rosters. This is common to both Canada and Australia, but there are few data to illustrate that this is as important for Aboriginal workers and communities in Australia as it is in Canada or Alaska. Regardless of country, it can also be disruptive where well-paid fly-in/fly-out jobs create "have/have not" income divisions within the community. Similarly, for families everywhere, separations may mean added stress because one member is away for extended periods, while for communities those absences may mean less participation in volunteer, sports or other political, cultural and social activities. Those left at home may also find that their ability to participate in community affairs is reduced either because of lack of support resources (e.g., child-care) or social *mores* that may discourage participation of the temporarily single and usually female spouse or partner.

For workers, fly-in/fly-out requires a trade-off. Most would presumably prefer to work in well-paid, stable jobs close to home, obviating the need for long travel times and absence from their families, friends and communities. However, work in resource exploration, development and production typically requires a high degree of job mobility and time spent in remote locations. For some there will continue to be the opportunity to exercise their preference to live in (usually) small, remote communities. However, most workers appear not wish to do so and would rather live in larger, often metropolitan, centres with better access to services and infrastructure, employment and other perceived benefits. Australian art critic Robert Hughes is attributed with describing Australians as "a people obsessed with the outback but with little desire to live there" [52], a view corroborated by the

distribution of the population in that country, and one which might well be equally applied to many Canadians with respect to their desire to live in the North.

Fly-in/fly-out might thus be seen as a benefit to larger or metropolitan centres as it adds further diversity to their economic bases. In Canada in particular, it has helped to maintain smaller rural communities that have lost their previous economic *raison d'être*, but in both countries it provides communities with opportunities for employment diversification. Likewise, in both Canada and Australia, it may contribute to the development of a new economic base for aboriginal communities previously outside of the industrial economy. At the same time fly-in/fly-out can be destructive to local communities where it results in infrastructure and service demands that the communities cannot meet, or erosive where a shift from "permanent" to fly-in/fly-out communities reduces the economic viability of local infrastructure and services, though the latter appears unique to Australia. Fly-in/fly-out, where it occurs near established communities, may also threaten those towns by reducing the number of workers who, through their relocation, might otherwise have been potential direct contributors to the social and financial well-being of those centres.

As noted in the introduction, there is no simple answer as to whether these work arrangements are "good" or "bad" in community sustainability terms. While the larger resource companies in particular work towards reducing labour requirements and addressing recruitment issues through hi-tech remote controlled mining and other measures, fly-in/fly-out is likely to remain the preferred option for delivering labour to remote places and, increasingly, for not so remote places, because it is cost-effective and maximizes access to a diminishing supply of skilled labour. While this remains the case some communities will find ways to use it to their advantage while others will struggle to deal with its consequences.

Acknowledgements

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