Where Do Frackers Call Home?

By Austin Zwick

Austin Zwick is based at the University of Toronto. He may be reached at austin.zwick at gmail.utoronto.ca

See footnotes at end of text.

Scholars have found that resource extraction, and fracking in particular, occurs in boom-bust cycles (Jacquet, 2006; Christopherson, 2011). Though production of a gas well-site may last decades, the labor necessary is frontloaded to the first few months as the majority of the labor is needed in the preparation and construction of the well-site (Jacquet, 2009). Afterwards, the well is drilled by a small team and then fracked by an even smaller one. Although over 400 workers step foot on a well-site, the total employment impact is only approximately 13 full-time employees (Jacquet, 2011). The regional boom in employment is not due to a single well-site, but rather the cumulative effect of thousands of well-sites being constructed, drilled, and fracked within a relatively short timeframe. Nowhere is this truer than the Bakken Shale formation along the North Dakota and Montana border, where over 4,600 wells have been drilled and fracked between the development of the technology in 2007 and December 2012 (N.D. DMR, 2012). Additional labor is necessary to supply secondary, support, and social goods and services to these frackers.

This leads to resource boomtowns being defined by "too many unfilled jobs and not enough empty beds" (Jacobsen and Parker 2014). In order to house growth, Storey (2010) describes the rise of a new organizational structures for extractive industries as 'Fly-In/Fly-Out' (FIFO), in which workers spend a certain number of days working onsite after which they return to their home communities for a specified rest period. Most of the FIFO literature has focused on industrial mining in Western Australia (Haslam-McKenzie 2011; Haslam-McKenzie and Hoath 2013; Perry and Rowe 2014), but this live-work arrangement began by offshore oil workers in Mexico (Gramling 1995) and has since been applied to other extractions situations including mining in northern Canada (Storey, 2010; Finegan and Jacobs, 2015) and fracking in the United States (White, 2012; Ruddell et al., 2014). New construction is typically not undertaken as the shorter lifecycle of the extraction process means that capital outlays to build anything more than a temporary camp no longer make financial sense as spatially fixed, expensive upfront housing is a poor investment for a temporary industry (Storey and Shrimpton 1988). Houghton (1993) explains that industrial firms choose to bring in temporary employees using the FIFO approach because "large scale capital outlays on urban infrastructure are replaced by transport costs" which are distributed across the lifespan and productivity levels of the project. As most mining projects are located in rural regions that have little by way of pre-existing infrastructure, FIFO is a necessity. This raises the question of where these workers call home.

Data was obtained from the U.S. Census Longitudinal Employer Household Dynamics' (LEHD) Origin-Destination Employment Statistics (LODES) main and auxiliary databases from 2007 and 2012 (LEHD LODES, 2016). This data is based on employers' business addresses and employees' mailing addresses as found on their paychecks, and can be downloaded as Census block groups corresponding with an origin (home address) and destination (work address). This data is typically used to quantify commuting patterns. The data was then cut down to the work locations of the 14 counties in North Dakota[1] and 3 counties in Montana[2] on which the vast majority of the Bakken Shale sits. This data gives insight as to where workers come from and whether they plan on staying or not, as indicated by their declared permanent residency, but will not give a complete picture because: (1) employers may declare their business office at a different address than the worksite where the worker is employed (particularly an issue as the individual fracking sites do not have addresses), (2) workers may declare a local address as their temporary mailing address (such as a P.O. Box), and (3) workers may obtain in-state residency for a temporary stay. All of these possibilities make it likely that the numbers presented are conservative estimates. The 2007 numbers were then subtracted from the 2012 numbers to come up with the number and location of new commuters and then were mapped onto the 2012 TIGER Census U.S. Counties Shapefile (CENSUS TIGER, 2012), as seen in Figure 1.

This data indicates that almost 50,000 jobs were gained in the Bakken Shale between 2007 and 2012. To find how many support jobs the fracking industry is producing, a crude calculation would be the total employment change, divided by the product of the average number of wells per year multiplied by 13 FTEs (Jacquet, 2011), the result implies that four support jobs are created for each fracker employed. In the map, black counties are those in the sample. Yellow represents home counties with little to no change (fewer than 20 people, gains or losses) in commuting patterns. Successively darker shades of green indicate home counties with successively increasing commuting patterns. No home

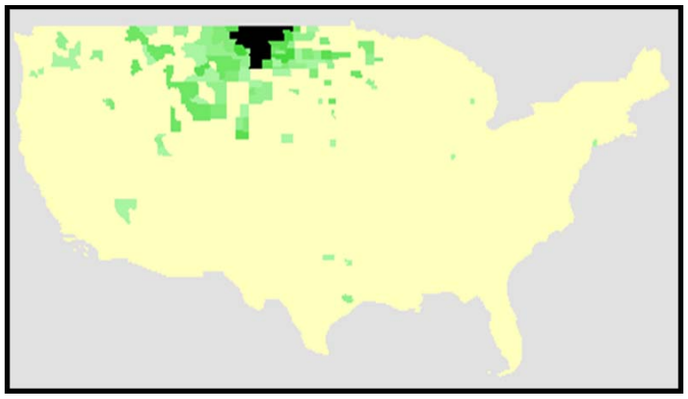

Figure 1. Bakken Shale Workers Home Addresses by County

counties had a large decrease in commuting. This data shows that the Bakken Shale has become a regional magnet for employment with the greatest gains in the neighboring counties within the states of North Dakota, South Dakota, Montana, Idaho, and Wyoming. A smaller number of people commute from farther away states such as Texas, Nevada, and Washington. This shows that, rather than a literal "fly-in, fly-out" as presented in the academic literature, the phenomenon more closely resembles a "drive in, drive out" employment opportunity for regional workers. Other shale plays most likely exhibit a similar pattern, but further research is needed.

Footnotes

[1] Billings, Bottineau, Bowman, Burke, Divide, Dunn, Golden Valley, McKenzie, Mountrail, Renville, Slope, Stark, Ward, and Willams counties

[2] Richland, Roosevelt, and Sheridan counties

References

Christopherson, S. (2011). The Economic Consequences of Marcellus Shale Gas Extraction: Key Issues (1st ed.). Ithaca, NY: CaRDI Reports.

Finnegan, G. & Jacobs, J. (2015). Canadian interprovincial employees in the Canadian Arctic: a case study in fly-in/fly-out employment metrics, 2004â€"2009. Polar Geography, 38(3), 175-193. http://dx.doi.org/10.1080/1088937x.2015.1034795

Gramling, R (1995). Oil in the Gulf: Past Development, Future Prospects; US Department of the Interior Minerals Management Service, Gulf of Mexico OCS Region: New Orleans, LA, USA.

Haslam McKenzie, F., (2011). Fly-in fly-out: the challenges of transient populations in rural landscapes. In Luck, G., Race, D. and Black, R. (eds) Demographic Change in Rural Environment? Springer, London, 353–374 Landscapes: What Does It Mean for Society

Haslam-McKenzie, F. and Hoath, A. (2014). Fly-In/Fly-Out, Flexibility and the Future: Does Becoming a Regional FIFO Source Community Present Opportunity or Burden. Geographical Research, 52: 430–441. doi:10.1111/1745-5871.12080

Houghton, D. (1993). Long-Distance Commuting: A New Approach to Mining in Australia. The Geographical Journal, 159(3), 281. doi:10.2307/3451278

Jacobsen, G. D. and Parker, D. P. (2014). The Economic Aftermath of Resource Booms: Evidence from Boomtowns in the American West. The Economic Journal, 126: 1092–1128. doi: 10.1111/ecoj.12173

Jacquet, J.B. (2006). Sublette County, Wyoming: A Brief History of Drilling – The Socioeconomics of Gas Big Piney, Wyo: Sublette County Socioeconomic Analysis Advisory Committee Winter 2006.

Jacquet, J. B. (2009). Energy boomtowns & natural gas: Implications for Marcellus Shale local governments & natural communities. NERCRD rural development paper, 43.State College, PA: North East Regional Center for Rural Development.

Jacquet, J.B. (2011). Workforce Development Challenges in the Natural Gas Industry. Working Paper Series, A Comprehensive Economic Impact Analysis of Natural Gas Extraction in the Marcellus Shale. February 2011.

LEHD LODES (2016). Origin-Destination Employment Statistics (LODES). US Census Bureau. Longitudinal Employer-Household Dynamics (LEHD). Accessed Dec. 29, 2016. https://lehd.ces.census.gov/data/#lodes

N.D. DMR (2012). Minot Energy Chamber. North Dakota Department of Mineral Resources. Presentation on Dec. 5, 2012. Accessed Jan. 20, 2017. https://www.dmr.nd.gov/oilgas/presentations/MinotChamberEnergy120512.pdf

Perry, M. & Rowe, J. (2014). Fly-in, fly-out, drive-in, drive-out: The Australian mining boom and its impacts on the local economy. Local Economy, 30(1), 139-148. http://dx.doi.org/10.1177/0269094214564957

Ruddell, R., Dheeshana, S., Jayasundara, Mayzer, R., and Heitkamp, T. (2014). Drilling Down: An Examination of the Boom-Crime Relationship in Resource Based Boom Counties." Western Criminology Review, 15(1):3-17"

Storey, K (2010). Commute Work, Regional Development and Settlement Strategies. In Proceedings of the Conference on the Role of the State in Population Movements: The Circumpolar North and Other Periphery Regions, Rovaniemi, Finland, 26–28 October 2009.

Storey, K., & Shrimpton, M. (1988). Fly-In Mining and Northern Development Policy: The Impacts of Long-Distance Commuting in the Canadian Mining Sector. Impact Assessment, 6(2), 127-136. doi:10.1080/07349165.1988.9725640

U.S. CENSUS TIGER (2012). TIGER/Line® Shapefiles and TIGER/Line® Files. 2012 County Shapefile. United States Census Bureau. Accesssed Jan. 1, 2017. https://www.census.gov/geo/maps-data/data/tiger-line.html

White, N. (2012) A tale of two shale plays. Rev. Reg. Stud., 42 (2012), pp. 107–119.