2,500 Number of horizontal wells that have been drilled in Montana, North Dakota, and Saskatchewan over the past nine years.

Each well costs between four and eight million dollars to build. According to case study on the Bakken region, this suggests that the oil and gas industry has invested

$15 billion

in energy infrastructure in the region.[1]

[1] Rankin, R. R., Thibodeau, M., Vincent, M. C., & Palisch, T. 2010. Improved Production andProfitability Achieved With Superior Completions in Horizontal Wells: A Bakken/ThreeForks Case History. Society of Petroleum Engineers. doi:10.2118/134595-MS

TRACKING TRENDS

IN UNCONVENTIONAL OIL & GAS DEVELOPMENT:

THE BAKKEN

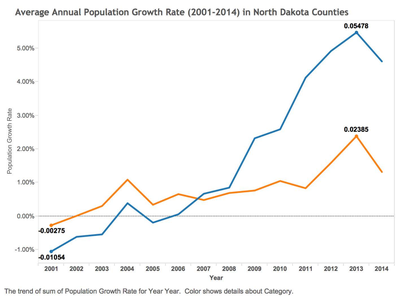
It is not clear how long the boom cycle will last for the Bakken.

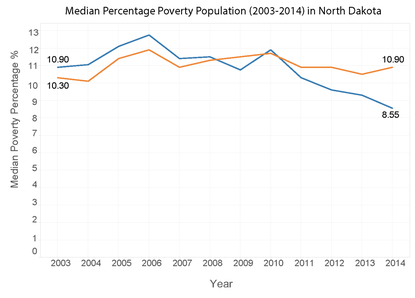
As of January 2016, there were **10,438** producing wells, and **1,067,891** barrels of oil produced every day.[2]

[2] "Bakken Shale Oil Deposit". 2016. Bakken Shale: News, MarketPlace, Jobs. Retrieved from:http://bakkenshale.com; "Bakken Shale Ends the Year with 52 Rigs." 2015. Bakken Shale: News, MarketPlace, Jobs.Retrieved from: http://bakkenshale.com

What are the major socioeconomic impacts of the increase in unconventional resource extraction in the North Dakota portion of the Bakken shale play since ~2005?

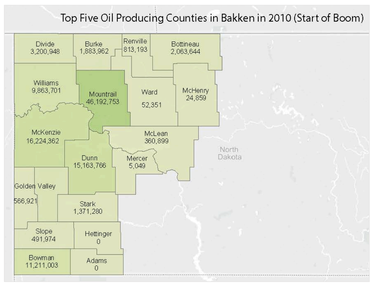
Oil and gas production in North Dakota is concentrated on a few western counties: McKenzie, Mountrail, Williams, and Dunn. We wanted to know whether the boom in unconventional oil and gas production had an impact that was highly localized, or if the effects were distributed across the state. In addition to the increased production of energy, the oil and gas boom also brought population growth and economic development to North Dakota. These changes, however, are highly imbalanced across North Dakota's 53 counties. In general, counties in the Bakken experienced faster pace of development than the rest of the state. *(Data compiled from the U.S. Census Bureau)*

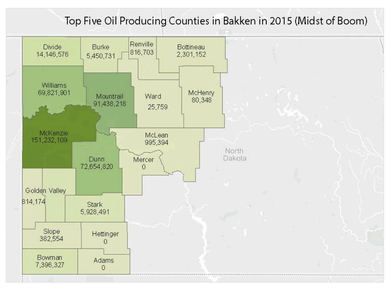


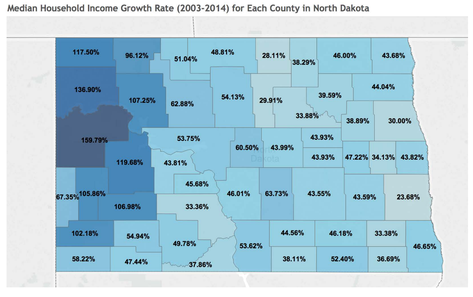


From 2003 – 2014, the median household income in 8 of the 16 "Bakken" counties grew by **more than 100%**

The population growth rate for Bakken counties was **5.478%** in 2013. Meanwhile, the U.S. population growth rate was just under 1%.

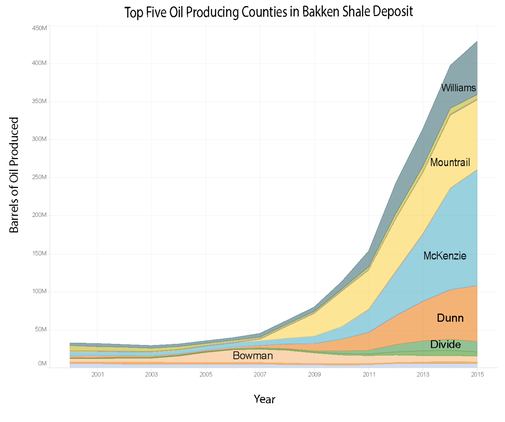


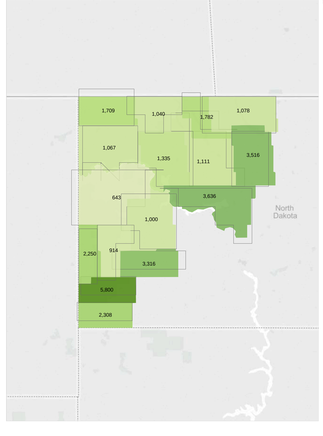




Where is the industry located, and where is the industry most heavily concentrated?

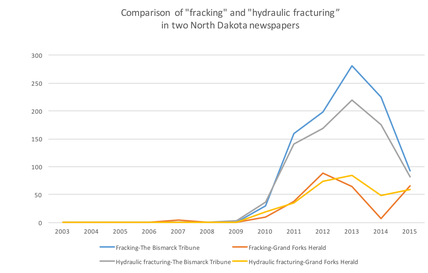
DAWSON
MCCONE
RICHLAND
ROOSEVELT
SHERIDAN
BILLINGS
BOTTINEAU
BURKE
DIVIDE
DUNN
GOLDEN VALLEY
MCHENRY
MCKENZIE
MCLEAN
MERCER
MOUNTRAIL
RENVILLE
STARK
WARD
WILLIAMS

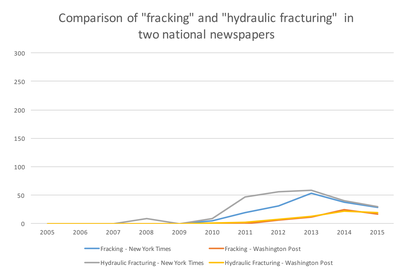




The industry concentrations displayed here are measured using the Herfindahl-Hirschman Index (HHI), which is calculated by taking the sum of the squared market shares of all firms in the industry. Here, market share is defined as share of total operating wells in 2015. An HHI close to zero indicates almost perfect competition. An HHI of 10,000 signals a monopoly. Generally, markets with an HHI higher than 2,500 are considered to be highly concentrated. Industry concentration plays an important role in regulatory outcomes and the impacts from industry on communities. Non-concentrated markets may be more difficult to regulate, and smaller firms may have less capacity or incentive to investment in community development.

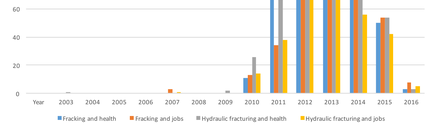
How might newspaper coverage of oil and gas development reflect differences in local and national attitudes on the issue?

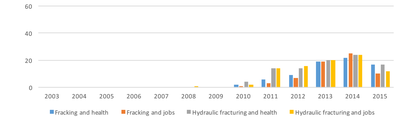




Several studies have identified the negative connotations associated with the term "fracking," and comparative lack of public knowledge on the process of "hydraulic fracturing." We wanted to know whether or not local and national newspaper coverage of hydraulic fracturing differed, and the contexts in which the two terms were used. We found that the North Dakota newspaper closest to the boom (the *Bismarck Tribune*) had substantively more coverage than the more distant *Grand Forks Herald*, or in either of the larger national papers like the *New York Times* and *Washington Post*. Moreover, many of the articles in the *Times* and the *Post* discussed bans and moratoria, primarily in the Marcellus Shale. (a search for "Bakken" and/or "North Dakota" returned fewer than 30 hits over a decade). *Data compiled from America's News (Bismarck Tribune, Grand Forks Herald), and Academic OneFile (New York Times, Washington Post).*

We are especially interested in this issue to ascertain how activists might deploy the negative connotations of "fracking" to further their cause.



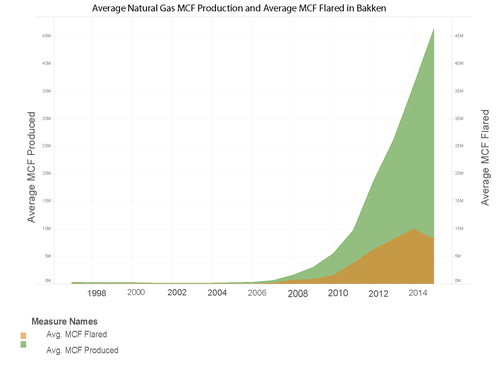


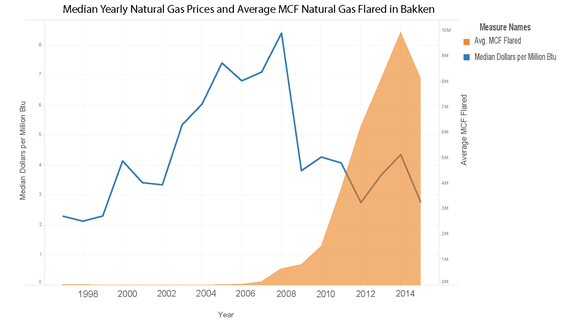
The word ***"fracking"*** was used as early as **1953** in the *Oil and Gas Journal*.[3]

Zimmer, Ben. "A Push to Make 'Fracking' Sound Better." *Wall Street Journal, Eastern Edition.* October 4, 2014.

How will the recent drop in prices affect production and output?

A great deal of natural gas produced in North Dakota is "flared," or allowed to enter the atmosphere without being captured for use as energy. This is often due to inadequate pipeline capacity and infrastructure in the region. While flaring is not expressly prohibited under U.S. regulations, it has been linked in to health problems and reduced air quality, which has caused other states to implement heavy restrictions. During the flaring process, the methane from the well is converted into carbon dioxide (CO_2). Though still a contributor to climate change, CO_2 is a much less potent greenhouse gas than methane. Many suggest that the decreasing price of natural gas on the market has also contributed to an increase in flaring practices (see charts below). *(Data from U.S. EIA)*





Duke UNIVERSITY | BASS CONNECTIONS

PROJECT TEAM: APRIL CHRISTENSEN, CAN FENG, JEFF FENG, ERIN LITZOW, ASHTON MERCK, JESSICA MCDONALD