

STRENGTHENING COMMUNITY RESILIENCE AT THE ENERGY-AGRICULTURE NEXUS

Identifying Resilience Traps in Bakken Communities

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COMMUNITY & ECONOMIC DEVELOPMENT STRATEGIES

My research uses three case studies to investigate examples of community and economic development strategies that communities in the Bakken have employed. Each case study analyzes why the strategy was chosen with a focus on the historical, cultural, political, and economic drivers.



Western Area Water Supply (WAWS) Project

In 2011 construction began on the WAWS project to address growing residential and industrial water demands stemming from the Bakken oil boom. It was designed as a private-public partnership with the goal of financing its \$469 million price tag with industrial water sales. However, WAWS has not been able to cover its debt repayments, and its rapid construction has resulted in reclamation issues for farmers.



Recreation Centers in Williston and Watford City

Given the large increases in revenues, both Williston and Watford City were able to build expansive recreation facilities to promote quality of life. Since they relied heavily on tax revenues, however, both are now struggling to make payments due to lagging oil prices. The recreation centers represent the tension between the need to create long-term benefits for residents and the risk of overdevelopment.



Higher Education Foundations

This case study analyzes how higher education foundations in the Bakken have (or have not) benefited from increasing budgets stemming from the oil boom. For example, high school graduates from the Bakken region can attend Williston State College for free due to the college's foundation. In contrast, the Dickinson State University Foundation was dissolved due to a series of misguided community-oriented development projects.

MIXED METHODS APPROACH



Document Analysis

I downloaded and/or scanned hundreds of pages of meeting minutes and legislative testimony that will be analyzed and coded in Fall 2017 to triangulate key findings.



Qualitative Interviews

Over the last 18 months I conducted 45+ semi-structured interviews with farmers, ranchers, and community leaders. Interviews will be coded in nVivo.



Ethnography

I lived in the Bakken for approximately three months over four trips so I could attend community events and meetings. Field notes will be used to triangulate findings.

THE BAKKEN OIL BOOM

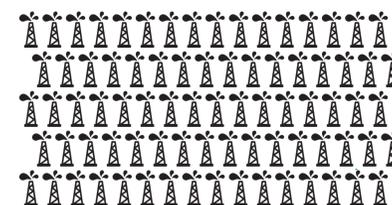


The Bakken formation underlies 20 rural and isolated counties in Montana and North Dakota. The region is part of the Northern Great Plains, one of the largest prairie grasslands in the world. Farmers, ranchers, and tribal nations are the primary landowners.



Williston (ND), Watford City (ND), and Sidney (MT) are major service hubs for oil development. During the boom, each city experienced rapid population growth with increasing demands on infrastructure.

The Shale Revolution in the United States

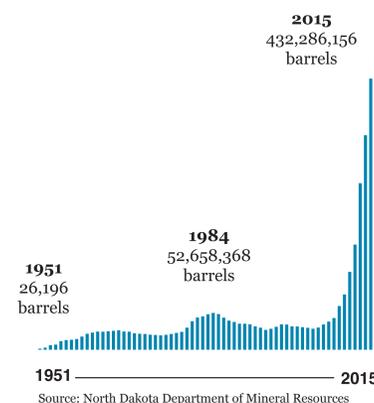


80,000+ new wells drilled in 9 years



~3 mill. ha in central Canada & U.S. (equivalent of 3 Yellowstone Ntl Parks) have been converted to well pads, roads, and storage facilities since 2000 (Allred et al 2015).

Spike in Annual Oil Production in North Dakota 1951 - 2015



Due to its relative isolation, North Dakota's first viable oil well was only discovered in 1951. Oil booms occurred in the 1950s, 1980s, and 2000s. **In the 2000s annual oil production grew over 1,200% from 2000 to 2015.**

RESILIENCE TRAPS REQUIRE INTERVENTION TO OVERCOME

Community resilience is the ability of a community to leverage its assets and resources to meet (un)expected challenges presented by an uncertain future (Magis 2010). Resilience is marked by a community's willingness to learn, experiment, adapt, and/or transform (Besser 2013; Kulig et al. 2013). In contrast, resilience traps are processes and barriers that limit community adaptability (Boonstra and de Boer 2014). Gunderson, Allen, and Holling (2010) identify four types of resilience traps, as described in Table 1.

Resilience traps are deeply entrenched and require intervention to overcome (Boonstra and de Boer 2014). Identifying resilience traps is thus the first step to building long-term community and economic resilience.

Table 1. Four types of resilience traps.

Trap Type	Characteristics	Literature
Rigidity Trap	Highly connected to the point of being self-reinforcing, inflexible	Gunderson & Holling 2002; Folke et al. 2005
Poverty Trap	Low potential for change due to low capital, connectivity, & resilience	Carpenter & Brock 2008
Lock-in Trap	Low potential for change due to high sunk costs	Allison and Hobbs 2004; Steneck et al. 2011
Isolation Trap	High capital but low potential for change due to limited connectivity	Gunderson, Allen, & Holling 2010

I use a resilience approach with a focus on traps to analyze development strategies and issues of equity related to energy development outcomes.

My preliminary research suggests that communities in the Bakken are attempting to create long-term economic benefits from the oil boom but are constrained by external forces, such as fiscal policies and global commodity prices, and internal forces like local politics and community norms. In addition to being examples of potential resilience traps, these constraints may enable new and unexpected resilience traps, such as overinvesting in inflexible infrastructure.

REFERENCES

Allison, Helen E., and Richard J. Hobbs. 2004. "Resilience, Adaptive Capacity, and the 'Lock-in Trap' of the Western Australian Agricultural Region." *Ecology and Society* 9 (1).

Allred, Brady, W. Kolby Smith, Dirac Twidwell, Julia H. Haggerty, Steven Running, David Naugle, and Samuel Fuhlendorf. 2015. "Ecosystem Services Lost to Oil and Gas in North America: Net Primary Production Reduced in Crop and Rangelands." *Science* 348 (6233): 401-2.

Besser, Terry L. 2013. "Resilient Small Rural Towns and Community Shocks." *Journal of Rural and Community Development* 8 (1): 117-34.

Boonstra, Wiebren, and Florianne W. de Boer. 2014. "The Historical Dynamics of Social-Ecological Traps." *Ambio* 43(2): 260-274.

Carpenter, Stephen R., and William A. Brock. 2008. "Adaptive Capacity and Traps." *Ecology and Society* 13 (2): 40.

Folke, Carl, Thomas Hahn, Per Olsson, and Jon Norberg. 2005. "Adaptive Governance of Social-Ecological Systems." *Annu. Rev. Environ. Resour.* 30: 441-73.

Gunderson, Lance H., Craig Reese Allen, and C.S. Holling, eds. 2010. *Foundations of Ecological Resilience*. Washington D.C.: Island Press.

Gunderson, Lance H., and C.S. Holling. 2002. *Panarchy: Understanding Transformations in Human and Natural Systems*. Washington D.C.: Island Press.

Kulig, Judith, Dana S. Edge, Ivan Townshend, Nancy Lightfoot, and William Reimer. 2013. "Community Resiliency: Emerging Theoretical Insights." *Journal of Community Psychology* 41 (6): 758-75. doi:10.1002/jcop.21569.

Magis, Kristen. 2010. "Community Resilience: An Indicator of Social Sustainability." *Society and Natural Resources* 23: 401-16.

Steneck, R.S., T.P. Hughes, J.E. Cinner, W.N. Adger, S.N. Arnold, Fikret Berkes, S.A. Boudreau, et al. 2011. "Creation of a Gilded Trap by the High Economic Value of the Maine Lobster Fishery." *Conservation Biology* 25 (5): 904-12.



This research has support from the Center for Western Lands & Peoples at Montana State University and USDA NIFA (Project #2014-05498).

