

Lehigh University Environmental Policy Design masters student, Jacqueline Wolf Tice, attended the 144th American Public Health Association Annual Meeting in Denver, Colorado where she presented her thesis research, Under the Earthlodge: Extraction of the MHA Nation, at the APHA Public Health Ethics section poster session. Under the advisement of Professor David Casagrande, Wolf Tice received the **Dale S. Strohl Award for Research Excellence in Humanities and Social Sciences** and the **Pyramid Fellowship Award** to conduct primary research on Ft. Berthold Indian Reservation in North Dakota, tribal homeland of the Mandan, Hidatsa and Arikara Nation. The research used quantitative and qualitative methods to examine the socio-ecological effects of extraction industry practices on the culture, environment and health of the MHA Nation. Wolf Tice, an adopted member of the MHA, holds a Bachelor of Science degree in Public Health and focuses her research on environmental health and justice issues in vulnerable populations.

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UNDER THE EARTHLIDGE: EXTRACTION OF THE MHA NATION

JACQUINE WOLF TICE – LEHIGH UNIVERSITY, ENVIRONMENTAL INITIATIVE

Introduction

The Bakken formation, long unmineralized western North Dakota, including its water in the Ft. Berthold Indian Reservation, is rich with oil and natural gas. Since 2008, oil and gas companies have drilled over 1,500 conventional and unconventional horizontal and hydraulic fracturing wells on Ft. Berthold, which accounts for a third of all oil produced from North Dakota. The environmental, social, economic and environmental costs to the reservation include increasing levels of traffic, air pollution, noise and light pollution, housing evictions, food waste, crime, sea level rise and drug overdoses, as well as toxic chemical leaks in ancient soil and waterways.

Compromised ecosystems factors are associated with stress-related increased cortisol levels, impacting individual health and wellbeing. These impacts upon individual wellbeing of the Mandan-Hidatsa-Arikara (MHA) Nation are mitigated or exacerbated by the political-cultural nation mechanisms unique to their culture. As an example, in the creation of the 19th and 20th centuries of the MHA Nation, the Mission House and the Spirit House are considered sacred places of ancestral identity. These sacred places are impacted by a modern extraction which compromised by the commodification of extraction industry practices (EIP) on Ft. Berthold, creating tension with the traditional and ways of life in the traditional culture values of the MHA Nation. This research examines the question of whether the benefits of extraction industry practices (health, consumption, jobs) have negative social and health impacts because of an increased disruption of MHA cultural values (and, especially, food).

Methods

Quantitative
Surveys were distributed to approximately 100 people on Ft. Berthold Indian Reservation. Survey Part 1 is a 36-item Likert scale survey designed to reveal individual opinions about environmental impacts of EIP, cultural beliefs about EIP, ethical considerations, socioeconomic effects, personal cultural identification and policy process perceptions relating to EIP. Survey Part 2 of the survey employed Cohen's Perceived Stress Scale-4 (PSS-4) (Cohen et al., 2006) to correlate relationship of Part 1 survey elements to an established instrument as well as to document measurement of perceived stress in this community. Survey Part 3 of the survey utilized the Symbolic Symbolism Scale-9 (SSS-9) (Cohen et al., 2014) to document respondents' physical anthropometry existing in the time with the presence of EIP on Ft. Berthold. Answers to all parts of the survey were coded and analyzed using correlation, Pearson bivariate correlations and multiple regression.

Qualitative
In-depth interviews consisting of approximately one-hour each were conducted with 10% of survey respondents to clarify and better understand their survey answers.

Unique Contribution
Four distinct indicators that address the cultural domain of the MHA Nation:

1. Policy Satisfaction Index (PSI)
2. Cultural Values Disruption Scale (CVD-4)
3. Land Ethic Scale (LES)
4. Extraction Industry Practices Satisfaction Index (EIPSI-7)

All indicators were normalized to a value range of 1-5, higher scores on indicators indicate stronger levels of identification, disruption, stress or dissatisfaction, according to the rated measurement.

Results

Policy Satisfaction Scale (PSI). The PSI tested very well for reliability with Cronbach's alpha .988. Governance and policy are important concerns in the lives of this sample. 84.2% of those surveyed with this scale registered dissatisfaction or high dissatisfaction, $n=79$, mean=25.47, $p < 4.62$.

Cultural Values Disruption-4 Scale. 94.1% of all respondents showed either moderate or high levels of CVD. 95% of questions within this scale specifically reference degree of agreement since, with from and of extraction industry practices on Ft. Berthold Indian Reservation.

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Conclusions
"Extraction industry practices (EIP) are causing disruption according to Land Ethic Scale, PSS-4 and EIPSI-7, suggesting culturally relative philosophical/ethical constructs do influence respondents' policy-related responses, and "Elevated stress levels related to ethical issues and a result of governance decisions associated with EIP. Tribal Government policies regarding EIP may change what imposed through the same mechanisms of trade/exchange 1700's (Harmon, 2010).

Sources
Cohen, S. (2006). Perceived stress scale. Retrieved from http://www.thepersonnel.com/psychometrics/assessments/Performance_Measures/assessments/2010/PSS-4.html.
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