

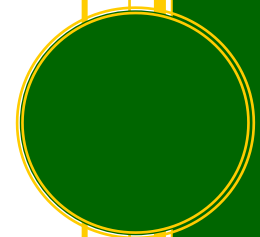
THE NEW NORMAL: THE DIRECT AND INDIRECT IMPACTS OF OIL DRILLING AND PRODUCTION ON THE EMERGENCY MANAGEMENT FUNCTION IN NORTH DAKOTA



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The NDSU team would like to thank and acknowledge the emergency managers and key partners in North Dakota who added to the richness of this report by participating in this study. Although many of the impacts on emergency management can be drawn from a variety of statistics and conclusions that have been covered in other articles and reports addressing general oil impacts, the voices of those impacted breathed life and humanity into this examination of North Dakota's new normal.

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Executive Summary

The study addressed in this report examined the type, and extent, of direct and indirect impacts of oil drilling and production on the emergency management function in North Dakota. The impacts addressed herein are tied to both the hazards that oil-related activities introduce and rapid growth issues that have strained community and state resources. Central to this study are the firsthand accounts of emergency management and partner agency personnel at the local and state level regarding the impacts that could result in an inability to fulfill the emergency management mission. Such impacts could result in the function being compromised to the extent that it is unable to perform at the capacity necessary to protect the safety and security of North Dakota communities.

The North Dakota State University research team's goal was to produce a report that advanced understanding, sharpened focus, and offered significant recommendations to legislators, policy makers, and community planners regarding the changes and challenges oil drilling and production have brought to the emergency management landscape. The team took a two-pronged approach to accomplish its directive. The first prong involved objective assessment of existing articles, reports, data and industry projections from distinct topical areas (i.e., oil, socioeconomic, transportation, public health, fire, emergency medical services, and law enforcement) to help better understand and frame the impacts from an emergency management perspective. The second prong sought to engage the thoughts, observations, and opinions of emergency management and partner agency personnel in order to examine impacts and potential solutions from their perspective.

The study participants' comments about direct and indirect impacts, as well as their recommendations for solutions, grounded the study with first person narrative of the current state of the emergency management function in North Dakota. From study participants' comments, six themes regarding direct impacts and four themes regarding indirect impacts were identified. The direct impact themes identified in this research effort: the need for additional equipment, personnel, and funding to address the increased workload and changing responsibilities; the need for additional planning, training, and exercising in regard to oil transport, drilling, and production issues that could require an emergency response; the shortage and burnout of first responders, particularly within volunteer departments; the increased likelihood of not only more events, but also more severe events based on

increased population and traffic; concerns regarding community compositions that are not versed in local hazards and are difficult to access and warn; and, the delays caused in emergency response due to rail and transportation corridor blockage or congestion. The indirect impact themes identified in this research effort: the growing population is pressing the limits of schools, housing, healthcare, social services, daycare, and existing retail and service industries; recruiting and retaining workers for non-oil jobs and volunteer responder services is difficult because of wage inflation, lack of affordable housing, crime, and quality of life concerns; the social safety net is being taxed and the needs are exceeding the available resources; and, the road conditions – to include the quality, safety, and amount of traffic – have become an area of critical concern.

The work conducted in the first prong of the study coupled with study participants' comments regarding impacts and recommendations helped frame the report's 21 recommendations. The recommendations, focus on solutions grounded in additional personnel, equipment, resources, planning, training, and exercise needs for emergency management and partner agency organizations; an examination of existing volunteer response structures, staffing, and the potential need for incentives and subsidization; traffic, accident, and life span studies that inform the usage and responsibility for roads, highways, thoroughfares, and rail; a study of criminal activity that informs the law enforcement agenda and identifies needs for additional personnel and equipment; outreach to vulnerable populations via industry partners and educational campaigns; support of community-based solutions to address rapid growth challenges; tax reductions, credits, and incentives to encourage the growth and development of businesses and institutions in communities; wage and cost-of-living studies that inform wage increases that help mitigate inflation and better inform low income baselines; examination of essential personnel housing options; and, a statewide strategy for addressing homelessness. Each recommendation offered, while independent, also serves part of an overall strategy to ensure that the emergency management function can perform at the level necessary to meet its mission. As such, these recommendations are intended to provide Governor Dalrymple, state legislators, and community leaders with an action plan for ensuring the safety and security of the citizens of North Dakota. Absent immediate and thoughtful actions to abate the impacts identified in this study, the emergency management function in North Dakota will remain comprised and subject to partial or complete failure.

Introduction

There can be no debate that the face of North Dakota has changed – both to longtime residents and outside observers. North Dakota’s agrarian identity and friendly, unassuming demeanor have been pushed aside to make way for a new identity that has emerged as oil drilling and production have heated up over the past five years. As news of the prosperity of the Bakken oil boom has spread, thousands have moved to the state to share in the opportunities that North Dakota oil offers. The state has become a mecca for big money and big dreams.

Unfortunately, North Dakota has also become a case study for what can happen when oil interests settle in for the long-term in rural and small urban areas ill-equipped to meet the housing, service, and infrastructure needs of an extended boom. The blessing and promise of the state’s well-lined coffers and increased opportunities for North Dakotans heralded on the front end of the boom have

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quickly turned to a bitter pill for some who argue that oil has compromised the quality of life in a state known for its simple lifestyle, sense of community, and serene landscape. On a daily basis oil is both cheered and lamented in newspaper and magazine articles, editorials, blogs, television news reports, on talk radio, and around workplace water coolers – it has become a staple of North Dakota vernacular.

As the second largest oil producer in the nation, North Dakota now garners a level of sustained national and international attention it has not experienced in the past absent a major disaster event. And yet, within the state it appears that North Dakota hasn’t really grown into the big shoes it seems destined to fill. The challenges associated with the population surge and infrastructure stress seem to have become endemic in western North Dakota. Likewise, the resignation amongst the citizenry that these challenges are irremediable is becoming more widespread.

Philosopher Heraclitus noted that “the only thing that is constant is change...”, offering that our challenge as human beings is to not only find ways to adapt to such change, but also to celebrate it. The words of Heraclitus are relevant to North Dakota’s dramatic shift from a primarily

agrarian state to an oil state. North Dakota's oil presence is not expected to diminish in a handful of years; indeed, the current extraction process being used on areas that are mature (which represents a very small percentage of the Bakken/Three Forks formation's oil potential) is expected to continue for 15-20 years. It is anticipated that beyond the current extraction period, advanced technologies will be utilized to extract additional oil for decades to come. Hence, North Dakota's oil boom is no flash in the pan that will dissipate as quickly as it arrived – it is North Dakota's new normal.

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Yet, North Dakota's new normal does not necessitate a wholesale departure from North Dakota's long respected sensibilities and values. There is room for coexistence and positive growth. It is from this viewpoint that the challenges must be addressed. Priorities must be set that are focused on the necessary investment to bring the state's current system to the requisite level to deal with the new normal.

Clearly, one of North Dakota's priorities must be the safety and security of its citizens and communities. This mission lies with the emergency management community and its partners. Presently, the emergency management function is under duress from direct and indirect impacts of oil drilling and production. This duress is reducing the ability of emergency managers and key partners to perform at a "high reliability"¹ level. If this duress is not abated it could result in a partial or full function interruption that would greatly diminish the safety and security of North Dakota citizens and communities.

This report provides the results from a study that examined the direct and indirect impacts affecting the emergency management function, from both an emergency management and key partner perspective. The genesis for this study was a presentation given at North Dakota State University in March of 2014, by Greg Wilz, North Dakota's Homeland Security Division Director and State Security Advisor. In his presentation², Director Wilz provided a somber overview of some of the challenges facing emergency managers and first responders in the Bakken. North Dakota State University emergency

management faculty and students received the presentation as a call-to-action and this report is the byproduct of that action.

Methodology

The NDSU team that conducted this study did so under the auspices of advanced emergency management coursework. The team – comprised of six undergraduate students, one graduate student, and a supervising faculty member – sought to answer the question, “What are the direct and indirect impacts of oil drilling and production on the emergency management function in North Dakota?” The directive for the team was to produce a report that could help advance understanding, sharpen focus, and offer significant recommendations to legislators, policy makers, and community planners regarding the changes and challenges oil drilling and production have brought to the emergency management landscape.

The approach taken by the team was two-pronged. The first prong was an objective assessment that reviewed existing articles, reports, data, and industry projections. The second prong was a subjective assessment that was partnered with the objective assessment to enhance the depth and understanding of the material. This prong provided a forum for the voices of those closest to the impacts and encouraged the contribution of ideas for addressing identified impacts.

First, the team researched distinct topical areas to help better understand and frame the impacts from an emergency management perspective. These topical areas were: oil, socioeconomic, transportation, public health, fire, emergency medical services (EMS), and law enforcement. This required team members to review material from a variety of sources and become the team’s subject matter expert on their specific research area. Team members were

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tasked with framing the challenges from their specific research area and the ways in which their research area intersected or was exacerbated by other research areas. This effort allowed the team to paint a more holistic picture of the current situation, which in turn allowed for a deeper and more nuanced understanding of the ways in which layered impacts could affect the emergency management function.

Second, the team created a survey instrument (see Appendix A) that featured four open-ended questions. The goal of the survey was to engage the thoughts, observations, and opinions of emergency management personnel in the state and a small selection of their key partner agency representatives to tell the story of impacts and potential solutions from a first person perspective. The survey was designed to afford participants relative anonymity and did not collect any identifying data other than affiliation designation, jurisdictional level, and whether oil drilling or production was occurring in their jurisdiction (if at a county, tribal, or regional level).

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quite clear to the team from years of interaction with emergency management and key partner agencies in the state that oil impact is much more far reaching than mere active drilling or production in a county. Study participants that identified their positions to be at the county, tribal, or regional level were asked if drilling or production was occurring in their jurisdiction to allow the team to better understand the data being supplied by participants, but the label “oil impacted county” was purposefully avoided based on the team’s understanding that the label is a misnomer.

The four open-ended questions on the survey sought participant narrative on direct impacts, indirect impacts, recommendations (to address identified impacts), and any additional thoughts participants wanted to share about such impacts. The direct and indirect impact questions offered a list of examples of the specific impact type to assist participant understanding of the ways the terms were being framed. The impact framing examples were based on the responsibilities, dynamics, and necessary components of successful emergency management programs. The questions, as posed to participants are detailed below.

1. What type of direct impacts from oil drilling and production do you believe are affecting the emergency management function?

(e.g., addressing the hazard implications in plans, training, and exercising; addressing the exacerbation of other potential hazards based on oil impacts; amount of time and energy focused on addressing oil-specific issues; changes in community composition that affect or change vulnerability; addressing community concerns about spills, rail transport, and safety matters; etc.)

2. What type of indirect impacts from oil drilling and production do you believe are affecting the emergency management function?

(e.g., impact on partner agencies that affects the effectiveness of EM preparedness, mitigation, response, and recovery activities; impact on social infrastructure; impact on schools, medical care, and other critical institutional services; impact on roads and highways; impact on ability to recruit and retain staff; impact on political decisions in the jurisdiction/state; impact on businesses that service or partner with EM; etc.)

3. Based on your understanding of emergency management and the community you work with, what recommendations would you make to address the impacts you referenced above?

4. Are there any other thoughts you would like to share about the direct and indirect impacts on the emergency management function in North Dakota?

The survey was hosted and managed by NDSU's Group Decision Center and remained open for approximately three weeks. The survey solicitation email included a copy of the open-ended questions in the survey to allow invited participants to better gauge the time it would take them to complete the survey. Survey participants were provided a web address at the survey

conclusion that allowed them to access the draft report for review and comments in January 2015. An invitation-only survey was distributed in early December 2014 to the following invited participants: emergency management personnel representing each of North Dakota's 52 counties and 5 tribes (64 total invitations for participation included offices with multiple points of contact and individuals who represented more than one county); North Dakota's 4 regional emergency management representatives; 5 state level personnel from the North Dakota Department of Emergency Services; and, 40 select members of emergency management partner agencies (i.e., public health, fire, EMS, and law enforcement) as identified by team members. A follow-up email was sent out fourteen days into the survey thanking those who had already participated and encouraging those who had not yet participated to do so in the time remaining.

In total, the survey was distributed to 113 individuals. 44 responses were received (emergency management and partner agencies) for an overall response rate of 39 percent. Of the responses, 25 were from emergency management participants (21 county/tribal/regional; 4 state) for a response rate of 34 percent from the emergency management solicitation; and, 19 were from partner agency participants (16 county/tribal/regional; 3 state) for a response rate of 47 percent from the partner agency solicitation. Partner agency participants that identified themselves as being at the municipal level were counted in the county/tribe/regional level. The partner agency participants identified themselves as follows: 6 public health/environmental health (4 county/tribal/regional; 2 state); 8 fire (7 county/tribal/regional; 1 state); 3 EMS (3 county/tribal/regional; 0 state); and, 2 law enforcement (1 county/tribal/regional; 0 state; 1 municipal).

Of the participants that identified their role at the county/tribal/regional (37), 35 percent (13) reported that drilling or production was occurring in their jurisdiction and 65 percent (24) reported it was not. The participants provided rich narrative comments to the four open-ended survey questions. A few respondents answered one or two of the open-ended questions with such elaboration, that they did not respond to the other questions. In total, the number of responses received for each question was: direct impacts – 41 responses; indirect impacts – 42 responses; recommendations – 39 responses; and, additional thoughts – 29 responses. The response rates include the few participant responses that indicated “none”, “N/A” or other such comments.

Participants' comments were reviewed and redacted where necessary to remove specific identifiers (and better protect the participants' identities). Small typing errors in the raw data that were readily apparent and did not affect the content or context of comments were corrected for the ease of the reader. Survey participants are identified within the report as follows: affiliation designation (EM for emergency management or PA for partner agency) and jurisdictional level (L for county/tribal/regional and municipality or S for state). For example, a participant affiliated with emergency management at the state level would be identified as EM/S.

To honor the input and effort of all study participants, the entirety of the narrative data is included in Appendix B. Of note, in an effort to avoid participants' comments from being linked together from one question to the next (and to honor the promise of relative anonymity)

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the narrative responses in Appendix B are not identified with the coding used in the report. Additionally, the responses have been purposefully moved out of the order they were received to circumvent any efforts to piece together the identities of the participants.

Structural Framing of the Report

One of the biggest challenges the team faced in reporting the results of this study came in the structural formatting of this report. The first consideration in framing the report was the sheer amount of material that could be discussed relative to oil impacts from team members' research efforts. Finding the balance between raising and touching on a variety of sub-topics in each main impact area without burying the reader in too many pages was recognized as a priority. This resulted in some important areas only being afforded brief coverage. Ultimately, the goal of the first prong effort was to supply a framing of the impacts that have already been addressed across a wide spectrum of resources to typically disparate audiences to create a more complete understanding of the current state of oil impacts generally. Due to the wide potential audience for this report - emergency management agencies, partner agencies, community leaders, state agencies, policy makers, legislators, and citizens - a level of base knowledge was not assumed.

The second consideration in framing the report was the recognition that each section of the report, while somewhat independent also had areas of overlap with other areas. To address this consideration, the sections were parceled out as logically as possible with the intent of avoiding repetition. The decision was to first speak specifically to two foundational topics - the *Emergency Management Function* and *Oil Drilling and Production*. Beyond those topics, the report moves into a discussion of impacts from the following vantage points: *Socioeconomic Impacts*; *Transportation Impacts*; *Public Health Impacts*; *Fire and EMS Impacts*; and, *Law Enforcement Impacts*.

The final consideration in framing the report, and perhaps the most difficult one, was the way in which study participants' comments would be shared with the reader. Three distinct approaches were considered. The first approach considered was to move in and out of participants' comments as each type of impact was discussed. This would have required that responses with multiple themes be deconstructed. The concern with this approach was that the power of participants' comments would be weakened when parsed out of their original context.

The second approach considered was to have a section that followed each impact discussion that featured participants' comments. This approach would have likewise required some amount of deconstruction, but not quite as much as the first approach. The concerns regarding loss of context remained.

The final approach considered was to include the comments more holistically under the framings in which they were solicited (direct impacts, indirect impacts, and recommendations) in the discussion section. This approach better honored the integrity and context of participants' comments, but did not allow for the structure afforded by the other options. While the final approach was decidedly messier from an organizational framing, it was notably more effective in conveying to the reader the layering of impacts, concerns, and frustrations participants' comments evidenced.

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Ultimately, it was decided that the power of this report resided in the voices of the study participants who conveyed their first person accounts of the impacts on emergency management. Hence, participants' comments were shared with little to no parsing in the *Discussion* section of the report. The key themes in the comments were summarized at the beginning of each discussion section (i.e., direct and indirect impacts) and a sampling of the study participants' recommendations were shared in the *Recommendations* section.

Emergency Management Function

Emergency management is a “managerial function charged with creating the framework within which communities reduce vulnerability to hazards and cope with disasters.”³ Emergency management’s mission is to protect “communities by coordinating and integrating all activities necessary to build, sustain, and improve the capability to mitigate against, prepare for,

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respond to, and recover from threatened or actual natural disasters, acts of terrorism, or other man-made disasters.”⁴ This mission is not one accomplished solely by the emergency management function, but instead is a distributed function⁵ that is managed by emergency management personnel at various tribal and government levels.

In North Dakota, as in other states, each county seat has a designated emergency management position.⁶ This position historically was framed as a 25 percent to 100 percent emergency management function commitment and was married with other responsibilities that are fire or law enforcement oriented.⁷ Increasingly, emergency management positions in the United States are moving toward a singular emergency management focus that is independent of first responder partner agencies.⁸ Additionally, more populated cities are establishing independent emergency management offices and counties are

expanding staffing in their offices.⁹ North Dakota has evidenced similar movement in primary focus and staffing, particularly since the heightened

focus and push the federal government has placed on safety and security since the events of 9/11/2001. Yet, many emergency managers at the local level (city, county, and tribal) still wear multiple hats, are housed within first responder agencies, and remain an office of one.¹⁰

Yet, many emergency managers at the local level (city, county, and tribal) still wear multiple hats, are housed within first responder agencies, and remain an office of one.

Fortunately, in North Dakota, the relationships between emergency management personnel and key partner agencies have been fairly effective in dealing with preparedness (e.g., training, basic exercises, and public education) and response activities.¹¹ Alas, time intensive activities such as planning efforts (e.g., emergency operations, mass-casualty events, mitigation, sheltering, evacuation, recovery, etc.); higher level exercises (e.g., multi-agency functional and full-scale exercises); and, management of long-term recovery operations have long taxed the emergency management capacity at the city, county, and tribal level.¹² To better address this lack of capacity and to enhance collaboration for a potential chemical, biological, radiological, nuclear, or explosive (CBRNE) event, the North Dakota Department of Emergency Services implemented a Regional Response Coordinator program.¹³ The four

regional coordinators are tasked with enhancing collaboration with, and providing support to, their regions to help improve the overall safety and security of the citizenry.¹⁴

The federal government supports the funding of emergency management programs at the local and state level with Emergency Management Performance Grant¹⁵ (EMPG) funding, but the amount of funding that flows through to local jurisdictions can vary and is typically 50 percent or less of a local emergency manager's pay.¹⁶ Hence, the decision to fully fund and support city, county, and tribal emergency management programs remains wholly at the local level.¹⁷

Unfortunately, varying levels of understanding of, or commitment to, the emergency management program can create fairly dramatic differences in the strength and capacity of emergency management programs from locality to

locality.¹⁸ When faced with an emergency or disaster, a lack of capacity can result in more injuries and loss of life, more extensive facility damage and loss, longer community interruptions, and, a more difficult recovery process. All of the aforementioned outcomes are counter to the emergency management mission.

To ensure the adequacy of the emergency management function at the local and state level to meet its responsibility to the citizenry, a fair assessment of community needs and emergency management capabilities must underlie staffing, training, exercising, planning, infrastructure, and funding decisions.¹⁹ Such an assessment requires both an up-to-date community profile and a comprehensive threat and hazard identification and risk assessment (THIRA).²⁰ The oil drilling and production in North Dakota affects both the community profile and the THIRA. As such, it presents additional challenges related to demographic, infrastructure, and socioeconomic impacts, as well as, hazard planning and preparedness, mitigation activities, response capabilities, and recovery considerations. Also, it must be noted that these considerations do not stop at the county lines in which active drilling or production are occurring, but instead have created a new normal that has rippled across North Dakota and in some instances, across the United States and Canada.

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Oil Drilling and Production

Oil was first discovered in North Dakota on April 4th, 1951, in Tioga. The Bakken Formation was discovered in 1953²¹, but due to the limitations of vertical drilling it did not prove to be a major economic player until 2009 when the advancement of horizontal drilling and hydraulic fracturing made the drilling and production of the Bakken/Three Forks Formation economically feasible and desirable. This formation is the “largest oil field (in

square miles) in the world” and “underlies approximately 18,000 square miles of North Dakota.”²² According to a 2010 survey, conducted by the USGS, it is estimated that the Bakken/Three Forks Formation contains 169 billion barrels of oil.²³ In 2013, the USGS predicted that the amount of recoverable oil in these formations fell somewhere between 4.42 and 11.43 billion barrels given the current technology available.²⁴ Enhanced Oil Recovery (EOR) techniques such as the use of carbon dioxide in “well-established conventional oilfields” have the potential to increase the amount of recoverable oil found in the Bakken.²⁵

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In April 2014, a Bakken milestone was reached when it became only the 10th oilfield in the world to start producing one million barrels of oil per day.²⁶ Production has continued to increase and according to a recent report, “there is the potential for production to reach two million barrels of oil a day, however infrastructure constraints will cap oil production at 1.7 million barrels of oil a day” before 2019.²⁷ The level of production in the Bakken has helped the United States become the world’s top oil producer.²⁸

With an American Petroleum Institute (API) range of 36-44, Bakken crude oil is light, sweet oil that is on par with West Texas Intermediate crude, the benchmark in the United States. Light, sweet crude oil is highly valuable as it provides the most sought after products, namely unleaded gasoline and diesel fuel, with the least amount of refinery processing.²⁹ As of December 2014, there were 189 active oil rigs in North Dakota. This number is down from 191 in 2013. The North Dakota Petroleum Council estimates that the “current fleet of rigs drilling Bakken and Three Forks wells will take 15-20 years to develop the entire thermally mature resource area.”³⁰

The rig count fluctuates on a weekly basis, however the “North Dakota Petroleum Council estimates that each rig accounts for 120 direct and indirect jobs.”³¹ The one million barrels per day production rate is estimated to contribute \$50 million per day to North Dakota’s economy and \$11 million per day to the state’s “coffers in oil and gas extraction and production

taxes.”³² Currently, only two states – North Dakota and Texas – produce more than one million barrels a day.³³

The drilling and fracking of each well requires upward of two million gallons of water.³⁴ Presently, the most economical source of water for producers is fresh water; however, it is likely that technological advances and future regulations on the use of fresh water will force producers to seek out alternative water sources.³⁵ This will cause an increase in operational costs that could potentially impact the number of wells in the state.

The unprecedented population growth that western North Dakota has experienced is directly tied to the growth of North Dakota’s oil industry. Oil companies have been attempting to procure as many mineral leases as possible since the Bakken oil boom began. To do so they “began to drill at least one well in each leased spacing unit.”³⁶ This unprecedented amount of drilling required a large amount of manpower. Workers from across the United States flocked to the oil fields. As the population of small towns in western North Dakota has skyrocketed, the state’s unemployment rate has plummeted. With an unemployment rate of 2.7 percent as of November 2014, the state presently has the lowest unemployment rate in the nation.³⁷

A recent assessment of oil and gas industry impacts reported that “drilling to hold leases was still common...although at a greatly diminished scale when compared to the 2007-2012 time frame of the Bakken/Three Forks unconventional oil play.”³⁸ As time progresses and exploratory drilling slows down, companies are transitioning into a “sustainable production phase.”³⁹ With this shift, “employment in the petroleum sector is expected to transition from one weighted heavily on a temporary/development workforce to an industry that will be more dominated by long-term/permanent employment. The industry is expected to retain a substantial portion of total employment related to temporary/development jobs over the next five years.”⁴⁰ This trend is expected to continue and “long-term employment in the petroleum sector will increasingly become more of a function of the number of wells as long-term employment in drilling and hydraulic fracturing will continue to decline.”⁴¹

As of September 2014, there were 11,750 producing wells in the Bakken.⁴² If the price of crude oil remains between \$70 and \$100 per barrel there could be between 40,000 and 120,000 wells in a fully produced Williston Basin.⁴³

Drilling activities alone could last up to 20 years and with current technology, it will take at least 50 years to produce all of the accessible oil.⁴⁴

Depending on the initial production rate of the well, price swings can heavily affect Bakken production. However, provided “wellhead values remain above \$50/barrel,” production will continue to be economical.⁴⁵ According to the Ross Smith Energy Group, the breakeven price for Bakken crude is \$47 per barrel.⁴⁶ Recently, the oil prices have dropped to their lowest in five years.⁴⁷ Oil prices are down 44 percent in North Dakota since September 2014.⁴⁸ The drop in price per barrel is particularly problematic for producers that have higher access and transport costs, such as North Dakota producers do.⁴⁹ The effect of the dropping prices was evident in October 2014 when oil production

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“declined by about 4,000 barrels per day to 1.18 million daily barrels compared with September, the first decline in eight months.”⁵⁰ New well drilling has also experienced a decline and is expected to face additional declines in 2015 based on the low oil prices.⁵¹

TYLER FORMATION RELATIVE TO BAKKEN



Source: North Dakota Geologic Survey

Formations will be developed.⁵² Successful development of these formations will create an expanded footprint for oil drilling and production in North

While the Bakken and Three Forks Formations are currently the most produced zones in the Williston Basin, there are other zones that could be worth developing in the future. As industry knowledge of geology and drilling techniques improves, it is expected that the Red River, Spearfish, and Tyler

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Dakota and expand the number of decades that North Dakota will be a lead contributor in the oil industry.

In addition to the oil play, opportunities exist for natural gas development in the Bakken. According to the North Dakota Petroleum Council, there are currently “6.7 trillion cubic feet of undiscovered, technically recoverable natural gas and 0.53 billion barrels of undiscovered, technically recoverable natural gas liquids” in the Bakken.⁵³ “Currently, Bakken-derived gas is more valuable than natural gas from conventional dry-gas plays due to the higher ratio of natural gas liquids.”⁵⁴ However, due to the limitations of the current gas gathering systems, almost 30 percent of Bakken natural gas is being flared.⁵⁵ This percentage is expected to drop due to increased regulation by the North Dakota Industrial Commission. The

regulation requires an incremental reduction in flaring between the final quarter of 2014 and 2020 to a maximum of 10% flared gas, and the potential of 95% gas capture.⁵⁶ The infrastructure and industry necessary to capture gas and the accompanying economic benefits of additional gas capture will be an added benefit to North Dakota’s economy and will create additional workforce, housing, and service needs.

Direct and Indirect Impacts

In the upcoming sections, the material developed in the first prong of the study is covered. As stated previously, the length of these sections has been necessarily limited for the reader’s ease. Many of the subtopics in each section could have been covered in greater depth barring length limitations. Each section is conscientiously notated to facilitate the reader’s further exploration of the topics covered.

Socioeconomic Impacts

North Dakota was still focused on out-migration as recently as 2007. Seven years later, the state is being challenged by expansive growth and change. The shifting demographics and economic profiles at the community level have had fairly dramatic socioeconomic impacts. North Dakota is not the same state it was a handful of years ago by anyone's estimation.

The boomtown model⁵⁷, which looks at “the effects of rapid energy development – substantial population change, in-migration of workers, overwhelmed public services, degradation of quality of life factors, among other issues such as community planning and development challenges – emerged as a model to characterize and generalize the impacts on rural communities experiencing rapid growth and economic disruption.”⁵⁸ An analysis of the boomtown model and other research that addressed rapid energy development on small communities by Bangsud and Hodor⁵⁹ offered the following “synthesis of expectations and observations linked to rapid energy developments”:

- “Development of natural resources requires a substantial labor force. Local labor supply is usually inadequate to fulfill those needs, resulting in influx of new workers to an area.
- Local communities often experience a substantial increase in population relative to initial thresholds.
- As population increases, community resources and services become inadequate.
- Housing supply is exhausted, leading to housing shortages and cost escalations.
- Public utilities cannot keep up to increased demands.
- Demands for medical, law enforcement, schools, and other public/private services increase, and can become overwhelmed.
- Local governments experience lags from when impacts occur and when funding mechanisms provide revenues.
- Wage rates escalate, putting additional pressure on housing markets.

- Recreational amenities are inadequate for the increased population, and when combined with cost-of-living increases, quality of life attributes become compromised.
- Communities are unable to address growth in both scale and pace to satisfy new workforce. Workers become disenfranchised with living arrangements, and are not engaged in the community.
- Workforce issues include high turnover and challenges recruiting and retaining qualified workers.
- The number and rates of crime increase in the region.”⁶⁰

The reality of the aforementioned challenges in western North Dakota (and increasingly across the state), have been captured in a multitude of articles and reports over the past five years. North Dakota has become a case study on the perils of rapid growth without the necessary infrastructure and services. In many ways, the rapid growth has become its own challenge that exacerbates other more specific challenges oil drilling and production bring to the state.

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Population and Worker In-migration

According to estimates provided by the Census Bureau, North Dakota has experienced a considerable population increase since the last census in 2010. North Dakota passed the all-time population peak in December 2013, with an estimated population of 723,393.⁶¹ The estimated population growth in just the past few years has increased each year, with a growth of 6,900 in 2011, 12,717 in 2012, and 19,051 in 2013.⁶² Similar substantial increases in demographics have been recorded in various parts of North Dakota, to include both the major cities and the western part of the state. North Dakota’s population growth in recent years is attributed to net migration, as opposed to the natural population increase most other areas that gained population experienced.⁶³

North Dakota cities have seen dramatic increases as well. Examples of this growth in North Dakota's larger cities from 2010 to 2013 are: Bismarck – a population increase of 3,500; Dickinson – a population increase of 2,000; Fargo – a population increase of 4,600; Minot – a population increase of 3,000; and, Williston – a population increase of 3,500.⁶⁴ While such population changes may seem minor when compared to the overall population of other states, when examined in a national context, the pace of North Dakota's growth is impressive. The data for state-wide, county-wide, and city-wide growth shows that the population in North Dakota is growing rapidly, even compared to the rest of the nation. The nation's fastest growing county in 2013 was Williams County, North Dakota, located in the heart of the Bakken. Stark County was the fourth fastest growing county.⁶⁵ Also in 2013, North Dakota cities were among the fastest growing in the nation with Fargo ranked number four and Bismarck ranked number five.⁶⁶ Additionally, in 2013, Williston, Dickinson, and Minot were among the top five fastest growing micro areas.⁶⁷

It is estimated that over the next five years, population will increase in some North Dakota counties by more than 30 percent.⁶⁸ It has been postulated that “the national average for manageable growth is 1.5 percent annually.”⁶⁹ Yet,

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the majority of the areas in, and adjacent to, the Bakken are expected to increase population at a rate beyond what is considered manageable growth.⁷⁰ Of note, inadequate housing availability to meet the needs of these projected populations is expected to have a dampening effect on population growth.⁷¹

Demographic changes have impacted the gender ratio. From 2009–2013, the male population has risen 14 percent.⁷² Comparatively, the female population rose only 9 percent.⁷³ The gender imbalance is more pronounced in western North Dakota. In the eastern part of the state the ratio of men to women has remained stable.

The balance between men and women is not the only changing demographic worth noting in North Dakota. The median age in the state is dropping below the national average. In 2013, the median age nationally sat at 37.6,

while the median age of North Dakota had dropped to 35.1.⁷⁴ The decrease in median age stands in stark contrast to the previous “graying of North Dakota” in which the state’s aging population and out-migration of younger people resulted in a consistent rise in median age⁷⁵

Also in flux is the increased racial and cultural diversity in western North Dakota.⁷⁶ This growth has resulted in populations versed in primary languages other than English and can present challenges in communicating important safety, enforcement, and warning messages. Additionally, the cultural needs and considerations of a changing demographic can necessitate additional awareness, sensitivity, and services.

Finally, the transient nature of many of the oil workers – in that they work in North Dakota, but still maintain residences in other states that they travel between – creates an interesting dynamic in regard to the way they view and behave in their part-time North Dakota community⁷⁷, the level of community integration they achieve, and the ways in which they can be accessed.

Housing

Housing in western North Dakota is inadequate to meet current population needs.⁷⁸ Even when housing is available in and around the Bakken, the costs can be prohibitive to those not earning the wages associated with oil jobs. In regard to renters (which temporary oil workers so often are), those in western North Dakota now pay the type of rental rates that are typically charged for prime Manhattan rentals. Indeed, the country’s top rental cost for a one-bedroom apartment is in Williston, North Dakota, at \$2,394 a month.⁷⁹ Dickinson is also on the top ten list of most expensive rental cities, among locations like Los Angeles, New York City, Santa Barbara,

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and Long Island.⁸⁰ The cost to rent in western North Dakota has displaced many longtime renters who live on fixed incomes or who are unable to make a sufficient wage to pay the increasing rates.⁸¹ Beyond forcing out existing renters, high rents and low availability make it difficult to maintain a properly functioning community. Affordable housing is tied to almost everything in a functioning community – from the ability to adequately staff essential operations such as the local school, police department, and public works, to the ability to staff businesses that supply food, fuel, and medical care.

North Dakota has the highest amount of new housing units in the entire country with the addition of 10,207 new units last year.⁸² Five of the top ten counties recognized as having added the most housing units in the country are located in North Dakota as well, with Williams County and Stark County in first and second place (respectively).⁸³ Yet, even with the addition of so many new housing units, the need remains stronger than the supply. A recent evaluation of the impacts of oil over a five year period stated that if drilling and production remained at least at 2013 levels, housing unit need would increase by more than 37,000 units in the Dickinson, Minot, and Williston regions over the next five years.⁸⁴

Formal crew camps, such as the one established by Target Logistics⁸⁵ in Dickinson, have helped to address some housing challenges, particularly as they apply to oil workers who have no current interest in establishing a permanent North Dakota residence. These camps are modular facilities designed to meet the short-term housing needs of a specific audience and to be removed when those needs no longer exist. The cost to stay at these camps is often subsidized by an oil worker's company. These types of units function as a dormitory and meet the needs of their residents by supplying a full

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cafeteria facility, recreation areas, weight room, laundry facilities, general store, and sleeping quarters. The camps are not intended to be akin to traditional housing and strict rules apply to residents' usage of the rooms and premises.

If affordable housing is not available in western North Dakota, those working in the Bakken and in surrounding communities will find it difficult to either bring family members to the state⁸⁶ or remain in the area for an extended period of time. Increasingly, a migration from western North Dakota to cities such as Bismarck and Fargo is occurring as a matter of housing economics.⁸⁷ Another outgrowth of the housing challenges in western North Dakota is an increase in homelessness in the state.⁸⁸ Homeless populations are more vulnerable and difficult to reach. Inadequate housing, community infrastructure, and governmental structures exacerbate more typical challenges that contribute to homelessness.

Services and Workforce

The population growth, demographic changes, and housing challenges create an environment wherein an inability to offer adequate government and private sector services develops. This is a multifaceted problem that begins with the lack of existing infrastructure, wage competition, and workforce gaps, and ultimately results in challenges that can affect safety, security, issue abatement, and positive growth management. Further complications result as the effects of these impacts extend beyond the areas directly affected to other nearby areas creating a series of secondary and tertiary impacts.

In many cases, inflation in the western part of North Dakota is pricing essential service providers out of the market.

Small-town North Dakota has struggled to create the level of infrastructure necessary to accommodate the ever-increasing needs of the oil industry. Public, private, and non-profit organizations have to try to catch up with a growth curve that is the result of unprecedented population growth and disproportionate capacity. Even when resources exist to meet the service needs, the ability to hire, house, and retain sufficient workers circumvents progress. In many cases, inflation in the western part of North Dakota is pricing essential service providers out of the market. The challenges mount

when housing limitations and costs are introduced to the discussion. Even in those instances where an agency, organization, or business can absorb the wage cost and supplement housing costs, there still remains the challenge of finding housing.⁸⁹

Service providers are stretched thin, schools and government offices are understaffed and overworked, medical facilities are strained, non-profit organizations are attempting to address the needs of an expanded service base, and the private sector is scrambling to keep the doors open to grocery stores, restaurants, gas stations, and other establishments that serve the community. The notion of strategic planning for the community's future has devolved to addressing the urgency of daily needs. The talk of prosperity and power that North Dakota has garnered as a key energy player in the world is lost on longtime residents who long for the quiet way of life they enjoyed before the boom.⁹⁰

The realities in the Bakken and in surrounding counties are such that fast food locations that used to have set hours now are forced to close because of lack of workers; shopping at Walmart must be carefully timed to align with the shipment days or the shelves will be empty; service quality has become an afterthought; and, travel time to and from any location has increased due

The talk of prosperity and power that North Dakota has garnered as a key energy player in the world is lost on longtime residents who long for the quiet way of life they enjoyed before the boom.

to traffic volume.⁹¹ Inflation has resulted in increased costs and reduced availability of goods and services. As an example, construction costs and availability are at a premium. In western North Dakota, new facilities cannot be built quickly enough; indeed, major projects such as additional medical facilities, schools, community infrastructure, and housing are pulling contractors from across a tri-state area to western North Dakota.⁹² This has a ripple effect across the state in the form of costs and timelines for

construction projects. Increasingly, these costs are inflating the cost of goods and supplies on the eastern side of the state.

Additionally, employers on the eastern side of the state are beginning to face struggles in regard to adequate workforce and wage competition. The evidence of the job surplus that is developing lies in the “We’re Hiring” signs that can be seen at dozens of major retail stores and restaurants in the Fargo area.⁹³ About 6,000 of the 20,000 open positions statewide are in the Fargo area. Grand Forks has likewise been feeling the effects of the workforce shortage.⁹⁴ The competition to retain workers on the eastern side of the state has forced employers to be more creative in their recruiting efforts and more liberal in their wage offerings.

Quality of Life

If there was one thing North Dakota always had in its corner, it was the quality of life the state offered, particularly for children, families, and older adults. These days, the quality of life, particularly in the western part of the state, is a function of conditions created by oil drilling and production.⁹⁵ Quality of life is shaped by “both monetary and non-monetary factors” that can be either positive or negative based on stakeholder group characteristics.⁹⁶ In western North Dakota two key tenets strongly influence monetary quality of life factors: 1) the state of housing (i.e., owner versus renter and ownership pre-boom or post-boom); and, 2) income (i.e., direct oil benefit from mineral rights or leases, landlords, business owners or high-paying employment versus other industries that are paying less or limited income). Non-monetary quality of life factors such as a sense of safety and security, adequate government services, good schools, well-maintained roads, accessible services, opportunities for recreation, and community trust, when coupled with the monetary factors, create the framing for both subjective and objective quality of life assessments.⁹⁷ Research in this area suggests that quality of life factors in western North Dakota over the next five years will depend on five main drivers: 1) availability of affordable housing); 2) level of investment in community infrastructure; 3) level of investment in public services; 4) attraction of new businesses; and, 5) community integration and interaction programs.⁹⁸

Clearly, quality of life assessments affect the ability to draw and retain workers, families, and new business to North Dakota. A negative perception of quality of life could result in inability to acquire new workers and residents and an out-migration, both which would affect the ability to sustain the oil infrastructure. The balance between monetary and non-monetary factors in quality of life assessments is much more finely-tuned with those who view

themselves as permanent residents (as opposed to transient oil workers who have permanent residence elsewhere).⁹⁹ Even those permanent residents who are making good money and are sheltered from the inflated housing costs can carry a negative perception of quality of life that would cause them to forsake the monetary benefits. If left unattended, this is an area that will wreak havoc on the ability to supply the infrastructure necessary to sustain communities in and around the Bakken.

Transportation

The impact of the oil industry can be felt across North Dakota via its effects on rail, roads, and highways. Issues such as increased rail usage, road and highway deterioration, and significant increases in rural and urban traffic have caused concern for citizens, industry, and government officials alike. The North Dakota Department of Transportation (NDDOT) has done a good job of identifying the impacts on transportation and the agency has actively sought to implement improvements to ensure that North Dakota's citizens and interests are served.¹⁰⁰ Reviewing the basic dynamics involved in these issues lays the groundwork for understanding additional challenges that oil drilling and production bring to bear in the transportation arena.

Rail

"North Dakota is served by two Class 1 and five short line railroads. These railroads operate a total of 3,634 miles of track. The state's current rail system is approximately one-third the size of the system in 1950. Currently, there are more than 3,400 public crossings, of which about 700 are equipped with automated signals."¹⁰¹ A 2007 NDDOT assessment¹⁰² of continuing long-term and emerging trends regarding North Dakota rail identified a number of trends that framed and affected rail operations in the state in the present and into the future. The assessment, completed prior to the full realization of oil impacts on rail, addressed a number of trends that are worth noting herein. In regard to continuing long-term trends, the primacy of rail use for agricultural transport and the importance of agriculture to North Dakota's economy were identified.¹⁰³ In regard to emerging trends, the specific trends of increased demands coupled with capacity constraints, safety concerns, and security issues¹⁰⁴ are increasingly relevant to the current discussion of oil transport by rail. Clearly, the transport of Bakken crude by rail across the state, country, and continent has complicated, and raised the stakes, in the discussion of rail utilization, safety, and security.

As predicted in 2007, there have been increased demands and capacity constraints that have affected rail transport. Railcar shortages have resulted in the usage of high capacity railcars that can carry greater tonnage than standard railcars can. Since each railcar is a set price, customers can overload the railcars to lower cost and increase the profit margin of their cargo.¹⁰⁵ Unfortunately, the increased weight of the high capacity railcars causes more wear on the already aging tracks increasing the overall vulnerability of the rail system.¹⁰⁶

The ever-growing transport of Bakken oil via rail has decreased the availability of rail transport for agricultural usage. Despite the fact that the state's agricultural sector accounts for between 20 and 30 billion dollars annually and "leads the nation in the production of several

...the increased weight of the high capacity railcars causes more wear on the already aging tracks increasing the overall vulnerability of the rail system.

different commodities"¹⁰⁷, its power to move its product via rail has been greatly diminished. The negative impact of this on North Dakota agriculture cannot be understated. A letter from the Wilton (N.D.) Farmers Union Elevator Co. to North Dakota Governor Jack Dalrymple captured the urgency of the situation in stating that the elevator was sitting five months behind on railcars and fighting for survival. Governor Dalrymple has acknowledged that the lack of railcar service for agriculture is costing North Dakota farmers; he recently stated at a transportation meeting that "the impact of late shipments has been in the 'hundreds of millions of dollars' for North Dakota farmers."¹⁰⁸

From September 2012 to September 2014, the number of oil producing wells in North Dakota rose from 7,907 to 11,770, an increase of 48.8 percent.¹⁰⁹ This caused the average daily production to rise from 729,341 barrels to 1,186,296 barrels, an increase of 62.65 percent.¹¹⁰ Currently 75 percent of all the Bakken oil is being transported by railcar¹¹¹, this equates to a need for 1695 railcars every day to transport Bakken oil to refineries around the nation.¹¹² It was noted in 2012, prior to the current acceleration of oil

transport that “without significant investments, some of the state’s railroad mainlines are projected to reach capacity by 2035.”¹¹³

Perhaps the hottest topic in regard to rail over the past two years has been the volatility of Bakken crude and what that means to local communities when an accident or derailment occurs.

Perhaps the hottest topic in regard to rail over the past two years has been the volatility of Bakken crude and what that means to local communities when an accident or derailment occurs. After a number of communities experienced explosive incidents¹¹⁴ involving Bakken crude, a national conversation has ensued regarding railcar suitability, rail deterioration, reduction of crude volatility, and the capacity and capability of local communities to respond. This is an area where the oil and rail industries will be pushed by federal legislators to improve the safety of Bakken crude transport.

Trains with dozens of oil railcars traverse North Dakota communities every day. After the Casselton derailment and explosion at the end of 2013, North Dakotans started to pay much more attention to the frequency with which oil railcars travelled through their cities and towns. Yet, most citizens are unaware that there are a multitude of hazardous materials traveling via rail that are equally as dangerous as oil given an accident or derailment. A derailment involving anhydrous ammonia in Minot on January 18, 2002, was a wake-up call regarding the transport of hazardous materials via rail through communities.¹¹⁵ Since 2002, there have been 208 train derailments in North Dakota.¹¹⁶ Derailments are more common than most people know and are often of little consequence. It is the potential of a rarer, high consequence event that significantly threatens life, property, and the environment that requires the thoughtful attention of emergency management and its partners. The 2013 Lac-Mégantic train derailment and explosions in Quebec, Canada, the deadliest Bakken crude incident to date, has caused many local officials in communities with Bakken oil traveling through them to wonder aloud, “What if that happened in the middle of our community?”

Roads and Highways

Another issue of concern is the increased traffic on North Dakota roads and highways. Historically, “the number of vehicle miles traveled (VMT) on the state’s roads has annually grown between three and four percent. However, between 2010 and 2011, overall VMT grew by more than nine percent, and statewide truck traffic grew by more than 26 percent.”¹¹⁷ With the increased population and oil activities in western North Dakota, the VMT and truck traffic have undoubtedly continued to rise between 2011 and 2014.

In addition, overloaded semi-trucks hauling fracking water, sand, and other drilling equipment are causing tremendous wear on roads and highways. It is estimated that “bringing a well into production requires about 2,300 inbound and outbound truckloads, many of which require permits since they are either overweight or over-dimension.”¹¹⁸ Further, it can take up to “100 loads to move an oil drilling rig, nearly 50 movements are either overweight or oversized and require permitting.”¹¹⁹ The high volume of traffic does not stop once the well is producing; roughly 70 percent of Bakken oil is picked up and taken to a pipeline terminal or rail hub by tanker trucks thereby further taxing North Dakota roads and highways.¹²⁰ With the estimated “additional 32,000 to 40,000 wells that will be drilled in the state’s oil producing region over the next 15 to 20 years, oil-related traffic is expected to be a long-term trend.”¹²¹

With the increase in traffic and driving time North Dakota has faced a record number of vehicle accident fatalities. Truckers in western North Dakota, hauling fracking fluid in overweight trucks on deteriorating roads, work 24 hour shifts; the sleep deprivation in such a situation creates a level of impairment equal to driving intoxicated.¹²² The statistics are in-and-of-themselves startling: “severe heavy vehicle crashes increased each year in the oil producing region, with 4 severe crashes in 2007 increasing to 81 severe crashes in 2011.”¹²³ The number, and extent, of these accidents have additional implications beyond

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motorist injuries and deaths. The effect of this sharp increase on responders, area healthcare facilities, traffic management, and community psyche all factor into the ultimate impact the increased number of accidents have.

Between 2005 and 2011, North Dakota's highway construction cost index increased by more than 90 percent.¹²⁴ Given the large increase in highway construction costs, in 2011-2013 the state allocated additional monies for transportation projects on city, county, and township roads from the oil impact fund: \$228.6 million for "extraordinary state highway maintenance," \$142 million for "county and township road re-construction," and \$60 million for "non-oil producing counties."¹²⁵ The allocation was just a portion of what was needed; indeed, at the time, the 2013 construction program was the largest construction program in the state's history estimated to be about \$878 million.¹²⁶

During the 63rd Legislative Assembly of North Dakota one-time funding for state highway construction and maintenance was appropriated. Senate Bill No. 2176 provided \$620 million and Senate Bill No. 2012 provided \$541.6 million. Together, the bills provided \$1.16 billion to the NDDOT for the 2013-2015 biennium for projects in the state affected by oil production. This oil-focused remediation funding surpassed the 2013 statewide construction estimate by \$228 million (32 percent).¹²⁷ Into the next biennium, it is reasonable to believe that the amount of monies appropriated for addressing highway issues in North Dakota will increase.

Public Health

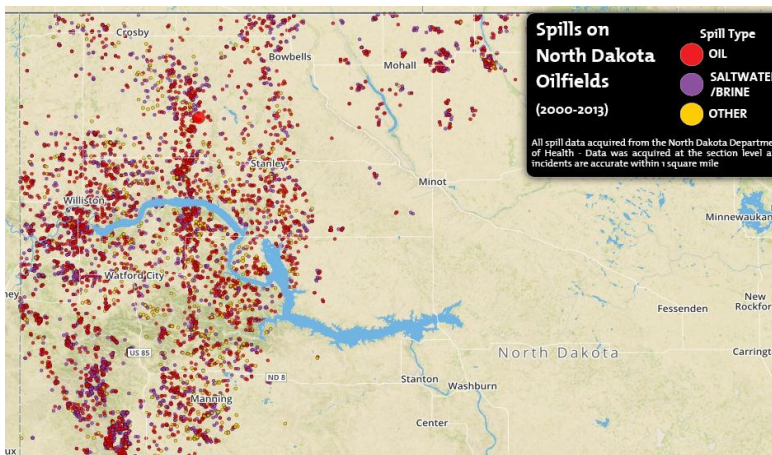
North Dakota has a bottom-up, decentralized public health system. In such a system, "the authority and direct responsibility for many public health functions lies at the local county or city level of government."¹²⁸ "In this decentralized approach, the units are required to meet state standards and follow state laws and regulations, but they can exercise their own powers and have administrative authority to make decisions to meet their local needs, and therefore determine their own service area or jurisdiction."¹²⁹ Fifty percent or more of the funding for local public health units comes from local, private, or federal sources and the remainder comes from state sources.¹³⁰ Local public health units are responsible for public health orders including quarantine, isolation, and seizure.¹³¹ The North Dakota Department of Health is designated as the primary state environmental agency.¹³²

Environmental Health

Environmental regulations and response to environmental events are the responsibility of the North Dakota Department of Health (NDDOH). As such, NDDOH is tasked with monitoring, assessment, and response to any oil-related environmental events. Additionally, NDDOH has a clear role in promoting public health and environmental stewardship.

The process of high volume hydraulic fracturing (HVHF) utilizes water, solids, and various fluids to enhance the extraction of natural gas from geologic formations.¹³³ In North Dakota, this process has contributed to over 18.4 million gallons of oil and chemicals

being released into the environment from 2006 through early October 2014.¹³⁴ Over five million gallons of non-toxic substances have also been spilled in North Dakota.¹³⁵ Mapped NDDOH data of oilfield spills for the



Snapshot of interactive application of mapped North Dakota spills from Gage Cartographics

“In North Dakota, this process has contributed to over 18.4 million gallons of oil and chemicals being released into the environment from 2006 through early October 2014.”

period of 2000-2013, shows almost 8000 spills of oil, brine, and other chemicals in western North Dakota.¹³⁶ NDDOH has also faced challenges with illegally dumped radioactive filter socks (used at drilling sites to filter wastewater).¹³⁷ Oil filter socks make up the bulk of the “up to 75 tons of radioactive waste generated daily” and are supposed to be

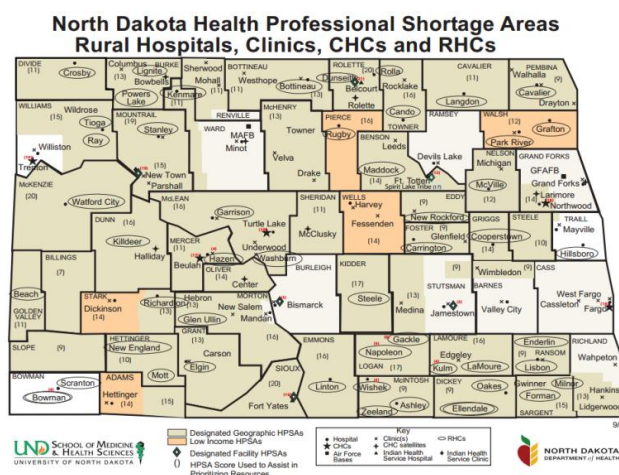
hailed to landfills in other states able to accept such radioactive material.¹³⁸

Public health can be impacted by HVHF. Groundwater quality is one of the most obvious impacts of HVHF. Up to 100% of fluids used in HVHF can return to the surface and contain hydraulic fracturing chemicals, heavy metals, salts, and naturally occurring radioactive materials.¹³⁹ While chemical additives to fracturing fluids are usually less than 2% by volume, over 100,000 gallons of chemical additives may be generated over the life of a well.¹⁴⁰ Some of the chemicals are known to be safe, while others like silica, methanol, and boric acid are known to be toxic.¹⁴¹ The chemical components of fracking fluids are trade secrets and this prevents effective public health monitoring and assessment.¹⁴²

HVHF fluids can overwhelm wastewater treatment systems.¹⁴³ The U.S. Environmental Protection Agency has found that even if drinking water supplies are not impacted, human health can be affected by the contamination of wildlife, livestock, and agricultural products.¹⁴⁴ HVHF can cause methane to contaminate drinking water supplies.¹⁴⁵ Combustion and leaking gasses associated with HVHF result in higher concentrations of ozone, particulate matter, and possibly increased air-quality linked health problems in production areas.¹⁴⁶ Hydrocarbon, methane, and other air pollutants levels were found to be elevated in HVHF production areas.¹⁴⁷ Presently, the risks associated with occupational exposure to chemical components of HVHF fluids, diesel exhaust, particulate matter, sand, and other substances are poorly understood.¹⁴⁸ It is known that the transportation and blending of sand used in HVHF generates dust containing crystalline silica, that is fine enough to be inhaled, and result in silicosis.¹⁴⁹ It is also an occupational lung carcinogen.¹⁵⁰

Trauma Patient Loads

Prior to the boom in the Bakken and the subsequent population explosion, health resources and human infrastructure in North Dakota were already under stress. A majority of the state was, and continues to be, classified as frontier, medically underserved, and experiencing a shortage of healthcare professionals. As a

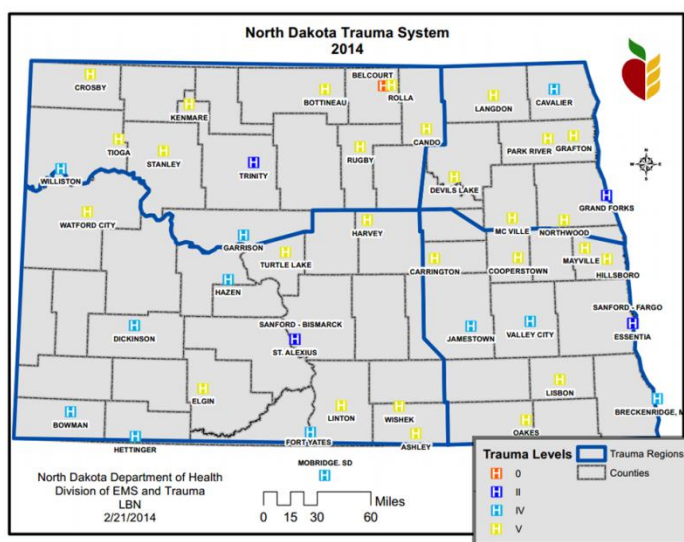


result, patients needing more than basic treatment at rural hospitals should expect to be transferred to referral centers up to 200 miles away.

The current challenges facing healthcare systems, while expected to some extent, were not fully realized in advance, per Gary Ramage, MD:

“We knew the oil boom was coming, but we didn’t realize the scope of the Bakken and other formations. This unabated influx has overwhelmed our resources. With this influx has come drugs, stabbings, beatings, bar fights, prostitution, gangs, sex offenders—a whole new level of violence, things associated with socioeconomic disadvantage.”¹⁵¹

The Northwest Trauma Region’s caseload saw a 147% increase from 2007 to 2012.¹⁵² Trinity Hospital in Minot experienced a 123% increase in traumas over the reporting period.¹⁵³ The increase in traumas in the western part of the state has driven an increase in demand for emergency department services. Physicians and other healthcare providers reported that the increased volume has caused providers to spend more time in the emergency department.¹⁵⁴ It is not uncommon for physicians in the oil-impacted region to work 24-hour shifts.¹⁵⁵ The North Dakota Hospital Association (NDHA) reports that its members are experiencing the same challenges as public health—high turnover, unfilled positions, increased costs, increased wage pressure, and housing shortages.¹⁵⁶



In 2007, the Tioga Medical Center saw an average of 600 patients a year in its emergency department; by 2012, the Center expected to see over 2,000 patients annually in its emergency department.¹⁵⁷ Mountrail County Medical Center’s emergency department load has increased four to five times pre-boom levels.¹⁵⁸ McKenzie County Hospital

emergency department visits doubled in less than a year, while Mercy Hospital expected an increase from 8,000 emergency department visits per

year pre-boom to over 24,000 emergency department patient encounters in 2013.¹⁵⁹

While traumas have increased across every age group, the greatest number of traumas were seen in the 20-29 age group with a 52 percent increase from 2009-2012.¹⁶⁰ The second largest increase was in the 30-39 age group with a 49 percent increase.¹⁶¹ Rural hospitals are seeing more severe injuries and have reported a 44 percent increase in patients that require transfer to Level II facilities.¹⁶² The nature of injuries being seen in emergency departments is changing. Blunt traumas were the predominant injury type from 2009-2012, but there has been an increase in penetrating injuries.¹⁶³ At Mercy Hospital traumatic orthopedic injuries have doubled due to an increase in oil field and motor vehicle related incidents.¹⁶⁴ The Northwest Trauma Region saw work-related traumas increase from 27 percent in 2010 to 41 percent in 2012 and has the highest percentage of work-related traumas in the state.¹⁶⁵ While the state's mortality rate for external causes remains around 68 per 100,000, this number may not be an accurate reflection of deaths in the state because it does not include non-North Dakota residents that die in North Dakota.¹⁶⁶

In 2012, motor vehicle related incidents surpassed falls as the leading cause of trauma in North Dakota.¹⁶⁷ The mortality rate for motor vehicle incidents and other trauma is at least 50 percent higher in rural areas.¹⁶⁸ Contributing to this increased mortality rate is an increase in transportation time. In western North Dakota, response times are about three hours from injury to arrival at the first medical center with an average transportation time of 77 minutes.¹⁶⁹ These response times result in arrival at the first medical center well outside the “golden hour” (the 60 minute window believed to significantly improve the survival rate of trauma patients).

In western North Dakota, response times are about three hours from injury to arrival at the first medical center with an average transportation time of 77 minutes.

Finances

Ninety percent of healthcare revenue is generated in the state's five biggest healthcare systems: Altru, Essentia, Sanford, St. Alexius, and Trinity.¹⁷⁰ These healthcare systems are outside of the oil production area. While non-rural healthcare systems are comparatively sound, the financial strain on rural healthcare systems has increased since the beginning of the oil boom. In 2012, North Dakota hospitals were paid \$0.54 for every dollar spent on patient care.¹⁷¹ Medicare and Medicaid accounted for 54% of revenue and charity care rose from \$51.5 million in 2010 to \$74 million in 2012.¹⁷² Sixty-four percent of critical access hospitals reported operational losses, coupled with an increase in bad debt from \$121.8 million in 2010 to \$150 million in 2012.¹⁷³ There was a 46% increase in healthcare facility unrecoverable debt in 2011-2012 alone.¹⁷⁴ The increase in uncollectable debt is more significant in oil impacted areas.¹⁷⁵

In 2012, Tioga Medical Center wrote off \$270,000 in medical debt; Mountrail County Medical Center reported that unrecoverable debt is up to 30% of revenue; McKenzie County Hospital expected to write off \$650,000; and, Mercy Hospital in Williston, North Dakota saw its debt rise from \$2 million pre-oil boom to \$7 million.¹⁷⁶ Hospitals in western North Dakota are seeing an increase in younger, uninsured patients engaged in oil-related activities.¹⁷⁷ Increased patient volume has not reflected increased revenue, and increased wages have not equated with less uncollectable debt.¹⁷⁸

The oil industry may inadvertently contribute to the unreimbursed care issue in North Dakota by offering incentives like housing allowances or other benefits in lieu of health insurance.¹⁷⁹ Additionally, the increase in unreimbursed care can be partly attributed to the inability to bill patients due to no billing or inaccurate billing information.¹⁸⁰ Medical providers in the region report they are unable to find their patients after they leave the healthcare facility. Randall Pederson of the Tioga Medical Center notes:

“We can take a copy of everything in their wallet or purse...and mail a statement out to them asking them to pay their bill. They've been returned by the post office ‘addressee not found.’ And you can't hunt them down using telephone numbers because they don't have landlines, only cell phones.”¹⁸¹

Uncollectable debt is only one part of the funding problems affecting health systems. Increased costs of disaster preparedness activities, aging equipment and equipment shortages, workforce and workforce housing, training costs, and the cost of updating or building new facilities are also adding to the financial strain.¹⁸² Healthcare systems are faced with \$48 million in need, but only \$7 million is available and is limited to fire, emergency medical services, and law enforcement.¹⁸³

Human Infrastructure

Hospitals in western North Dakota are experiencing difficulty with recruitment and retention due the changing nature of the region and wage pressure.¹⁸⁴ Hospitals cannot compete when a housekeeper at a hospital could expect to earn about \$11 an hour, while a housekeeper at a crew camp could expect to earn about \$24 an hour.¹⁸⁵

Mercy Hospital in Williston had 65 vacancies with applications to fill the open positions; however, the positions could not be filled because of a lack of housing and day care.¹⁸⁶ Healthcare systems not only recruit physicians, but their families as well; these families tend to come from areas with cultural and educational opportunities that are not available in North Dakota.¹⁸⁷

The changing culture of western North Dakota is viewed as part of the reason for recruitment challenges: doctors used to come to rural North Dakota for outdoor activities like hunting and fishing; however, these activities have been negatively impacted by oil development are not as attractive a draw as they were.¹⁸⁸ There is a concern that fear is discouraging new providers from coming to the region, Rob Kemp, MD states:

“You have to come to peace with the fact that some people are going to die because you don’t have the ability to take care of that problem. And that’s happened...”

“I think there’s apprehension about going out to a rural site because there is no cardiologist, there is no neurologist, there is no intensive care doctor. If you are working the ER you may have to deal with horrible automobile accident trauma on your

own. So I think it creates a huge amount of apprehension when you feel like you are isolated and by yourself. *You have to come to peace with the fact that some people are going to die because you don't have the ability to take care of that problem. And that's happened* [emphasis added], and people here are very accepting of that. I don't know about the new people coming here.”¹⁸⁹

Workforce Degradation

Rapid changes to the social structure and infrastructure coupled with increasing demands on public and private healthcare systems are resulting in a degradation of the workforce in the public and private health systems. The boom has shown no sign of peaking and there is significant uncertainty regarding future demand.¹⁹⁰ The entire healthcare system is being impacted: “dispatchers, first responders, quick response units, law enforcement, fire, emergency medical services, clinics, physicians, critical access hospitals, tertiary hospitals, long-term care facilities, public health, disaster health preparedness, health department, other healthcare delivery entities, [and] patients.”¹⁹¹ Healthcare systems see the current situation as, “a crisis within a crisis with all of the characteristics of a slow disaster, presenting dangers to

Healthcare systems see the current situation as, “a crisis within a crisis with all of the characteristics of a slow disaster, presenting dangers to patients, providers, and the public.”

patients, providers, and the public.”¹⁹² Seven key challenges of oil development in North Dakota have been identified by the healthcare community: increasing demand for service, finding and retaining staff, housing, safety, funding, a lack of collaboration, and “just keeping up.”¹⁹³ Difficulty in keeping staff is attributed to public health employees leaving for oil jobs, the long distances

and time required to travel due to traffic and housing shortages, and difficulty competing with rising private-sector wages.¹⁹⁴

Fire and EMS

Fire departments and emergency medical service (EMS) providers, whether independent or intertwined with each other in a given jurisdiction, encounter both unique and common challenges that can affect the quality and level of service they can provide. Oil development and production impacts on these emergency services have aggravated existing challenges and added new challenges. Fire departments and EMS providers are integral partners of emergency management and as they are impacted, so too is the emergency management function impacted. In examining impacts on fire departments and EMS providers, it must be noted that many considerations can affect the extent to which a unit is impacted. Considerations such as unit mission (i.e., firefighting only, EMS only, a combination, etc.); structural composition (i.e., paid staff, volunteer, or both); service level provided (i.e., certification levels of responders in the unit); geographic coverage; number of units; quality and extent of equipment; budgetary considerations; and, call volume, can both independently and collectively create either greater resilience or greater vulnerability. Additionally, the challenges associated with recruitment and retention of volunteers in rural settings remain a constant.¹⁹⁵

Fire departments in North Dakota come in various forms ...but the vast majority are staffed with volunteer personnel.

Fire

Fire departments in North Dakota come in various forms - all paid personnel, combined paid and volunteer personnel, and all volunteer personnel¹⁹⁶ – but the vast majority are staffed with volunteer personnel.¹⁹⁷ North Dakota certifies firefighters according to North Dakota Fire Association (NDFA) standards.¹⁹⁸ This is a mandatory certification requirement, regardless of what other credentials the person may hold. Firefighters can be trained and credentialed at different levels and for different specialties, but credentials must be maintained. These training and certification requirements take time and money. Whether it is individuals paying out-of-pocket or fire departments paying out of their budgets, the cost can be an impediment. Regardless of who pays for the training, the department loses staff from the roster of available personnel

when licenses/certifications expire and when staff are away attending training.

Fire departments often serve additional roles beyond firefighting, such as: EMS providers or support personnel, search and rescue and technical rescue personnel, state resources for wildland firefighting, and hazardous materials (hazmat) response personnel. These roles can require additional equipment and training and are not typically available in all areas.¹⁹⁹ Apparatus and equipment numbers, types, age, and condition can also affect a department's ability to respond, as well as affect the safety of those personnel assigned. Many rural departments and volunteer departments are using converted vehicles and equipment ²⁰⁰ with its own set of hazards, and many others have equipment – especially critical personal protective equipment such as bunker gear, hazmat suits, and biohazard gear – that is old, poor fitting, or otherwise unsafe. ²⁰¹ Mutual aid requests or Emergency Management Assistance Compact (EMAC) requests can leave an area with insufficient resources to meet the needs of that area unless plans for such requests and the existence of enough apparatus and personnel have been considered pre-event. ²⁰² Even though other agencies exist which can be called on in case of need, a jurisdiction cannot and should not depend on those resources as an alternative to adequate staffing and equipment.²⁰³ Additionally, while industrial firefighters, such as those that may work at a refinery may help, they do not have the same equipment or training as non-industrial firefighters.²⁰⁴

EMS

EMS includes more than ambulances and paramedics; it covers a wide variety of needs, expectations, standards, and system components. The components of EMS include everything from dispatch to the interface with healthcare system providers. The North Dakota Department of Health, EMS Division, determines requirements for EMS certification, but also accept certifications issued by the National Registry of Emergency Medical Technicians (EMTs).²⁰⁵ EMS personnel, like firefighters, must meet and maintain training and recertification requirements. Medics are not wholly volunteers, some areas are served by paid or partial pay services, but a large number of rural services are unpaid. EMS services experience the same financial and staffing impacts from training and certification requirements as fire departments do.

Ideally, from the time of injury, the ambulance needs to arrive at the patient's location, provide on-scene stabilizing care (which takes longer if the patient is trapped and fire or other personnel are needed to extricate the patient), load the patient into the ambulance, and transport the patient to a hospital that can meet their needs, all within an hour. Unfortunately, in rural health systems, few hospitals are equipped for trauma. Those that are so equipped are usually found in larger urban areas.²⁰⁶ This can extend the time it takes to get the patient needed care. If only one or two ambulances cover a given area, and one or both are transporting patients an extended distance – such as to a trauma center, then other patients in the service area will have an even longer wait. Services may also be negatively affected if the service area has geographically challenging areas (e.g., locations with limited roads or access). Winter weather may also delay or prevent the ambulance's arrival.²⁰⁷

Other Challenges Facing Fire and EMS

An additional challenge that faces both fire departments and EMS providers is population dispersion which tends to occur in regions that are primarily agricultural in nature. In these areas fewer people live farther apart. This results in the need for emergency services to cover larger areas²⁰⁸ and results in potentially longer travel times to get to the scene of an emergency. Clearly, response time is a critical aspect of controlling a fire or providing medical care. Response times can also be affected by weather events, traffic accidents, road closures, construction or other factors.²⁰⁹ Longer response times thereby implicitly contribute to increased property and environmental damage, medical acuity, and deaths due to care or response delays.²¹⁰

Also, the types of calls commonly encountered in rural settings can differ greatly from urban areas.²¹¹ Fire departments are more likely to respond to woodland fires, farm silo emergencies, and incidents involving farm equipment. EMS personnel are required to provide care for farm injuries involving farm machines, chemicals such as fertilizers and pesticides, and other situations not common in urban areas.

Longer response times thereby implicitly contribute to increased property and environmental damage, medical acuity, and deaths due to care or response delays.

As oil drilling and production have expanded in North Dakota, additional challenges have surfaced for fire departments and EMS providers. Problems such as increased numbers and types of calls, increased traffic and accidents, increased crime, increased risk of hazmat incidents, and increased development have aggravated existing vulnerabilities in the response framework.²¹² Further, many former volunteer fire and EMS personnel move into oil jobs that do not allow them the flexibility to continue their service, creating more volunteer vacancies. This decrease in volunteers coupled with the increased number of fire and EMS calls has resulted in some reticence by

When faced with a lack of staff, some departments may have to close - thereby creating more work, over larger areas, for fewer responders.

other employers to allow volunteers to leave the workplace for calls.²¹³ Both volunteer and paid fire department and EMS providers face significant hiring challenges based upon cost-of living increases and housing shortages.²¹⁴ When faced with a lack of staff, some

departments may have to close²¹⁵ - thereby creating more work, over larger areas, for fewer responders.

Finally, in addition to the other challenges faced by fire departments and EMS providers, are the challenges posed by costs. These costs include fixed costs, variable costs, and extra costs imposed by rare situations such as mass casualty incidents. Fixed costs can include facilities such as fire stations or EMS base locations, dispatch centers, apparatus and equipment – vehicles, personal protective equipment, medical or fire suppression supplies and the maintenance for all of these, and salaries and benefits for paid staff. The aforementioned facilities, apparatus, and equipment need to be current, in good condition, and regularly inspected and maintained, or the safety of responders and the public may be compromised.²¹⁶ Variable costs can include items such as training, actual response costs such as fuel, time for on-call personnel, care provided, disposable supplies and equipment, and damage to durable and non-expendable goods. Additional variable costs are incurred in the event of mutual aid use, a mass casualty incident, or a multiple-alarm fire. While some funding for responders may come from their jurisdictions, volunteer departments' funding typically comes from insurance and billing

for medical responses and independent fund-raising efforts. The challenges that come with maintaining the funds necessary for volunteer department operations adds to the strain on North Dakota fire departments and EMS providers, especially in areas where needs continue to expand.

Law Enforcement

The effect that a boomtown has on law enforcement has been studied before²¹⁷, most recently in North Dakota.²¹⁸ In the North Dakota study, over 100 sworn officers and sheriff deputies employed by eight different agencies in western North Dakota were interviewed. The study found that “significant changes” occurred within the agencies and departments that participated. Changes identified were high call volume, less time to interact with area schools and businesses, less time engaging in community building, difficulty in retention (due to cost-of-living and housing challenges), and high levels of work-related stress.²¹⁹ Further, the study found that those interviewed reported increased crime and a greater fear of crime amongst citizens in their communities.²²⁰

“The FBI has warned that Mexican drug cartels are trafficking drugs to the area, targeting the large paychecks of the mostly young men who work in the Bakken.”

While the study acknowledged the increased crime, it likewise noted data from the North Dakota Bureau of Investigation that the increase was “proportionate with the increase in population.”²²¹ The study did not examine or report on the extent to which the types or severity of crimes increased. For example, drugs have long been an issue in the state. North Dakota’s Attorney General Wayne Stenehjem initiated a drug task force in 2001, which outlined eight goals to help educate the population and to control the use of illegal drugs.²²² Yet, it is clear from reports that the drug concerns in the state have changed fairly dramatically over the past few years. “The FBI has warned that Mexican drug cartels are trafficking drugs to the area, targeting the large paychecks of the...men who work in the Bakken.”²²³ These cartels have established violent networks selling “meth, heroin, cocaine and marijuana” across western North Dakota.²²⁴ Federal resources are now being more intently focused on the Bakken area, indeed, “Williams County – home

to Williston – was recently designated a high-intensity drug trafficking area.”²²⁵

With the oil boom has come “a crime wave – including murders, aggravated assaults, rapes, human trafficking and robberies – fueled by a huge market for illegal drugs, primarily heroin and methamphetamine.”²²⁶ Human trafficking and crimes against women have become a matter of intense focus in North Dakota. In late 2014, more than \$1.5 million in federal funding was committed to help address the growing issues of domestic violence and sex trafficking.²²⁷

The growth in western North Dakota has resulted in many new law enforcement positions, but turnover is high. “Increases in calls for service, arrests, index crimes, fatal and non-fatal motor vehicle crashes, and sexual offenders, as well as significant turnover and recruitment issues have exacerbated the challenges experienced by law enforcement agencies. Law enforcement officials attribute much of the turnover and recruitment difficulties to employees seeking employment outside of law enforcement, low salary, and lack of available housing.”²²⁸ The shortages of sworn officers in the west is one of the factors adding to the stress and burnout of those in law enforcement.²²⁹

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Law enforcement partners with adequate capacity are essential to fulfilling the emergency management mission. Such capacity requires a level of staffing that allows for participation in planning, training, exercising, and other activities central to the emergency management function. Law enforcement’s capacity in North Dakota has been impacted by the dramatic population increase, increase in criminal activity, inflated cost-of-living, and housing shortages. Failure to bolster law enforcement partners that are struggling with such impacts affects not only the day-to-day safety and security of the communities they are in, but also the ability to meet emergency management needs.

Discussion

Having reviewed the general framing of impacts from the first prong of the study efforts, the participants' comments now can be better understood in the context in which they are presented. As was mentioned earlier in the report, study participants were asked about direct impacts, indirect impacts, recommendations, and additional thoughts. In this section the comments will be presented in the same framing as they were collected, with the exception of the question asking for additional thoughts. Those comments have been interspersed in the section where they make the most sense (i.e., direct impacts, indirect impacts, recommendations). In the few instances where a comment from one query resonated more clearly with comments from another query, the comment was included with the comments from the other query. Not all study participant comments are included in the body of the report, to review all participants' comments see Appendix B. As a reminder, the coding for responses is as follows: affiliation designation (EM for emergency management or PA for partner agency) and jurisdictional level (L for county/tribal/regional and municipality or S for state).

It must be said at the outset that the participants' comments are matter-of-fact commentaries on the state of affairs in North Dakota and reveal tremendous vulnerabilities that have developed in communities across the state from an emergency management lens. These vulnerabilities were shared in an effort to shed light on the new normal that is affecting the ability of the emergency management function to fulfill its mission to protect the communities it serves. Also evident in the comments is a fair amount of frustration and concern with the current situation. The reader is reminded that the participants in this study are a caring collective that operate more from a point of passion than pay; as such, their words should be afforded the respect that is due them. It is understood that there

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will be those who try and diminish the reported impacts based on individual or business interests; but, as a matter of principle, participants' comments must be honored as first person accounts of the environment they are experiencing.

Direct Impacts

The survey instrument supplied some suggestive framing for direct and indirect impacts, but study participants offered different delineations of what they considered direct and indirect impacts. Of particular note, a majority of both emergency management and partner agency respondents viewed the impact on partner agencies (i.e., law, fire, public health, EMS, and others) as a direct impact on the emergency management function. This is important because the survey instrument used impact on partner agencies as an indirect impact example. The fact that the participants' reported a different perception is telling in regard to the type of collaborative structure and interdependence that exists in ensuring the safety and security of communities in North Dakota.

It is understood that there will be those who try and diminish the reported impacts based on individual or business interests; but, as a matter of principle, participants' comments must be honored as first person accounts of the environment they are experiencing.

Six important themes emerged from participants' comments in regard to direct impacts:

- 1) The need for additional equipment, personnel, and funding to address the increased workload and changing responsibilities (e.g., the inability to focus on other necessary function activities based on the time and workload associated in dealing with oil issues);
- 2) The need for additional planning, training, and exercising in regard to oil transport, drilling, and production issues that could require an emergency

response (i.e., rail transport, truck hazardous material transport, spill response, rig fires, hazard event at oil site, etc.);

3) The shortage and burnout of first responders, particularly within volunteer departments;

4) The increased likelihood of not only more events, but also more severe events based on increased population and traffic;

5) Concerns regarding community compositions that are not versed in local hazards and are difficult to access and warn; and,

6) The delays caused in emergency response due to rail and transportation corridor blockage or congestion.

EM/L: “Even though we are at this time on the fringe of the western North Dakota oil boom, we still see the transportation of oil products, equipment, chemicals and manpower through our communities. We are in line for pipeline activities throughout our county and gas well drilling is very near and will soon be a possibility for us. We must address the benefits and problems to our county. With the onslaught of the dangers involved and increase in population, we are faced with updating of plans, training, access to equipment and specialized tools for our first responders and providers. We do realize with the increased transportation in our community, be it rail or roadway, and with the increased product and persons, the chance for an incident is much more possible. These types of products and equipment can be a partner in an incident that could be devastating in both human and/or property losses.”

“...with the increased transportation in our community, be it rail or roadway, and with the increased product and persons, the chance for an incident is much more possible.”

EM/L: “Transportation of oil via rail impacts our county directly, resulting in community concerns, responder requirements for planning, training and increased response capabilities.”

PA/L: *"The response to locations is difficult to manage with new locations popping up daily. The training to deal with situations that arise on well sites for all first responders is minimal. The knowledge of oil rigs, type of rigs, rig functions, and rig safety is minimal. Minimal exercises have been done with first responders and rig situations such as rig explosions."*

"The training to deal with situations that arise on well sites for all first responders is minimal. The knowledge of oil rigs, type of rigs, rig functions, and rig safety is minimal."

EM/S: *"1) Increased spills, releases, and discharges of hazardous material. 2) Increased challenges with emergency notifications. 3) Sheltering needs increases. 4) Critical and key infrastructure risk increases."*

PA/L: *"The populations we have now do not tune in to local media outlets so how in an emergency do you get emergency messaging out to these individuals? What languages does the messaging need to be in? These are all unanswered questions that with our current funding levels we can't even scratch the surface of. Then you have the housing situations where people are living 6 to more people in a house or lodging built for maybe 4 - things like that that make the likelihood of an outbreak and far reaching spread even*

greater. Vaccination status of the people moving here both children with parents that don't believe in vaccines and those coming from other countries that are under immunized. We are an outbreak waiting to happen. Everyone quickly goes to spills etc. with the oil but these are the situations that could have even further reaching consequences that we don't have the staffing to address."

EM/L: *"The increased number of railcars traveling through our county, there is only one city that does not have rail tracks running through it, has definitely increased the risk of an "event" happening and the possible severity of such an accident."*

PA/L: “We are a volunteer department, with all members having full time jobs. We have been so busy with additional runs that we are getting burnt out. Nobody wants to train on our training nights. We are not new to the oil field, we have been dealing with that aspect since the 50's. We have highly trained personnel. It's all the vehicle accidents that we have had to deal with. This boom has brought in trucks and workers from every state, who seem to think that they need to drive as fast as they can, at all times. Nobody feels safe here anymore. The media doesn't know half the stuff that is going on up here. Or maybe that's political too, so the state can keep raking in all the money.”

EM/L: “I believe the focus of emergency management in oil-producing counties has definitely changed. Increased time and energy is devoted to addressing oil-specific issues. More EM time is consumed in establishing relationships/cooperation with the oil producers, educating yourself and obtaining training/education for Responders so there is awareness of what is needed to respond to oil issues be it emergency situations, spills, transportation issues, etc.”

EM/S: “In general EMs are so busy chasing everyday stuff that they are not able to dedicate the time to plan for the increases of risk, threats and hazards. Rapid growth has caused most EM to be reactive rather than proactive.”

EM/L: “Updating hazard planning, training & exercising for oil related events, increase in spill reports.”

“We are a volunteer department, with all members having full time jobs. We have been so busy with additional runs that we are getting burnt out. Nobody wants to train on our training nights.”

PA/S: “We on the eastern side see more rail traffic, vehicle traffic and more people moving through the area going to and from work. We have done more training on rail emergencies and attended several training classes of this subject. The increased truck traffic on interstate 94 also is very noticeable- presuming equipment traveling through to the oil fields.”

“Rapid growth has caused most EM to be reactive rather than proactive.”

EM/L: “We are seeing an extreme increase in the amount of truck and rail traffic within the county hauling either hazardous material associated with oil & gas exploration as well as the shipment of crude oil throughout our transportation routes. Railcar shipments of crude oil from the Bakken area have dramatically increased in the last 2 years. Thus our local response plans and training have concentrated on preparation and response to train derailments and Hazmat accidents/releases associated with this increased transportation.”

EM/S: “No new hazards created per se, just a higher number of incidents and potential intensity of them. We have always had to deal with spills and potential 2nd and 3rd order effects from transporting HazMat; but now there is a larger area where they could occur and a higher number of occurrences to manage. But it is nothing we can't handle.”

PA/L: “Increased population, increased traffic, means more opportunities for things to go wrong compared to only 5 years ago. Weather including snow and ice on roads joined with people not normally used to those road conditions. Many more traffic accidents- the bulk of our business. Speed, fatigue, drug and alcohol abuse, cell phones all contribute to our huge increase in calls for service.”

PA/S: "There is an increase in workload of incidents that the county EM's must deal with. Also, the area is in such a state of change, that planning for an incident, or even knowing what is out there is more difficult. Also, an increased awareness and level of concern from the public adds to the workload."

PA/L: "The biggest impact has been the number of calls we have been asked to respond to, our vehicle accident calls have gone up 600% in the last 5 years. Our total number of fire calls have risen 2 to 3 times, we have went from an average of 48 to an

"...our vehicle accident calls have gone up 600% in the last 5 years."

average of 110 in the last 3 years. Another impact has been the time required to respond to these, we need to send more units for our own safety since if we are on a major highway, the short staffed law

enforcement agencies have limited resources and are spread thin so we need to provide traffic control as well as extrication of the victims. Also the size and types of vehicles involved has changed from mostly passenger cars to semis and multi-passenger vehicles. So we not only need firefighters to extricate, but to perform traffic control. Another impact is the added training we have taken on, in the last 18 months we have trained with BNSF HazMat, AMTRACK, NDFA HazMat awareness, and a number of tabletop exercises with local oil companies on rail loading facilities, gas plants, and pipelines, while this is all great training, and we are lucky to have it offered at low or no cost, nonetheless it still takes volunteers' time, on top of the time needed to respond to emergencies. Our town's population has grown many times, but the people coming are not volunteering for emergency services, so the burden is placed upon the people that are already doing so much for the community."

"Our town's population has grown many times, but the people coming are not volunteering for emergency services..."

EM/L: "Increased transportation of hazardous materials (railway, vehicular) through our community. Competition for jobs inside and outside the community is very high due to wages offered in "oil counties" thereby driving up some local wages. Emergency response positions continue "the revolving door" of employees. Existing employees move on to better-paying positions, while newer employers obtain the training and then leave. Crime continues to increase and detention centers are forced to house inmates outside their facilities due to maximum capacity--straining budgets. Traffic routes congested. We no

"We no longer talk about how many miles away, we talk about the length of time it takes to get there."

longer talk about how many miles away, we talk about the length of time it takes to get there. Delays for response."

EM/L: "It brings in day earners from areas completely ignorant of

the weather- life in the prairie- who expect the infrastructure to provide for them the amenities they are accustomed to in the urban areas. Doubles the traffic flows across our counties- when you are a county NOT getting the revenue from the oil it is even worse as you do not have the extra income to mitigate- this goes to all aspects of infrastructure and services [EMS-FD-LAW-PW-Social Services]. Increased UNFUNDED activities eat budgets fast. Without the NEW income you cannot even compete in the job market to beef up your infrastructure or cover normal attrition."

PA/L: "Vehicle accidents take a disproportionate amount of time. Inadequate response personnel in environmental, ambulance, and law enforcement."

EM/L: "The number of spills within the county has risen dramatically since the drilling began. Also, with the increased traffic the incidents with the oil tankers/water tankers, work crew trucks, etc., have increased my involvement in accidents county wide."

PA/L: "Increase in population without the infrastructure to support it. Increase in transportation by car, plane or train. Trains are considerably longer and carry large amounts of oil. This is not only a hazard but also limits the local agriculture community in moving grains out of the area. With the population increase, local businesses are unable to keep enough supplies or employees to meet the needs of their businesses, some have reduced hours or even closed due to no employees. Can't get employees due to lack of affordable housing. With the wages paid in the oil patch and an increase in demand for commodities, cost of living has risen considerably. With the types of vehicles in

"With the wages paid in the oil patch and an increase in demand for commodities, cost of living has risen considerably."

the area we find a larger number of traumas and of more severity."

EM/L: "Dramatic increase in the number of oil trains passing through our county. Increase in number of trains

blocking crossings during switch over or for passing purposes. Concerns about delays created for emergency responders when this happens. Planning a tabletop -an exercise with scenario of train derailment-hazmat fire & explosion. Have received increased tax dollar funding in county & school districts due to pipelines crossing through the county."

PA/L: "Skews the conversation from preparedness to reaction."

EM/L: "Increased traffic on rail and highway, especially training and planning for a possible accident in our jurisdiction. We need to update our planning and response capabilities in regard to EMS and possible evacuations of the public from a rail accident or hazmat spill. This puts a strain on resources because all EMS are volunteer in our county."

PA/L: "Increased traffic on road and rail and increased population that is affected by the increased traffic."

EM/L: “We are responding to more and more spills and illegal dumping incidents, the volume of Tier II reports are nearly unmanageable, we are having to update emergency response and hazard mitigation plans to address new threats, fire departments are having to update equipment in order to respond to hydrocarbon and new chemical hazards, the number of calls have overwhelmed the volunteer ambulance service to the point we have had to contract for personnel, we have had to add training for mass casualty and significant Hazmat incidents, and the emergency management/911 position went from a part-time position to full-time.”

PA/L: “We are implementing oil spills into our emergency plans due to the amount of trains that we have running through our area that have oil on board. We have participated in table top exercises to prepare for scenarios in our response area.”

PA/L: “The most direct impact is the transportation of oil through our community, both highway and rail. We have two major ND highway transportation routes. The major rail line in the southern part of the state also runs directly through the heart of our city. Not only is oil a concern but all of the hazardous chemicals that support the oil drilling are of great concerns to not only the first responders but the community as well.”

PA/L: “Changes in community composition - increase in oil workers and families, increase in traffic (this is probably more of an "indirect" impact). Railroad oil car traffic - increased number of trains as well - go right through the middle of our city.”

“Not only is oil a concern but all of the hazardous chemicals that support the oil drilling are of great concerns to not only the first responders but the community as well.”

EM/L: “Planning, training and exercise is definitely an issue in the EM community. Whether you have oil in your jurisdiction or not, you do have different and more diverse chemicals traveling through your area.”

PA/L: “Spills and concerns with rail transport etc. are basically swept under the rug. Emergency managers in some counties respond to bigger spills but they are essentially out there to give the appearance that something is being done. Spills are reported every day and they aren't checked on. The industry is pretty much on the honor system and that is not a good thing. I personally have seen spills that the state never follows up on - booms still lying in the ditch 2 years later after the state says they will be out to take care of it. If you ask the state they are on top of everything and doing a good job. In reality they don't do a lot and definitely do NOT communicate with local emergency management. The reality of what is going on in the oilfield is not what is portrayed in the media or what the state tells everyone. If we all lived in Bismarck like them we could say things are great and everything gets cleaned up...not the reality. This may sound negative but that is the truth about what is happening out here. How many of the people from the state live in oil country and actually go out and see what is happening??”

“Emergency managers in some counties respond to bigger spills but they are essentially out there to give the appearance that something is being done. Spills are reported every day and they aren't checked on. The industry is pretty much on the honor system and that is not a good thing.”

EM/S: “Training, exercising, quality employee retention, addressing impacts to other areas impacted by oil production, addressing potential for cyber terrorism and natural disasters in relation to oil, e.g., lightning strikes, tornados, etc.”

EM/S: “Our agency has a huge amount of work to address emergency issues, spill cleanup, etc. while also having to shift emphasis on regulatory issues to oil development issues. We also have a huge workload increase on our work to review and approve infrastructure development essential for spill cleanup and daily oilfield activities. We spend a large percentage of our time and energy on oilfield issues, inspection of oilfield issues and on compliance. Our state programs have fallen behind in many other duties. This has added stress for staff. Staff has been diverted to oilfield related issues, leaving other work uncompleted. Retaining staff is a serious issue.”

“We spend a large percentage of our time and energy on oilfield issues, inspection of oilfield issues and on compliance. Our state programs have fallen behind in many other duties. This has added stress for staff.”

EM/L: “Increase in local population, risks, and vulnerabilities relating to rail and truck transportation and industry in general. The direct impact has been related to applying emphasis or focus on training and exercise activities as well as planning efforts related to the rail transportation of crude oil. Some of these direct impacts may be a result of the Casselton Incident as much (if not more) than the existence of the industry itself (in county not producing oil). Incidents such as the Casselton incident always have impact on time, energy, and the “direction” of emergency management - based on media, political, and general population interest.”

PA/L: *"There has been a general increase in train and truck traffic hauling hazardous materials making a hazardous materials flow study necessary to determine what and how much material may be flowing through the area. The increasing need to spend time and money to keep staff up to date with training/new methods of responding to the new risks/threats /hazards in the area. We concentrate on hazardous materials exercises and we overlook other exercise*

"Language barriers are becoming more noticeable. Historically, the majority of all residents spoke English, we are now seeing more Spanish and some Western African languages. Need access to multi-lingual staff or translation services."

opportunities. Language barriers are becoming more noticeable. Historically, the majority of all residents spoke English, we are now seeing more Spanish and some Western African languages. Need access to multi-lingual staff or translation services. The increased demand for social economic assistance (WIC, Food Stamps, Rent Assistance, etc.) is depleting resources quicker than previous years."

PA/L: *"I believe EM is behind the ball out here in the oil fields as they are over run and understaffed. The federal government runs around without notice to local or state authorities and conducts their own operations and does not share results, in essence we are in a pre-9/11 era with the federal government again with respects to EM, OSHA, and the EPA."*

PA/L: *"Barely keeping head above water- call volume (VFD) went from 25 calls for service in 1997 to an expectation of approximately 300 calls for service for calendar year 2014. This does not include EMS- they are separate from us and are also experiencing extremely high call volume."*

EM/S: “The oil boom has redefined the roll of Emergency Management. Is it our responsibility to investigate an illegal dumping of human waste in a ditch? Is a semi wreck with leaking diesel fuel constitute an emergency? We are now on the planning and zoning check list for permits which can be several in a week. We receive daily reports of oil spills from 1 barrel to several hundred barrels. Many of them on-site within an oil facility dike which we have to determine if it needs investigating. We investigate open burning pits which is supposed to come under the state health dept. but they don't have enough staff. We have numerous natural gas pipeline breaks which we respond to.

“We continue to be drowning over here while other people keep handing us umbrellas to fix the situation. We are overwhelmed, tired, and just a bit fed up.”

We keep track of well over 600 hazardous material sites and growing. I would suggest visiting the Bakken region and get a true understanding of the impacts!!!”

PA/L: “We continue to be drowning over here while other people keep handing us umbrellas to fix the situation. We are overwhelmed, tired, and just a bit fed up.”

Indirect Impacts

The indirect impacts addressed by respondents focused on population, workforce, community issues, inflation, and other quality of life concerns. These impacts are of concern because they create a less than ideal environment for recruiting and retaining personnel and increase both the risk and vulnerability within communities. These impacts cannot be ignored as they are creating an organic decay that left unabated will dramatically affect and undermine the emergency management function.

Four important themes emerged from participants' comments in regard to indirect impacts:

- 1) The growing population is pressing the limits of schools, housing, healthcare, social services, daycare, and existing retail and service industries;

- 2) Recruiting and retaining workers for non-oil jobs and volunteer responder services is difficult because of wage inflation, lack of affordable housing, crime, and quality of life concerns;
- 3) The social safety net is being taxed and the needs are exceeding the available resources; and,
- 4) The road conditions – to include the quality, safety, and amount of traffic – have become an area of critical concern.

“Grocery and department stores have difficulty maintaining inventories.”

EM/L: “Grocery and department stores have difficulty maintaining inventories. Housing costs (purchase and rental) have greatly increased, forcing people to move in with parents. Homelessness continues to rise as people come to “oil country” and have difficulty finding jobs

within their skillsets. Daycare availability is nearly non-existent with waiting lists 11-18 months. Volunteerism continues to decrease--people working paid positions with no “spare” time.

States Attorneys have caseloads the far exceed the recommended averages.”

“Daycare availability is nearly non-existent with waiting lists 11-18 months.”

PA/L: “Schools have had to add modular units to handle the increase in numbers, people are not always pre-registering and local schools have had to hire extra staff to deal with unexpected numbers of children. Roads are not able to be maintained to good condition due to the traffic, often the roads are in need of repair. With the large vehicles the roads are torn up. Even with the money it would be difficult to secure construction companies that could get the job done as they are over booked with jobs due to the increase in the area.”

PA/L: *“House values have gone up 4 times from what they are really worth, rentals, apartments – cost \$1800-\$2400 a month. So how can a teacher or city worker or hospital staff afford to even live here? All these transient employees are running our hospitals and ambulances broke. They expect service then when it's time to pay they disappear. The majority of local businesses have a revolving door of employees. If they can find any at all. Our schools have to add on because of non-taxpaying students that are living in campers. So who pays the taxes for that, the locals? The state needs to give back to the oil communities that are making them rich.”*

“House values have gone up 4 times from what they are really worth, rentals, apartments – cost \$1800-\$2400 a month. So how can a teacher or city worker or hospital staff afford to even live here?”

“All these transient employees are running our hospitals and ambulances broke. They expect service then when it's time to pay they disappear.”

PA/L: *“The indirect impacts that we notice vary vividly is the amount our fire & rescue crews are responding to I-94 vehicle accidents. More winter time responses than any other time. Many of the vehicles are out of state vehicles.”*

EM/L: *“Volunteer first responders work in oil fields, lack of state response on local issues.”*

PA/L: "Vastly increased population, motor vehicle traffic. Increase in registered students in schools. Increase in calls for service for our police department. Increase in traffic crashes, crimes, etc. High-paying private sector jobs means decreased pool of officer candidates."

PA/L: "Because of outmigration of the community members that used to live here we have lost a great number of community partners that we used to work with on emergency management. There has been a great deal of turnover in the new staff hired. It is very difficult to move forward with emergency plans and exercises when you are constantly working with those partners just so they know who you are and what each other's roles are. We also have had a hard time recruiting and retaining staff as soon as we get them trained they move on to another positions making it difficult to keep knowledgeable staff."

PA/L: "Impact on adequate and safe housing. Impact on safety shelters for times of emergencies i.e. tornados and emergency routes. Everything listed in the "e.g." portion is applicable. Failure to maintain employees in the first responder field is crucial same with the medical field."

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“The demand for construction materials and services has significantly increased the cost of road repairs to local counties and townships while revenues remain relatively stagnant.”

EM/L: “One problem is maintaining an accurate 911 database; rental changes occur so frequently and RV's pop up with no notice to the point that it is impossible to keep the database current and 911 calls can come from a residence that nobody knew about. The lack of available and affordable housing makes it difficult to hire new employees; poor road conditions slow response and some roads are impassable, and volunteers are getting burned out. The demand for construction materials and services has significantly

increased the cost of road repairs to local counties and townships while revenues remain relatively stagnant. The local hospital emergency room is experiencing an increased number of uncollectable debts for services provide; incorrect or fraudulent insurance and address information leaves the hospital with worthless accounts receivable and their balance sheet. The demand for social services has increased significantly as has the demand for special services with the local school district. Increased need means increased staffing requirements which means additional demand for affordable housing; a social worker or school teacher cannot afford \$2100-2500 per month for housing. Our local school district has built housing for staff and the county has employees living in FEMA trailers.”

“Our local school district has built housing for staff and the county has employees living in FEMA trailers.”

PA/S: “We have seen an impact in staffing. Staff are expecting higher wages and we cannot be competitive with what families can make in the drilling areas they are not applying or are moving out of the area where these types of jobs are.”

EM/L: “Increases in population due an influx of oilfield workers and support business employees, changes community composition increasing needs for housing, schools, health services, law enforcement, fire, and businesses to support the needs of the increased population. As Emergency Management is a resource for many of these services, we spend more time and efforts in working with these organizations in preparation for more potential community growth.”

“We have seen a major impact on the ability to retain staff. This loss of experience is a major concern in our work.”

EM/L: “Impacts on political decisions. Redirection of funding to communities that are directly affected by the oil industry although the outlying communities are still indirectly affected and encountering

deficiencies that are not being addressed.”

PA/L: “Increase of calls for service have implications on needs for career type people- need for more responders (volunteers). Lack of affordable housing and competition for workers drives up housing (much of which is junk when erected) and salaries. Hard to keep ahead of the power curve for planning, budgets. Mix of equipment and training for new types of emergencies has changed.”

“Except for mobile homes, housing is no longer affordable to those making minimum wage up to approximately \$14.00 per hour.”

EM/L: “Except for mobile homes, housing is no longer affordable to those making minimum wage up to approximately \$14.00 per hour. Excerpt from NDDDES’s Winter Storm Annex. As a consequence of the oil boom and the shortage of suitable housing in oil producing counties, a significant number of transient workers are forced to live in tents, vehicles, and

other shelters not suitable for winter conditions making them vulnerable. Determining how

many persons are possibly threatened in each area remains a challenge. It is also difficult to account for persons residing in ad-hoc camps, such as abandoned farmsteads. The welfare of man camp residents is not an immediate concern due to available support systems such as auxiliary power and winterization applications. Most transient residents are not active within their communities, have limited to no local support

“... a significant number of transient workers are forced to live in tents, vehicles, and other shelters not suitable for winter conditions making them vulnerable.”

structure, and are for the most part unaccounted for. Thus, most transient living conditions are unverifiable. Local emergency managers in oil producing counties are prepared to activate shelter plans which address short-term sheltering needs, but due to the transient nature of the oil patch’s population, no reliable method exists for accurately estimating pre-event numbers. If significant numbers of persons present at local shelters, resources may quickly overwhelm local capabilities. Long-term sheltering would also present similar challenges.”

PA/L: "The schools in our area have been overwhelmed with the increase in population, they have been doing their best with some expansion, but there doesn't seem to be much financial support coming from the state to help them. In our town they had plans for a beautiful expansion to the high school, but the bids came back way higher than the initial cost estimates from the engineers. So two problems, the school had to cancel the plans, because the cost was too high, and the second problem is the

cost of building is so high in our region, I have been told it is 3 to 4 times higher than in other parts of the state. Another problem that I worry about is business owners not letting employees leave work during business hours to let them, volunteers, respond to emergencies. This has not happened in my community, but I have seen it happen in other communities, and it is hard to blame the employers, they need the employees at work to do the jobs they are

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"Another problem that I worry about is business owners not letting employees leave work during business hours to let them, volunteers, respond to emergencies."

hired for. So far my department has been lucky we have been able to keep volunteers, and been able to keep a good number of responders to each call needed."

EM/L: "One only needs to research the current local EMS runs/calls, Rural Fire Dept. calls, Sheriff Dept. calls and compare to 3 years ago."

PA/L: "Recruitment and retention of qualified employees is a major concern across both public and private sector employers. It is difficult to compete against the higher salaries that are being offered in western part of the state. There has been a housing impact due to the population boom in our area of people who live here, but work in the oil fields. Apartment rents are increasing and some apartments building owners are opting out of government subsidized housing, thereby increasing the likelihood that people will become homeless because they won't be able to afford the rent after their lease is up. The shortage of housing due to the increased economic development. Some people recruited into local public sector jobs must live 30-60 miles away since they have been unable to find affordable housing locally. Lack of funding to do full scale exercises especially in the public health and medical sector."

"Some people recruited into local public sector jobs must live 30-60 miles away since they have been unable to find affordable housing locally."

"Every part of the system is overtaxed above what is a sustainable level."

PA/S: "Every part of the system is overtaxed above what is a sustainable level. The uncertainty of the boom/bust cycle has made it difficult for governing bodies to direct enough resources to handle the growth."

EM/S: "Economic impact as locals expect more money from oil to pay bills and expect some of that to come in the form of grants which are getting to be less and less."

PA/L: "Higher potential for spills and accidents in the area."

EM/L: "Since the beginning of the "oil boom" our county has experienced an increase in crime, incarceration, and traffic, an influx of people that have either not made it to the oil fields or were turned away due to various reasons. Trust of citizens that our responders are unfamiliar with has been an issue, law enforcement is called upon more often to travel with EMS due to this. Retaining staff for information technology has become an issue with businesses in the area due to the high wages paid just a few counties away. Communications issues have arisen due to interference on radio channels likely from increased use."

"Since the beginning of the "oil boom" our county has experienced an increase in crime, incarceration, and traffic, an influx of people that have either not made it to the oil fields or were turned away due to various reasons."

PA/L: "Emergency responders have always trained on their response to oil and hazardous materials. That is nothing new. What's new is the amount and frequency that oil and hazardous materials come through our community. For years plans have been in place to respond to single tanker emergencies. The frequency of crude oil transportation by rail has required a significant change in emergency response plans. This includes looking at all facets of emergency response from activation of initial response; EOC and mutual aid agreements."

EM/S: "Stresses on existing support systems such as housing, commercial goods and services, roads and road maintenance, and criminal activity. A combination of market forces and increased emphasis by government officials is helping communities to adapt to their new normal."

EM/L: “There are more people that are not only living in the county, but every hour in the day our direct traffic from the oil field employment has increased, this in turn is calling for increased LE; Fire; Ambulance responses. Our public works employees are busier than ever before. One more thing is the inflation of our products we buy in the county. Example - one gallon of milk in the Cenex Convenience Store here...is \$7.99. Our folks that have always lived here are encountering and living with a large number of changes. They are not all bad, but it is change.”

“One more thing is the inflation of our products we buy in the county. Example - one gallon of milk in the Cenex Convenience Store here...is \$7.99.”

EM/S: “Many agencies and programs we deal with are flooded with work to address energy related issues. From our work and public interaction, we observe the impact to all infrastructure in the oil development areas. City and county governments, schools, police, local health officials, etc. are hugely impacted.”

PA/L: “We have 3 to 4 1/2 million gallons of crude oil moving through our fire protection area on the rail daily.”

EM/L: “Roads.

EM/L: “I believe population and economic growth have impact in all of these areas cited as examples above. In regard to emergency management, as other partner agencies become more busy in managing growth and sustaining levels of service, emergency preparedness, which should be in front, can become more difficult to sustain due to increased workload of our partner agencies.”

EM/L: “Even though our jurisdiction is not directly impacted by active exploration and drilling rigs, we have experienced population growth and housing demands due to supporting oil field companies and workers that support the industry as a whole. This increase in population has increased our public safety services within the law enforcement agencies and county social services for support. We have worked closely with the local planning and zoning committees as it relates to this industrial growth to ensure proper zoning and placement of facilities are in the best interest of public safety and environmental concerns. Our local zoning and planning committee tasked our emergency management office to gather direct input from oil impacted counties in the NW and SW parts of the state as it related to public safety functions and the impacts associated with this oilfield activity. The input we gathered (“lessons learned”) from these law enforcement, fire, EMS, public health and Emergency Management agencies were shared with the planning and zoning committee as we developed plans, policies and procedures for potential man camps or staging areas for oilfield related activities. The plans, policies and procedures have now been adopted by the County Commission as requests for these type facilities are made.”

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Recommendations

In this section, a selection of the study participants' recommendations for dealing with the direct and indirect impacts identified (as provided to the "recommendations" and "additional thoughts" queries) will be shared first. Following the participants' recommendations, the report recommendations are provided. The report recommendations were framed around the impact themes drawn from study participants' comments, and informed by the research teams' examination of the literature and existing data. It is clear that the impacts from Bakken oil extend far beyond the geographical boundaries of drilling and production sites; as such, the report recommendations are focused statewide, unless otherwise specified.

As is often the case with problem-based recommendations, key tools such as – money, time, education, and system re-structuring – are utilized. To ensure real progress toward intended solutions, the use of these tools must be thoughtfully considered and not just used haphazardly to create disparate band-aid solutions. The report recommendations herein are offered individually for ease of

...each recommendation is part of an overall strategy designed to empower and strengthen the emergency management function and mission in North Dakota.

comprehension and implementation, but ultimately only accomplish the overall intended solutions if they are implemented with an understanding that each recommendation is part of an overall strategy designed to empower and strengthen the emergency management function and mission in North Dakota.

The study participants' recommendations tended to focus on the arena in which they most regularly operate within (e.g., agency, jurisdiction level, geographic, area, etc.). The review of these recommendations is valuable as often the best solutions are generated by those who best understand the problems. In regard to the current impacts on the emergency management function (which they are experiencing in the first person), the study participants' ability to see a path forward is likely to exceed armchair quarterback assessments made by others. Toward that end, the study

participants' responses and recommendations (in total) weighed heavily in the creation of report recommendations.

It must be noted that one particular comment made by a study participant served as a constant reminder to the team to stay focused on why it engaged in this undertaking to begin with – to support the emergency management mission by bringing to the forefront the voices of those being impacted. The comment came from a partner agency representative at the local level:

PA/L: "We have filled out survey after survey out here. Most of the information falls on deaf ears or we never see anything from it. What is going on out here isn't a secret, you have heard it all before and we have told people before. I have spent my time giving you the truth in this survey, I hope that you get what you are looking for from others in your survey."

At the end of the day, the team wants to ensure that the powerful information shared by study participants is heard, acknowledged, and acted upon.

PA/L: "State needs to realize that areas are impacted around the areas that are drilling due to large populations and the areas not having the infrastructure needed. These outlying areas need to be subsidized during this time in order to keep personnel and to keep needed businesses open. The National Guard goes to other countries to build houses and roads, why not use them at home to do the same? Money is especially needed to staff police in the oil patch to properly protect the residents in those areas, crime is way out of hand. Ambulances need subsidies to be able to keep staff in the surrounding areas, paid services or volunteers. Maybe the state could give Paramedics an incentive from the state to stay at a service for a certain number of years."

At the end of the day, the team wants to ensure that the powerful information shared by study participants is heard, acknowledged, and acted upon.

EM/L: “Our office has increased its intelligence gathering by having our eyes and ears open to local impacts we gather from our smaller communities and public safety agencies and sharing information among these organizations to be proactive to potential impacts rather than reactive to incidents. Keeping open lines of communication and coordination across all local government functions and offer assistance of our resources and services when/where needed. Being vigilant to accidents/incidents across the state (e.g. Hazmat spills, train derailments and environmental impacts) and working with the ND Department of Emergency Services to gather information for

“The choke point on many of these issues is a lack of funds. The share of tax revenue returned to the primary oil producing counties is woefully inadequate to address the adverse financial impact.”

more proactive mitigation and response actions should this happen within our jurisdictional boundaries.”

EM/L: “Better funding for equipment to help with a spill and derailment locally.”

EM/L: “It would be helpful to have more funding for training & exercise expenses, either through grants or from the legislature.”

EM/L: “The choke point on many of these issues is a lack of funds. The share of tax revenue returned to the primary oil producing counties is woefully inadequate to address the adverse financial impact. The state continues to shove more and more money into investment funds while the counties are forced to raise property taxes or ignore very real problems due to a lack of funds.”

EM/L: “The first responders in our county need better PPE and more training for rail incidents.”

EM/S: “1) Hire more staff. 2) Hire professional/experienced people. 3) Educate local elected officials about emergency management and their responsibilities in it. Something as simple as having zoning and building ordinances to mitigate risk is not understood in many rural communities and counties. 4) Leverage existing systems and processes and engage lawfully organized groups such as Local Emergency Planning Committees to do their jobs.”

PA/L: “Immediate need for the state to funnel more dollars to county and local jurisdictions to be able to pay for infrastructure (water-sewer-curb-gutter) including improvements for equipment and structures needed for emergency equipment. This would also free up local dollars to be able to hire emergency personnel vs dependency on local volunteers.”

“ ‘Oil-impacted counties’ needs a broader definition to include the indirect impacts in other counties. Monies made available could assist with the issues currently faced in the local communities.”

EM/L: “ ‘Oil-impacted counties’ needs a broader definition to include the indirect impacts in other counties. Monies made available could assist with the issues currently faced in the local communities.”

EM/L: “Additional training for first responders, fire, law. Additional funding for county/township roads in need of repair due to increase in oil activity/traffic.”

EM/L: “Ongoing efforts to train responders, coordinating with communities on rail lines, work with elected officials on the local, state, and federal levels to affect increased regulatory attention. Address attention to developing policy, provide exercise and training opportunities. Insure local capabilities through resource analysis, needs, and acquisition through purchase or mutual aid.”

PA/L: "More training, more preparations, more exercises, more funding, more personnel in EM."

*"More training,
more preparations,
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more personnel in
EM."*

PA/L: "The more we respond the more it costs us financially. We have to pay our volunteers - as their time has become valuable - in order to retain most of them. Our expense surely does

increase, such as fuel and some maintenance. Expenses are not cheap anymore. This time of increased activity to our department also demands that our training must be better. The added increase means more preparation for our personnel doing the training. This wears on the department trainers and directly affects their families."

EM/L: "There are NO options to deal with today's problem as the mills are just not there- education of our city/county officials of the pearls and pitfalls seen in the most affected counties out west need to be the number one priority of the state at all levels.

Strictly coming from emergency management is NOT enough. In our county we are dealing with farmers [elected officials across the board] who can't see over the price of corn what is coming...

HOWEVER: What we are doing in our county is developing zoning- taxing- overall planning to be in place ASAP to try to control the expected growth- Anything we can do which doesn't cost anything!"

PA/L: "I would also like to see more funding from the state for more law enforcement, and more funding for the North Dakota Fire Fighters Association, and NDFA. The NDFA offers very valuable training and support to the local fire departments."

PA/L: "Better tools to handle accidents and better planning for accidents."

EM/L: “We have to be prepared for this, or at least be deep into preparing. We need to make sure have all our plans current and up to date. We need to make sure all mutual aid agreements are current. We need to look at the forecasting of staffing. We have to realize that the volunteers will just not be available, and paid responders are going to have opportunities for jobs that pay more and have better benefits. Recruitment and retention now becomes an issue. Our infrastructures have to be assessed, everything from utilities to rail, to roads and bridges, pipelines, water, sewage, and etc. SAFETY-SAFETY. We need to look at

“We need to look at adequate medical services, ems, fire, social service functions, elderly care, affordable and safe housing. People will not be able to get services and care. Some will not have money or the ability to get to a larger city for these. Money will be short for some of the middle to lower class persons, especially disabled and elderly.”

adequate medical services, ems, fire, social service functions, elderly care, affordable and safe housing. People will not be able to get services and care. Some will not have money or the ability to get to a larger city for these. Money will be short for some of the middle to lower class persons, especially disabled and elderly. We will also see an increase in persons that are felons, criminals, prostitution becomes an issue, increase in drugs and with these an increase in crime. We have to be able to provide a safe community for our citizens.”

EM/L: “Oil Impact Grant funding needs to be made available to all jurisdictions seeing an impact. Rural Fire Departments are responding to more truck accidents and in some cases they don't have the wherewithal for extrication and hazmat mitigation. Oil Impact Grant funding should support justifiable grant applications from communities along the Interstate.”

EM/L: “We need to be very proactive, and not afraid to react. It is very important that we have all our plans up to date and use current standards. We need to work closely with local, regional, state, and federal entities. We cannot sit with our heads in the sand and hope that it will go away or take care of itself. Sorry it won't. We need to gather the major players and stake holders and discuss our plans and concerns together. We need to be sure we weed out the persons who have conflicts of interest. This needs to be assessed objectively. Meeting and conferring with others who have gone through this would be a wise move, and benefit us.”

PA/S: “All local, state and federal agencies must work together to address the numerous challenges. Prioritization,

streamlining, and additional staff/resources are needed.”

“All local, state and federal agencies must work together to address the numerous challenges. Prioritization, streamlining, and additional staff/resources are needed.”

EM/L: “I feel the 24/7 response capability is by far the most important role I have....We need to keep up with all that is going on, and retain a working relationship with the LE, Fire, Ambulance entities.”

EM/L: “Ensure adequate staffing, not just in emergency management, but in partner agencies

that have roles in emergency/disaster preparedness, response, recovery and mitigation.”

PA/L: “We need more training, equipment, and gear to handle a derailment if it happens.”

PA/L: "I think there should be more thorough inspections done to make sure the railroads are compliant with regulations to prevent oil spills from occurring. I'm hoping that salaries do not continue to rise in the oil drilling areas because it is becoming difficult for us to be competitive and difficult for those moving here to find affordable housing."

PA/L: "We need more training, equipment, and gear to handle a derailment if it happens."

"So this guy named Newton said, "Acceleration is produced when a force acts on a mass. The greater the mass (of the object being accelerated) the greater the amount of force needed (to accelerate the object)". We are dealing with a great mass and it is getting bigger, things will not get better until we get folks to understand and we all push together."

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PA/L: "Constant and continued review, revision and inter-agency training of all facets of any oil related functions that pertain to production, transportation, emergency response (including law, fire, & EMS), mitigation, restoration and recovery."

PA/S: “Increase the amount of resources directed to emergency preparedness on both the local and state levels. Adopt requirements on private industry (oilfield service companies, drilling companies, and housing developers) to provide information and notification to local EM's, to save the work of having to track down what is occurring in their counties.”

EM/L: “Oil companies in North Dakota: Continent, Marathon, MBI Amerada Hess - need to help with the funding of HazMat training and equipment in communities.”

EM/L: “More planning and funding to address: the increased traffic and stress on public infrastructure, the larger transient population and crime, and the resources to assist our more diversified population moving into the smaller “local” communities.”

“Oil companies in North Dakota: Continent, Marathon, MBI Amerada Hess - need to help with the funding of HazMat training and equipment in communities.”

EM/L: “Ensure that planning, training, coordination, and communication is in place to respond in a timely manner; that responders have the equipment to deal with the issues that they are facing and that they have the training to do so. Better communication between all aspects of emergency management is needed, from the EM's working for various companies, health care facilities, state, county and city, to the responders and citizens.”

EM/L: “Social Services needs to be fully funded by the State. Too many unfunded State-mandates are exacerbating an already, overburdened system.”

EM/S: “Training & exercises - work with stakeholders to conduct exercises. Employee retention - work to get wages comparable. Addressing impacts to other areas impacted by oil production - through mitigation efforts, THIRA and community as well as state meetings to identify areas of concern and address them. Addressing potential for cyber terrorism and natural disasters in relation to oil, e.g., lightning strikes, tornado's etc. - conduct more training on cyber terrorism with industry experts teaching the classes as well as awareness campaigns. Public awareness campaign to the oil companies on best practices. Committee to assess grant process to be sure that the money is distributed on a as needed basis.”

EM/S: “Better compensation for current staff could help address staff turnover and burnout. Some increase in staff

“Better compensation for current staff could help address staff turnover and burnout.”

levels is also recommended; however, there is little sense in adding staff unless we can retain experienced people. If we had better compensation, we could possibly add field staff that live and work in oil impact areas. The state might also consider state offices in the oil impact area.”

PA/L: “Increased state funding to counties/cities outside of the oil-producing region so the counties/cities can properly fund the 10 disciplines of emergency preparedness in order to increase staffing levels, salary, training, and exercising.”

EM/S: “There have been many positives that have come from oil development as it pertains to EM. Key is a closer partnership with the whole community; specifically the private sector. Build closer partnerships based on collaboration vs regulation, and foster positive open relationships vs creating and encouraging adversarial ones.”

EM/L: “We need to preserve the North Dakota that our forefathers used their blood, sweat, and tears to build for us. We need to take responsibility and see that this was not done in vain, and that we hand our children and grandchildren a product to be proud of. Oil and Gas has been and will be a boon to North Dakota, we have been entrusted to see that it is done right and not let greed haze our vision. There are so many positive things yet to be achieved from this; we must be vigilant as we move forward.”

EM/S: “‘Slowing it down’ (i.e., oil production) is not an option. Market forces, when messed with, can hit back with unintended consequences that are often worse than what government interventions set out to correct in the first place. Market forces are also helping to alleviate many concerns in the oil patch; they simply needed time to catch up. Recommendation is to allow market forces to continue to address the needs in the patch, and catch up with production. These same forces will also address increased needs for safer production and transportation. The new DOT 111 rail cars are a good example. Industry began work on developing these before a government standard was ever established.”

“We need to preserve the North Dakota that our forefathers used their blood, sweat, and tears to build for us. We need to take responsibility and see that this was not done in vain, and that we hand our children and grandchildren a product to be proud of. Oil and Gas has been and will be a boon to North Dakota, we have been entrusted to see that it is done right and not let greed haze our vision. There are so many positive things yet to be achieved from this; we must be vigilant as we move forward.”

PA/L: "Most people don't understand that these people that are up here working right now, have no intention of moving here, they have houses and families back home - wherever that is. We don't need more houses built that nobody can afford. We need affordable apartments."

EM/L: "Educating long time county commissioners on the increased scope of duties and responsibilities for emergency managers is also an issue. Between the post 9/11 homeland security issues and the oil boom demands, it is no longer possible to adequately function in even small counties with a part time emergency manager. NDDES has reached out to the county commissioners in an attempt to quantify the workload but the staffing doesn't change and EM is a low budget priority. I am the emergency manager, the 911 coordinator, and zoning administrator in our county which is unreasonable and I am forced to choose which tasks will not be completed. Our emergency response plan was last updated before the oil boom

"Educating long time county commissioners on the increased scope of duties and responsibilities for emergency managers is also an issue. Between the post 9/11 homeland security issues and the oil boom demands, it is no longer possible to adequately function in even small counties with a part time emergency manager."

and needs a thorough overhaul. I cannot devote time to re-writing the plan with my day to day workload and requests for consultant funding through EMPG and to the county commissioners were denied."

PA/L: "State surplus money should be sent to all fire departments for training and equipment."

EM/L: “Someone needs to facilitate this effort at a statewide level.”

PA/L: “ - #1 is the state needs to allow for the increase of outdated, antiquated extremely low traffic fines - Use percentage of those fines to fund some of the needed infrastructure - Get the state and locals to obtain and funnel the additional needed funds to fund law enforcement services in their communities, i.e. if the only way to pay for needed increases in law enforcement is through property taxes (general funds), then increase the damn property taxes; quit expecting your law enforcement agencies to deal with the issues of increased traffic/crime, etc. with what they've always had, they are already stretched too thin!”

“...quit expecting your law enforcement agencies to deal with the issues of increased traffic/crime, etc. with what they've always had, they are already stretched too thin!”

PA/L: “A lot of these problems will fix themselves with these low oil prices that we have right now. So that shows that the state should slow down on their drilling permits, let infrastructure catch up.”

EM/L: “We need to update and refine our mitigation and response plans for the increase in rail and semi traffic in our county. We have recognized the need for more training for the ems personnel to address these specific hazards and to keep aware of the changing landscape and adapt were needed if possible.”

PA/S: “The growth in industry and cities has resulted in many challenges. Many of the challenges are more complicated than they may appear - infrastructure takes time. In general, the citizens of ND have done a nice job in adjusting; however more resources are needed to effectively address both direct and indirect impacts.”

EM/L: “Even though our first response agencies haven't seen the direct increase in response calls that are happening in the NW and SW portions of the state, it's obvious that those local volunteer fire and EMS units are and will have difficulty maintaining membership. Over time, it may become inherent that the private industry partners will have to look at embedding fire response, EMS and air quality units on a regional or area basis. This type of support exists where there are local refineries and ethanol plants. The smaller rural communities will no doubt have challenges in the future maintaining local law enforcement, fire and EMS personnel as the demand for their services increase. We have even noticed that full-time, paid public safety personnel are migrating to oil field related jobs due to higher wages, thus leaving a challenge to local governments to backfill trained and experienced personnel in these agencies.”

“...it's obvious that those local volunteer fire and EMS units are and will have difficulty maintaining membership.”

PA/L: “The effect is truly what it is and I have to address it in a way that will maintain our response effectiveness. When I see what the future is with the oil impact, which I believe is a good thing economically, there is a real down side to it as a fire service if this is not taken care of. I am sure you have seen the burn-out in a number of fire & rescue services. I wrote a letter to the governor & his staff after the oil impact grants were distributed. We are not an oil impact county so I was not surprised that we did not receive a grant. I would like to see the state provide my department with a new Rescue truck as ours is too small and overloaded. Because of the amount of traffic on the interstate which parallels ...City, I see this traffic not slowing down for many years. We can also use some of the training personnel from outside our department. The best solution would be to provide a fulltime trainer for our department.”

EM/L: "As emergency managers our number one job is escape goat! If the disaster goes great - "What a great fire dept - EMS squad - highway response, etc." When the response fails- the emergency manager is obviously to blame. It's OK! - part of the job. But this type of critical thinking changes [zoning-taxes-traffic routes-wages, etc.] which need to be implemented

NOW and are hard to sell VS the available guidance and funding we live with. Until the state starts taking the lead thru Auditors-Tax Directors-County Commission caucuses, etc. the problem will be kept in the list of MAYBE issues like volcanos and urban unrest. It is strange to me that EM and a limited number of law responders are the only folks actively trying to

"It is strange to me that EM and a limited number of law responders are the only folks actively trying to drive the changes needed to avoid the everyday calamity being seen in western ND. When I address our local elected officials on these types of issues I seem to be the only one saying the sky is falling. Unless they have family or friends in the troubled areas they see ONLY \$\$\$\$ as the oil impact."

drive the changes needed to avoid the everyday calamity being seen in western ND. When I address our local elected officials on these types of issues I seem to be the only one saying the sky is falling. Unless they have family or friends in the troubled areas they see ONLY \$\$\$\$ as the oil impact. When you address anything that costs money to try to mitigate [wages- more personnel] the conversation stops... "There's NO money to do that! " The famous spiraling circle of DEATH!"

EM/L: “This position is not a job for me, it is my passion. I think, and I’m speaking for a vast number of emergency managers, this is how we operate. This job requires us to think of the worst case possible and figure out the best possible response and solution.”

“This position is not a job for me, it is my passion. I think, and I’m speaking for a vast number of emergency managers, this is how we operate.”

Direct Impact Recommendations

In regard to the six predominant themes that emerged from the participants’ comments relating to direct impacts the below recommendations are offered.

The need for additional equipment, personnel, and funding to address the increased workload and changing responsibilities (e.g., the inability to focus on other necessary function activities based on the time and workload associated in dealing with oil issues).

Recommendation 1: Establish a fund that specifically supports the emergency management function and can be used for the acquisition of equipment and other resources essential to the emergency management mission. Fund management and distribution oversight should sit with the Department of Emergency Services Advisory Committee. (ND-EM Fund)

The Department of Emergency Services Advisory Committee (DESAC) is comprised of emergency management and partner agency representatives. DESAC, through its representation, is apprised of the needs in specific areas and is best-suited to make decisions about the distribution of the ND-EM Fund. Under DESAC’s guidance an equation for prioritizing needs and distribution can be created. The ND-EM Fund needs to be liberally funded at

the outset and then replenished every biennium based on DESAC's projection of continuing needs. It is recommended that the ND-EM Fund be initially funded at \$25 million.

Recommendation 2: Conduct a personnel needs assessment across emergency management and partner agency organizations (e.g., fire, EMS, public health, law enforcement, etc. – to include volunteer agencies) to determine what adequate staffing should be: a) given current population and needs; and, b) given population growth estimates for the next five years.

It is clear from the comments herein and a host of reports completed over the past few years, that there are critical personnel needs related to fulfilling the emergency management function. Some of these needs presently exist as volunteer positions which may necessarily migrate to paid positions in the future. This assessment should be conducted by an independent party who is well-apprised of the existing impacts, familiar with community development and assessment, and removed from any potential biases.

Recommendation 3: Fund the personnel needs assessment via budget increases and/or renewable grant funding at 50% this current biennium and an additional 50% the following biennium.

Personnel needs will undoubtedly remain at a significant deficit even after the first round of budget increases and/or renewable grant funding. Indeed, it may take until the next biennium to complete the hiring sanctioned under the first funding allocation based on the time and effort it takes to recruit, hire, and train new employees. Additionally, such an effort is exacerbated by staff that are stretched thin and community challenges (such as impacted housing and schools) that make recruitment and retention more difficult. It is noted that the community challenges must be addressed in tandem with efforts to adequately staff emergency management and partner agencies for the personnel challenges to be effectively addressed. Further, consideration must be given to the wage inflation and cost of living conditions potential new hires will face to allow for competitive position offers.

The need for additional planning, training, and exercising in regard to oil transport, drilling, and production issues that could require an emergency response (i.e., rail transport, truck hazardous material transport, spill response, rig fires, hazard event at oil site, etc.).

Recommendation 4: Add a team (eight staff positions) to the North Dakota Department of Emergency Services that are dedicated specifically to planning, training, and exercise as it relates to oil transport, drilling, and production issues.

Creating such a knowledge and resource base will allow the state to fast-track efforts to build the needed capacity to address oil related issues. This type of capacity building is not currently an option at the local level (either in regard to the number of folks necessary to build such capacity or the luxury of time to build said capacity). The state team can help localities shape plans, offer training, and facilitate exercises.

Recommendation 5: Provide additional monies to the North Dakota Department of Emergency Management that can be distributed to local jurisdictions to cover the costs associated with oil specific training and exercise.

Training and exercises require time and money that many jurisdictions do not have. Emergency management and partner agency personnel are often “on the clock” when creating, delivering, and participating in training and exercises. Training and exercise budgets that are designed to cover staff pay and supplies have dwindled dramatically since 9/11. In addition, jurisdiction specific exercises may be contracted for (particularly in areas that are impacted), which results in definitive costs (as opposed to time eked out of the emergency manager’s schedule). It is recommended that the North Dakota Department of Emergency Management receive \$500,000 in the current biennium earmarked for distribution to local jurisdictions for costs associated with oil specific training and exercise.

Recommendation 6: Create a statewide map of oil-based operations.

For the purposes of safety and security, the North Dakota Department of Emergency Services (NDDDES) needs to have a map that reflects all oil-based activity in the state. Each data point on the map should have location data, a list of substances and types of equipment at the location, the type of activity occurring, typical staffing numbers, and emergency contact information for the site (or personnel at the site). To ensure that the map remains current, those conducting oil-based activities in the state must be mandated to report new or changed activity 24 hours in advance (when this is not feasible, no later than 72 hours after new or changed activity) to NDDDES Operations. Such a map will assist emergency management and partner agency personnel

in addressing any issues that arise that could compromise the safety of workers, responders, or the community.

The shortage and burnout of first responders, particularly within volunteer departments.

Recommendation 7: Assess the need in western North Dakota to convert volunteer fire and EMS services to state or county subsidized paid services. Utilize this assessment to make decisions about the subsidization, structure, staffing, placement of existing services, and the creation of new services.

Volunteer fire and EMS services in rural areas have long struggled with maintaining their volunteer base, but have historically managed to meet community needs with a small core of dedicated volunteers. With an increased number of calls and fewer volunteers (due to paid opportunities that do not allow time for such volunteer engagements), these services are struggling and increasingly unable to keep up. When fire and EMS services are compromised and unable to meet the community's needs, residents are more vulnerable. These are essential services that must be supported. How that support is structured is best considered at both the state and county level and should include options such as: combined fire/EMS services; regionalization of services; subsidization of community based services; and, various personnel models (i.e., all paid or a mixture of paid and volunteer).

Recommendation 8: Offer a North Dakota tax credit to volunteer responders and employers who support volunteer responders.

Currently, the volunteer responder system is being subsidized by a core group of citizens and employers who support those citizens by allowing them to leave the workplace to go on calls. This model has worked in the past when the calls were few and inflation was not an issue; however, with fewer volunteers, an increased number of calls, and inflation that has affected the cost of doing business, this model is being strained. A tax credit will help acknowledge and offset this contribution by volunteers and businesses.

The tax credit for individuals should have requirements such as hour baseline documentation and levels of contribution. For example, volunteers must have contributed 250 hours over the course of a year (to include calls, training, and exercises whether during the workday or not) to receive a \$1,000 credit. Those contributing 500 or more hours over the course of a year

could receive an increased credit of \$2,000. The credit should be refundable beyond tax liability.

The tax credit for employers who support responders leaving the workplace for service calls should be awarded (per capita) for every employee that contributes the baseline effort of 250 documented hours whether those hours occurred within the workday or not. For every responder afforded this option, an employer should receive a \$2,000 tax credit. This credit should only be usable for tax reduction.

The examples provided herein for the recommended tax credit are modest and are provided only to illustrate the concept. This is an area where North Dakota can make some quick and meaningful changes to help alleviate some of the pressures facing overburdened first responder services. When this option is compared with the subsidization of paid emergency services, it is clear that increased tax credits are a smart economic alternative.

The increased likelihood of not only more events, but also more severe events based on increased population and traffic.

Recommendation 9: Conduct a study that examines quantity and severity of traffic accidents over the period of 2007 to present to understand where the biggest issues exist. Utilize study results to more closely examine trouble spots and frame solutions that result in reduced traffic accidents (quantity and severity) and additional paid responder personnel in the areas experiencing increased accidents.

Effective strategies for addressing traffic issues that are resulting in more accidents and injuries require a complete understanding of what has been happening (e.g., rear-end collisions, multi-vehicle accidents, truck/car accidents), where it has been happening (e.g., near intersections, on county roads, at onramps, etc.), and when it has been happening (e.g., during rush hour, in the evenings, after 2 AM, etc.). Beyond understanding the interplay between the aforementioned factors, there can be additional factors that affect the number and severity of these accidents (i.e., signage, visibility, roadside distractions, etc.). Effective strategies to address high accident areas can include approaches such as additional regulations, traffic signal flow adjustments, and bypass roads for large trucks – to name just a few. However, without sufficient study such strategies are ill-placed.

Recommendation 10: Conduct a study that examines the number and types of criminal incidents (both recorded and by virtue of law enforcement professionals anecdotal reports) over the period of 2007 to present to understand what types of changes are occurring and the extent to which they are typical or atypical given the population. Utilize study results to inform law enforcement efforts and to allocate funding for increased personnel and acquisition of equipment.

While anecdotal reports indicate an increase in crime across North Dakota, particularly in western North Dakota, it is difficult to know (in regard to some crimes) to what extent this is a population-driven increase as opposed to a function of a different community composition than North Dakota has previously known. Studies support that boomtowns do experience more crime based on the workforce composition that is tied to energy development. It is clear from all reports that drugs and human trafficking activities are becoming serious problems in western North Dakota. Dealing with this type of activity requires more, and different, resources than most police departments have available. A thorough analysis of crime in North Dakota, to include the examination of anecdotal reports of law enforcement professionals in areas where the extent of crime is dwarfing the ability to respond, is needed to inform crime reduction strategies.

Concerns regarding community compositions that are not versed in local hazards and are difficult to access and warn.

Recommendation 11: Create an outreach site and materials sponsored by the North Dakota Petroleum Council (in collaboration with the North Dakota Department of Emergency Services) that provides a quick orientation to oil workers unfamiliar with North Dakota hazards, systems, and conditions.

Oil industry employers have a vested interest in their employees' wellbeing. Unfortunately, the oil industry employers themselves may not be well-versed in North Dakota's hazards, systems, and weather conditions. By providing a website with materials and promoting it to oil industry employers and their employees working in the Bakken, the oil industry can better protect its employees and operations. Such information coming from the industry may carry more weight than coming from a government agency. This effort, although seemingly small, could reap big benefits for North Dakota

communities by reaching and educating an audience that has been difficult to access.

Recommendation 12: Advance a statewide educational campaign to encourage all residents to sign-up for, and utilize, local notification systems and other alert and information systems.

Notification systems (such as CodeRED), weather radios, cell phone apps, 511, and tornado sirens are functional warning mechanisms designed to keep people safe and have proven to be effective. A statewide campaign that utilizes all forms of media (television, print, radio, billboards, social media, etc.) and community institutions (e.g., churches, schools, workplaces, etc.) to convey the value of these notification, warning, and information systems will inform, and thus empower, individuals to manage their own risk more responsibly.

The delays caused in emergency response due to rail and transportation corridor blockage or congestion.

Recommendation 13: Conduct an assessment on the extent to which rail and transportation corridor blockage is affecting the ability of emergency responders (e.g., law, fire, and EMS) to perform their functions. Utilize study results to craft solutions on a community by community basis.

This is a difficult challenge to address; yet, failure to address it could result in more severe injuries or loss of life for North Dakota residents. Alternate routes, road design, service provider locations, and transportation regulations could all be potential solutions to help reduce or eliminate the delays being experienced. However, understanding the extent of the problem is necessary in the selection of an adequate solution. For example, in areas where blockage occurs because of rail crossings during heavy commute times (thereby taxing alternate routes as well, as commuters attempt to route around the train) - rail schedules could potentially be altered. This is the type of challenge that may have varying solutions from one community to the next and requires community-specific consideration.

Indirect Impact Recommendations

In regard to the four predominant themes that emerged from the participants' comments relating to indirect impacts the below recommendations are offered.

The growing population is pressing the limits of schools, housing, healthcare, social services, daycare, and existing retail and service industries.

Recommendation 14: Establish an oil-industry supported fund that supplies county-based grants to meet each community's specific needs. (ND-OPEC Fund)

The goal of the North Dakota Oil Promoting Empowered Communities (ND-OPEC) Fund is to allow communities to apply for grant monies to address the needs that increased population, growth and inflation (from oil-based activities) have created in their communities. This fund is ideally managed by the North Dakota Association of Counties. The fund's revenue stream can be generated by a 10 cents per barrel oil contribution for every barrel produced in the state. At a production rate of over a million barrels a day, this small per barrel contribution will add up quickly. The ND-OPEC Fund is specifically designed to help communities address the more amorphous challenges they face with a focus on creating safer and more secure communities.

Recommendation 15: Use tax reductions, credits and other incentives to subsidize growth initiatives of businesses and institutions that are essential to a strong, healthy and productive community.

There are many examples of ways to facilitate growth in communities aside from the standard supply and demand model. Using incentives that allow the jurisdiction or state to shoulder some of the burden can stimulate growth to meet community needs. This type of subsidization can quickly shore up foundational services leading to a stronger, healthier, and more productive community.

Recruiting and retaining workers for non-oil jobs and volunteer responder services is difficult because of wage inflation, lack of affordable housing, crime, and quality of life concerns.

Recommendation 16: Evaluate existing personnel wages and the extent to which they have been adjusted upward in accordance with wage inflation. Existing personnel should be brought, at a minimum, to wage parity with new hires.

To retain existing personnel, wages should be evaluated and increased according to the current wage market in North Dakota. While budget limitations may limit the extent to which existing personnel wages can be increased, existing personnel must at least have wage parity with new hires. Of course, parity is only a stop gap measure and must be followed up with a more liberal raise structure based on criteria such as quality of work, level of responsibility, and years of experience. Increasing wages is essential to worker retention in any market, let alone an inflated market such as the one North Dakota is now experiencing.

Recommendation 17: Address essential personnel housing needs with employer-offered benefits; community-owned, rent-controlled properties; or, a state tax deduction.

Locating available and affordable housing is at a crisis level in western North Dakota. It is also becoming an increasing challenge across the rest of the state as workers are forced to move farther and farther away from the workplace to find appropriate housing. Housing costs and availability are affecting the ability to recruit and retain essential personnel (e.g., city and county workers, emergency responders, school employees, healthcare professionals, etc.). Accommodations must be made to either subsidize housing or to provide reasonably-priced housing that meets the needs of essential personnel.

One option would be an employer-offered housing benefit, but it is an option that would need to be offered universally across the existing workforce (at least in the impacted area). This means that the benefit could go equally to one employee who owns a home and pays a reasonable mortgage payment established prior to the rise in the housing market, as well as another employee paying \$2,000 for a two bedroom apartment. While such a benefit is helpful, it creates disparity in workforce earnings and could fail to accomplish the desired goal of recruitment and retention. While such a benefit could be scaled and only offered based on each employee's housing cost, the operational complexities given the potential for roommates and dual

earner households (both potentially receiving housing benefits), could create animosity in the workplace and challenges for human resources.

On the other hand, offering housing in community-owned, rent-controlled properties as a housing option to existing essential personnel and new personnel could require a substantial front-end investment from the community if new development or purchase of existing buildings is required. This option essentially creates a rental covenant that requires that renters be essential personnel (or family members/partners living with essential personnel) in order to reside there. Such an option would put the community in the position to function as a landlord and require additional consideration regarding ongoing costs, but would go a long way toward taking housing off the table as a recruitment and retention challenge.

Of note, communities could contract directly with a property owner and then subsidize the cost of rent to create the same rent-controlled effect. In the event a property owner has multiple properties, the subsidy could be excused by the owner for the purposes of a tax deduction (this may take additional legal framing to accomplish). Such an option could also be used as a short-term measure while the community develops its own properties for essential personnel housing.

The final option and perhaps the easiest to implement, is to allow a North Dakota tax deduction for essential personnel (or for that matter all North Dakotan taxpayers), that allows a tax reduction based on verifiable housing costs that exceed the state's baseline for reasonable housing costs. For example, if the reasonable housing guidelines states the cost of a one bedroom apartment to be between \$600 and \$750, and the rate paid is \$1,250 (a \$500 increase about the state's guideline), a percentage of that increase can be deducted from taxes (e.g., 50% of \$500 a month for a year would equate with a \$3,000 tax deduction). It is noted, that given North Dakota's tax structure, a rental deduction such as illustrated would zero out most citizens tax liability. Additionally, this option does nothing to increase availability or adequacy of housing and relies on individuals' ability to pay the higher housing costs month to month (only realizing the tax benefit upon filing once a year).

Ultimately, regardless of the way housing adequacy and availability is addressed, it must be addressed. Additionally, it is noted that it will require an infusion of capital that will necessitate larger budgets, state assistance, or

purposeful donations. The ND-OPEC Fund could be a resource for addressing this issue.

The social safety net is being taxed and the needs are exceeding the available resources.

Recommendation 18: Conduct a wage and cost of living study in western North Dakota to determine new baselines for low income programs and services. Utilize study results to inform the adjustment of existing baselines; and, fund the agencies and programs that offer low income (and no income) support in accordance with the number of individuals and households that populate the low income bracket post-adjustment.

Wage inflation in North Dakota has made what was once a satisfactory and livable wage, to starting pay for a teenager at a fast food restaurant. Even though many wage earners do not fall within the low income bracket based on their earnings, some cannot afford to pay for important necessities based on the inflation in housing, goods, and services in the state. A wage and cost of living study specifically for western North Dakota can inform the needed changes in the income considerations that affect eligibility. In the absence of change, other challenges such as health neglect, hunger, homelessness, and crime could increase. Such increases could cost communities and the state more money than proactively extending services to those who need the assistance based on disparities between their earnings and the cost of living.

Recommendation 19: Create and implement a statewide strategy for addressing homelessness with a specific focus on identifying and developing short-term sheltering facilities in areas where housing is impacted.

Homelessness in North Dakota can be a deadly proposition. In communities where adequate shelters are not available, those without housing, and those residing in inappropriate housing, are vulnerable. In western North Dakota, there are many living in vehicles and ill-equipped campers or trailers, thereby creating a new challenge in dealing with homelessness. Communities need shelter facilities to ensure that homeless individuals have adequate protection and facilities available to them. A statewide strategy that establishes priorities and directs efforts dealing with homelessness is needed to help expeditiously address the safety and quality of life issues for North Dakota's growing number of homeless.

The road conditions – to include the quality, safety, and amount of traffic - have become an area of critical concern.

Recommendation 20: Conduct a statewide evaluation of major thoroughfares, critical access roads, and highways in regard to surface and integrity conditions, safety concerns, and traffic volume. Utilize the study results to inform strategies that affect traffic flow, volume, and access on these thoroughfares, roads, and highways.

To the extent the above framed research can be combined with the research referenced in Recommendation 9, it should be. Oil industry traffic has resulted in greater stress on roads, more congestion, and more danger for residents. In addition, the sheer growth in population related to oil industry activities has also contributed to increased risks. Some of these risks can be reduced or eliminated with smart strategies that modify traffic flow, volume, and access. Reducing or eliminating these risks could result in a reduced need for accident response, reduced travel time for emergency vehicles, and a safer environment for those who need to work on the thoroughfares, roads, and highways (e.g., public works, law enforcement, emergency responders, etc.).

Recommendation 21: Establish extraordinary usage contracts with oil industry companies to help subsidize the cost for increased road repairs and resurfacing due to truck and equipment transport.

To the extent that the oil industry's extraordinary usage has contributed to an acceleration of the need for road repairs and resurfacing, it should be made to bear the cost. This is particularly true in regard to local jurisdictions responsible for maintaining these roads as part of their limited budgets. Oil companies should be required to pay for the shortened life spans their traffic causes on these roads via extraordinary usage contracts. These contracts should require a bond to be posted prior to the increased usage (i.e., such as the type of usage evidenced during fracking) and the bond should not be released until the extraordinary usage is completed and the road impacts are paid for by the company.

Conclusion

The emergency management function in North Dakota is being impacted (both directly and indirectly) by oil drilling and production in the state. These impacts are tied to both rapid growth without sufficient infrastructure or resources and the hazards that oil-related activities introduce. Without abatement, the emergency management function will not be able to perform at the capacity necessary to protect the safety and security of North Dakota communities.

This report, which features the firsthand accounts of emergency management and partner agency personnel at the local and state level, provides a snapshot of the many potential points of failure that currently exist in regard to fulfilling the emergency management mission. These potential points of failure are not a result of a lack of concern, commitment, or effort on emergency management or partner agency personnel. The primary responsibility to empower and fund the emergency management function lies squarely with Governor Dalrymple, state legislators and community leaders. Indeed, the breadth of the impacts identified herein necessitates thoughtful, big picture analysis and action that is best structured and funded at the state level.

North Dakota's newly found identity as a key player in national and international oil production is not something that will fade away as quickly as it emerged. Given current and evolving technology, it is clear that North Dakota will be considered an oil state for decades to come. What is not quite as clear is the extent to which the state will remain a place that can support the needs of its citizenry. The new normal must be aggressively addressed to ensure that North Dakota remains a place where folks want to raise their families, grow old, start businesses, go to college, and take vacations.

Endnotes

1. On the subject of high reliability characteristics, see: Kym Overland, “The United States Department of Agriculture as a High Reliability Organization: Identifiers' Perceptions of Risk” (thesis, North Dakota State University, 2003).
2. Greg Wilz, “Emergency Management & Response in the Bakken” (presentation at North Dakota State University, Fargo, North Dakota, March 24, 2014).
3. B. Wayne Blanchard et al., *Principles of Emergency Management* (Emmitsburg, MD: Federal Emergency Management Agency, 2007).
4. Ibid.
5. Jessica A. Jensen, *Report of the 2013 Disciplinary Purview Focus Group: Scholarship and Research to Ground the Emerging Discipline of Emergency Management* (Emmitsburg, MD: Federal Emergency Management Agency, 2013), p. 2.
6. North Dakota Century Code 37-17.01-07, North Dakota Disaster Act of 1985.
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Appendix A: Study Survey

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Fargo, ND 58108-6050
701-231-5847

**Direct and Indirect Impacts of Oil Drilling and Production on the
Emergency Management Function in North Dakota**

You are invited to participate in a research study conducted by Dr. Carol Cwiak from NDSU's Department of Emergency Management that examines the direct and indirect impacts of oil drilling and production on the emergency management function in North Dakota.

You are being asked to participate in this study because you are county, tribal, or state level emergency management personnel in North Dakota, or a key response partner (i.e., public health, law enforcement, fire, emergency medical services) that works closely with emergency management partners in North Dakota.

The reason for doing this study is to capture, analyze, and report the direct and indirect impacts on the emergency management function and to offer recommendations for addressing these impacts effectively. Multiple data points and anecdotal evidence support the premise that the emergency management function in North Dakota is being impacted, but the emergency management community and its partners have not yet been afforded the opportunity to be a primary source of data regarding these impacts.

You will be asked to provide your thoughts and observations regarding the direct and indirect impacts on the emergency management function via a short online survey that requests narrative responses. The survey will be hosted online via NDSU's Group Decision Center. Based on the extent of your responses, the survey could take between 5 and 20 minutes to complete.

The survey is designed to provide participants confidentiality. Any comments that can be used to specifically identify you will be redacted. Your information will be combined with information from other people taking part in the study. You will only be identified by your role, government level, and the type of oil impact you identify (e.g., drilling or production occurring in jurisdiction).

Your participation in this study is voluntary. You may change your mind and cease participation at any point during the completion of the survey instrument. Your completion of the survey indicates your consent to participate in the survey. All survey participants will be provided a link to allow for an early review of the draft report before it is published and distributed. The review period will be January 5th - 19th, 2015. During the review period, participants will have an opportunity to provide commentary and address any questions they may have about the report.

Participants may experience minor stress while sharing their thoughts and observations in this study. Participants may also find the opportunity to share these thoughts and observations cathartic. Participants may find satisfaction in knowing that their participation will help the emergency management community in North Dakota and nationally, as well as, the communities they serve.

If you have any questions about this study, contact Dr. Carol Cwiak at 701-231-5847.

If you have questions about your rights as a research participant, or complaints about this research you may contact the researcher or contact the NDSU Human Research Protection Program via telephone - 701-231-8908, email - ndsu.irb@ndsu.edu, or mail - NDSU HRPP Office, NDSU Dept. 4000, PO Box 6050, Fargo, ND 58108-6050. The role of the Human Research Protection Program is to see that your rights are protected in this research; more information about participant rights can be found at: www.ndsu.edu/irb.

Direct and Indirect Impacts of Oil Drilling and Production on the Emergency Management Function in North Dakota

What is your role? Please check the appropriate box.

Role	County/Tribal/Regional	State
Emergency Management		
Emergency Management Partner		
Public Health		
Law Enforcement		
Fire		
EMS		
Other (please specify):		

If you are at the county, tribal, or regional level, is drilling or production occurring in your jurisdiction?

YES _____

NO _____

1. What type of **direct impacts** from oil drilling and production do you believe are affecting the emergency management function?

(e.g., addressing the hazard implications in plans, training, and exercising; addressing the exacerbation of other potential hazards based on oil impacts; amount of time and energy focused on addressing oil-specific issues; changes in community composition that affect or change vulnerability; addressing community concerns about spills, rail transport, and safety matters; etc.)

2. What type of **indirect impacts** from oil drilling and production do you believe are affecting the emergency management function?

(e.g., impact on partner agencies that affects the effectiveness of EM preparedness, mitigation, response, and recovery activities; impact on social infrastructure; impact on schools, medical care, and other critical institutional services; impact on roads and highways; impact on ability to recruit and retain staff; impact on political decisions in the jurisdiction/state; impact on businesses that service or partner with EM; etc.)

3. Based on your understanding of emergency management and the community you work with, what recommendations would you make to address the impacts you referenced above?

4. Are there any other thoughts you would like to share about the direct and indirect impacts on the emergency management function in North Dakota?

Thank you for your participation in this important effort!

Please note the web address for the draft report (posted January 5-19, 2015) below. Only survey participants are being provided this link to the draft report, please do not forward it to others until the final report has been completed (approximately 10 days after the draft review window closes and comments from reviewers can be addressed).

<http://www.ndsu.edu/emgt/projects/>

Appendix B: Participant Narrative Comments

1. What type of direct impacts from oil drilling and production do you believe are affecting the emergency management function?

(e.g., addressing the hazard implications in plans, training, and exercising; addressing the exacerbation of other potential hazards based on oil impacts; amount of time and energy focused on addressing oil-specific issues; changes in community composition that affect or change vulnerability; addressing community concerns about spills, rail transport, and safety matters; etc.)

The response to locations is difficult to manage with new locations popping up daily. The training to deal with situations that arise on well sites for all first responders is minimal. The knowledge of oil rigs, type of rigs, rig functions, and rig safety is minimal. Minimal exercises have been done with first responders and rig situations such as rig explosions.

1) Increased spills, releases, and discharges of hazardous material.
2) Increased challenges with emergency notifications. 3) Sheltering needs increases. 4) Critical and key infrastructure risk increases.

No new hazards created per se, just a higher number of incidents and potential intensity of them. We have always had to deal with spills and potential 2nd and 3rd order effects from transporting HazMat; but now there is a larger area where they could occur and a higher number of occurrences to manage. But it is nothing we can't handle.

Railroad Trains up to 7-9 a week through [REDACTED] County which poses risk for communities and towns in [REDACTED] County. Now have emergency plans and training for Cities, Fire Fighters, First Responders, etc.

We are seeing an extreme increase in the amount of truck and rail traffic within the county hauling either hazardous materials associated with oil & gas exploration as well as the shipment of crude oil throughout our transportation routes. Railcar shipments of crude oil from the Bakken area have dramatically increased in the last 2 years. Thus our local response plans and training have concentrated on preparation and response to train derailments and Hazmat accidents/releases associated with this increased transportation.

Transportation of oil via rail impacts our county directly, resulting in community concerns, responder requirements for planning, training and increased response capabilities.

I believe the focus of emergency management in oil-producing counties has definitely changed. Increased time and energy is devoted to addressing oil-specific issues. More EM time is consumed in establishing relationships/cooperation with the oil producers, educating yourself and obtaining training/education for Responders so there is awareness of what is needed to respond to oil issues be it emergency situations, spills, transportation issues, etc.

It brings in day earners from areas completely ignorant of the weather- life in the prairie- who expect the infrastructure to provide for them the amenities they are accustomed to in the urban areas. Doubles the traffic flows across our counties- when you are a county NOT getting the revenue from the oil it is even worse as you do not have the extra income to mitigate- this goes to all aspects of infrastructure and services [EMS-FD-LAW-PW-Social Services]. Increased UNFUNDED activities eat budgets fast. Without the NEW income you cannot even compete in the job market to beef up your infrastructure or cover normal attrition.

Updating hazard planning, training & exercising for oil related events, increase in spill reports.

None

Vehicle accidents take a disproportionate amount of time. Inadequate response personnel in environmental, ambulance, and law enforcement.

Increased transportation of hazardous materials (railway, vehicular) through our community. Competition for jobs inside and outside the community is very high due to wages offered in "oil counties" thereby driving up some local wages. Emergency response positions continue "the revolving door" of employees. Existing employees move on to better-paying positions, while newer employers obtain the training and then leave. Crime continues to increase and detention centers are forced to house inmates outside their facilities due to maximum capacity--straining budgets. Traffic routes congested. We no longer talk about how many miles away, we talk about the length of time it takes to get there. Delays for response.

Increase in population without the infrastructure to support it. Increase in transportation by car, plane or train. Trains are considerably longer and carry large amounts of oil. This is not only a hazard but also limits the local agriculture community in moving grains out of the area. With the population increase, local businesses are unable to keep enough supplies or employees to meet the needs of their businesses, some have reduced hours or even closed due to no employees. Can't get employees due to lack of affordable housing. With the wages paid in the oil patch and an increase in demand for commodities cost of living has risen considerably. With the types of vehicles in the area we find a larger number of traumas and of more severity.

Increased population, increased traffic, means more opportunities for things to go wrong compared to only 5 years ago. Weather including snow and ice on roads joined with people not normally used to those road conditions. Many more traffic accidents- bulk of our business. Speed, fatigue, drug and alcohol abuse, cell phones all contribute to our huge increase in calls for service.

Dramatic increase in the number of oil trains passing through our county. Increase in number of trains blocking crossings during switch over or for passing purposes. Concerns about delays created for emergency responders when this happens. Planning a tabletop - an exercise with scenario of train derailment-hazmat fire & explosion. Have received increased tax dollar funding in county & school districts due to pipelines crossing through the county.

We are responding to more and more spills and illegal dumping incidents, the volume of Tier II reports are nearly unmanageable, we are having to update emergency response and hazard mitigation plans to address new threats, fire departments are having to update equipment in order to respond to hydrocarbon and new chemical hazards, the number of calls have overwhelmed the volunteer ambulance service to the point we have had to contract for personnel, we have had to add training for mass casualty and significant Hazmat incidents, and the emergency management/911 position went from a part-time position to full-time.

We see new people in our community which I believe is somewhat direct. I think this can be good but it also brings in some others who cause problems.

Incident at site (spill, injury, fire).

Even though we are at this time on the fringe of the Western North Dakota oil boom, we still see the transportation of oil products, equipment, chemicals and manpower through our communities. We are in line for pipeline activities throughout our county and gas well drilling is very near and will soon be a possibility for us. We must address the benefits and problems to our county. With the onslaught of the dangers involved and increase in population, we are faced with updating of plans, training, access to equipment and specialized tools for our first responders and providers. We do realize with the increased transportation in our community, be it rail or roadway, and with the increased product and persons, the chance for an incident is much more possible. These types of products and equipment can be a partner in an incident that could be devastating in both human and/or property losses.

The populations we have now do not tune in to local media outlets so how in an emergency do you get emergency messaging out to these individuals? What languages does the messaging need to be in? These are all unanswered questions that with our current funding levels we can't even scratch the surface of. Then you have the housing situations where people are living 6 to more people in a house or lodging built for maybe 4 - things like that that make the likelihood of an outbreak and far reaching spread even greater. Vaccination status of the people moving here both children with parents that don't believe in vaccines and those coming from other countries that are under immunized. We are an outbreak waiting to happen. Everyone quickly goes to spills etc. with the oil but these are the situations that could have even further reaching consequences that we don't have the staffing to address.

Workload has significantly increased with can tax resources in all areas.

We are implementing oil spills into our emergency plans due to the amount of trains that we have running through our area that have oil on board. We have participated in table top exercises to prepare for scenarios in our response area.

The most direct impact is the transportation of oil through our community, both highway and rail. We have two major ND highway transportation routes. The major rail line in the southern part of the state also runs directly through the heart of our city. Not only is oil a concern but all of the hazardous chemicals that support the oil drilling are of great concerns to not only the first responders but the community as well.

We on the eastern side see more rail traffic, vehicle traffic and more people moving through the area going to and from work. We have done more training on rail emergencies and attended several training classes of this subject. The increased truck traffic on interstate 94 also is very noticeable - presuming equipment traveling through to the oil fields.

There is an increase in workload of incidents that the county EM's must deal with. Also, the area is in such a state of change, that planning for an incident, or even knowing what is out there is more difficult. Also, an increased awareness and level of concern from the public adds to the workload.

Changes in community composition.

The biggest impact has been the number of calls we have been asked to respond to, our vehicle accident calls have gone up 600% in the last 5 years. Our total number of fire calls have risen 2 to 3 times, we have went from an average of 48 to an average of 110 in the last 3 years. Another impact has been the time required to respond to these, we need to send more units for our own safety since if we are on a major highway, the short staffed law enforcement agencies have limited resources and are spread thin so we need to provide traffic control as well as extrication of the victims. Also the size and types of vehicles involved has changed from mostly passenger cars to semis and multi-passenger vehicles. So we not only need firefighters to extricate, but to perform traffic control. Another impact is the added training we have taken on, in the last 18 months we have trained with BNSF HazMat, AMTRACK, NDFA HazMat awareness, and a number of tabletop exercises with local oil companies on rail loading facilities, gas plants, and pipelines, while this is all great training, and we are lucky to have it offered at low or no cost, nonetheless it still takes volunteers' time, on top of the time needed to respond to emergencies. Our town's population has grown many times, but the people coming are not volunteering for emergency services, so the burden is placed upon the people that are already doing so much for the community.

The number of spills within the county has risen dramatically since the drilling began. Also, with the increased traffic the incidents with the oil tankers/water tankers, work crew trucks, etc., have increased my involvement in accidents county wide.

BNSF Train AVERAGES through [REDACTED] Average# per Day - Trains Through Our Community - 18 Total Trains through [REDACTED] per day. 110 average number of cars per train. Average break-down of the 18 total trains per day: 8 Coal (100%) All loaded or all empty per train, 3 Grain (100%) All loaded or all empty per train, 4 Mixed Merchandise includes hazmat (various), 3 Oil Trains (crude- 100%) All loaded or all empty per train, 18 Total. Also, verifiable through the NDDOT is the doubling of truck traffic in [REDACTED] County since 2003.

Increase in local population, risks, and vulnerabilities relating to rail and truck transportation and industry in general. The direct impact has been related to applying emphasis or focus on training and exercise activities as well as planning efforts related to the rail transportation of crude oil. Some of these direct impacts may be a result of the Casselton Incident as much (if not more) than the existence of the industry itself (in county not producing oil). Incidents such as the Casselton incident always have impact on time, energy, and the "direction" of emergency management - based on media, political, and general population interest.

Planning, training and exercise is definitely an issue in the EM community. Whether you have oil in your jurisdiction or not, you do have different and more diverse chemicals traveling through your area.

Training, exercising, quality employee retention, addressing impacts to other areas impacted by oil production, addressing potential for cyber terrorism and natural disasters in relation to oil, e.g., lightning strikes, tornados, etc.

Spills and concerns with rail transport etc. are basically swept under the rug. Emergency managers in some counties respond to bigger spills but they are essentially out there to give the appearance that something is being done. Spills are reported every day and they aren't checked on. The industry is pretty much on the honor system and that is not a good thing. I personally have seen spills that the state never follows up on - booms still lying in the ditch 2 years later after the state says they will be out to take care of it. If you ask the state they are on top of everything and doing a good job. In reality they don't do a lot and definitely do NOT communicate with local emergency management. The reality of what is going on in the oilfield is not what is portrayed in the media or what the state tells everyone. If we all lived in Bismarck like them we could say things are great and everything gets cleaned up...not the reality. This may sound negative but that is the truth about what is happening out here. How many of the people from the state live in oil country and actually go out and see what is happening??

[REDACTED] County - the largest oil producing county in the state- All of the above!

Our agency has a huge amount of work to address emergency issues, spill cleanup, etc. while also having to shift emphasis on regulatory issues to oil development issues. We also have a huge workload increase on our work to review and approve infrastructure development essential for spill cleanup and daily oilfield activities. We spend a large percentage of our time and energy on oilfield issues, inspection of oilfield issues and on compliance. Our state programs have fallen behind in many other duties. This has added stress for staff. Staff has been diverted to oilfield related issues, leaving other work uncompleted. Retaining staff is a serious issue.

The increased number of railcars traveling through our county, there is only one city that does not have rail tracks running through it, has definitely increased the risk of an "event" happening and the possible severity of such an accident.

There has been a general increase in train and truck traffic hauling hazardous materials making a hazardous materials flow study necessary to determine what and how much material may be flowing through the area. The increasing need to spend time and money to keep staff up to date with training/new methods of responding to the new risks/threats/hazards in the area. We concentrate on hazardous materials exercises and we overlook other exercise opportunities. Language barriers are becoming more noticeable. Historically, the majority of all residents spoke English, we are now seeing more Spanish and some Western African languages. Need access to multi-lingual staff or translation services. The increased demand for social economic assistance (WIC, Food Stamps, Rent Assistance, etc.) are depleting resources quicker than previous years.

Changes in community composition - increase in oil workers and families, increase in traffic (this is probably more of an "indirect" impact). Railroad oil car traffic - increased number of trains as well - go right through the middle of our city.

Increased traffic on road and rail and increased population that is affected by the increased traffic.

We are a volunteer department, with all members having full time jobs. We have been so busy with additional runs that we are getting burnt out. Nobody wants to train on our training nights. We are not new to the oil field, we have been dealing with that aspect since the 50's. We have highly trained personnel. It's all the vehicle accidents that we have had to deal with. This boom has brought in trucks and workers from every state, who seem to think that they need to drive as fast as they can, at all times. Nobody feels safe here anymore. The media doesn't know half the stuff that is going on up here. Or maybe that's political too, so the state can keep raking in all the money.

Increased traffic on rail and highway, especially training and planning for a possible accident in our jurisdiction. We need to update our planning and response capabilities in regard to EMS and possible evacuations of the public from a rail accident or hazmat spill. This puts a strain on resources because all EMS are volunteer in our county.

2. What type of indirect impacts from oil drilling and production do you believe are affecting the emergency management function?

(e.g., impact on partner agencies that affects the effectiveness of EM preparedness, mitigation, response, and recovery activities; impact on social infrastructure; impact on schools, medical care, and other critical institutional services; impact on roads and highways; impact on ability to recruit and retain staff; impact on political decisions in the jurisdiction/state; impact on businesses that service or partner with EM; etc.)

Grocery and department stores have difficulty maintaining inventories. Housing costs (purchase and rental) have greatly increased, forcing people to move in with parents. Homelessness continues to rise as people come to "oil country" and have difficulty finding jobs within their skillsets. Daycare availability is nearly non-existent with waiting lists 11-18 months. Volunteerism continues to decrease--people working paid positions with no "spare" time. States Attorneys have caseloads that far exceed the recommended averages.

Schools have had to add modular units to handle the increase in numbers, people are not always pre-registering and local schools have had to hire extra staff to deal with unexpected numbers of children. Roads are not able to be maintained to good condition due to the traffic, often the roads are in need of repair. With the large vehicles the roads are torn up. Even with the money it would be difficult to secure construction companies that could get the job done as they are over booked with jobs due to the increase in the area.

Impact on adequate and safe housing. Impact on safety shelters for times of emergencies i.e. tornados and emergency routes. Everything listed in the "e.g." portion is applicable. Failure to maintain employees in the first responder field is crucial same with the medical field.

Volunteer first responders work in oil fields, lack of state response on local issues.

Increases in population due an influx of oilfield workers and support business employees, changes community composition increasing needs for housing, schools, health services, law enforcement, fire, and businesses to support the needs of the increased population. As Emergency Management is a resource for many of these services, we spend more time and efforts in working with these organizations in preparation for more potential community growth.

Impacts on political decisions. Redirection of funding to communities that are directly affected by the oil industry although the outlying communities are still indirectly affected and encountering deficiencies that are not being addressed.

Even though our jurisdiction is not directly impacted by active exploration and drilling rigs, we have experienced population growth and housing demands due to supporting oil field companies and workers that support the industry as a whole. This increase in population has increased our public safety services within the law enforcement agencies and county social services for support. We have worked closely with the local planning and zoning committees as it relates to this industrial growth to ensure proper zoning and placement of facilities are in the best interest of public safety and environmental concerns. Our local zoning and planning committee tasked our emergency management office to gather direct input from oil impacted counties in the NW and SW parts of the state as it related to public safety functions and the impacts associated with this oilfield activity. The input we gathered ("lessons learned") from these law enforcement, fire, EMS, public health and Emergency Management agencies were shared with the planning and zoning committee as we developed plans, policies and procedures for potential man camps or staging areas for oilfield related activities. The plans, policies and procedures have now been adopted by the County Commission as requests for these type facilities are made.

In general EMs are so busy chasing everyday stuff that they are not able to dedicate the time to plan for the increases of risk, threats and hazards. Rapid growth has caused most EM to be reactive rather than proactive.

Stresses on existing support systems such as housing, commercial goods and services, roads and road maintenance, and criminal activity. A combination of market forces and increased emphasis by government officials is helping communities to adapt to their new normal

N/A

Because of outmigration of the community members that used to live here we have lost a great number of community partners that we used to work with on emergency management. There then has been a great deal of turnover in the new staff hired. It is very difficult to move forward with emergency plans and exercises when you are constantly working with those partners just so they know who you are and what each other's roles are. We also have had a hard time recruiting and retaining staff as soon as we get them trained they move on to another positions making it difficult to keep knowledgeable staff.

Every part of the system is overtaxed above what is a sustainable level. The uncertainty of the boom/bust cycle has made it difficult for governing bodies to direct enough resources to handle the growth.

One problem is maintaining an accurate 911 database; rental changes occur so frequently and RV's pop up with no notice to the point that it is impossible to keep the database current and 911 calls can come from a residence that nobody knew about. The lack of available and affordable housing makes it difficult to hire new employees; poor road conditions slow response and some roads are impassable, and volunteers are getting burned out. The demand for construction materials and services has significantly increased the cost of road repairs to local counties and townships while revenues remain relatively stagnant. The local hospital emergency room is experiencing an increased number of uncollectable debts for services provide; incorrect or fraudulent insurance and address information leaves the hospital with worthless accounts receivable and their balance sheet. The demand for social services has increased significantly as has the demand for special services with the local school district. Increased need means increased staffing requirements which means additional demand for affordable housing; a social worker or school teacher cannot afford \$2100-2500 per month for housing. Our local school district has built housing for staff and the county has employees living in FEMA trailers.

SEE ABOVE ANSWERS

Mitigation, response, impact of roads (township & county).

None

Skews the conversation from preparedness to reaction.

Increase of calls for service have implications on needs for career type people-need for more responders (volunteers). Lack of affordable housing and competition for workers drives up housing (much of which is junk when erected) and salaries. Hard to keep ahead of the power curve for planning, budgets. Mix of equipment and training for new types of emergencies has changed.

We are preparing a Railroad Emergency Response Plan for the county. As state earlier, we are benefitting from the increased tax dollars.

We have seen a major impact on the ability to retain staff. This loss of experience is a major concern in our work.

The indirect impacts that we notice vary vividly is the amount our fire & rescue crews are responding to I-94 vehicle accidents. More winter time responses than any other time. Many of the vehicles are out of state vehicles.

We have 3 to 4 1/2 million gallons of crude oil moving through our fire protection area on the rail daily.

Roads

We have to be prepared for this, or at least be deep into preparing. We need to make sure have all our plans current and up to date. We need to make sure all mutual aid agreements are current. We need to look at the forecasting of staffing. We have to realize that the volunteers will just not be available, and paid responders are going to have opportunities for jobs that pay more and have better benefits. Recruitment and retention now becomes an issue. Our infrastructures have to be assessed, everything from utilities to rail, to roads and bridges, pipelines, water, sewage, and etc. SAFETY-SAFETY. We need to look at adequate medical services, ems, fire, social service functions, elderly care, affordable and safe housing. People will not be able to get services and care. Some will not have money or the ability to get to a larger city for these. Money will be short for some of the middle to lower class persons, especially disabled and elderly. We will also see an increase in persons that are felons, criminals, prostitution becomes an issue, increase in drugs and with these an increase in crime. We have to be able to provide a safe community for our citizens.

We have seen an impact in staffing. Staff are expecting higher wages and we cannot be competitive with what families can make in the drilling areas they are not applying or are moving out of the area where these types of jobs are.

Emergency responders have always trained on their response to oil and hazardous materials. That is nothing new. What's new is the amount and frequency that oil and hazardous materials come through our community. For years plans have been in place to respond to single tanker emergencies. The frequency of crude oil transportation by rail has required a significant change in emergency response plans. This includes looking at all facets of emergency response from activation of initial response; EOC and mutual aid agreements.

This is not meant to be the easy answer but it is true- All of the above! One only needs to research the current local EMS runs/calls, Rural Fire Dept. calls, Sheriff Dept. calls and compare to 3 years ago. [REDACTED] County now leads the state in traffic deaths!

Our EM has addressed this in the past and is very proactive on keeping us informed and providing information as it comes along. We have had a couple extreme incidents in the past and with his help have mitigated through each of our events.

The schools in our area have been overwhelmed with the increase in population, they have been doing their best with some expansion, but there doesn't seem to be much financial support coming from the state to help them. In our town they had plans for a beautiful expansion to the high school, but the bids came back way higher than the initial cost estimates from the engineers. So two problems, the school had to cancel the plans, because the cost was too high, and the second problem is the cost of building is so high in our region, I have been told it is 3 to 4 times higher than in other parts of the state. Another problem that I worry about is business owners not letting employees leave work during business hours to let them, volunteers, respond to emergencies. This has not happened in my community, but I have seen it happen in other communities, and it is hard to blame the employers, they need the employees at work to do the jobs they are hired for. So far my department has been lucky we have been able to keep volunteers, and been able to keep a good number of responders to each call needed.

There are more people that are not only living in the county, but every hour in the day our direct traffic from the oil field employment has increased, this in turn is calling for increased LE; Fire; Ambulance responses. Our public works employees are busier than ever before. One more thing is the inflation of our products we buy in the county. Example one gallon of milk in the Cenex Convenience Store here in [REDACTED] is \$7.99. Our folks that have always lived here are encountering and living with a large number of changes. They are not all bad, but it is change.

The above as well as : Economic impact as locals expect more money from oil to pay bills and expect some of that to come in the form of grants which are getting to be less and less.

I believe population and economic growth have impact in all of these areas cited as examples above. In regard to emergency management, as other partner agencies become more busy in managing growth and sustaining levels of service, emergency preparedness, which should be in front, can become more difficult to sustain due to increased workload of our partner agencies.

Except for mobile homes, housing is no longer affordable to those making minimum wage up to approximately \$14.00 per hour. Excerpt from NDDDES's Winter Storm Annex. As a consequence of the oil boom and the shortage of suitable housing in oil producing counties, a significant number of transient workers are forced to live in tents, vehicles, and other shelters not suitable for winter conditions making them vulnerable. Determining how many persons are possibly threatened in each area remains a challenge. It is also difficult to account for persons residing in ad-hoc camps, such as abandoned farmsteads. The welfare of man camp residents is not an immediate concern due to available support systems such as auxiliary power and winterization applications. Most transient residents are not active within their communities, have limited to no local support structure, and are for the most part unaccounted for. Thus, most transient living conditions are unverifiable. Local emergency managers in oil producing counties are prepared to activate shelter plans which address short-term sheltering needs, but due to the transient nature of the oil patch's population, no reliable method exists for accurately estimating pre-event numbers. If significant numbers of persons present at local shelters, resources may quickly overwhelm local capabilities. Long-term sheltering would also present similar challenges.

Since the beginning of the "oil boom" our county has experienced an increase in crime, incarceration, and traffic, an influx of people that have either not made it to the oil fields or were turned away due to various reasons. Trust of citizens that our responders are unfamiliar with has been an issue, law enforcement is called upon more often to travel with EMS due to this. Retaining staff for information technology has become an issue with businesses in the area due to the high wages paid just a few counties away. Communications issues have arisen due to interference on radio channels likely from increased use.

We have filled out survey after survey out here. Most of the information falls on deaf ears or we never see anything from it. What is going on out here isn't a secret, you have heard it all before and we have told people before. I have spent my time giving you the truth in this survey, I hope that you get what you are looking for from others in your survey.

Many agencies and programs we deal with are flooded with work to address energy related issues. From our work and public interaction, we observe the impact to all infrastructure in the oil development areas. City and county governments, schools, police, local health officials, etc. are hugely impacted.

The first responders in our county need better PPE and more training for rail incidents.

Recruitment and retention of qualified employees is a major concern across both public and private sector employers. It is difficult to compete against the higher salaries that are being offered in western part of the state. There has been a housing impact due to the population boom in our area of people who live here, but work in the oil fields. Apartment rents are increasing and some apartment building owners are opting out of government subsidized housing, thereby increasing the likelihood that people will become homeless because they won't be able to afford the rent after their lease is up. The shortage of housing due to the increased economic development. Some people recruited into local public sector jobs must live 30-60 miles away since they have been unable to find affordable housing locally. Lack of funding to do full scale exercises especially in the public health and medical sector.

Vastly increased population, motor vehicle traffic. Increase in registered students in schools. Increase in calls for service for our police department. Increase in traffic crashes, crimes, etc. High-paying private sector jobs means decreased pool of officer candidates.

Higher potential for spills and accidents in the area.

House values have gone up 4 times from what they are really worth, rentals, apartments cost 1800-2400 a month. So how can a teacher or city worker or hospital staff afford to even live here? All these transient employees are running our hospitals and ambulances broke. They expect service then when it's time to pay they disappear. The majority of local businesses have a revolving door of employees. If they can find any at all. Our schools have to add on because of non-taxpaying students that are living in campers. So who pays the taxes for that, the locals. The state needs to give back to the oil communities that are making them rich.

3. Based on your understanding of emergency management and the community you work with, what recommendations would you make to address the impacts you referenced above?

More training, more preparations, more exercises, more funding, more personnel in EM.

The choke point on many of these issues is a lack of funds. The share of tax revenue returned to the primary oil producing counties is woefully inadequate to address the adverse financial impact. The state continues to shove more and more money into investment funds while the counties are forced to raise property taxes or ignore very real problems due to a lack of funds.

"Oil-impacted counties" needs a broader definition to include the indirect impacts in other counties. Monies made available could assist with the issues currently faced in the local communities.

Better funding for equipment to help with a spill and derailment locally. Not having to wait for hours for Regional Response, we are lucky in [REDACTED] County with two Fire Departments having HazMat Operations Training.

Our office has increased its intelligence gathering by having our eyes and ears open to local impacts we gather from our smaller communities and public safety agencies and sharing information among these organizations to be proactive to potential impacts rather than reactive to incidents. Keeping open lines of communication and coordination across all local government functions and offer assistance of our resources and services when/where needed. Being vigilant to accidents/incidents across the state (e.g. Hazmat spills, train derailments and environmental impacts) and working with the ND Department of Emergency Services to gather information for more proactive mitigation and response actions should this happen within our jurisdictional boundaries.

1) Hire more staff. 2) Hire professional / experienced people. 3) Educate local elected officials about emergency management and their responsibilities in it. Something as simple as having zoning and building ordinances to mitigate risk is not understood in many rural communities and counties. 4) Leverage existing systems and processes and engage lawfully organized groups such as Local Emergency Planning Committees to do their jobs.

Ongoing efforts to train responders, coordinating with communities on rail lines, work with elected officials on the local, state, and federal levels to affect increased regulatory attention. Address attention to developing policy, provide exercise and training opportunities. Insure local capabilities through resource analysis, needs, and acquisition through purchase or mutual aid.

I think our community is aware of the increasing impact of oil activity in ND. We have increased community activity as a peripheral county to counties with active drilling, and we are trying to increase community functions accordingly, but if active drilling were to begin in our county, many adjustments would need to be made. I think it would be an ongoing process to adjust and more information/advice from other oil producing counties would be sought.

There are NO options to deal with today's problem as the mills are just not there- education of our city/county officials of the pearls and pitfalls seen in the most affected counties out west need to be the number one priority of the state at all levels. Strictly coming from emergency management is NOT enough. In our county we are dealing with farmers [elected officials across the board] who can't see over the price of corn what is coming...
HOWEVER: What we are doing in our county is developing zoning- taxing- overall planning to be in place ASAP to try to control the expected growth- Anything we can do which doesn't cost anything!

Additional training for first responders, fire, law. Additional funding for county/township roads in need of repair due to increase in oil activity/traffic.

NC

State needs to realize that areas are impacted around the areas that are drilling due to large populations and the areas not having the infrastructure needed. These outlying areas need to be subsidized during this time in order to keep personnel and to keep needed businesses open. The National Guard goes to other countries to build houses and roads, why not use them at home to do the same? Money is especially needed to staff police in the oil patch to properly protect the residents in those areas, crime is way out of hand. Ambulances need subsidies to be able to keep staff in the surrounding areas, paid services or volunteers. Maybe the state could give Paramedics an incentive from the state to stay at a service for a certain number of years.

Immediate need for the state to funnel more dollars to county and local jurisdictions to be able to pay for infrastructure (water-sewer-curb-gutter) including improvements for equipment and structures needed for emergency equipment. This would also free up local dollars to be able to hire emergency personnel vs dependency on local volunteers.

It would be helpful to have more funding for training & exercise expenses, either through grants or from the legislature.

The more we respond the more it costs us financially. We have to pay our volunteers - as their time has become valuable - in order to retain most of them. Our expense surely does increase, such as fuel and some maintenance. Expenses are not cheap anymore. This time of increased activity to our department also demands that our training must be better. The added increase means more preparation for our personnel doing the training. This wears on the department trainers and directly affects their families.

We need more training, equipment, and gear to handle a derailment if it happens.

We need to be very proactive, and not afraid to react. It is very important that we have all our plans up to date and use current standards. We need to work closely with local, regional, state, and federal entities. We cannot sit with our heads in the sand and hope that it will go away or take care of itself. Sorry it won't. We need to gather the major players and stake holders and discuss our plans and concerns together. We need to be sure we weed out the persons who have conflicts of interest. This needs to be assessed objectively. Meeting and conferring with others who have gone through this would be a wise move, and benefit us.

If I had the solutions I would have already implemented them. Other than more funding for these areas I don't know what those solutions may be.

All local, state and federal agencies must work together to address the numerous challenges. Prioritization, streamlining, and additional staff/resources are needed.

I think there should be more thorough inspections done to make sure the railroads are compliant with regulations to prevent oil spills from occurring. I'm hoping that salaries do not continue to rise in the oil drilling areas because it is becoming difficult for us to be competitive and difficult for those moving here to find affordable housing.

Constant and continued review, revision and inter-agency training of all facets of any oil related functions that pertain to production, transportation, emergency response (including law, fire, & EMS), mitigation, restoration and recovery.

The outside public makes too much of an issue of things. Some way to contain that would be nice but will never happen. I think on the eastern edge of the state we can and will deal with whatever changes occur. I think our highways will be pushed to the limit in a few years and we will see more traffic incidents than we have seen before. We have a lot of passing through traffic. Highway patrol should in my opinion start now to increase their force before the need is necessary so they don't get behind.

Increase the amount of resources directed to emergency preparedness on both the local and state levels. Adopt requirements on private industry (oilfield service companies, drilling companies, and housing developers) to provide information and notification to local EM's, to save the work of having to track down what is occurring in their counties.

More planning and funding to address: the increased traffic and stress on public infrastructure, the larger transient population and crime, and the resources to assist our more diversified population moving into the smaller "local" communities.

Our county emergency manger has done a great job having the meeting we need to attend in the evening so it does not interfere with business hours, He has also been a great help with responding to accidents and helping with traffic control or whatever needs to be done to get the volunteers back to their jobs or their families. The families usually end up getting the short end of the stick when it comes to the volunteers time management, emergencies need to be responded to, careers need to be tended to, the families get put off. I would also like to see more funding from the state for more law enforcement, and more funding for the North Dakota Fire Fighters Association, and NDFA. The NDFA offers very valuable training and support to the local fire departments.

I feel the 24/7 response capability is by far the most important role I have. To ensure the emergency management is available 24/7 is the one thing that I know I am giving to the persons in [REDACTED] County. We need to keep up with all that is going on, and retain a working relationship with the LE, Fire, Ambulance entities.

Oil Impact Grant funding needs to be made available to all jurisdictions seeing an impact. Rural Fire Departments are responding to more truck accidents and in some cases they don't have the wherewithal for extrication and hazmat mitigation. Oil Impact Grant funding should support justifiable grant applications from communities along the interstate. [REDACTED]

Ensure adequate staffing, not just in emergency management, but in partner agencies that have roles in emergency/disaster preparedness, response, recovery and mitigation.

Ensure that planning, training, coordination, and communication is in place to respond in a timely manner; that responders have the equipment to deal with the issues that they are facing and that they have the training to do so. Better communication between all aspects of emergency management is needed, from the EM's working for various companies, health care facilities, state, county and city, to the responders and citizens.

The ND DES receives federal funding which is doled out to the counties to fund Emergency Managers locally. The distribution formula that is used is not based on current activity in oil producing counties. As an example prior to the boom Emergency Management was a half time position and is now a 1 1/2 time position.

Better compensation for current staff could help address staff turnover and burnout. Some increase in staff levels is also recommended; however, there is little sense in adding staff unless we can retain experienced people. If we had better compensation, we could possibly add field staff that live and work in oil impact areas. The state might also consider state offices in the oil impact area.

Training & exercises - work with stakeholders to conduct exercises.
Employee retention - work to get wages comparable. Addressing impacts to other areas impacted by oil production - through mitigation efforts, THIRA and community as well as state meetings to identify areas of concern and address them. Addressing potential for cyber terrorism and natural disasters in relation to oil, e.g., lightning strikes, tornado's etc. - conduct more training on cyber terrorism with industry experts teaching the classes as well as awareness campaigns. Public awareness campaign to the oil companies on best practices. Committee to assess grant process to be sure that the money is distributed on a as need basis.

I was in an emergency management role at one point so I have seen what goes on. The state puts on training, which teaches emergency managers how to fill out the state paperwork to jump through their hoops. There is NO training on what emergency managers should be doing day to day. They make a lot of meetings to justify their existence. I have yet to see one of the meetings be productive. Emergency managers in the west have meetings to learn how to grind grain to make bread, watch movies about EMP and to complain about the state not telling them when something is going on in their respective areas. The state has meetings to try to get emergency managers to fill out bureaucratic paperwork, they have no care as to what is actually going on locally. If a big event happens our phones light up with rude people wanting information, before responders even arrive, because "the governor wants to know". If you want to see a real emergency manager go to [REDACTED], other than that they are a joke. No, I don't work or live in that area but I have been there to see that they actually do some of what they are supposed to do, and the others mock them and whisper behind their backs. The state doesn't like [REDACTED] because they will actually question the state if something isn't right. There is a lot of the good old boys club at the state and local areas. If you doubt what I am saying, take a look at emergency managers out here and their education. Then actually ask what they do on a daily basis and what they do if they respond to a spill.

Increased state funding to counties/cities outside of the oil-producing region so the counties/cities can properly fund the 10 disciplines of emergency preparedness in order to increase staffing levels, salary, training, and exercising.

"Slowing it down" (ie oil production) is not an option. Market forces, when messed with, can hit back with unintended consequences that are often worse than what government interventions set out to correct in the first place. Market forces are also helping to alleviate many concerns in the oil patch; they simply needed time to catch up. Recommendation is to allow market forces to continue to address the needs in the patch, and catch up with production. These same forces will also address increased needs for safer production and transportation. The new DOT 111 rail cars are a good example. Industry began work on developing these before a government standard was ever established.

- #1 is the state needs to allow for the increase of outdated, antiquated extremely low traffic fines - Use percentage of those fines to fund some of the needed infrastructure - Get the state and locals to obtain and funnel the additional needed funds to fund law enforcement services in their communities, i.e. if the only way to pay for needed increases in law enforcement is through property taxes (general funds), then increase the damn property taxes; quit expecting your law enforcement agencies to deal with the issues of increased traffic/crime, etc. with what they've always had, they are already stretched too thin!

Better tools to handle accidents and better planning for accidents.

A lot of these problems will fix themselves with these low oil prices that we have right now. So that shows that the state should slow down on their drilling permits, let infrastructure catch up.

We need to update and refine our mitigation and response plans for the increase in rail and semi traffic in our county. We have recognized the need for more training for the ems personnel to address these specific hazards and to keep aware of the changing landscape and adapt were needed if possible.

4. Are there any other thoughts you would like to share about the direct and indirect impacts on the emergency management function in North Dakota?

I believe EM is behind the ball out here in the oil fields as they are over run and understaffed. The federal government runs around without notice to local or state authorities and conducts their own operations and does not share results, in essence we are in a pre-9/11 era with the federal government again with respects to EM, OSHA, and the EPA.

So this guy named Newton said. "Acceleration is produced when a force acts on a mass. The greater the mass (of the object being accelerated) the greater the amount of force needed (to accelerate the object)". We are dealing with a great mass and it is getting bigger, things will not get better until we get folks to understand and we all push together.

There have been many positives that have come from oil development as it pertains to EM. Key is a closer partnership with the whole community; specifically the private sector. Build closer partnerships based on collaboration vs regulation, and foster positive open relationships vs creating and encouraging adversarial ones.

Oil Companies in North Dakota: Continent, Marathon, MBI Amerada Hess need to help with the funding of HazMat training and equipment in communities.

Even though our first response agencies haven't seen the direct increase in response calls that are happening in the NW and SW portions of the state, it's obvious that those local volunteer fire and EMS units are and will have difficulty maintaining membership. Over time, it may become inherent that the private industry partners will have to look at embedding fire response, EMS and air quality units on a regional or area basis. This type of support exists where there are local refineries and ethanol plants. The smaller rural communities will no doubt have challenges in the future maintaining local law enforcement, fire and EMS personnel as the demand for their services increase. We have even noticed that full-time, paid public safety personnel are migrating to oil field related jobs due to higher wages, thus leaving a challenge to local governments to backfill trained and experienced personnel in these agencies.

As emergency managers our number one job is escape goat! If the disaster goes great - "What a great fire dept - EMS squad - highway response, etc." When the response fails- the emergency manager is obviously to blame. It's OK! - part of the job. But this type of critical thinking changes [zoning- taxes- traffic routes-wages, etc.] which need to be implemented NOW and are hard to sell VS the available guidance and funding we live with. Until the state starts taking the lead thru Auditors-Tax Directors-County Commission caucuses, etc. the problem will be kept in the list of MAYBE issues like volcanos and urban unrest. It is strange to me that EM and a limited number of LAW responders are the only folks actively trying to drive the changes needed to avoid the everyday calamity being seen in western ND. When I address our local elected officials on these types of issues I seem to be the only one saying the sky is falling. Unless they have family or friends in the troubled areas they see ONLY \$\$\$\$ as the oil impact. When you address anything that costs money to try to mitigate [wages- more personnel] the conversation stops... "There's NO money to do that! " The famous spiraling circle of DEATH!

Not in my area South Central ND [REDACTED] County. I am afraid I was not much help to you. Sorry.

Social Services needs to be fully funded by the State. Too many unfunded State-mandates are exacerbating an already, overburdened system.

EM has good plans in place but with the growth we may be short sighted and not really as prepared as we think we are.

Barely keeping head above water- call volume (VFD) went from 25 calls for service in 1997 to an expectation of approximately 300 calls for service for calendar year 2014. This does not include EMS- they are separate from us and are also experiencing extremely high call volume. Would be nice to see things level off in the rate of drilling, fracking etc. to enable for everyone to catch up.

We need to preserve the North Dakota that our forefathers used their blood, sweat, and tears to build for us. We need to take responsibility and see that this was not done in vain, and that we hand our children and grandchildren a product to be proud of. Oil and Gas has been and will be a boon to North Dakota, we have been entrusted to see that it is done right and not let greed haze our vision. There are so many positive things yet to be achieved from this; we must be vigilant as we move forward.

Educating long time county commissioners on the increased scope of duties and responsibilities for emergency managers is also an issue. Between the post 9/11 homeland security issues and the oil boom demands, it is no longer possible to adequately function in even small counties with a part time emergency manager. NDDDES has reached out to the county commissioners in an attempt to quantify the workload but the staffing doesn't change and EM is a low budget priority. I am the emergency manager, the 911 coordinator, and zoning administrator in our county which is unreasonable and I am forced to choose which tasks will not be completed. Our emergency response plan was last updated before the oil boom and needs a thorough overhaul. I cannot devote time to re-writing the plan with my day to day workload and requests for consultant funding through EMPG and to the county commissioners were denied.

The effect is truly what it is and I have to address it in a way that will maintain our response effectiveness. When I see what the future is with the oil impact, which I believe is a good thing economically, there is a real down side to it as a fire service if this is not taken care of. I am sure you have seen the burn-out in a number of fire & rescue services. I wrote a letter to the governor & his staff after the oil impact grants were distributed. We are not an oil impact county so I was not surprised that we did not receive a grant. I would like to see the state provide my department with a new Rescue truck as ours is too small and overloaded. Because of the amount of traffic on the interstate which parallels [REDACTED] I see this traffic not slowing down for many years. We can also use some of the training personnel from outside our department. The best solution would be to provide a fulltime trainer for our department.

State surplus money should be sent to all fire departments for training and equipment.

We continue to be drowning over here while other people keep handing us umbrellas to fix the situation. We are overwhelmed, tired and just a bit fed up.

The growth in industry and cities has resulted in many challenges. Many of the challenges are more complicated than they may appear - infrastructure takes time. In general, the citizens of ND have done a nice job in adjusting; however more resources are needed to effectively address both direct and indirect impacts.

N/A

It's hard to say not being on the west end of the state where they go through it every day.

The quality and skills of the EM's in the oil impacted areas has increased, we have some great new people to work with, and they do awesome work.

Our department has been very fortunate in receiving funding from the Energy Impact fund from the state, we have been able to update some facilities and equipment, so at least we do not need to spend a lot of time repairing our equipment when we are not responding to emergencies. Also there is different equipment we have needed to keep up with larger vehicles and different fires we have had to fight. Don't get me wrong our area has seen a lot of benefits from the oil industry, but there has been a lot of growing pains that I'm not sure have been noticed. Thanks for the opportunity to be involved in this survey.

This position is not a job for me, it is my passion. I think and I'm speaking for a vast number of emergency managers, this is how we operate. This job requires us to think of the worst case possible and figure out the best possible response and solution.

I suggest you crunch the increased criminal activity numbers from 2003 until now. Soon to be realized with the decreased drilling, will be how people staying in the area that are being laid-off will seek to resume their income.

Hopefully there will be long term beneficial impact in terms of highlighting the importance of the emergency management profession in ND.

Someone needs to facilitate this effort at a statewide level.

Emergency management is a good theory, they could actually make a bit of a difference in oil country but things would have to change. These people have no experience in oil related "stuff". They should be people who have life experience in the field. There really are no qualifications to be an emergency manager. Most of these individuals really have no clue about true emergencies. They aren't first responders, they truly do NOT manage emergencies. Their title is a misnomer. They are "resource liaisons" at best. Emergency is not an appropriate description and they manage nothing. Most EMS, Fire and LE have no idea what an emergency manager does. Most emergency managers don't have much contact with these folks. Until we get honest about the role of emergency management, what they do, what they should do, what training they should have...this is really a non-issue.

The oil boom has redefined the roll of Emergency Management. Is it our responsibility to investigate an illegal dumping of human waste in a ditch? Is a semi wreck with leaking diesel fuel constitute an emergency? We are now on the planning and zoning check list for permits which can be several in a week. We receive daily reports of oil spills from 1 barrel to several hundred barrels. Many of them on-site within an oil facility dike which we have to determine if it needs investigating. We investigate open burning pits which is supposed to come under the state health dept. but they don't have enough staff. We have numerous natural gas pipeline breaks which we respond to. We keep track of well over 600 hazardous material sites and growing. I would suggest visiting the Bakken region and get a true understanding of the impacts!!!

No, thank you!

The Energy Impact goes far beyond the counties that have active well and drilling. The communities that live along the highways and railway have seen an increase in traffic and incident without any help. While it is obvious the counties with wells have bigger issues, the other have issue as well and do not receive any benefit of revenues.

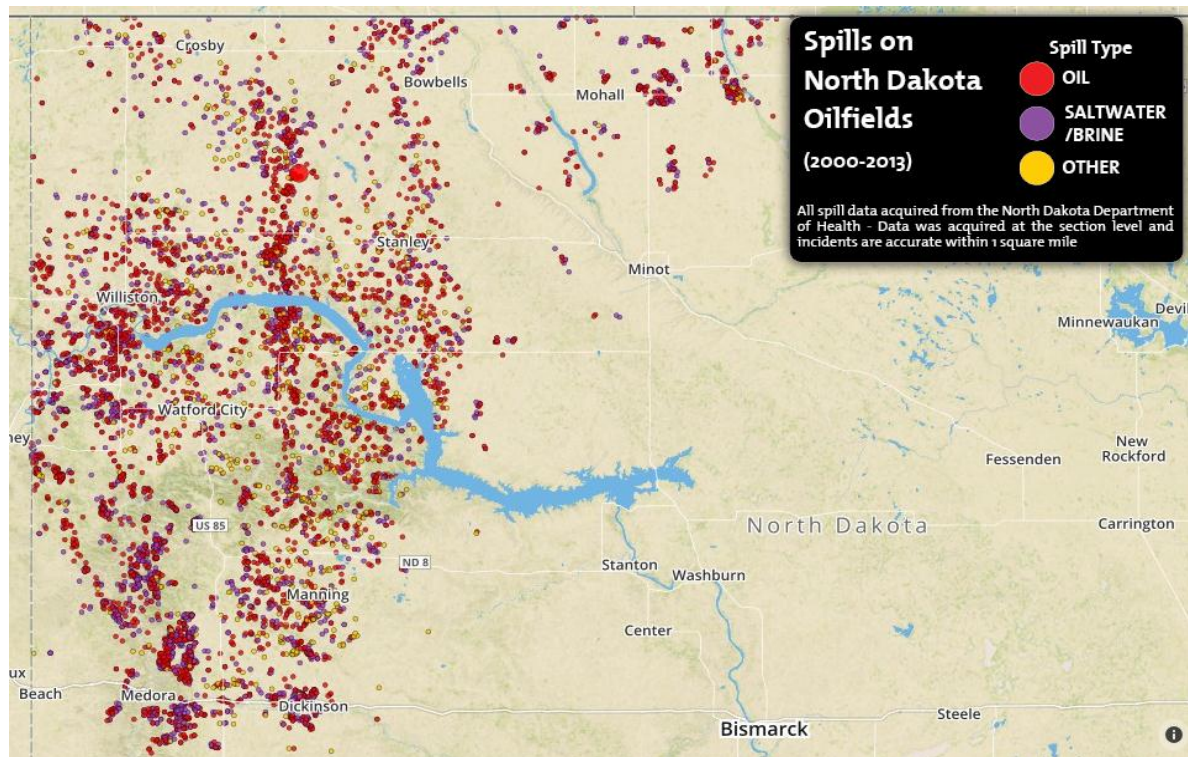
Most people don't understand that these people that are up here working right now, have no intention of moving here, they have houses and families back home - wherever that is. We don't need more houses built that nobody can afford. We need affordable apartments.

Appendix C: Full-sized Images

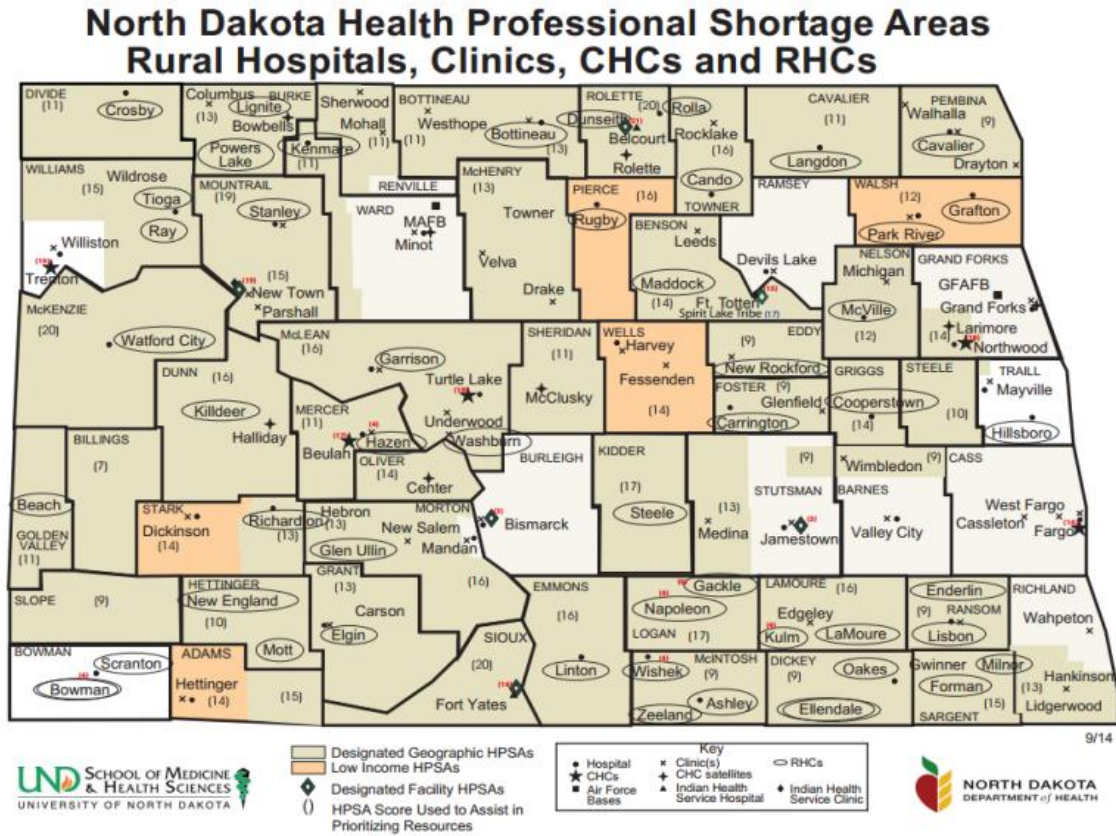
TYLER FORMATION RELATIVE TO BAKKEN



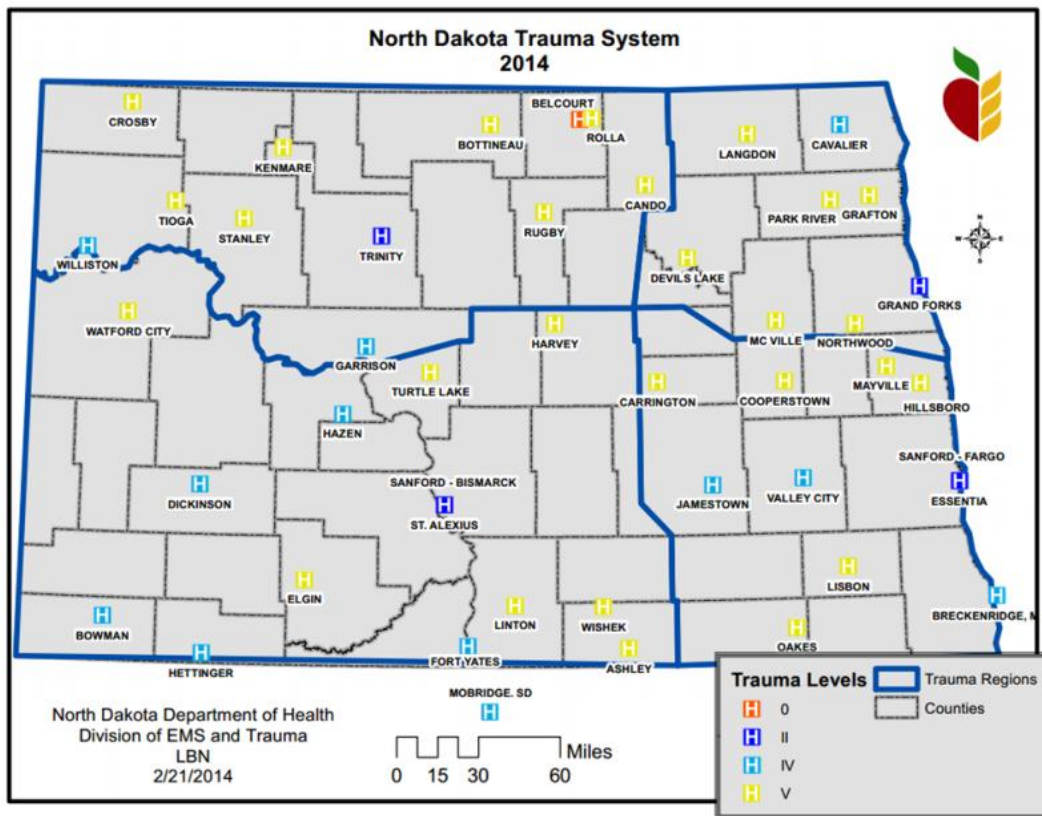
Source: North Dakota Geologic Survey



Source: Gage Cartographics



Source: North Dakota Department of Health



Source: North Dakota Department of Health