

Sierra Club Three Lakes Group **Fall 2014 Newsletter**

Three Lakes Group Officers: Annemarie Askwith; Acting Chair and Treasurer; Roger Blanchard; Secretary; Carol Ward, Forestry; Diane Meyer, Conservation Chair

Fall Program Schedule

Programs will be held at Bayliss Public Library in Sault Ste. Marie, MI.

"Tar Sands: Canada for Sale" Documentary, Thursday, September 11, at 6:30 p.m.

The hour-long film is a cautionary tale for all nations that exploit their natural resources for the global marketplace. With tar sands potentially flowing through our Eastern U.P. pipelines and under the Straits of Mackinac, this film on the Alberta mega-enterprise is informative and relevant. Presently about 2 million barrels/day of oil are produced from the tar sands with ~70% going to the U.S. Probably every gallon of gasoline in this part of the country has some percentage of gasoline made from tar sands oil. The film will be followed by a discussion of tar sands development and possible transport.

Candidates Forum, October 16, at 6:30 p.m

Three Lakes Group is tentatively planning a Candidates Meet and Greet at Bayliss Public Library. Candidates from both parties for state senate and state representative positions have been invited. They will be given a number of questions regarding the environment to address. There will also be time for attendees to meet and speak with the candidates.

At the time of this printing, we are awaiting confirmation from the Republican candidates: Lee Chatfield for State Representative and Wayne Schmidt for State Senate.

Jim Page, Democratic candidate for State Representative, has confirmed that he will attend. Phil Bellfy Democratic candidate for State Senate has a previous commitment for this date.

A film will be shown as an alternate program if there is not enough participation.

Regional Projects We've Been Working On

1) Graymont Mine and land sale proposal:

The Michigan DNR met in Munising in August and tabled a request to sell 13,000 acres of state land in the Eastern U.P. to the Graymont Corporation. The DNR Land review committee, made up of DNR staff requested that the company revise its application to include unspecified information requested by staff. A revised application may require a "start-over" for the whole application. In that event the sale request could take a year or longer to process. The commissioner's office is yet to decide if a re-start is required. Regardless, the land sale will take at least two more DNR Commission meetings in the fastest scenario possible.

2) Enbridge Pipeline

A coalition of northern groups interested in the request by Enbridge to increase flow and pressure in two 63 year old pipes below the Straits Mackinac met in Traverse City in August. The "group of groups" is considering a memorandum of understanding (MOU) to solidify their organization, but the MOU has not been reached. In the meantime the Governor has formed a task force to study the Enbridge request. The Sierra Michigan Chapter has taken a stand that the Governor's task force is simply a way for the governor to keep the issue neutral and invisible through the November election. The chapter, and others have continually pointed to existing state law

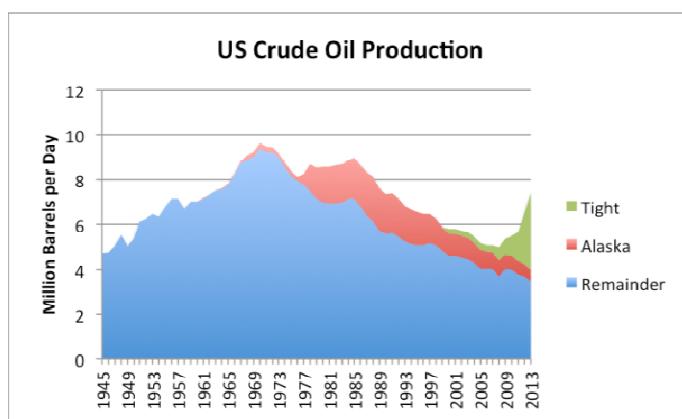
and regulations which could be employed to force Enbridge to either improve the safety of the pipeline or remove it.

3) Wolf Referenda

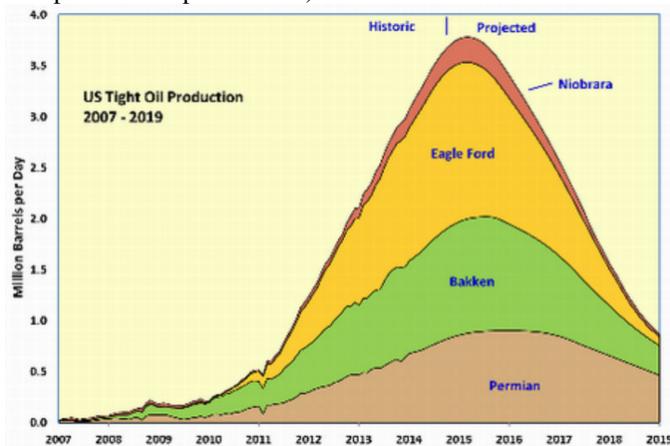
The Michigan legislature, in one of the few actions it took over the summer, approved a law to allow the Michigan DNR to regulate hunting of a number of species including wolves. This essentially negates any power of law in the two approved referendums which will appear on November ballots. One of those propositions is sponsored by the Humane Society and is endorsed by the Michigan Sierra chapter. The other mimics the law passed by the legislature which essentially gives all hunting authority to the governor-appointed DNR commission. Conservation groups will be highlighting the ballot proposals regardless of their affect as they may illuminate public sentiment on the wolf hunt proposal.

U.S. Oil and Gas Production

From media sources you have probably heard about booming U.S. oil production. Essentially all of the increase is due to tight oil, oil produced from fracking, as illustrated in the following figure:



What goes up fast can also go down fast. The following figure is from a recent commentary dealing with tight oil production (<http://peakoilbarrel.com/imminent-peak-us-oil-production/>):



Based upon the graph, peak tight oil production would occur in 2015 and drop to roughly 25% of peak by 2019. Below are two commentaries I've written recently that deal with U.S. oil production.

The Status of U.S. Oil and Gas Production (Spring 2014)

By Roger Blanchard

I find it interesting that many of the individuals expressing the greatest concerns about oil and natural gas supplies are petroleum geologists. The list includes, but is not limited to, Jean LaHerrere, Colin Campbell, Art Berman, Jeremy Leggett, David Hughes and Jeffrey Brown.

Prominent entities expressing the view that there is no problem with oil and gas supplies include media sources, politicians and bureaucrats in organizations like the U.S. Department of Energy. Is it more reasonable to expect experts in petroleum geology to give an honest assessment of petroleum resources or politicians, bureaucrats and media sources who stand to benefit from optimistic pronouncements?

Based upon numerous media reports and statements by politicians you may have the impression that life couldn't be any better for the U.S. oil and gas industry. Production is booming and oil and gas companies are rolling in dough. Fracking has made natural gas very cheap and will soon make oil cheap. Could it be that those reports and statements are not telling the whole story? The petroleum geologists listed above, as well as numerous recent reports that can be found on the Internet, tell a very different story.

According to Art Berman, the vast majority of U.S. oil and gas companies are losing considerable amounts of money on tight oil and shale gas production. He states that the only shale play that has made money is the Bakken shale play of North Dakota.

As an example, Chesapeake Energy, one of the largest natural gas producers in the U.S., lost \$1 billion in 2012 while its total debt increased to \$20 billion. Sales of natural gas only provided Chesapeake with about 23% of their revenues in 2012 while asset sales provide most of the company's revenues. Chesapeake may be an extreme example of an oil and/or gas company that is losing money on tight oil and/or shale gas but most others are losing considerable sums as well.

Many investors are willing to invest large sums of money on energy companies even if those companies are losing money. Rice Energy Inc., a natural gas producer, raised \$900 million in three days recently, \$150 million more than it originally sought. Raising that large sum occurred even though Rice Energy has lost money three years in a row, has drilled fewer than 50 wells and will spend \$4.09 for every \$1 it earns in 2014.

According to Tim Gramatovich, Peritus Asset Management LLC, "There's a lot of Kool-Aid that's being drunk now by investors". Because many investors believe the oil and gas boom is highly lucrative, "People lose their discipline. They stop doing the math. They stop doing the accounting. They're just dreaming the dream, and that's what's happening with the shale boom."

To a large extent, oil and gas companies are using junk bonds to finance the U.S. oil and gas boom. Due to the low interest rate policies of the Federal Reserve in recent years, investors have moved to junk bonds because the possible returns are higher even if the risks are greater.

According to a presentation by Steve Kopits, an energy analyst, major oil companies greatly increased their capital expenditures between 2000 and 2012 (see Figure 1), including on tight oil and shale gas. In spite of that increased investment, their oil production has been declining (see Figure 1). Because of those negative trends, major oil companies have recently decided to cut back significantly on exploration and development until the price of oil increases to at least \$130/barrel. The price of oil, West Texas Intermediate (WTI), is presently a little over \$100/barrel. Reduced exploration and development by major oil companies will accelerate the production decline for the majors.



Listed Oil Majors: Capex and Crude Oil Production

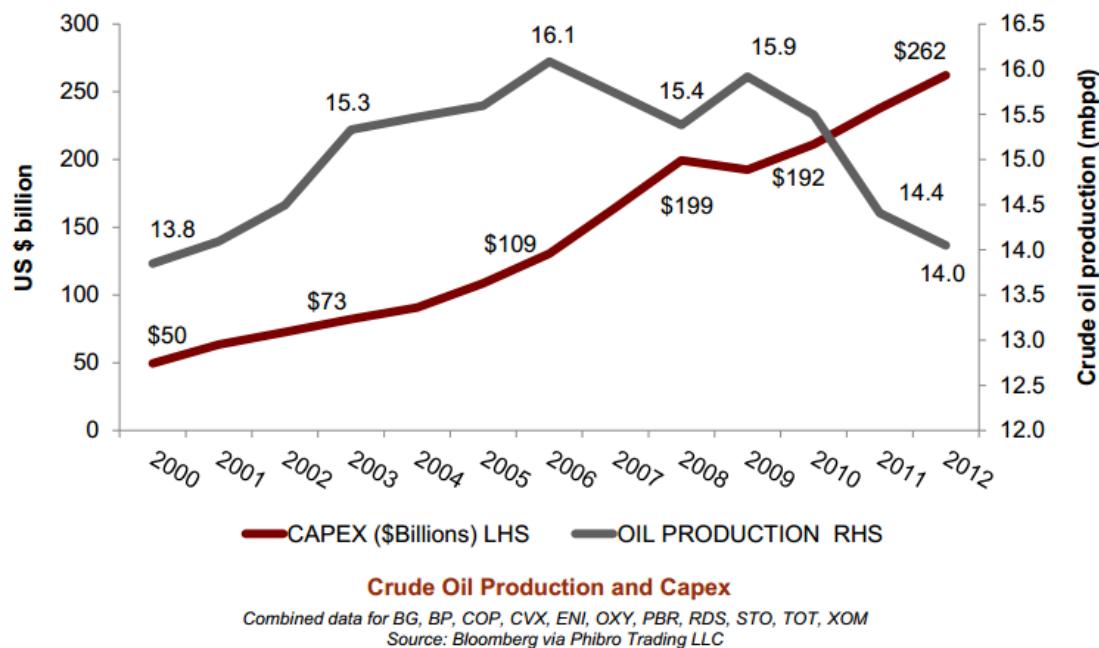


Figure 1

You're probably asking yourself, "if oil and gas companies are losing large sums of money on fracking operations, why do they continue drilling and fracking more wells?" The answer is that the only way they can entice investors to invest in their companies is to highlight their production rates. If their production rates go down, investors may stop investing and the companies could go broke. As Mike Kelly, an energy analyst at Global Hunter Securities in Houston states: "If you're not growing production, you're dying."

In the meantime, the oil and gas industry hopes that the prices of oil and gas go up enough so they can make money at some point in the future. A big question is how long will investors continue to provide money to the oil and gas industry while the industry loses money on fracking operations? "Who can, or will want to, fund the drilling of millions of acres and hundreds of thousands of wells at an ongoing loss?" states Ivan Sandrea, Oxford Institute for Energy Studies in England. "The benevolence of the U.S. capital markets cannot last forever."

"The spending never stops," states Virendra Chauhan, of Energy Aspects in London. That is because the typical tight oil or shale gas well declines more than 50% in the first year of operation. Producers have to keep drilling more and more wells to maintain production. "The whole boom in shale is really a treadmill of capital spending and debt," Chauhan said. "It's a perfect set-up for investors to lose a lot of money," Gramatovich said. "The model is unsustainable."

Gas producers are pushing the idea of natural gas liquefaction for export overseas. The reason they want to export gas is because the price of natural gas in Asia is roughly \$17/mmBtu while in the U.S. the current price is ~\$4.70/mmBtu. Of course if producers export their natural gas, it means the price of natural gas would increase significantly in the U.S.

The reality is that the price of natural gas is likely to rise significantly in coming years even if natural gas is not exported. It's unlikely that you heard anything about it from media sources but the storage level of natural gas in the U.S. dropped 1 trillion cubic feet (TCF) below average in the spring of 2014. On average the storage level drops from ~3.8 TCF at the start of the heating season to around 1.8 TCF at the end of the season. This year it dropped to 0.8 TCF. The elevated decline was due to the cold winter of 2013/2014.

Media sources are so engrossed with telling the public about how natural gas production is booming that they don't want to inform the public of this year's extraordinarily low storage level. As for the booming U.S. natural gas supply, dry gas production increased 0.9% in 2013.

What I expect to happen this year is that as the summer progresses, the storage level will continue to remain much below where it should be. As we go into the next heating season, I expect the price of natural gas to rise significantly to entice gas producers to produce more gas to try and bring the storage level up to where it should be at the start of the heating season.

You won't hear this from any media source but the 3 year decline for fracked oil and gas wells is 80-90%. If U.S. oil and gas producers stopped drilling new wells, production of oil and gas would decline rapidly. In the Bakken and Eagle Ford plays, it takes roughly 2500 new wells a year, in each play, just to keep production flat. In my "Analysis of Well Completion Data for Bakken Region Oil Wells" (<http://www.resilience.org/stories/2013-11-22/analysis-of-well-completion-data-for-bakken-oil-wells>) I showed that about 90% of Bakken oil production in North Dakota comes from 4 counties: McKenzie, Mountrail, Dunn and Williams out of a total of 16 counties in the Bakken region of North Dakota. Average initial production outside of those 4 counties is significantly lower than within the 4 counties. The oil industry is rapidly approaching well saturation within the 4 counties and they will have to resort to drilling outside of the top 4 counties in the near future. I expect that to lead to higher costs and lower production. I've been predicting a Bakken oil production peak in 2014 +/-1 year and I maintain that prediction.

Based upon information from media sources, and even Josh Fox (director of Gasland and Gasland II), the public is given the impression that because shale plays can cover large areas, that means there are huge amounts of oil and gas within each play. Those promoting tight oil and shale gas want the public to think that a shale play is homogeneous and all plays are comparable. The reality is that most oil or gas in a play is extracted from relatively small areas within the play.

In the case of the Marcellus shale play in PA, almost all of the gas comes from small regions in northeast and southwest PA. Almost all of the gas production in the Haynesville shale comes from a small area in the northern part of the play. In spite of the considerable hype concerning the Monterey (California), Sprayberry/Wolfcamp (Texas) and Bone Spring (New Mexico/Texas) shale plays, it appears that they will never produce much oil or gas. Geologists Art Berman and David Hughes, in particular, make the case that the amount of recoverable U.S. tight oil and shale gas being reported by the mainstream media, politicians, etc. are greatly exaggerated. In the case of Art Berman, he makes the case that the amount of recoverable gas in the U.S. is approximately 25 years worth at present rates of extraction rather than the 100 years or more that is often stated in the media.

In the case of David Hughes, he has published detailed reports concerning tight oil plays in which he concludes that plays such as Bakken and Eagle Ford, where the majority of the U.S. tight oil production comes from, have much less recoverable oil than U.S. government reports state and that the Monterey shale, which the U.S. government has reported as having ~13 billion barrels of recoverable oil, will be limited in terms of future oil production (**Since I wrote this, the U.S. Department of Energy/Energy Information Administration downgraded the amount of recoverable oil in the Monterey shale from 13.7 Gb to 0.6 Gb, a 96% downgrade**). Fracking results to date don't provide a reason for optimism in terms of oil extraction in the Monterey shale region.

The oil industry is presently concentrating on the sweet spots within shale plays as they drill about as fast as humanly possible. The sweet spots are rapidly being saturated with wells in plays such as Bakken and Eagle Ford. As oil and gas companies have to drill in less fruitful areas, I expect production to go down and cost's to increase. Jeremy Leggett, a petroleum geologist, recently wrote a book about our oil supply situation. The main point he made is that he expects crunch time for global oil supply to be in the period 2015-2020. I think that's a reasonably expectation because I believe that U.S. production from fracking will be declining within that period and many of the world's giant oil fields that haven't yet started to decline are likely to start declining.

There are analysts such as Gail Tverberg and Nicole Foss who make the case that the global financial system can't handle declining global oil production because oil is such a critical commodity for the system. We'll soon find out if that is the case. Many oil analysts make the case that the need for quantitative easing, ultralow Fed interest rates

and high government deficit spending as well as the slow economic growth we've had in recent years are a result of high oil prices.

Environmentalists like the thought of doing away with fracking. The harsh reality is that that isn't going to happen, irrespective of the environmental problems associated with fracking. Approximately 40% of all U.S. oil and natural gas production now comes from fracked wells. Americans would be up in arms if that production were cut off. Even the vast majority of environmentalists can't live without oil and natural gas, including that which comes from fracking. My impression is that most environmentalists don't see the relationship between their lifestyle, fracking, tarsands development, oil and gas pipelines, offshore oil development, etc.

That's not to say that the environmental consequences of fracking aren't significant. I thought the most important aspect of Gasland II was when drilling technology expert Tony Ingraffea stated that 5% of all well cement jobs fail immediately (cement goes between the well casing and the surrounding rock to prevent the flow of fluids and gas along the outside of the casing). He explicitly stated that the methane contamination in the Dimmock, PA aquifer was due to a bad cement job. It was also stated in Gasland II that based upon industry documents, 50% of all well cement jobs fail within 30 years. I expect that means that most aquifers in shale play regions with fracking wells will ultimately be contaminated.

Analysis of Well Completion Data for Bakken Oil Wells

By Roger Blanchard

The following analysis uses "well completion information" contained in a newspaper called the Bakken Weekly, a paper covering western North Dakota. The Bakken Weekly started providing well completion information for North Dakota counties in the Bakken region in early 2012. The analysis below is for 2012/2013 from the week of April 1, 2012 through the week of Oct. 28, 2013.

Figure 1 is a map of North Dakota counties so that the reader can relate the data below to the counties within North Dakota.

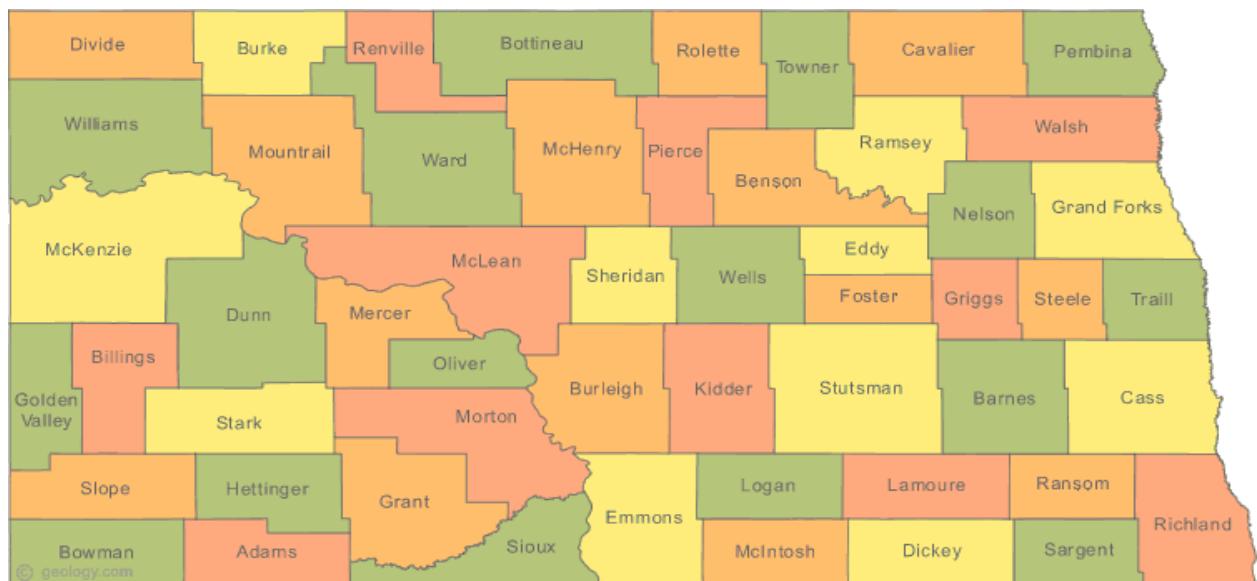


Figure 1-Map of North Dakota

The well completion information in the Bakken Weekly includes initial production data for approximately 50% of wells. I suspect that many wells don't have initial production data because there was little or no initial production, although that is generally not stated. There are a few cases where either 0 b/d is given or it is stated that the well was dry, but that is rare.

A fact that suggests that many of the completed wells don't produce oil is that the sums of well completions in the Bakken Weekly increases significantly more rapidly than the number of producing wells provided by the state of North Dakota. In this analysis, I will assume that initial production was 0 b/d for wells in which initial well production data was not included.

Based upon oil production data from the state of North Dakota, the counties of Dunn, McKenzie, Mountrail and Williams made up 89.0% of the Bakken region oil production in 2013 through August. Based upon well completion data, it's easy to see why oil companies have concentrated on those 4 counties: initial production/well values are considerably higher in those 4 counties compared to the values for other Bakken counties, excluding Stark. Table I contains initial well production data for the 4 main counties based upon all wells drilled within the counties in 2013, through the week of Oct. 28.

Average Initial Well Production for Top 4 Counties

County	Dunn	McKenzie	Mountrail	Williams
Initial production/well (b/d)	658	924	716	643

Table I

Compare the values in Table I with the values for other counties, excluding Stark, contained in Table II.

Average Initial Well Production for other Counties in the Bakken Region

County	Billings	Bottineau	Burke	Divide	Others*
Initial production/well (b/d)	104	53	262	269	60

Table II

*Bowman, Golden Valley, Ward, Renville, McLean, McHenry and Slope counties combined

I combined and separated out Bowman, Golden Valley, Ward, Renville, McLean, McHenry and Slope counties because there have been few wells drilled in those counties. Based upon the initial production/well data, it's not surprising that far fewer wells have been drilled in the counties contained in Table II relative to the 4 main counties.

I did not include Stark County in the tables above because Stark County is unique. Relative to the 4 main counties, not very many wells have been drilled in Stark County. There appears to be an area within the county where wells are quite productive but outside of that area, well production is minimal. Oil companies appear to be delineating where the sweet spot is within Stark County and concentrating on that sweet spot. The average initial production per well in Stark County is 676 b/d in 2013. For all Stark County wells drilled thus far in 2013 through Oct. 28, 28.6% had an initial production >1000 b/d while 44.0% were <300 b/d.

Table III contains data for the percentage of wells that had initial production of >3000 b/d, >2000 b/d, >1000 b/d and <300 b/d in the four main counties.

Percentage of Wells per Initial Well Production Rate for Top 4 Counties

County	Dunn	McKenzie	Mountrail	Williams
>3000 b/d	0.4	4.9	0.4	1.7
>2000 b/d	8.0	15.7	6.1	7.3
>1000 b/d	23.9	29.6	24.9	17.9
<300 b/d	58.8	53.6	50.2	48.3

Table III

The high numerical values for <300 b/d in Table III is largely due to the large number of wells without production data.

The other counties, excluding Stark, have few wells with initial production >1000 b/d and a high percentage of wells that have initial production of <300 b/d (see Table IV):

Percentage of Wells per Initial Well Production Rate for Other Bakken Counties

County	Billings	Bottineau	Burke	Divide	Others*
>1000 b/d	1.5	0.0	3.7	0.9	0.0
<300 b/d	86.3	100	64.8	44.0	95.8

Table IV

Oil companies are high-grading their drilling, drilling in the most favorable locations first. In 2013, McKenzie County has become the prime location to drill as seen in the data of Table V (The number of wells without initial production data are included in Table V):

Well Completion Data for Top 4 Counties

County	Dunn	McKenzie	Mountrail	Williams
Number of well completions in 2013 through week of Oct. 28	524	905	478	480
Number of Wells Without Production Data	291	464	230	218

Table V

I attribute the high drilling rate in McKenzie County to the higher probability that a highly productive well will be drilled there, based upon data in Table III.

Table VI contains the high and low reported initial production rates for the 4 main counties so far in 2013 (This excludes wells for which initial production data was not provided):

High and Low Initial Well Production Rates for Top 4 Counties

County	Dunn	McKenzie	Mountrail	Williams
High Rate (b/d)	4,331	12,248	8,683	4,174
Low Rate (b/d)	53	23	52	23

Table VI

Promoters of the oil industry who claim that production in the Bakken region will continue to increase for many years to come appear to assume that the area outside of the 4 main counties will be as productive as within the 4 main counties. The data above provides compelling evidence that future production outside of the 4 main counties will not be comparable to present production within the 4 main counties. At some point in the not-too-distant future, the 4 main counties will be saturated with oil wells. It's reasonable to assume that production within the 4 main counties will decline fairly rapidly after that point is reached.

The average yearly percent declines for wells in the Bakken region, based upon data in a presentation by geologist David Hughes, Tight Oil: A Solution to U.S. Import Dependence?, given at the Geological Society of America meeting on Oct. 28, 2013, are given in Table VII.

Average Decline Rates for Bakken Oil Wells Based Upon the Hughes Report

Year	% Decline
1	70
2	34
3	23
4	21

Table VII

Based upon the values in Table VII, the rate of drilling in the Bakken region has to be maintained at a high level to prevent a rapid decline in Bakken region oil production. It also means that much of the production from new wells is replacing declining production from older wells.

How does the 2013 data compare to 2012 data? Because the Bakken Weekly does not have well completion information for the early part of 2012, the data in Table VIII for 2012 is from the first week of April through the end of 2012. I've also included data for July-October 2013.

Average Initial Well Production Comparison between 2012 and 2013 for Top 4 Counties

County	Dunn	McKenzie	Mountrail	Williams
Average Initial Well Production 2012 (b/d)	700	928	883	760
Average Initial Well Production in 2013 (b/d)	658	924	716	643
Average Initial Well Production for July-Oct. 2013	680	844	606	677

Table VIII

Another interesting aspect of drilling activity in the Bakken region is that the number of well completions and the sum of initial well production in the Bakken region during the period April-August 2013 has been substantially higher than in the same period of 2012, as seen in Table IX:

Bakken Oil Production Relative to Well Completions and Initial Well Production

Year	2012	2013	Percent Increase
Well Completions (April-August)	868	1,302	50.0
Sum of Initial Well Production in b/d (April-August)	674,207	923,728	37.0
Bakken Oil Production Increase in b/d (August relative to March)*	123,072	125,950	2.3

Table IX

*Data from the State of North Dakota

The data in Table IX indicates that far more effort has been required in 2013, compared to 2012, to obtain a comparable production increase for Bakken region oil production.

Roger

Sierra Club Calendars

The sale of Sierra Club calendars provides funds for the Three Lakes Group. If you would like a calendar or calendars, they can be ordered from Annemarie Askwith at:

askwitha@lighthouse.net

Price: \$12 for wall; \$13 for engagement.
