

Sierra Club Three Lakes Group

Spring 2018 Newsletter

Three Lakes Group Officers: Roger Blanchard; Chair and Secretary, Carol Ward; Vice Chair and Forestry Chair, Jim Page; Treasurer, Mikel Classen; Conservation Chair, Dave Aho; Communications and Internet Technology, Stephanie Aho; Communications, Angela Henley; Outings Chair, Kathy English; Group Representative

Three Lakes Group Spring Programs

Spring programs will be held in Room 207, Crawford Hall, Lake Superior State University at 6:30 pm

Thursday March 29: Invasive Mussel Control: The New Hope by Jack Talcott, chair of the Outdoor Adventure Club at LSSU. This presentation will be on how invasive mussels have been altering the Great Lakes region, what impacts this has had on the ecosystem, and what research is being conducted that might help keep the invasion at bay. Jack will also talk a bit about what the Outdoor Adventure Club is doing.

Thursday April 12: Lake Superior and U.P. Water Trails by Joanie McGuffin, Executive Director of the Lake Superior Watershed Conservancy and long-time Lake Superior paddler and author and Wayne Barry, retired Lansing Community College instructor and community advocate

Ms. McGuffin will highlight LSWC's 5-year project in partnership with Trans Canada Trail to build and connect a 600-mile section of the Lake Superior Water Trail along the Canadian North Shore between Whitefish Bay and Thunder Bay. This connection is part of two superlative trails: 1) [The Great Trail](#), an 18,000 mile ocean to ocean to ocean trail across Canada and 2) The total Lake Superior Water Trail encircling the greatest expanse of freshwater on Earth. This trail has been an opportunity for LSWC to develop partnerships basin-wide for the health and well-being of the Lake Superior watershed.

Mr. Barry's presentation builds on the international aspect of this water trail project. He and his wife Joanne undertook research trips to gather the existing American Lake Superior Water Trail data in Michigan, Wisconsin and Minnesota for LSWC to build the connection between nations and truly make this an international "Appalachian Trail of Water Trails."

Thursday May 24: Immiscible: The Fight Over Line 5 - Every single day, 23 million gallons of oil pump through 64-year-old old pipelines under the largest source of surface freshwater on the planet. The Great Lakes are a delicate ecosystem and a sanctuary to over 40 million citizens who depend on them for their livelihoods, whether they realize it or not. Immiscible: The Fight Over Line 5 explores the growing tension between water activists and big oil companies. The film features interviews from leading organizations in the fight to decommission Enbridge Line 5 in the Straits of Mackinac, members of indigenous communities at risk, concerned residents, as well as Enbridge Energy's public response to this conflict. This film was created by four Michigan State University students (Olivia Dimmer, Daniel Stephens, Austin Torres, & Annette Kim) in the College of Communication Arts & Sciences, Department of Media & Information. A discussion will follow the video.

Fall 2017/Spring 2018 Activities

Our Celebrate the UP event in September 2017 was a great success, and you can watch the recorded sessions and get other information on the event by going to: <http://tlgsierraclub.org/celebrate/>.

Thursday Night Chat

Citizens Meet, 1300 Ryan SSM, MI., Thursday March 15, 5:30-7:00pm. Monthly conversation on timely issues, events, candidates. On March 15, the topic will be: "Dark Money: How our vote matters less." Introduced by Rich Robinson. Please call [906.632.3286](tel:906.632.3286) if attending. Pizza will be served.

Rich has worked throughout his career for the public purpose, beginning nearly 40 years ago as a Peace Corps volunteer in the Philippines. He has worked in local, state and federal government, and for nearly 25 years in the nonprofit sector.

Rich was executive director of the nonprofit, nonpartisan Michigan Campaign Finance Network for the past 16 years, where he conducted research and provided public education on money in Michigan politics. Prior to that he was user services manager for the Center for International Earth Science Information Networks (CIESIN), a nonprofit contractor to NASA's Mission to Planet Earth. CIESIN was responsible for archiving data and applications on the human dimensions of global climate change, and he was responsible for facilitating access to CIESIN's data holdings by a global community of earth scientists. CIESIN has since been absorbed by the Lamont-Doherty Earth Observatory at Columbia University.

Hiawatha Clean-up

This spring we will be having our annual Hiawatha National Forest Cleanup in the St. Ignace District. A date has not been set, but we will be letting people know when that happens. We always need volunteers, so if you are interested in helping out, please email dave.r.aho@gmail.com and I will keep you informed. This is not a Sierra Club Three Lakes Group sponsored event so the Three Lakes Group is not responsible for your safety.

North Country Trail Maintenance

I (Roger) will be having a trail maintenance trip to clean up the North Country Trail from Tahqua Trail to the Lower Falls of the Tahquomenon River in May, probably the second or third weekend. I will probably be going out for a three day period (Friday/Saturday/Sunday). If you are interested in working on the trail, you can contact me at blanchardclimate@gmail.com. This is not a Sierra Club Three Lakes Group sponsored event so the Three Lakes Group is not responsible for your safety.

What we are working on

Bicycle Issues Update - Bike Friendly Soo (BFS) is now a year old. As I remember it, it was sometime in Dec. 2016 that Emily Weber, Ken Miller and I met to discuss forming a group to promote bike infrastructure, bike and pedestrian safety and to ultimately obtain Bicycle Friendly Community status for Sault Ste. Marie. Bicycle Friendly Community status is given when a community meets the 5 E requirements of the League of American Bicyclists. Those 5 E's are: Engineering, education, enforcement, encouragement, and evaluation.

Leadership of the group consists of Emily Weber, Wayne Barry and I. Over the last year, we have met with virtually any person or group that was interested in Sault Ste. Marie bicycling issues. That included the city manager, Downtown Development Authority director, Rotary Club, Community Services Board, MDOT, the Meijer store manager, Officer Daryl Meyette of the Sault Ste. Marie Police Department, and the manager of the International Bridge. Wayne gave PowerPoint presentations to the Rotary Club and Community Services Board. I believe in all of our meetings and events, we were well received.

The Sault Ste. Marie Police Department has been very supportive of what we're doing and we must give special thanks to Captain Larsen. The Police Department sent Officer Meyette to a bicycle safety training program so he can provide safety training to school groups within Sault Ste. Marie.

We provided bike literature at the LSSU Gear Swap, Sault Ultimate Paddle, Sault Ste. Marie Farmers Market, Sault Arts Festival, Lakerpalooza, Downtown Days, Octoberfest, and the Arts and Crafts Fair at the junior high. We sold Bike Friendly Soo t-shirts and/or bike streamers at various events that permitted sales. Emily was the creative force for making the streamers.

Pro Sports provided the bike literature and printed the t-shirts. Dave and Kenny have been strong supporters of BFS. Lakerpalooza is an event at LSSU to introduce students to various university, city and regional groups. We provided bicycle information to well over 100 students at the event.

BFS participated in a UP 4 Health event promoted by the Building Healthy Communities Coalition and the SsSMART Group at the Farmers Market in June along with a Yoga and Tia Chi demonstration. Also, a stationary trainer was set up and bike streamers sold. The event earned \$1858.00 dollars for repairs and maintenance on the Lynn Trail.

We created a Bike Route Guide for Sault Ste. Marie that was published in late summer. Joann Barry was instrumental in making the maps for the guide and Rich Robinson was instrumental in writing descriptions for the routes and determining route distances. Bike route guides were funded by the Building a Healthier Community Coalition and we're grateful for their support and funding. Guides were distributed to many tourist-related entities in town. We will get them out early in this coming spring for the biking season.

Bike lanes were added to Easterday Ave. by the university and the newly paved 4th Ave. west of the Recycling Center. We have been working with the city manager and Downtown Development Authority director on possible bike lanes on city streets in the future. I think there is a good possibility that bike lanes will be added to multiple streets in town within the next few years.

Along with possible bike lanes on roads within Sault Ste. Marie, the Power Canal Trail will be constructed next summer. Based upon the crowdfunding effort associated with the trail, which brought in over \$60,000, there is strong public support for the trail. BFS got \$1000 together to donate to the Power Canal Trail. I think that will be a tremendous addition to the city.

BFS establishing non-profit status through Chippewa County Community Foundation.

Besides the efforts of Emily, Wayne and I, we were blessed to have a great deal of help from Jen Parks, Mary Jill Leonhardt, Joann Barry, Rich Robinson and Joe Gallagher.

From my perspective, our objective should be to try and make Sault Ste. Marie the most pleasant and livable city possible. Making Sault Ste. Marie bike and pedestrian friendly is an important aspect of making the city pleasant and livable. In the coming year, we will have a Bike Route Guide for the Eastern U.P. We are also planning a Bike Rodeo and at some point, possibly a bicycle safety training program through the League of American Bicyclists. We need to have someone certified through the League's safety training program to obtain Bicycle Friendly Community status.

Graymont Limestone Mine Update - Trout Lake Township received notice that the DEQ granted Graymont permits to drill five (5) wells for monitoring the flow and quality of the water in the immediate area. More exploration related to the 'wells' is needed.

What's going on with oil and natural gas Resources

The World Oil Supply is Infinite: I Know That Because I Believe It

By Roger Blanchard

Earth scientists have been making the case for years that the present level of human activity is not sustainable. We're rapidly depleting resources, degrading ecosystems, altering the atmosphere, etc. What earth scientists are saying is generally not covered by the mainstream media, or is sugar coated, because the mainstream media is an outlet for the corporate perspective on the world.

As an example, in 2016 global crude oil + condensate production (typically used to define oil-this does not include natural gas liquids, biofuels, or other hydrocarbon liquids) was 29.4 billion barrels. Cumulative world oil production at the end of 2017 will be around 1.36 trillion barrels (1,360 billion barrels). Since WWII, approximately 95% of the cumulative total global oil production has been produced (See Figure 1 by Jean Laherrere-the top brown line represents global oil production).

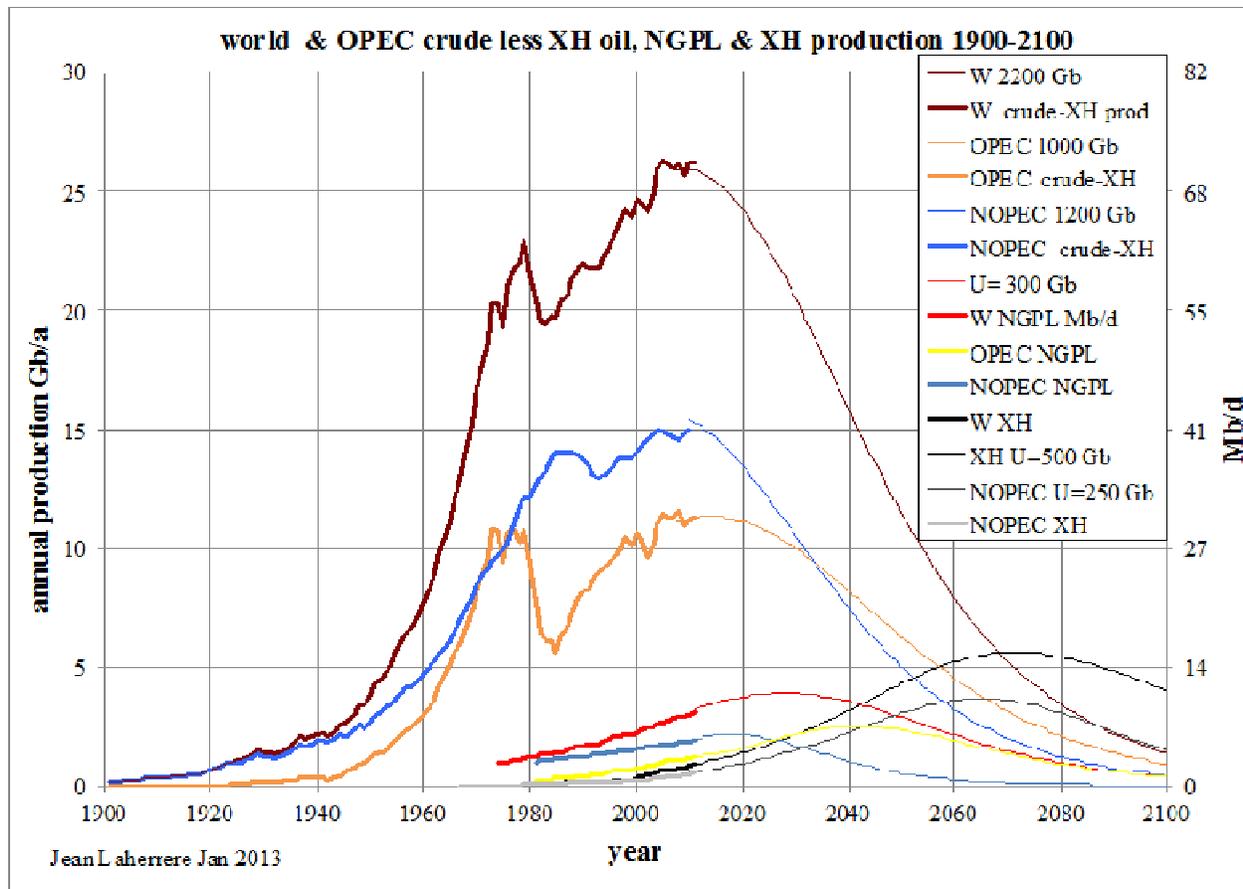


Figure 1

Jean Laherrere, an international petroleum geologist with over 50 years of experience, had estimated ultimate recoverable oil, excluding extra heavy oil, at approximately 2.2 trillion barrels back in 2013. It's a good bet that the ultimate recovery of **economically** recoverable oil will be less than 3 trillion barrels. At the clip we're burning oil, we could go through a significant percentage of the remaining economically recoverable oil in the next 20 years.

Ugo Bardi makes the case that the actual oil production curve will look more like Figure 2.

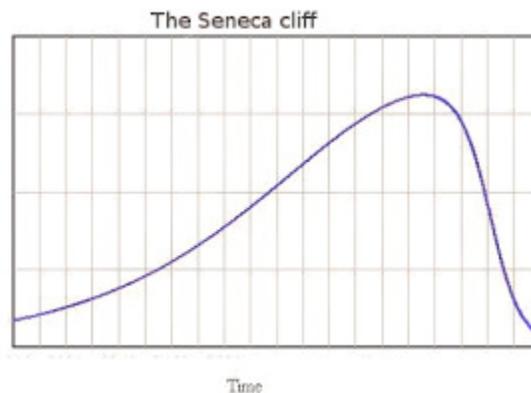


Figure 2

Ugo is the author of a Club of Rome produced report titled "Extracted" that reiterated the earlier conclusions of the Club of Rome in their "Limits to Growth" report of 1972. Ugo concludes that the problem of depletion is real and that it is progressively getting worse.

In recent years, the rate of global oil discovery has been running less than 1/5th the rate of global oil consumption (Figure 3). It appears that the 2017 discovery rate will be around 1/10th of the consumption rate. The most favorable geologic areas for oil have now been extensively explored so there isn't that much oil left to find.

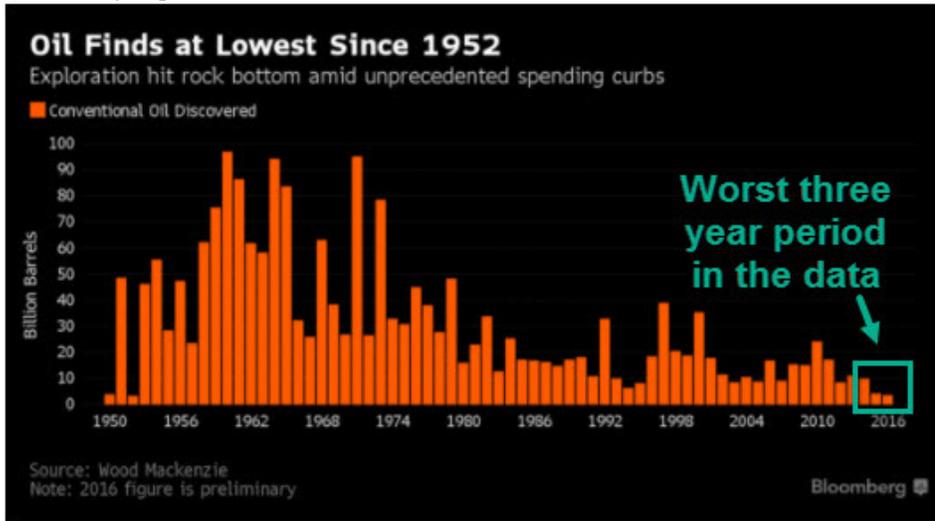


Figure 3

About 95% of transportation fuel is oil distillates. It's common to hear that electric vehicles are going to take over the motor vehicle market sometime soon and eliminate much of the demand for oil in the not-to-distant future.

In spite of those claims which have been made for some years now, global oil consumption has risen at a rate of nearly 1 million barrels/day (mb/d) per year on average from 2000-2017. The U.S. Department of Energy/Energy Information Administration (US DOE/EIA) is predicting that global petroleum consumption (this includes all hydrocarbon liquids) will increase ~1.6 mb/d in 2018. In the U.S., petroleum consumption in the first half of 2017 was the highest since 2007 at around 20.2 mb/d or ~7.4 billion barrels/year.

The argument for the takeover of the motor vehicle market by electric vehicles ignores the fact that the energy per unit mass of presently used lithium ion batteries in electric vehicles is less than 1/50th that of gasoline or diesel fuel. Possibly there will be some improvement in lithium ion batteries in the future but not by a factor remotely close to 50. The much higher energy per unit mass for gasoline and diesel fuel provides a significant advantage for gasoline and diesel over lithium ion batteries, particularly in terms of hauling, towing and long-distance driving.

To compensate for the low energy per unit mass of lithium ion batteries in motor vehicles, exotic light weigh, and expensive, materials are used in electric vehicles. For that reason, electric vehicles are expensive to make.

At present, auto companies subsidize the cost of electric vehicles through the sale of gasoline and diesel fueled vehicles. If they sell electric vehicles in large quantities, the subsidy would have to be removed so auto companies could make money on those sales. The federal government also presently provides a \$7,500 tax credit to electric vehicle purchases although there has been talk of eliminating the tax credit by the current administration.

Americans were quite happy when the price of oil went down significantly in late 2014. There were several reasons for the decline in the price of oil. One was the rapid development of fracking in U.S. A second reason was the large increase of oil production in Iraq, from 2.412 mb/d in 2010 to 4.464 mb/d in 2016 according to US DOE/EIA data.

U.S. oil production from fracking increased by 3.933 mb/d from 2010 to 2015 (US DOE/EIA). The increase from 2010 to 2015 was achieved through intensive development of several key oil plays most importantly the Bakken Shale (North Dakota/Montana), Eagle Ford Shale (Texas), Permian Basin (Texas/New Mexico), Niobrara Shale (Colorado/Wyoming) and Anadarko Basin (Oklahoma/Texas).

The top 3 producing regions for fracked oil are Permian Basin, Eagle Ford and Bakken. They are significantly more productive than Niobrara and Anadarko. The Permian Basin is now the hot play with a rapid production increase occurring.

When the price of oil went down in late 2014, the rate of drilling decreased which provides an argument for the production declines in Bakken and Eagle Ford after their peaks in late 2014/early 2015. The price decline was indeed a factor but in the Bakken region of North Dakota, there were 2,817 more producing wells, as of Dec. 2017, than there were in Dec. 2014. Oil companies didn't stop drilling and completing wells although they built up an inventory of over 900 wells that were uncompleted and 713 still await completion as of Nov. 2017. The sweet spots of Bakken and Eagle Ford have now been fairly extensively drilled which creates a problem for future production.

It's easy to assume that the Bakken Shale has truly huge quantities of oil based upon the extensive area of the play (see Figure 4) and the production results within the sweet spot.



Figure 4

The problem is that about 90% of Bakken oil production in North Dakota comes from 4 counties out of the 16 in the Bakken region of North Dakota. Those 4 counties are where the sweet spot is located. Drilling outside of the sweet spot results in significantly lower oil production. From my experience, many of the wells in the sweet spot have initial production values over 1,000 b/d whereas outside of the sweet spot, initial production values are often less than 100 b/d.

For the period 2008-2017, total Bakken Shale oil production in North Dakota was 2.32 billion barrels. Art Berman, a petroleum geologist with decades of experience in the U.S. oil and gas industry, has estimated the economically recoverable amount of oil from Bakken, including Montana, to be approximately 5 billion barrels. The amount of oil produced from the North Dakota Bakken play over the last 10 years is approaching half of 5 billion barrels.

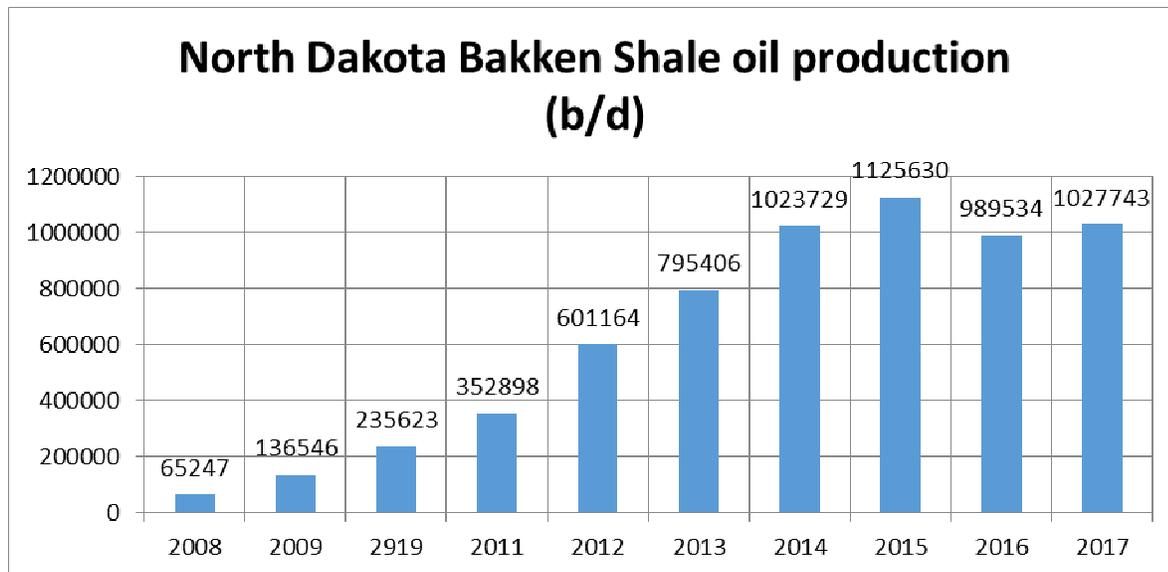


Figure 5

For the period 2008-2017, total Eagle Ford Shale oil production was 1.94 billion barrels (That's preliminary because I don't have Dec data yet) (See Figure 6). Art Berman has estimated the economically recoverable amount of oil from Eagle Ford to be approximately 5 billion barrels. The amount of oil produced in the last 10 years is approaching 40% of 5 billion barrels.

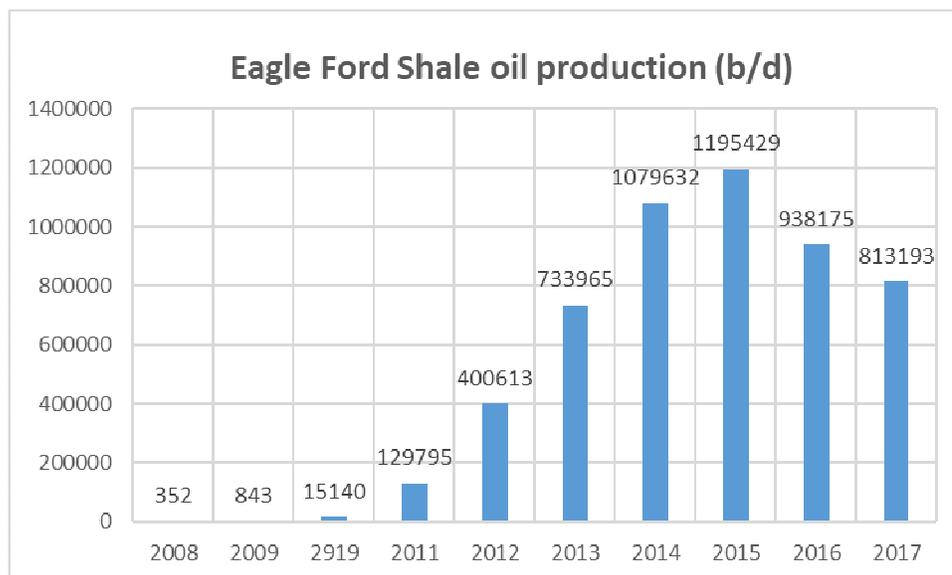


Figure 6

Production from fracked wells generally declines by 80-90% by the end of the 3rd year of production. That means to maintain or increase production, new wells must be drilled at a fairly rapid pace.

The Barnett Shale region (mostly gas) illustrates what happens with intensive development in a shale play. Barnett was an early intensively fracked shale region in Texas. Figure 7 Is a graph of Barnett Shale gas production versus time.

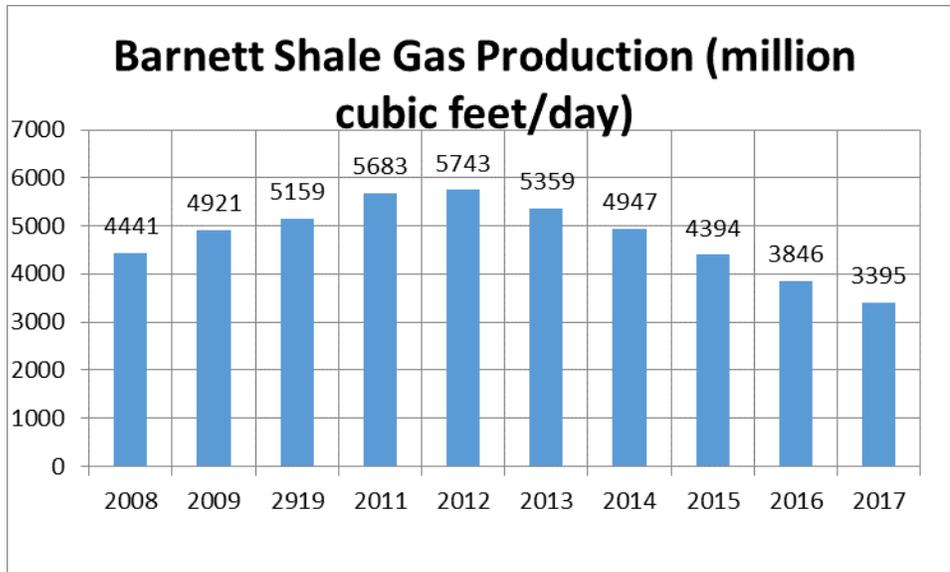


Figure 7

*The value for 2017 is for Jan.-Sept.

In 2008, there were 194 rigs drilling in the Barnett Shale. In 2016, there were periods with no drilling rigs because the region had been drilled to the point of saturation. Since 2012, natural gas production from the Barnett Shale has declined by over 40% and will likely continue to decline.

Here is what Wikipedia says about the Barnett Shale region:

As of 2007, some experts suggested that the Barnett Shale might have the largest producible reserves of any onshore [natural gas field](#) in the [United States](#).^[1] The field is thought to have 2.5×10^{12} cu ft (71 km³) of recoverable natural gas, and 30×10^{12} cu ft (850 km³) of natural gas in place.^[1]

The point here is that the Barnett Shale is not an insignificant source of natural gas for the U.S. With intense development of shale oil and natural gas plays, it typically takes less than 10 years from initial production to the time of peak production. Art Berman has expressed the opinion that it's unlikely that there will be shale plays that aren't presently producing oil and/or gas in the U.S. that will produce significant quantities of oil and gas in the future.

In the initial boom of fracked shale oil production, there was a lot of hype about the quantity of oil available through fracking. The mainstream media made it sound like the quantity was nearly infinite, if not infinite. Then oil production from shale plays declined and the media went silent for several years. With the recent increase in oil production from shale plays, media sources are again making it sound like the volume of oil from shale plays is, if not infinite, at least huge.

The media are assuming that high flow rates translate into huge volumes of oil, many tens or hundreds of billions of barrels. What the oil companies are doing in the shale plays is extracting the oil that exists as rapidly as humanly possible. The objective of the oil executives is to make their millions or billions of dollars before they're pushing up daisies. There isn't a lot of thought about the long-term consequences.

Based upon results from Barnett, Bakken, and Eagle Ford, economically recoverable oil and gas is far from infinite. The Permian Basin is now experiencing extremely intensive development which will lead to the peaking of production in the not-too-distant future. Fracking will be a relatively short-term phenomenon in the U.S. As Art Berman says, "fracking is a retirement party for petroleum geologists in the U.S."

The current administration is doing everything possible to open all federal areas closed to oil development in the U.S. The reality is that most federal areas closed to oil development do not have the geology required to produce large quantities of oil.

One of the more favorable areas geologically that was opened during the Obama administration is the National Petroleum Reserve-Alaska (NPRA). Here is an excerpt from an article in 2011 about the NPRA (NPR is west of the Prudhoe Bay region):

Reporting from Washington — President Obama will open Alaska's national petroleum reserve to new drilling, as part of a broad plan aimed at blunting criticism that he is not doing enough to address rising energy prices.

The plan, unveiled in Obama's weekly radio address Saturday, also would fast-track environmental assessment of petroleum exploration in some portions of the Atlantic and extend the leases of oil companies whose work in the Gulf of Mexico and the Arctic Ocean was interrupted by the drilling moratorium after last year's BP oil spill.

Here is what is stated on Wikipedia concerning the NPRA:

An assessment by the [United States Geological Survey \(USGS\)](#) in 2010 estimated that the amount of oil yet to be discovered in the NPRA is only one-tenth of what was believed to be there in the previous assessment, completed in 2002.^[3] The 2010 USGS estimate says the NPRA contains approximately "896 million barrels of conventional, undiscovered oil".^[3] The reason for the decrease is because of new exploratory drilling, which showed that many areas that were believed to hold oil actually hold natural gas. As of October 2012, a total of 1,374,583 acres (556,274 ha) have been leased; 872,125 acres (352,936 ha) in the Northeast region, and 502,458 acres (203,338 ha) in the Northwest region.^[13]

Little, or no, new oil has been produced from the NPRA. Even if the USGS says there is 896 million barrels (mb) of oil, that doesn't mean it's economically extractable. Alaska is now producing about 25% of what it was producing at its peak in the late 1980s (~0.5 mb/d vs 2.1 mb/d) in spite of many new fields brought on-line and new areas opened for oil development. With the passage of the recent tax bill, the Arctic National Wildlife Refuge (ANWR) has been opened for oil development (ANWR is east of the Prudhoe Bay region). It is probably the last significant area in the U.S. that is geologically favorable for oil left in the U.S. I heard a comment on the radio recently that ANWR contains 19 Gb (billion barrels) of oil. A common tactic of proponents of oil drilling is to greatly exaggerate how much oil is in a region to make it appear too appealing to pass up. In reality, the best that could be hoped for is maybe 3-4 Gb. There is a good possibility that there is considerably less than 3-4 Gb of economically recoverable oil in ANWR.

Americans appear to believe that they are entitled to cheap and abundant oil and that the cheap and abundant oil will last forever. Cheap and abundant oil will go on until it can't go on. Even the largest oil fields ultimately decline. As an example, the largest oil complex in the western world is the Cantarell Complex in Mexico (Estimated Ultimate Recovery, EUR, ~20 Gb). In 2004 it was producing 2.1 mb/d. Cantarell is presently producing approximately 250,000 b/d (~12% of maximum production) as it rapidly declines.

The Prudhoe Bay oil field (Alaska) is the largest field ever discovered in the U.S. (EUR ~12 Gb). In 1988 it was producing 1.6 mb/d. In 2016, it produced ~0.23 mb/d (14.4% of maximum production) as it continues to decline. The large fields in the North Sea such as Brent, Piper, Forties, Statfjord, Oseberg, Gullfaks and many more show the same tendency to decline. The largest fields in the Middle East like Ghawar (EUR ~120 Gb) and Burgan (EUR ~70 Gb) are showing signs of strain from decades of intensive pumping.

Are there not moral issues when it comes to using finite natural resources? If there are, we should consider the morality of how we are rapidly consuming our finite oil resources. Future generations may look at our rampant use of oil much differently than we do.

Below is an essay by George Monbiot in which he relates consumer consumption with the diminishment of the earth. Consumption is also directly relatable to CO2 emissions.

Everything Must Go

Economic growth will destroy everything. There's no way of greening it – we need a new system.

By George Monbiot, published in the Guardian 22nd November 2017

Everyone wants everything – how is that going to work? The promise of economic growth is that the poor can live like the rich and the rich can live like the oligarchs. But already we are bursting through the physical limits of the planet that sustains us. Climate breakdown, soil loss, the collapse of habitats and species, the sea of plastic, [insectageddon](#): all are driven by rising consumption. The promise of private luxury for everyone cannot be met: neither the physical nor the ecological space exists.

But growth must go on: this is everywhere the political imperative. And we must adjust our tastes accordingly. In the name of autonomy and choice, marketing uses the latest findings in neuroscience to break down our defences. Those who seek to resist must, like the Simple Lifers in *Brave New World*, be silenced – in this case by the media. With every generation, the baseline of normalised consumption shifts. Thirty years ago, it was ridiculous to buy bottled water, where tap water is clean and abundant. Today, worldwide, we use [a million plastic bottles a minute](#).

Every Friday is a Black Friday, every Christmas a more garish [festival of destruction](#). Among the [snow saunas](#), [portable watermelon coolers](#) and [smart phones for dogs](#) with which we are urged to fill our lives, my #extremecivilisation prize now goes to [the PancakeBot](#): a 3-D batter printer that allows you to eat the Mona Lisa or the Taj Mahal or your dog's bottom every morning. In practice, it will clog up your kitchen for a week until you decide you don't have room for it. For junk like this we're trashing the living planet, and our own prospects of survival. Everything must go.

The ancillary promise is that, through green consumerism, we can reconcile perpetual growth with planetary survival. But a [series of research papers](#) reveal that there is [no significant difference](#) between the ecological footprints of people who care about their impacts and people who don't. [One recent article](#), published in the journal *Environment and Behaviour*, finds that those who identify themselves as conscious consumers use more energy and carbon than those who do not.

Why? Because, environmental awareness tends to be higher among wealthy people. It is not attitudes that govern our impacts on the planet, but income. The richer we are, the bigger our footprint, regardless of our good intentions. Those who see themselves as green consumers, the paper found, “mainly focus on behaviours that have relatively small benefits.”

I know people who recycle meticulously, save their plastic bags, carefully measure the water in their kettles, then take their holidays in the Caribbean, cancelling their environmental savings 100-fold. I've come to believe that the recycling licences their long-haul flights. It persuades people they've gone green, enabling them to overlook their greater impacts.

None of this means that we should not try to reduce our impacts, but we should be aware of the limits of the exercise. Our behaviour within the system cannot change the outcomes of the system. It is the system that needs to change.

[Research by Oxfam](#) suggests that the world's richest 1% (if your household has an income of £70,000 or more, [this means you](#)) produce around 175 times as much carbon as the poorest 10%. How, in a world in which everyone is supposed to aspire to high incomes, can we avoid turning the Earth, on which all prosperity depends, into a dust ball?

By decoupling, the economists tell us: detaching economic growth from our use of materials. So how well is this going? [A paper in the journal PlosOne](#) finds that while in some countries relative decoupling has occurred, “no country has achieved absolute decoupling during the past 50 years.” What this means is that the amount of materials and energy associated with each increment of GDP might decline, but, as growth outpaces efficiency, the total use of resources keeps rising. More importantly, the paper reveals that, in the long term, both absolute and relative decoupling from the use of essential resources is impossible, because of the physical limits of efficiency.

A global growth rate of 3% means that the size of the world economy [doubles every 24 years](#). This is why environmental crises are accelerating at such a rate. Yet the plan is to ensure that it doubles and doubles again, and keeps doubling in perpetuity. In seeking to defend the living world from the maelstrom of destruction, we might believe we are fighting

corporations and governments and the general foolishness of humankind. But they are all proxies for the real issue: perpetual growth on a planet that is not growing.

Those [who justify this system](#) insist that economic growth is essential for the relief of poverty. But [a paper in the World Economic Review](#) finds that the poorest 60% of the world's people receive only 5% of the additional income generated by rising GDP. As a result, \$111 of growth is required for every \$1 reduction in poverty. This is why, on current trends, it would take 200 years to ensure that everyone receives \$5 a day. By this point, average per capita income will have reached \$1m a year, and the economy will be 175 times bigger than it is today. This is not a formula for poverty relief. It is [a formula for the destruction](#) of everything and everyone.

When you hear that something makes economic sense, this means it makes the opposite of common sense. Those sensible men and women who run the world's treasuries and central banks, who see an indefinite rise in consumption as normal and necessary, are beserkers, smashing through the wonders of the living world, destroying the prosperity of future generations to sustain a set of figures that bear ever less relation to general welfare.

Green consumerism, material decoupling, sustainable growth: all are illusions, designed to justify an economic model that is driving us to catastrophe. The current system, based on private luxury and public squalor, will immiserate us all: under this model, luxury and deprivation are one beast with two heads.

We need a different system, rooted not in economic abstractions but in physical realities, that establish the parameters by which we judge its health. We need to build a world in which growth is unnecessary, a world of [private sufficiency and public luxury](#). And we must do it before catastrophe forces our hand.

Climate by the Numbers

The following was written on January 2:

Much is being made in the U.S. media concerning the extremely cold temperatures we've been having in the middle to eastern U.S. lately. There is a flip side to those cold temperatures. The far north of North America was exceeding warm relative to their 1971-2000 averages during December 2017. Prudhoe Bay averaged 19.06 F above its 1971-2000 average for December, Iqaluit, Nunnuvut was 12.45 F above its 1971-2000 average and Nome, Alaska was 12.97 F above its 1971-2000 average. Cold air has pushed down from the Arctic into the middle and eastern U.S.

Table I contained temperature deviation values (°F) for selected locations in December 2017, for the year 2017 and for the 2010-2017 period relative to 1971-2000 averages:

Time Frame	Prudhoe Bay, Alaska		Moosonee, Ontario	Nome, Alaska	Churchill, Manitoba
Dec. 2017	+19.06		-3.03	+12.97	+0.32
2017	+6.84		+2.14	+2.19	+2.41
2010-2017	+4.27		+2.77	+1.48	+3.12
Time Frame	Iqaluit, Nunn.	Goose Bay, NFL	Yellowknife, NWT	Sault Ste. Marie, MI	Hibbing, MN
Dec. 2017	+12.45	+5.61	+5.16	-4.29	-3.26
2017	+3.19	+1.60	+3.11	+3.61	-1.01
2010-2017	+2.85	+2.37	+3.12	+2.85	+6.2

Table I

For Sault Ste. Marie, it was the 7th warmest year on record dating back to 1890. Table II contains the top 7 warmest years on record in Sault Ste. Marie.

Year	Average Yearly Temperature (°F)
2012	45.71
1998	45.52

2016	44.91
2010	44.77
1931	44.28
2006	43.82
2017	43.80

Table II

December 2017 was the first month since April 2016 in which the monthly average was below the 1971-2000 average for Sault Ste. Marie.

I heard Karl Bohnac on the radio January 1 say that Sault Ste. Marie was 5.4°F above the long-term average. He was using the 1981-2010 average rather than the 1971-2000 average that I used. The National Weather Service updates the long-term average every 10 years so when you hear a temperature compared to the long-term average, that average will be 1981-2010 until we get to 2021.

In Feb. 2015, the average temperature here in Sault Ste. Marie was 2.92 F. The average temperature in Prudhoe Bay for December was 5.68 F.

Scanning through my data, I find 8 monthly averages in Sault Ste. Marie below the Prudhoe Bay average in December. The lowest monthly average in Sault Ste. Marie was 0.2 F in January 1912 (A bit nippy). There were many monthly averages that are only slightly above the Prudhoe Bay average for December. The Prudhoe Bay 1971-2000 average for December was - 13.39 F. Prudhoe Bay was 15.50 F above the 1971-2000 average in November so they have had 2 exceedingly warm months relative to the 1971-2000 averages.

Table III has average temperature data per decade from 1890-2017 for Sault Ste. Marie:

Decade	Average Temperture (°F)
1890-1899	39.47
1900-1909	39.86
1910-1919	39.40
1920-1929	39.56
1930-1939	40.84
1940-1949	40.36
1950-1959	40.23
1960-1969	39.86
1970-1979	39.77
1980-1989	40.18
1990-1999	40.85
2000-2009	42.14
2010-2017	43.04

Table III

Web Page and Facebook

We're on the Web and Facebook. The addresses are:

<http://tlgsierraclub.org/>

<https://www.facebook.com/ThreeLakesGroupOfSierraClub?ref=bookmarks>

Please take a look at what we have online. We'll try to supply material regularly to these sites. Feel free to contact us with questions, concerns and suggestions.

If you would like to attend Three Lakes Group meetings, send me an e-mail at:

blanchardclimate@gmail.com

and I will put you on the list.