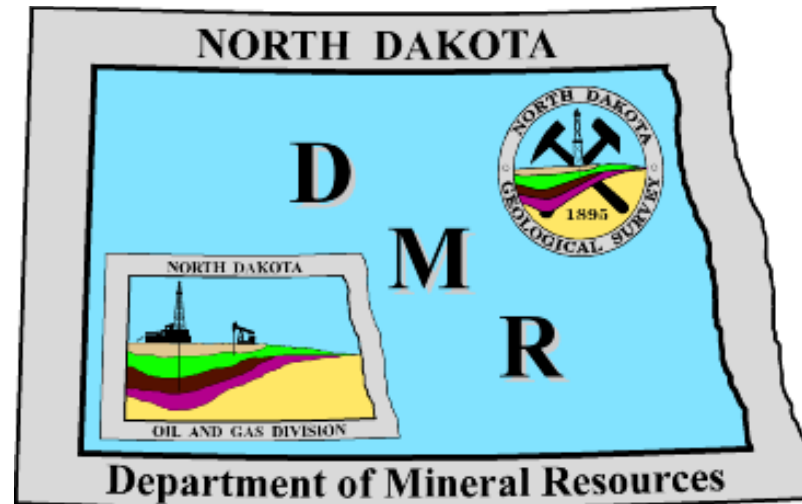


North Dakota Department of Mineral Resources



<http://www.oilgas.nd.gov>

<http://www.state.nd.us/ndgs>

***600 East Boulevard Ave. - Dept 405
Bismarck, ND 58505-0840
(701) 328-8020 (701) 328-8000***

Wells

13,004 active

2,106 conventional

10,898 Bakken/Three Forks

1,442 inactive

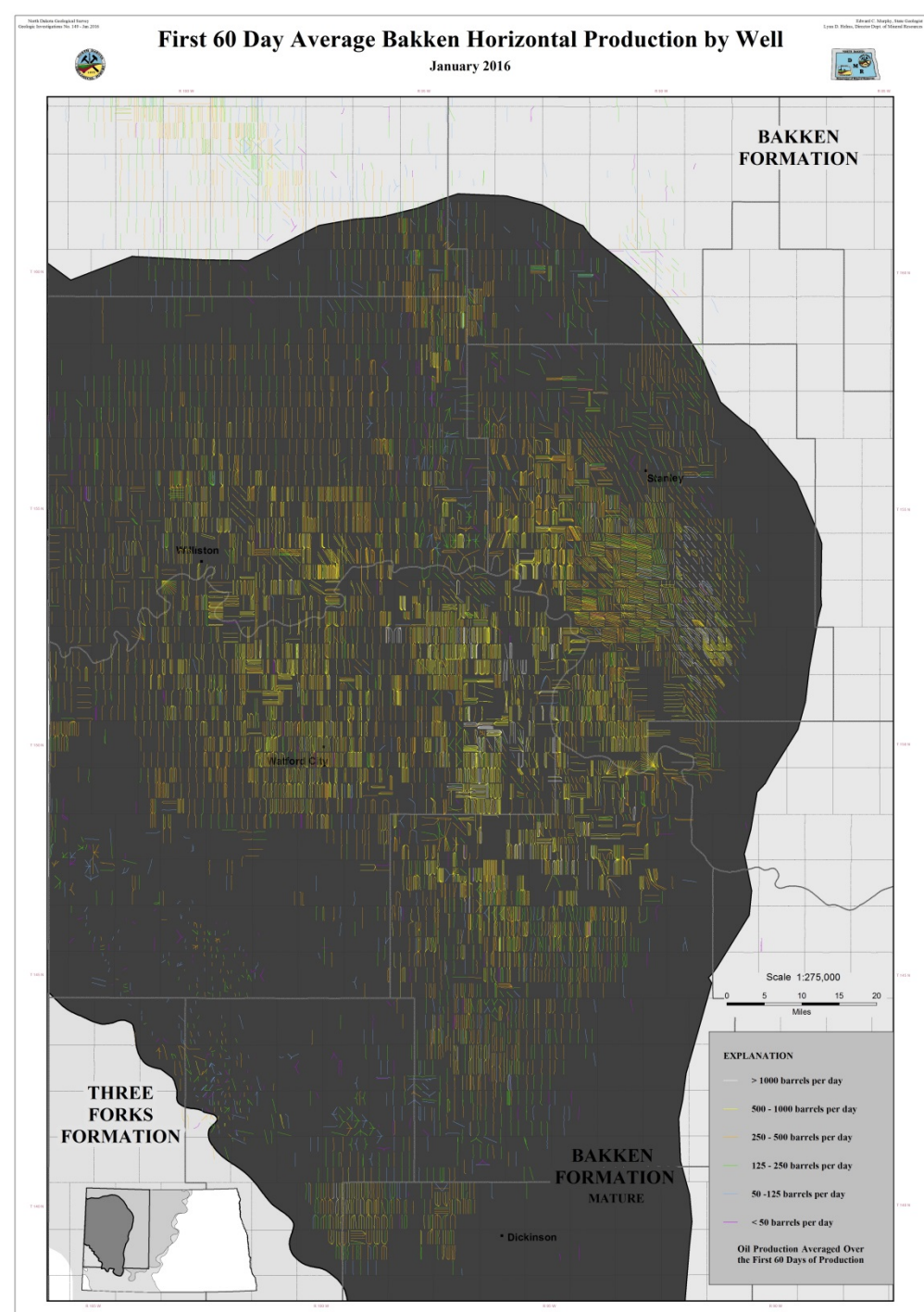
909 waiting on completion

1,984 permitted

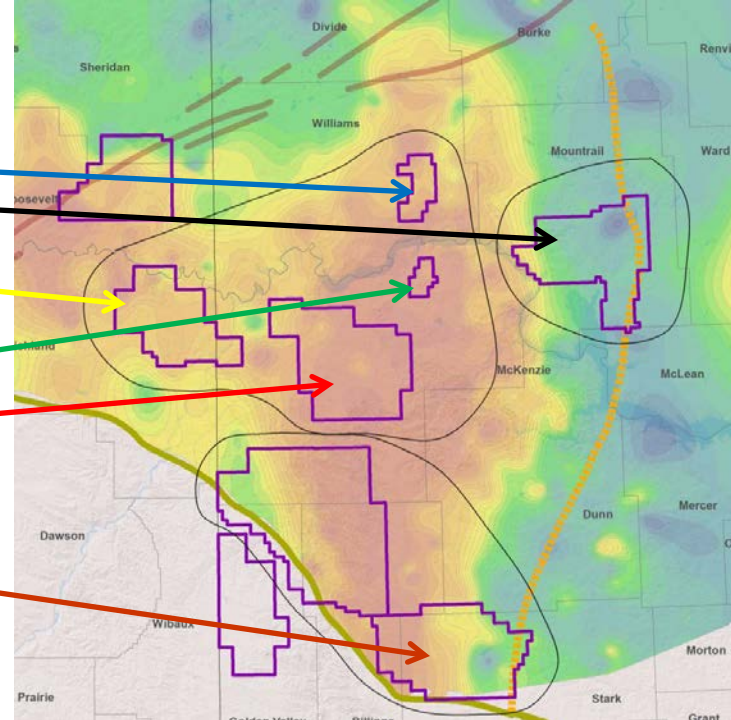
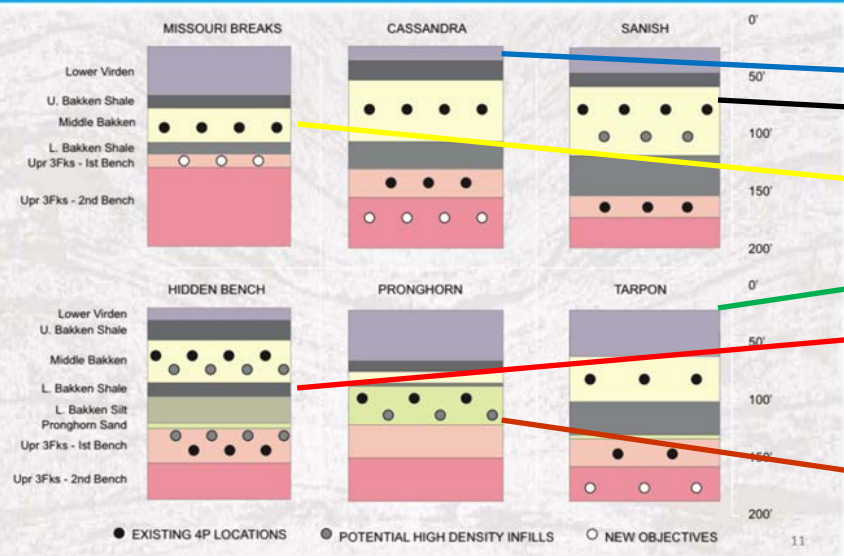
13,374 increased density approved

30,713 total

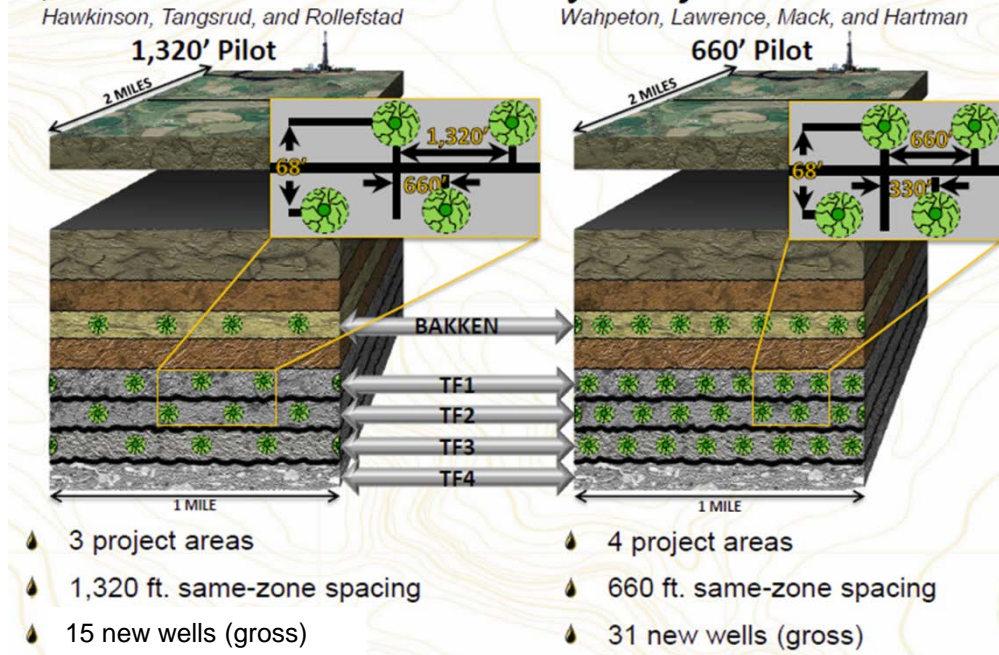
55,000-65,000 estimated ultimate



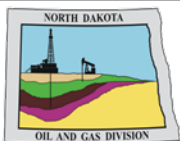
Williston Basin Primary and Prospective Drilling Plan by Area



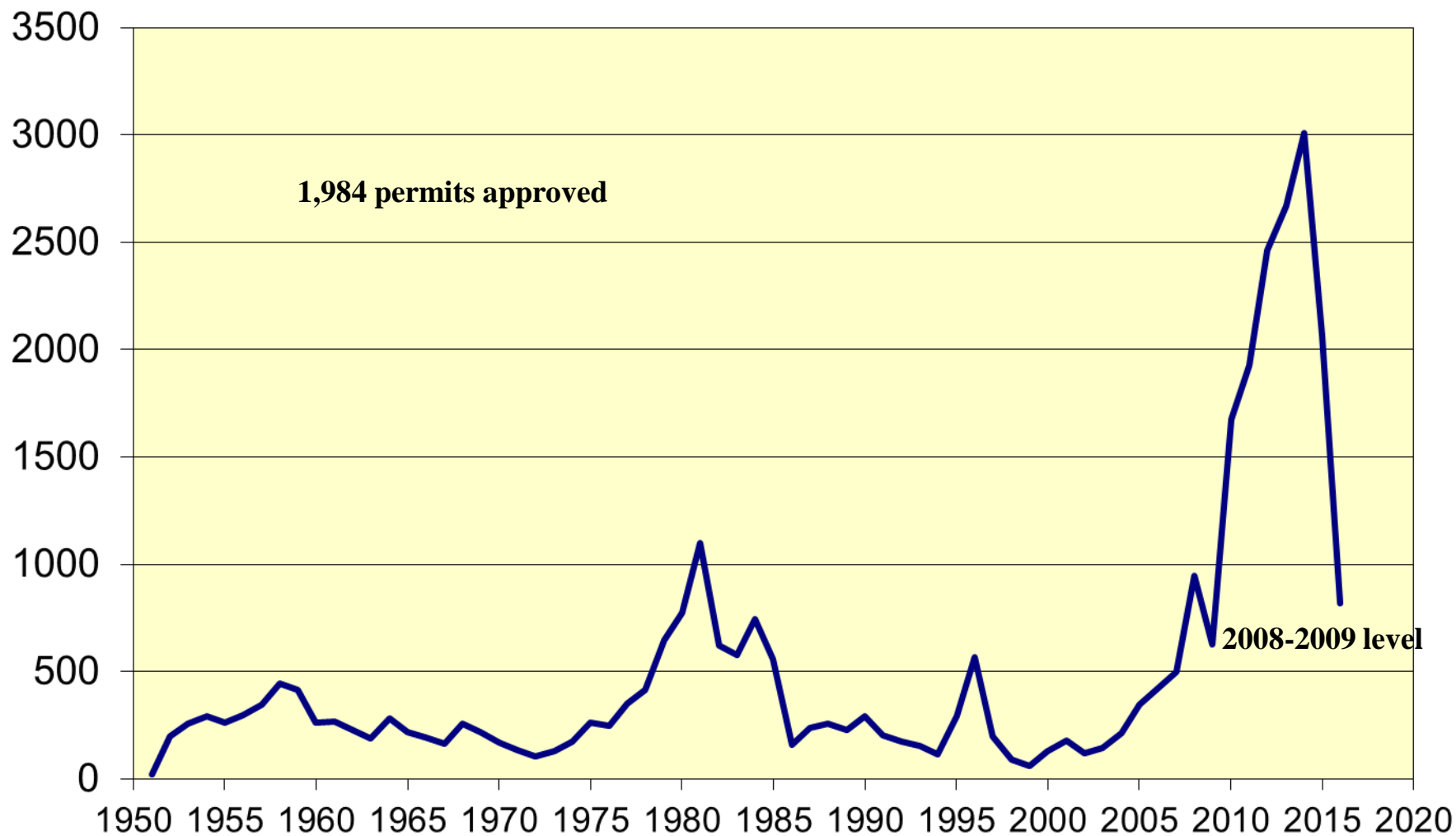
1,320' & 660' Pilot Density Projects: 2013-14

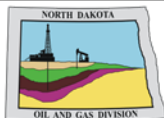


55,000-65,000 wells

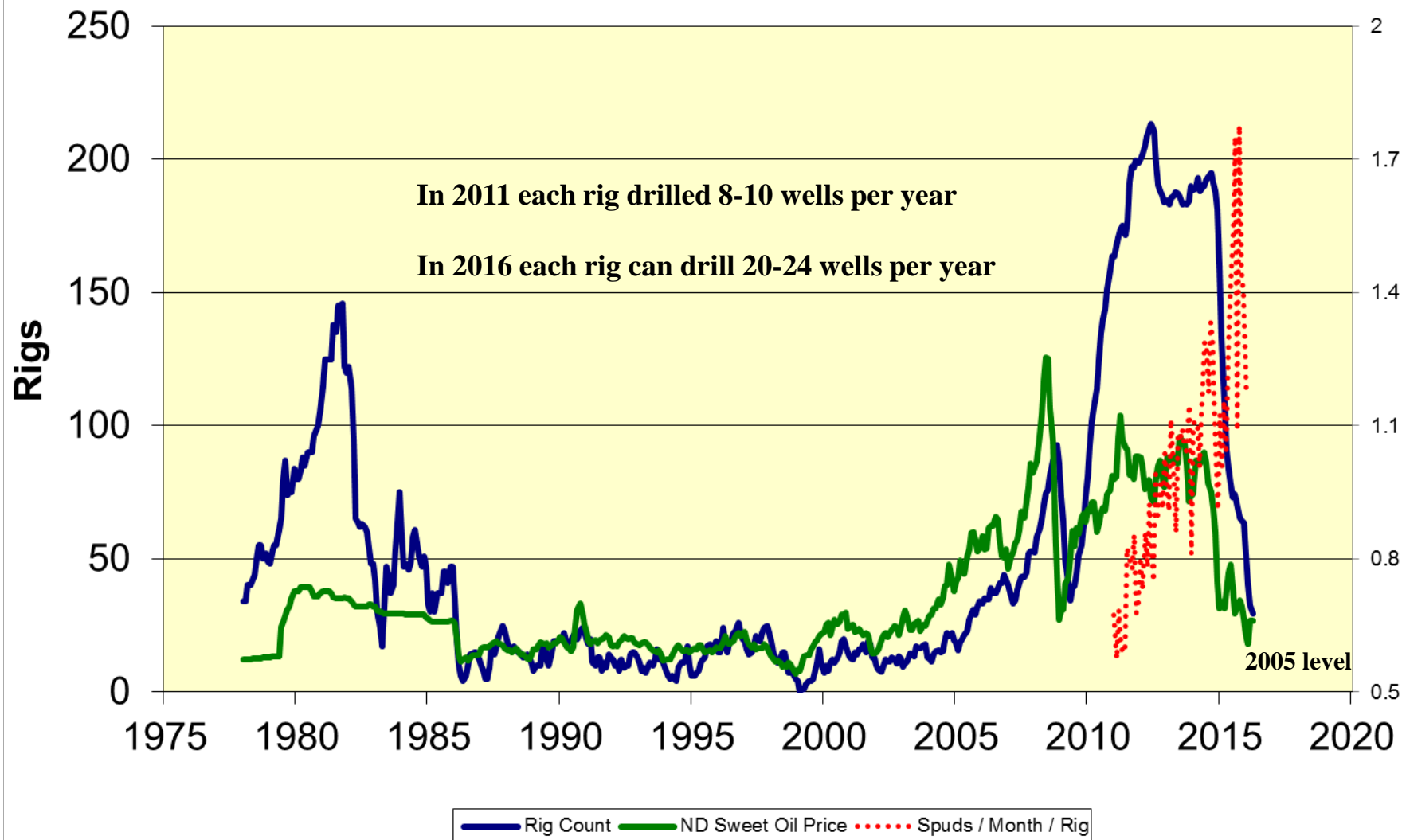


North Dakota New Well Permits Issued

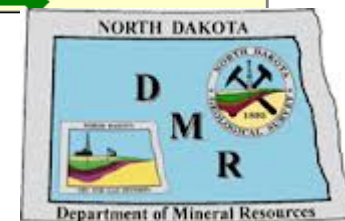
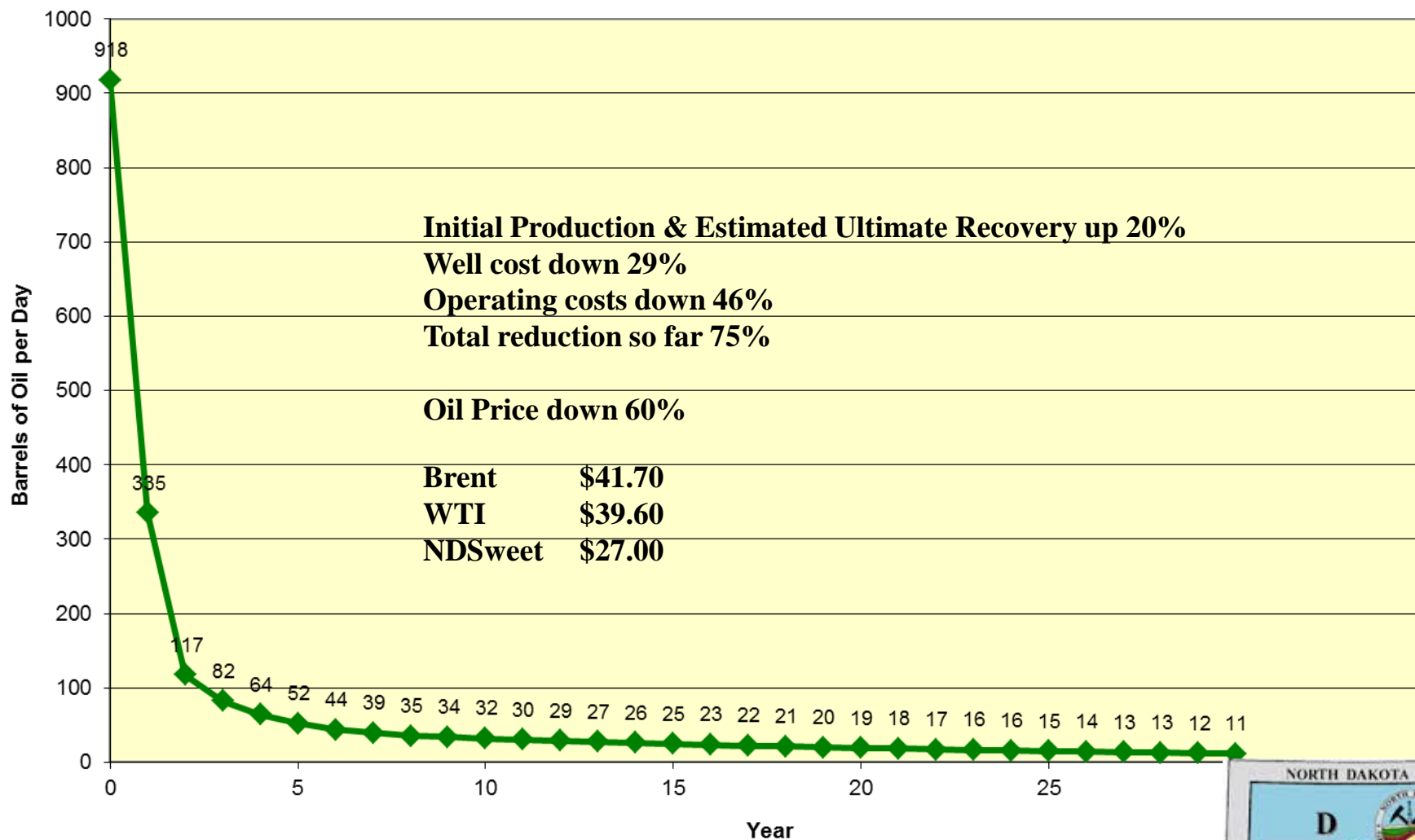


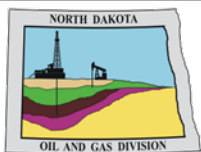


North Dakota Average Monthly Rig Count

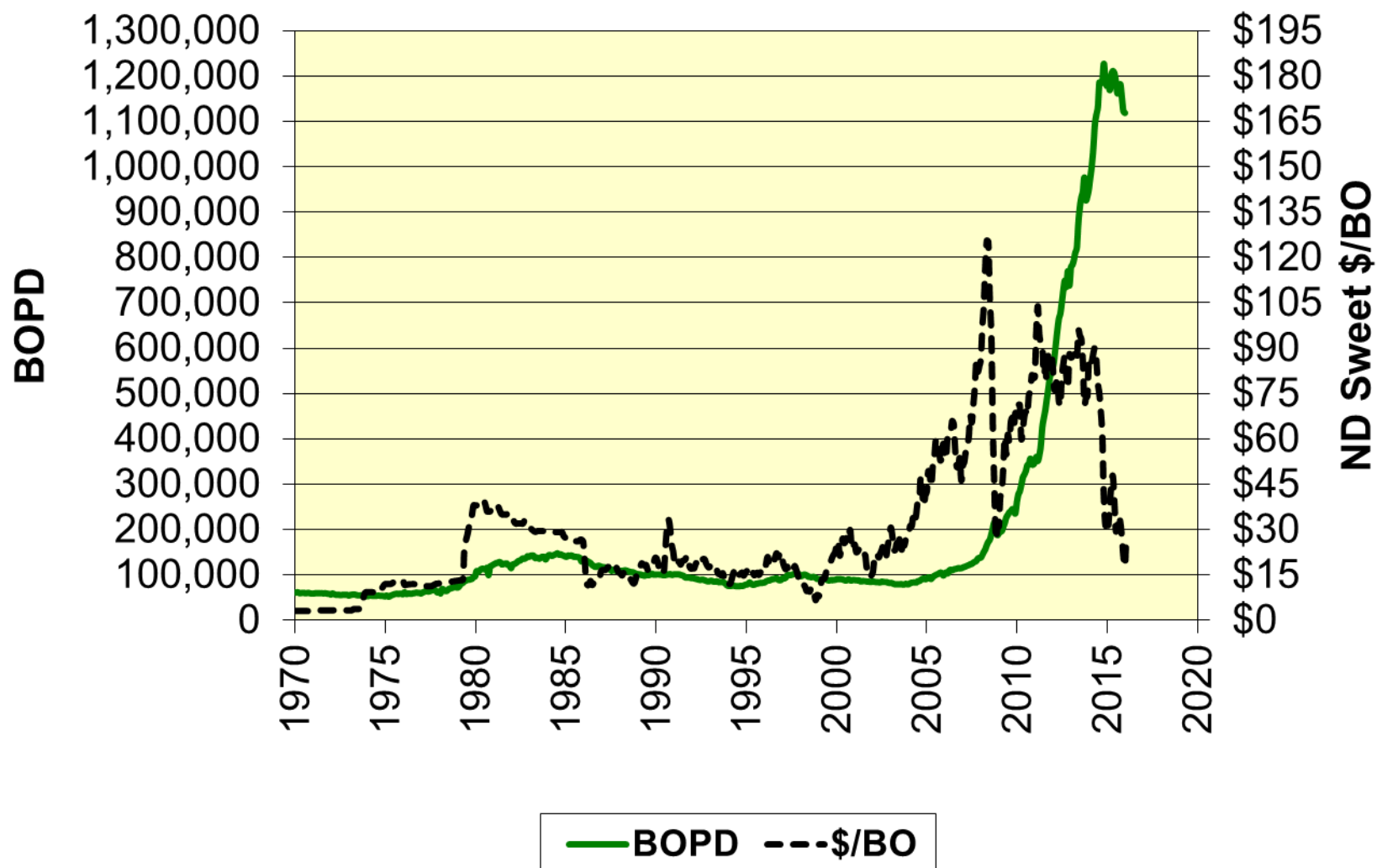


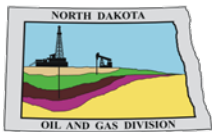
Typical Bakken Well Production



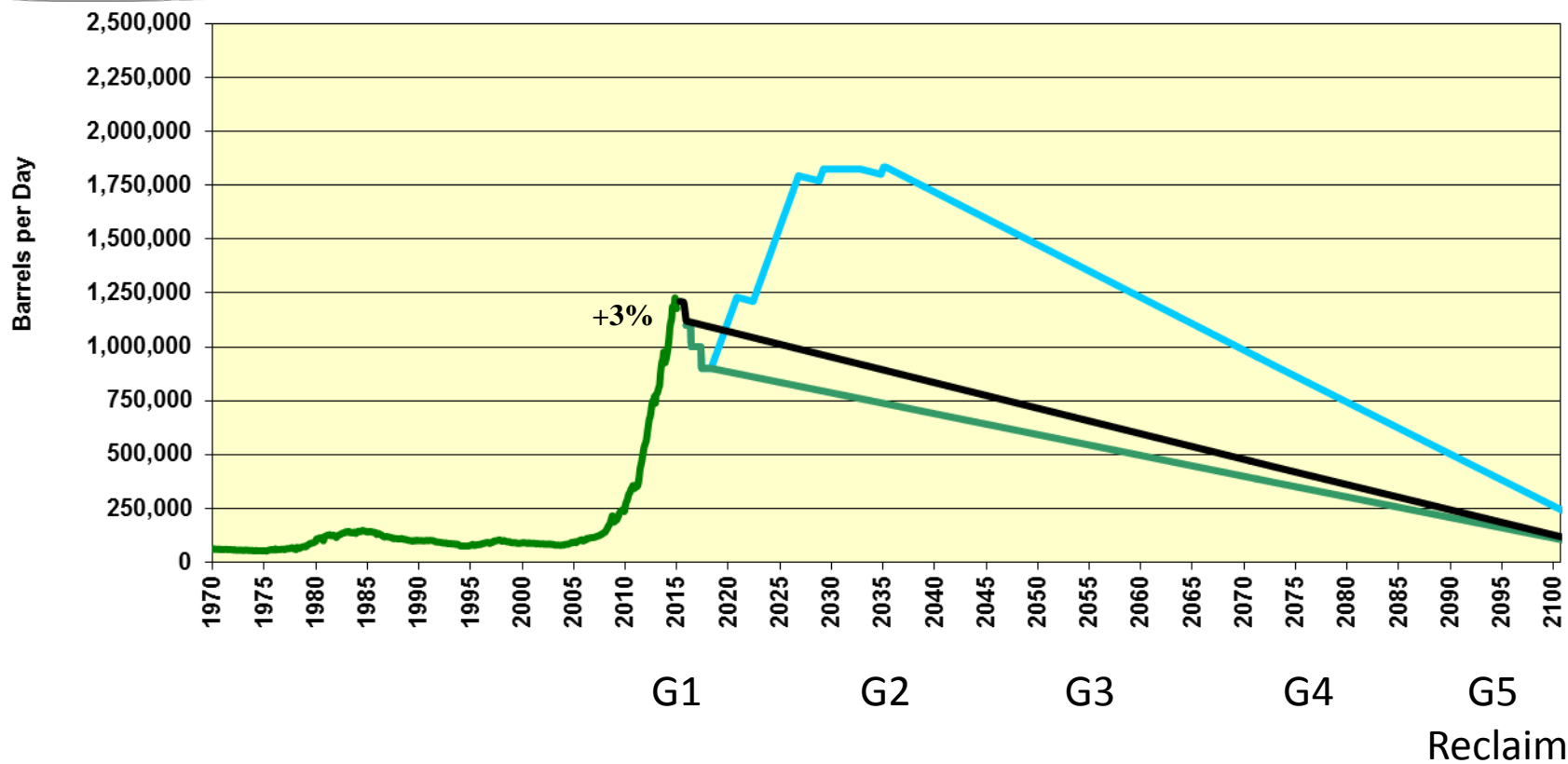


North Dakota Daily Oil Produced and Price





North Dakota Oil Production



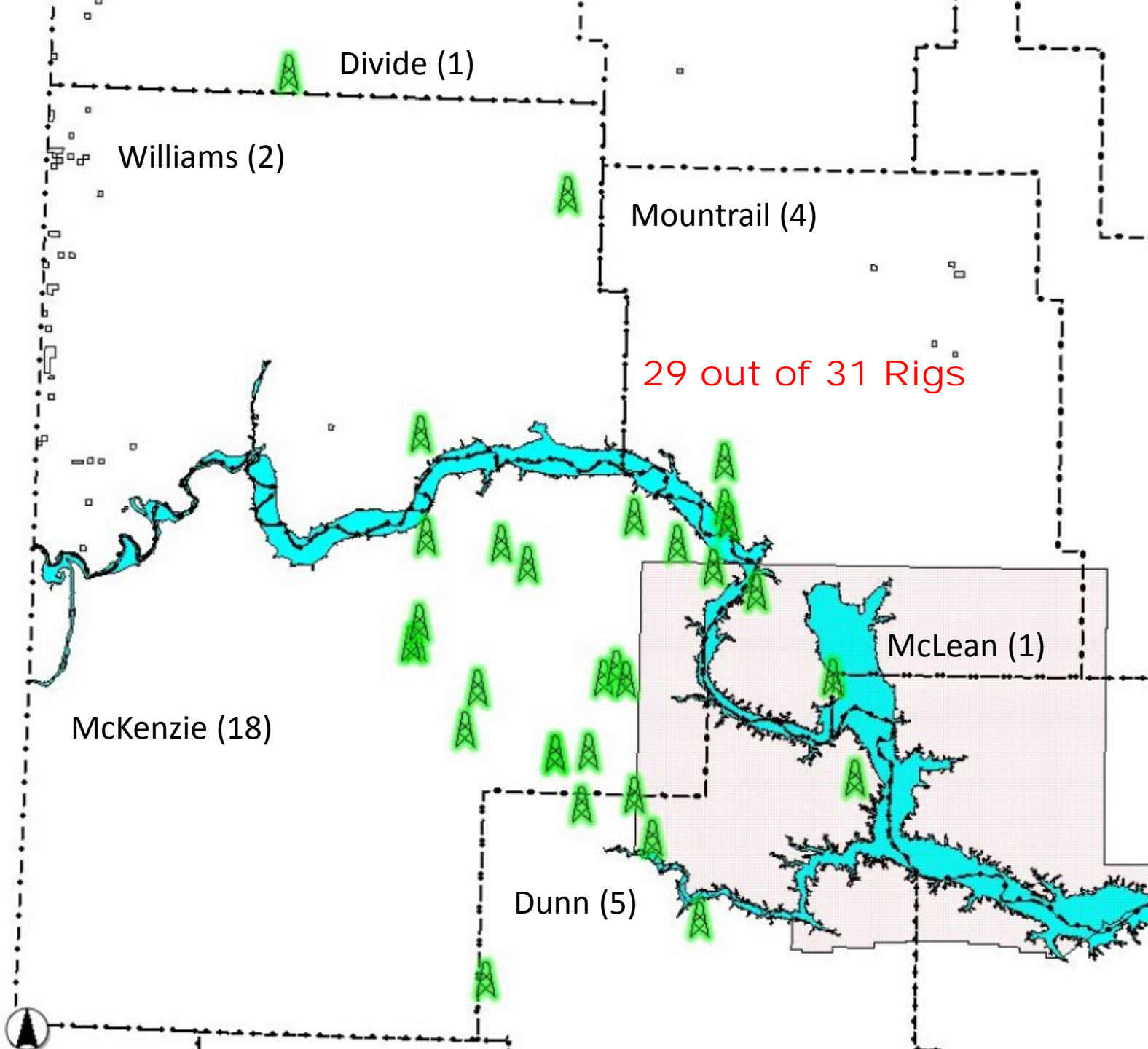
EOR? +++

History Peak Production Estimate Current ND Revenue Estimate Current Production Limited-No Drilling



North Dakota Oil Production and Price





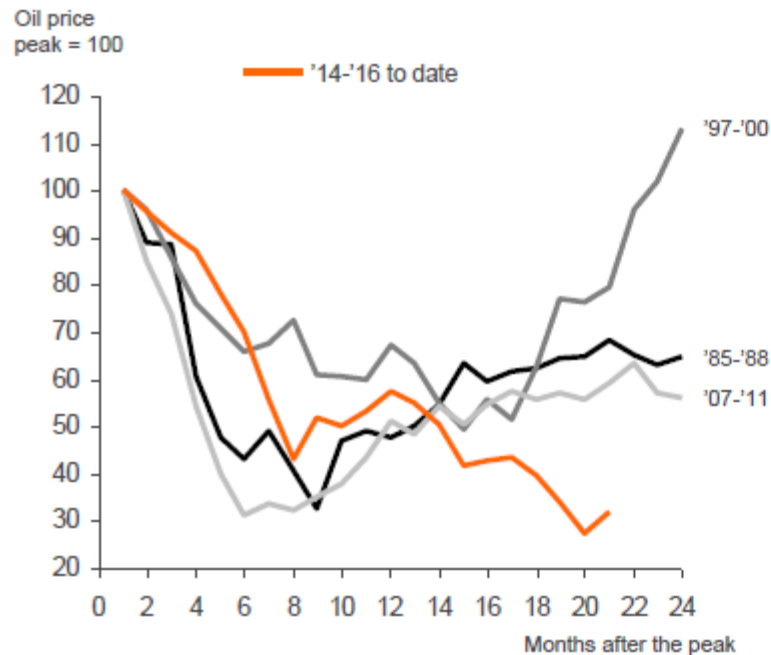
	4Q 2015			
April-16	Breakeven		Wells	
\$32	ND\$/barrel	Rigs	Dec 2015	NC
Billings	\$41	0	643	6
Bot-Ren	\$95	0	1,033	3
Bow-Slp	\$100	0	543	0
Burke	\$120	0	628	5
Divide	\$94	1	782	6
Dunn	\$22	5	1,889	129
Golden Valley	\$68	0	103	0
McKenzie	\$31	18	3,900	354
McLean	\$25	1	59	6
Mountrail	\$53	4	2,592	209
Stark	\$42	0	273	8
Williams	\$43	2	2,384	183
Statewide	\$40	31	14,862	909

			2015								2016								2017					
	Breakeven		Wells	Frac	Wells					Semi	Wells	Frac	Wells	MMGal					Semi	Wells	Frac	Wells	MMGal	
\$20-\$30 / barrel	ND\$/barrel	Rigs	Active	Crews	NC	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD		
Billings	\$36	0	511	0	5	16,081	Billings	0	0	511	0	5	0	13,267	Billings	0	0	511	0	5	0	10,945		
Bot-Ren	\$85	1	773	0	6	8,532	Bot-Ren	1	1,063	783	0	6	23	7,131	Bot-Ren	0	0	783	0	6	0	5,883		
Bow-Slp	\$100	1	559	0	2	21,208	Bow-Slp	1	1,063	569	0	2	23	17,816	Bow-Slp	0	0	569	0	2	0	14,698		
Burke	\$100	1	532	0	4	14,820	Burke	1	1,063	542	0	4	23	12,461	Burke	0	0	542	0	4	0	10,280		
Divide	\$80	5	718	1	43	40,398	Divide	1	2,125	731	0	50	31	33,950	Divide	0	0	736	0	45	12	28,201		
Dunn	\$27	12	1,689	9	91	199,278	Dunn	10	21,250	1,864	5	120	403	181,439	Dunn	10	21,250	2,109	8	115	564	169,361		
Golden Valley	\$65	0	93	0	0	2,308	Golden Valley	0	0	93	0	0	0	1,904	Golden Valley	0	0	93	0	0	0	1,571		
McKenzie	\$33	35	3,246	19	326	437,317	McKenzie	16	34,000	3,548	9	350	696	394,398	McKenzie	19	40,375	4,009	14	345	1,060	367,651		
McLean	\$25	0	42	0	2	2,778	McLean	1	2,125	62	1	2	47	3,405	McLean	1	2,125	86	1	2	55	3,889		
Mountrail	\$46	14	2,359	7	183	249,195	Mountrail	0	0	2,352	0	190	0	204,976	Mountrail	0	0	2,357	0	185	12	169,465		
Stark	\$42	1	236	0	2	16,282	Stark	0	0	236	0	2	0	13,432	Stark	0	0	236	0	2	0	11,082		
Williams	\$44	15	2,071	14	182	202,831	Williams	0	0	2,063	0	190	0	166,689	Williams	0	0	2,068	0	185	12	137,852		
Statewide	\$40	85	12,864	51	846	1,211,328	Statewide	30	62,688	13,356	16	921	1,131	1,050,869	Statewide	30	63,750	14,101	23	896	1,714	930,878		
	Breakeven		Wells	Frac	Wells					Semi	Wells	Frac	Wells	MMGal					Semi	Wells	Frac	Wells	MMGal	
\$30-\$40 / barrel	ND\$/barrel	Rigs	Active	Crews	NC	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD		
Billings	\$36	0	508	0	5	16,082	Billings	1	2,125	528	1	5	47	13,801	Billings	1	2,125	552	1	5	55	11,903		
Bot-Ren	\$85	1	772	0	6	8,531	Bot-Ren	1	1,063	782	0	6	23	7,131	Bot-Ren	0	0	782	0	6	0	5,883		
Bow-Slp	\$100	1	559	0	2	21,208	Bow-Slp	1	1,063	569	0	2	23	17,816	Bow-Slp	0	0	569	0	2	0	14,698		
Burke	\$100	1	532	0	4	14,820	Burke	1	1,063	542	0	4	23	12,461	Burke	0	0	542	0	4	0	10,280		
Divide	\$80	5	718	1	43	40,398	Divide	1	2,125	741	1	40	54	34,415	Divide	0	0	741	0	40	0	28,392		
Dunn	\$27	12	1,687	9	91	199,220	Dunn	10	21,250	1,872	6	110	426	182,380	Dunn	10	21,250	2,112	8	110	552	169,753		
Golden Valley	\$65	0	93	0	0	2,308	Golden Valley	0	0	93	0	0	0	1,904	Golden Valley	0	0	93	0	0	0	1,571		
McKenzie	\$33	35	3,248	19	326	437,478	McKenzie	20	42,500	3,642	12	340	906	404,701	McKenzie	20	42,500	4,122	15	340	1,104	377,882		
McLean	\$25	0	42	0	2	2,778	McLean	1	2,125	62	1	2	47	3,405	McLean	1	2,125	86	1	2	55	3,889		
Mountrail	\$46	14	2,360	7	183	249,184	Mountrail	10	21,250	2,567	6	180	476	223,609	Mountrail	10	21,250	2,807	8	180	552	201,725		
Stark	\$42	1	235	0	2	16,282	Stark	0	0	235	0	2	0	13,432	Stark	0	0	235	0	2	0	11,082		
Williams	\$44	15	2,068	14	182	202,589	Williams	10	21,250	2,274	6	180	474	183,785	Williams	8	17,000	2,466	6	180	442	164,424		
Statewide	\$40	85	12,864	51	846	1,210,878	Statewide	55	115,813	13,909	34	871	2,403	1,098,839	Statewide	50	106,250	15,109	38	871	2,760	1,001,483		
ND Revenue Forecast	Breakeven		Wells	Frac	Wells					Semi	Wells	Frac	Wells	MMGal					Semi	Wells	Frac	Wells	MMGal	
\$40-\$50 / barrel	ND\$/barrel	Rigs	Active	Crews	NC	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD		
Billings	\$36	0	508	0	5	16,082	Billings	1	2,125	532	1	1	56	13,905	Billings	1	2,125	555	1	2	53	11,967		
Bot-Ren	\$85	1	772	0	6	8,531	Bot-Ren	1	2,125	797	1	1	58	7,270	Bot-Ren	1	2,125	820	1	2	53	6,170		
Bow-Slp	\$100	1	559	0	2	21,208	Bow-Slp	1	2,125	580	0	1	49	18,167	Bow-Slp	1	2,125	604	0	1	55	15,607		
Burke	\$100	1	532	0	4	14,820	Burke	1	2,125	555	1	1	54	12,764	Burke	1	2,125	579	1	1	55	10,986		
Divide	\$80	5	718	1	43	40,398	Divide	1	2,125	756	1	25	88	35,111	Divide	1	2,125	795	1	10	90	30,460		
Dunn	\$27	12	1,687	9	91	199,220	Dunn	10	21,250	1,907	7	75	506	185,790	Dunn	15	31,875	2,302	12	40	909	185,025		
Golden Valley	\$65	0	93	0	0	2,308	Golden Valley	0	0	93	0	0	0	1,904	Golden Valley	0	0	93	0	0	0	1,571		
McKenzie	\$33	35	3,248	19	326	437,478	McKenzie	22	46,750	3,898	20	125	1,495	433,125	McKenzie	25	53,125	4,583	21	40	1,576	420,125		
McLean	\$25	0	42	0	2	2,778	McLean	0	0	42	0	2	0	2,292	McLean	1	2,125	68	1	0	60	3,061		
Mountrail	\$46	14	2,360	7	183	249,184	Mountrail	11	23,375	2,667	10	100	707	232,354	Mountrail	14	29,750	3,033	11	70	842	217,995		
Stark	\$42	1	235	0	2	16,282	Stark	0	0	235	0	2	0	13,432	Stark	1	2,125	261	1	0	60	12,308		
Williams	\$44	15	2,068	14	182	202,589	Williams	12	25,500	2,395	10	100	752	193,548	Williams	14	29,750	2,771	12	60	865	184,747		
Statewide	\$40	85	12,864	51	846	1,210,878	Statewide	60	127,500	14,459	50	433	3,669	1,149,662	Statewide	75	159,375	16,466	62	226	4,616	1,100,023		

			2015								2016								2017							
	Breakeven		Wells	Frac	Wells					Semi	Wells	Frac	Wells	MMGal					Semi	Wells	Frac	Wells	MMGal			
\$50-\$60 / barrel	ND\$/barrel	Rigs	Active	Crews	NC	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD				
Billings	\$36	0	508	0	5	16,082	Billings	1	2,125	528	1	5	47	13,801	Billings	2	4,250	577	2	2	112	12,433				
Bot-Ren	\$85	1	772	0	6	8,531	Bot-Ren	1	2,125	795	1	3	54	7,251	Bot-Ren	1	2,125	819	1	2	55	6,161				
Bow-Slp	\$100	1	559	0	2	21,208	Bow-Slp	1	2,125	580	0	1	49	18,167	Bow-Slp	1	2,125	603	0	1	52	15,576				
Burke	\$100	1	532	0	4	14,820	Burke	1	2,125	554	1	2	52	12,741	Burke	1	2,125	578	1	1	55	10,963				
Divide	\$80	5	718	1	43	40,398	Divide	2	4,250	762	1	40	101	35,362	Divide	2	4,250	837	2	10	174	32,069				
Dunn	\$27	12	1,687	9	91	199,220	Dunn	12	25,500	1,933	8	90	565	188,303	Dunn	15	31,875	2,325	12	40	902	186,857				
Golden Valley	\$65	0	93	0	0	2,308	Golden Valley	0	0	93	0	0	0	1,904	Golden Valley	0	0	93	0	0	0	1,571				
McKenzie	\$33	35	3,248	19	326	437,478	McKenzie	25	53,125	3,784	17	300	1,233	420,480	McKenzie	25	53,125	4,614	26	40	1,909	422,985				
McLean	\$25	0	42	0	2	2,778	McLean	2	4,250	83	1	2	94	4,518	McLean	1	2,125	108	1	0	57	4,843				
Mountrail	\$46	14	2,360	7	183	249,184	Mountrail	15	31,875	2,674	10	175	722	232,929	Mountrail	15	31,875	3,121	14	70	1,028	224,290				
Stark	\$42	1	235	0	2	16,282	Stark	0	0	235	0	2	0	13,432	Stark	2	4,250	283	1	0	109	13,326				
Williams	\$44	15	2,068	14	182	202,589	Williams	15	31,875	2,381	10	175	720	192,432	Williams	15	31,875	2,848	15	50	1,074	189,895				
Statewide	\$40	85	12,864	51	846	1,210,878	Statewide	75	159,375	14,403	49	795	3,540	1,141,321	Statewide	80	170,000	16,806	74	216	5,527	1,120,970				
	Breakeven		2015								2016								2017							
	ND\$/barrel	Rigs	Active	Crews	NC	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD				
Billings	\$36	0	508	0	5	16,082	Billings	1	2,125	531	1	2	54	13,879	Billings	2	4,250	577	1	2	105	12,433				
Bot-Ren	\$85	1	772	0	6	8,531	Bot-Ren	1	2,125	796	1	2	56	7,260	Bot-Ren	1	2,125	819	1	2	52	6,161				
Bow-Slp	\$100	1	559	0	2	21,208	Bow-Slp	1	2,125	580	0	1	49	18,167	Bow-Slp	1	2,125	603	0	1	52	15,576				
Burke	\$100	1	532	0	4	14,820	Burke	1	2,125	555	1	1	54	12,764	Burke	1	2,125	578	1	1	52	10,963				
Divide	\$80	5	718	1	43	40,398	Divide	2	4,250	782	2	20	147	36,290	Divide	2	4,250	837	2	10	128	32,069				
Dunn	\$27	12	1,687	9	91	199,220	Dunn	12	25,500	1,983	9	40	680	193,174	Dunn	15	31,875	2,325	11	40	787	186,857				
Golden Valley	\$65	0	93	0	0	2,308	Golden Valley	0	0	93	0	0	0	1,904	Golden Valley	0	0	93	0	0	0	1,571				
McKenzie	\$33	35	3,248	19	326	437,478	McKenzie	25	53,125	4,034	25	50	1,808	448,260	McKenzie	25	53,125	4,614	18	40	1,334	422,985				
McLean	\$25	0	42	0	2	2,778	McLean	2	4,250	85	1	0	98	4,627	McLean	1	2,125	108	1	0	52	4,843				
Mountrail	\$46	14	2,360	7	183	249,184	Mountrail	15	31,875	2,799	14	50	1,010	243,818	Mountrail	15	31,875	3,141	11	50	787	225,727				
Stark	\$42	1	235	0	2	16,282	Stark	0	0	237	0	0	5	13,547	Stark	2	4,250	283	1	0	105	13,326				
Williams	\$44	15	2,068	14	182	202,589	Williams	15	31,875	2,506	14	50	1,007	202,535	Williams	20	42,500	2,962	14	50	1,049	197,496				
Statewide	\$40	85	12,864	51	846	1,210,878	Statewide	75	159,375	14,982	67	216	4,871	1,196,225	Statewide	85	180,625	16,940	60	196	4,503	1,130,009				
	Breakeven		2015								2016								2017							
	ND\$/barrel	Rigs	Active	Crews	NC	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD		Rigs	Loads	Active	Crews	NC	Water	BOPD				
Billings	\$36	0	508	0	5	16,082	Billings	2	4,250	552	1	2	101	14,412	Billings	5	10,625	666	4	2	262	14,346				
Bot-Ren	\$85	1	772	0	6	8,531	Bot-Ren	1	2,125	796	1	2	56	7,260	Bot-Ren	1	2,125	819	1	2	52	6,161				
Bow-Slp	\$100	1	559	0	2	21,208	Bow-Slp	1	2,125	580	0	1	49	18,167	Bow-Slp	1	2,125	603	0	1	52	15,576				
Burke	\$100	1	532	0	4	14,820	Burke	1	2,125	555	1	1	54	12,764	Burke	1	2,125	578	1	1	52	10,963				
Divide	\$80	5	718	1	43	40,398	Divide	4	8,500	823	3	20	241	38,184	Divide	4	8,500	924	3	10	233	35,377				
Dunn	\$27	12	1,687	9	91	199,220	Dunn	12	25,500	1,983	9	40	680	193,174	Dunn	25	53,125	2,553	18	40	1,311	205,183				
Golden Valley	\$65	0	93	0	0	2,308	Golden Valley	0	0	93	0	0	0	1,904	Golden Valley	1	2,125	116	1	0	52	1,956				
McKenzie	\$33	35	3,248	19	326	437,478	McKenzie	25	53,125	4,034	25	50	1,808	448,260	McKenzie	35	74,375	4,842	25	40	1,858	443,887				
McLean	\$25	0	42	0	2	2,778	McLean	2	4,250	85	1	0	98	4,627	McLean	2	4,250	130	1	0	105	5,870				
Mountrail	\$46	14	2,360	7	183	249,184	Mountrail	20	42,500	2,901	17	50	1,244	252,703	Mountrail	25	53,125	3,471	18	50	1,311	249,443				
Stark	\$42	1	235	0	2	16,282	Stark	2	4,250	278	1	0	98	15,879	Stark	5	10,625	392	4	0	262	18,476				
Williams	\$44	15	2,068	14	182	202,589	Williams	20	42,500	2,608	17	50	1,242	210,779	Williams	25	53,125	3,178	18	50	1,311	211,898				
Statewide	\$40	85	12,864	51	846	1,210,878	Statewide	90	191,250	15,288	76	216	5,575	1,218,113	Statewide	130	276,250	18,272	93	196	6,863	1,219,137				

Return to the 1980s?

Oil price trajectory vs previous cycles



Drivers of this cycle

Demand ... China + global

Supply ... US, Saudi, Iran, Iraq ...

Financial markets

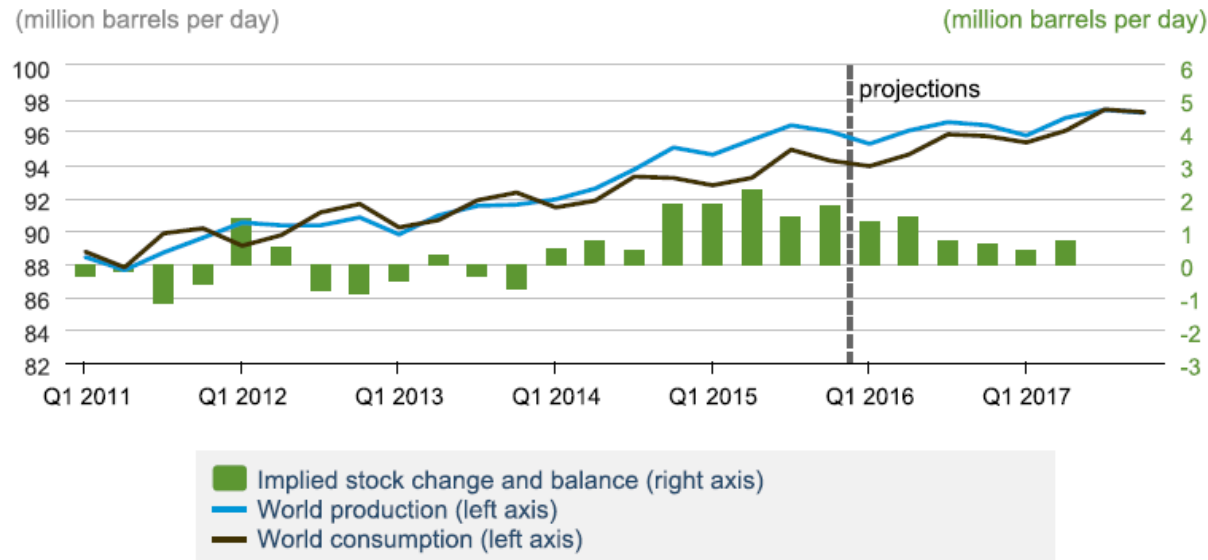
Supply-driven price cycles take longer to recover



Sources: GE O&G analysis based on EIA and World Bank data

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World Liquid Fuels Production and Consumption Balance



Source: Short-Term Energy Outlook, February 2016

<http://www.bloomberg.com/news/articles/2016-02-22/opec-s-el-badri-doesn-t-know-how-to-live-together-with-shale-oil>

Abdalla Salem El-Badri, OPEC secretary-general

“Shale oil in the United States, I don’t know how we are going to live together”

“Any increase in price, shale will come immediately and cover any reduction”

“OPEC didn’t expect oil prices to drop this much when it decided to keep pumping near flat-out”

“This is the first step to see what we can achieve, If this is successful, we will take other steps in the future”

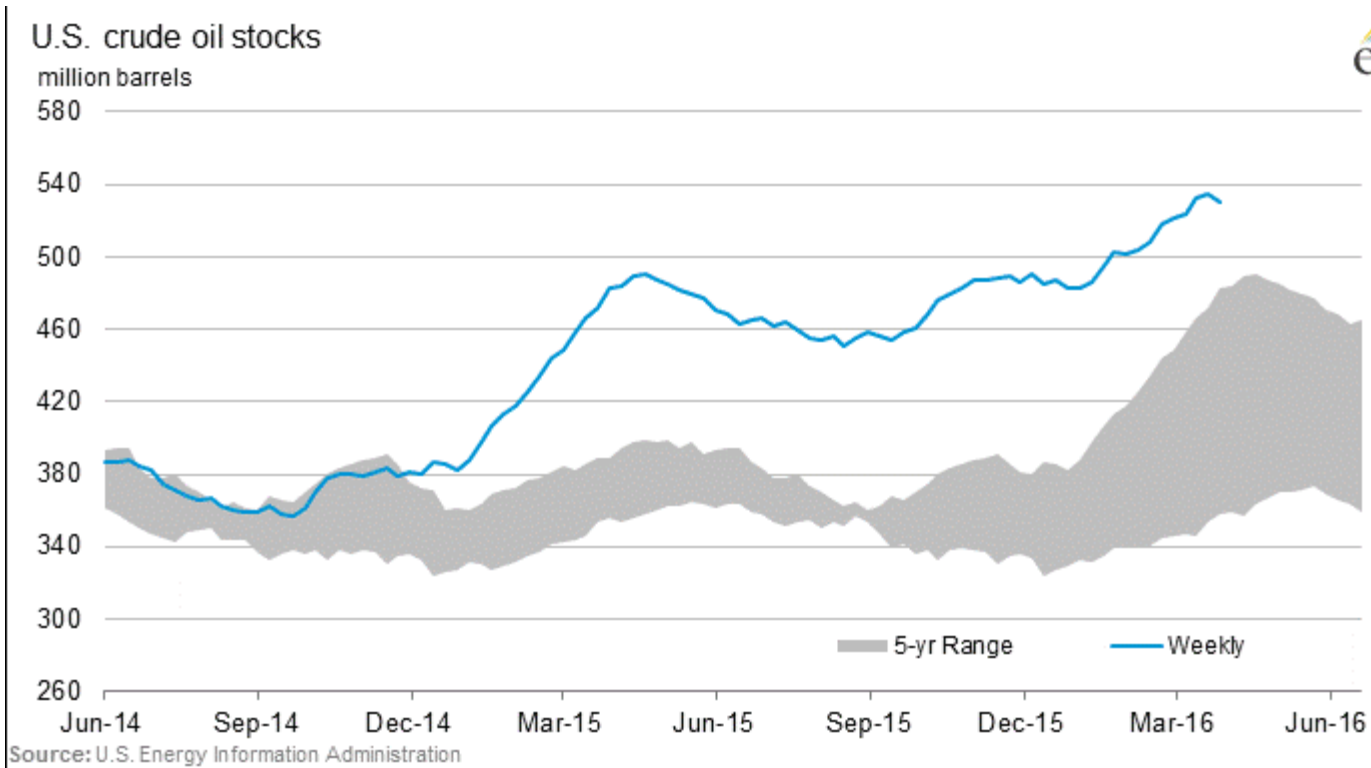
“Low oil prices have caused companies to cut too much spending on developing new output, which could plant the seed for “a very high price” in the future, if there’s no supply coming to the market, prices will go up”

Ali Al-Naimi, Saudi Arabia minister of petroleum and mineral resources

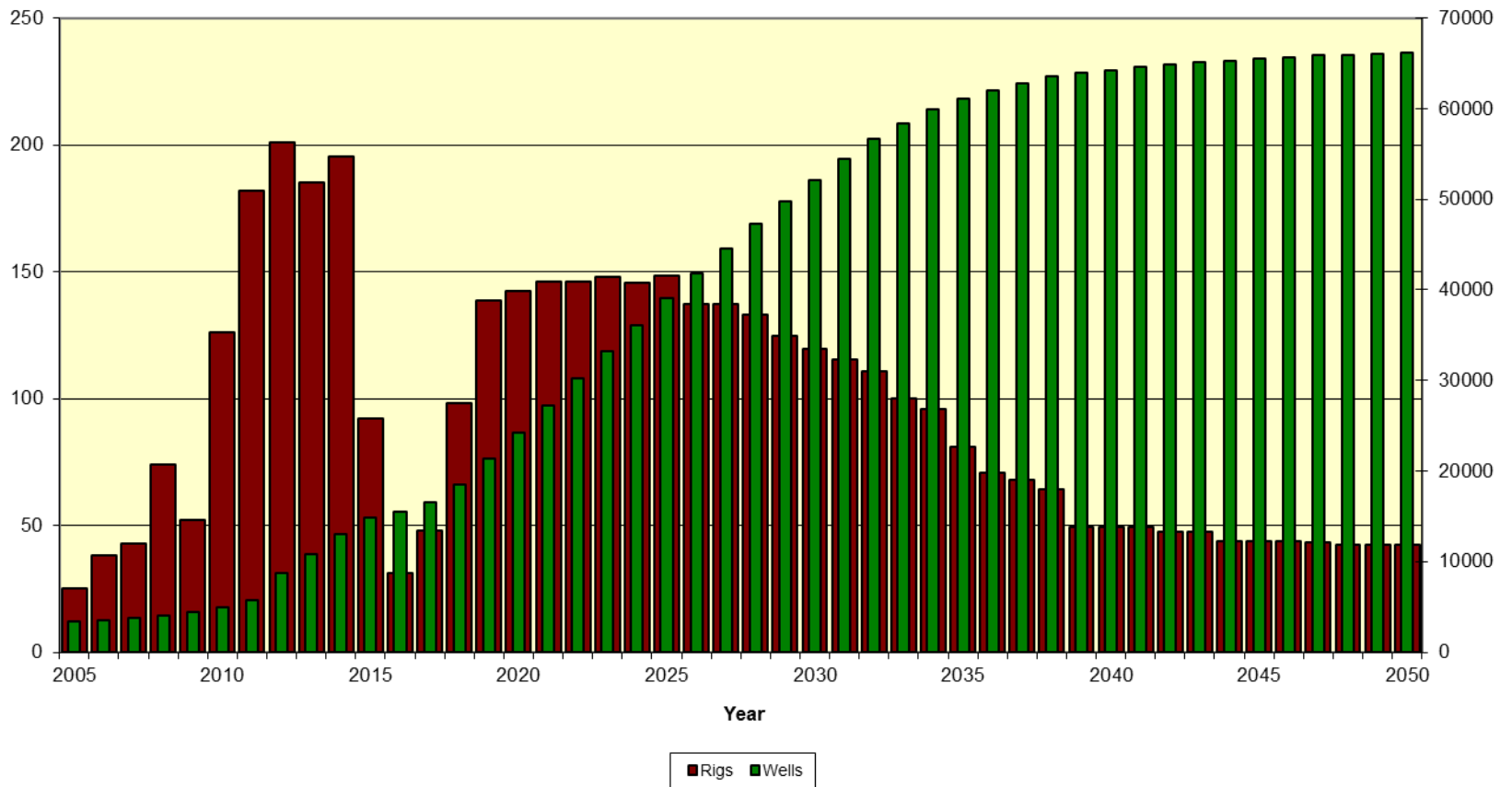
“This is not the 1980s, each cycle comes with uncharted territory and unwelcome surprises, it will end, when—I don’t know, but it will,” ”

Storage East Coast 18 of 20=90%
Permian 90 of 120=75%
Rockies 24 of 40=60%
Total US 530 of 735=72%

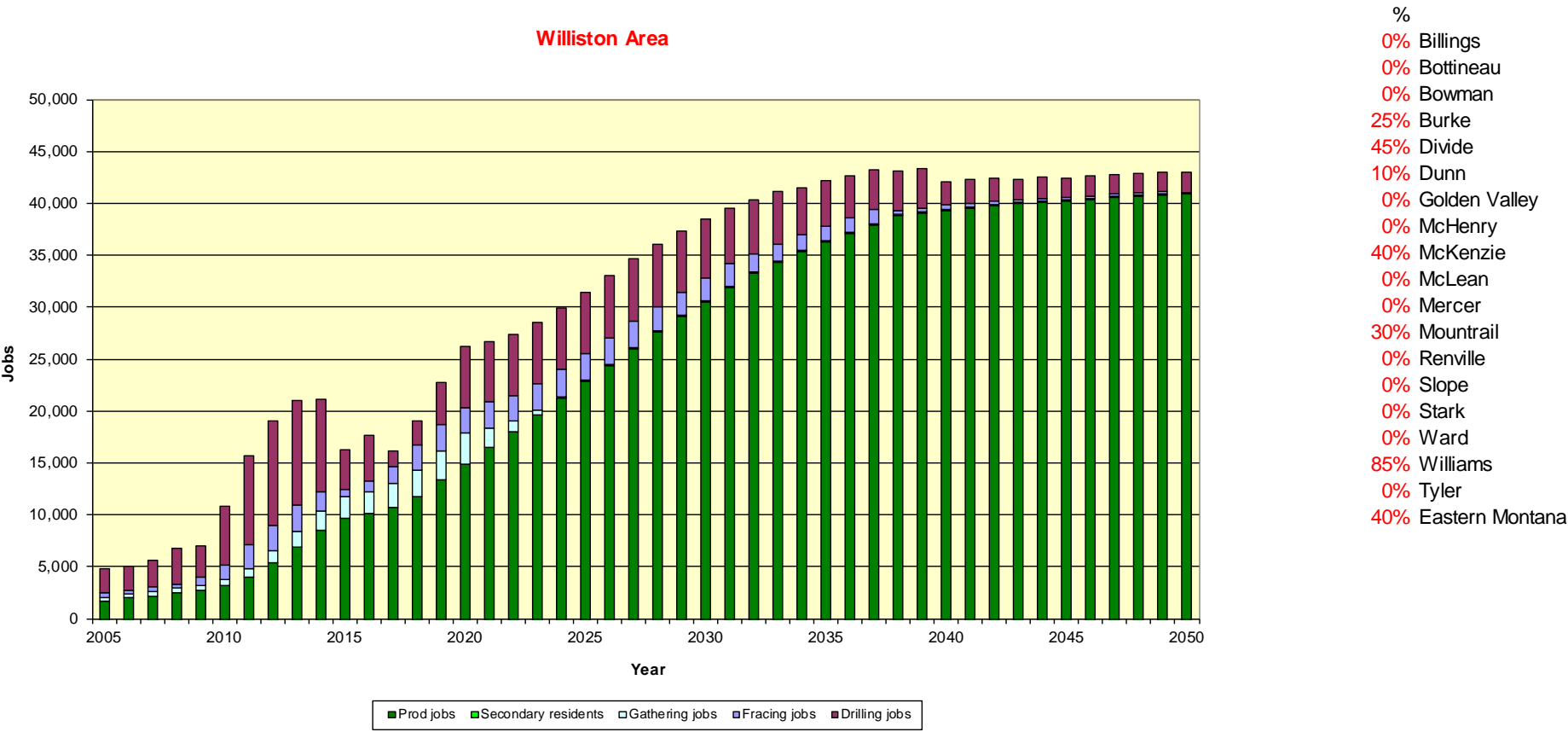
Cushing 66 of 70=94%
Gulf Coast 278 of 395=70%
West Coast 55 of 100=55%
Normal 380 of 735=52%



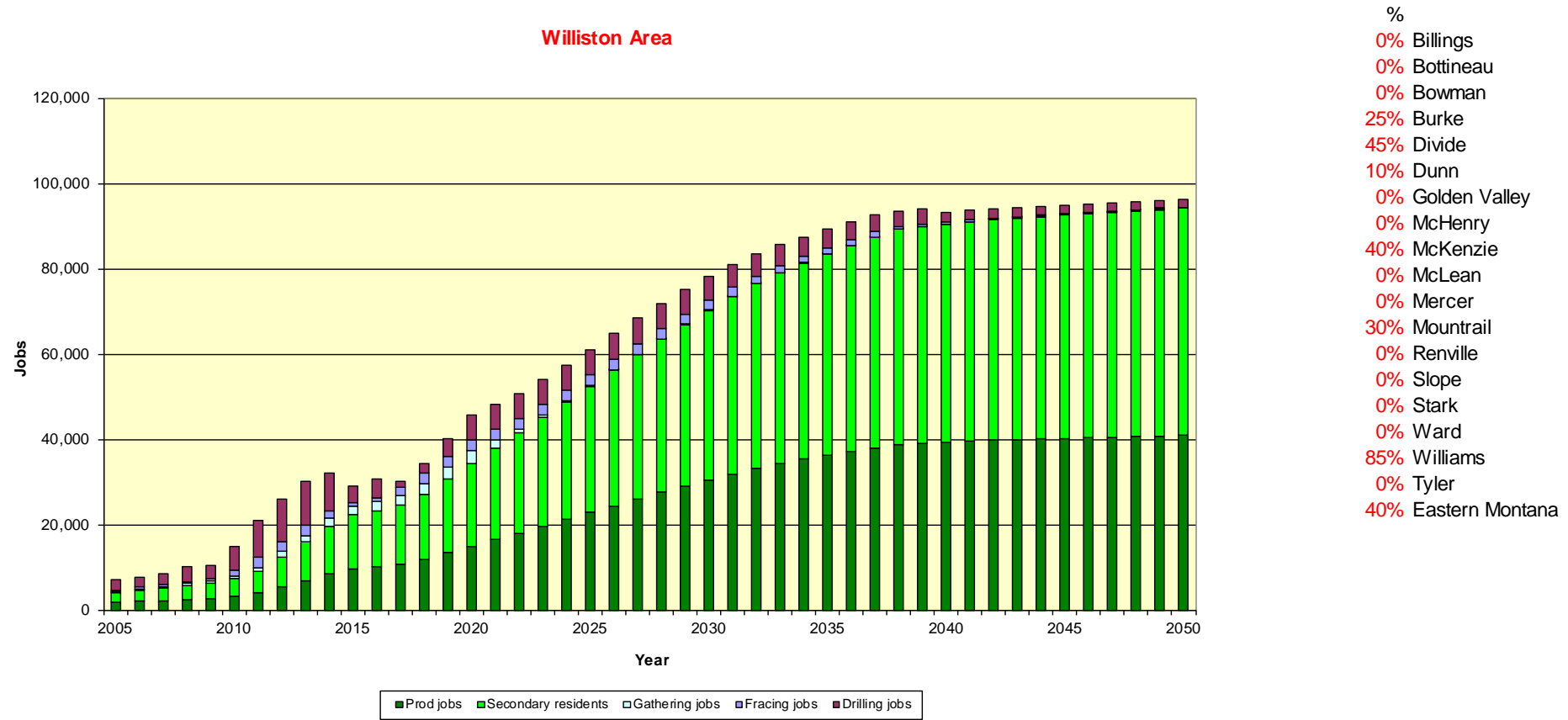
North Dakota Rigs and Wells



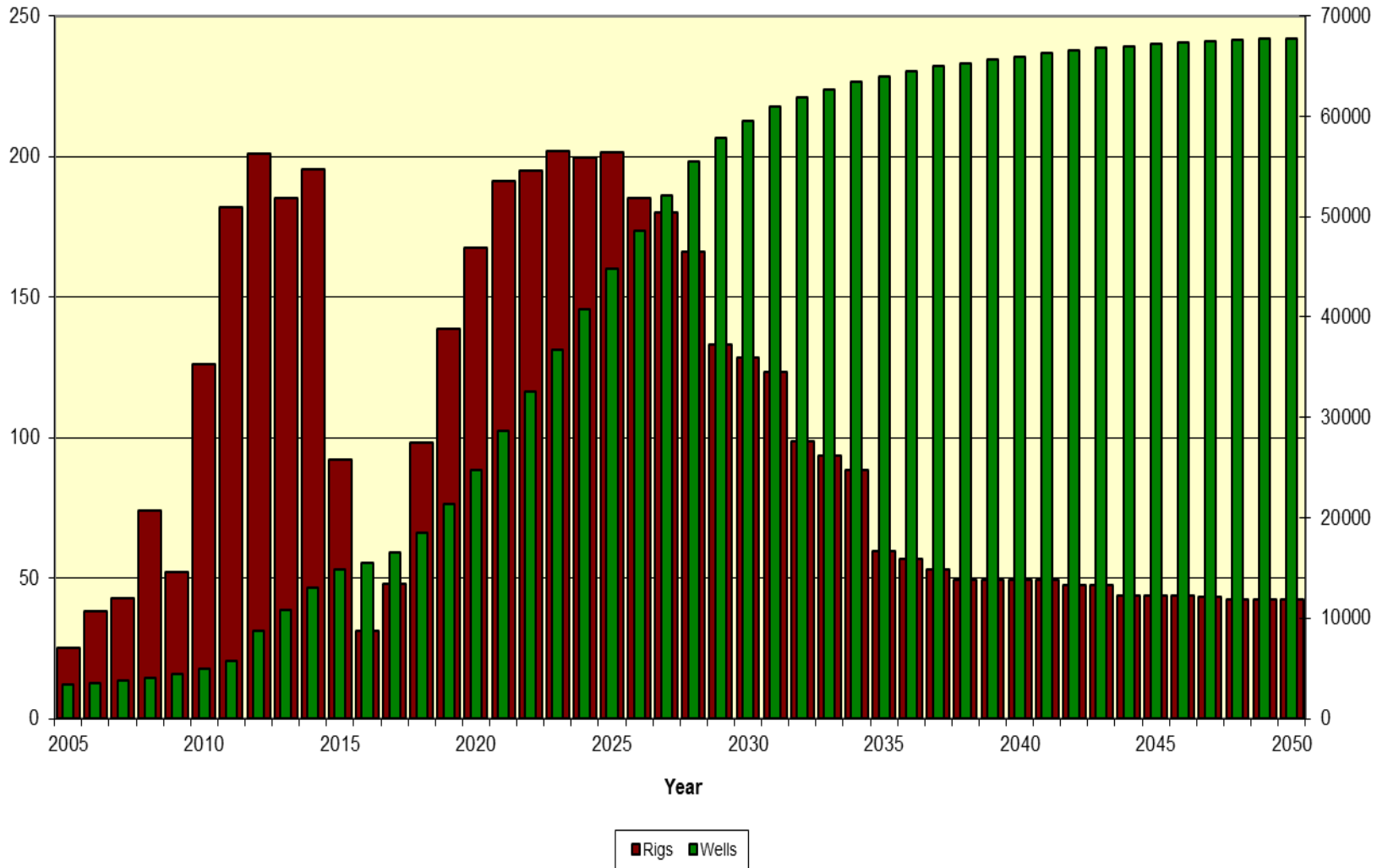
Williston Area



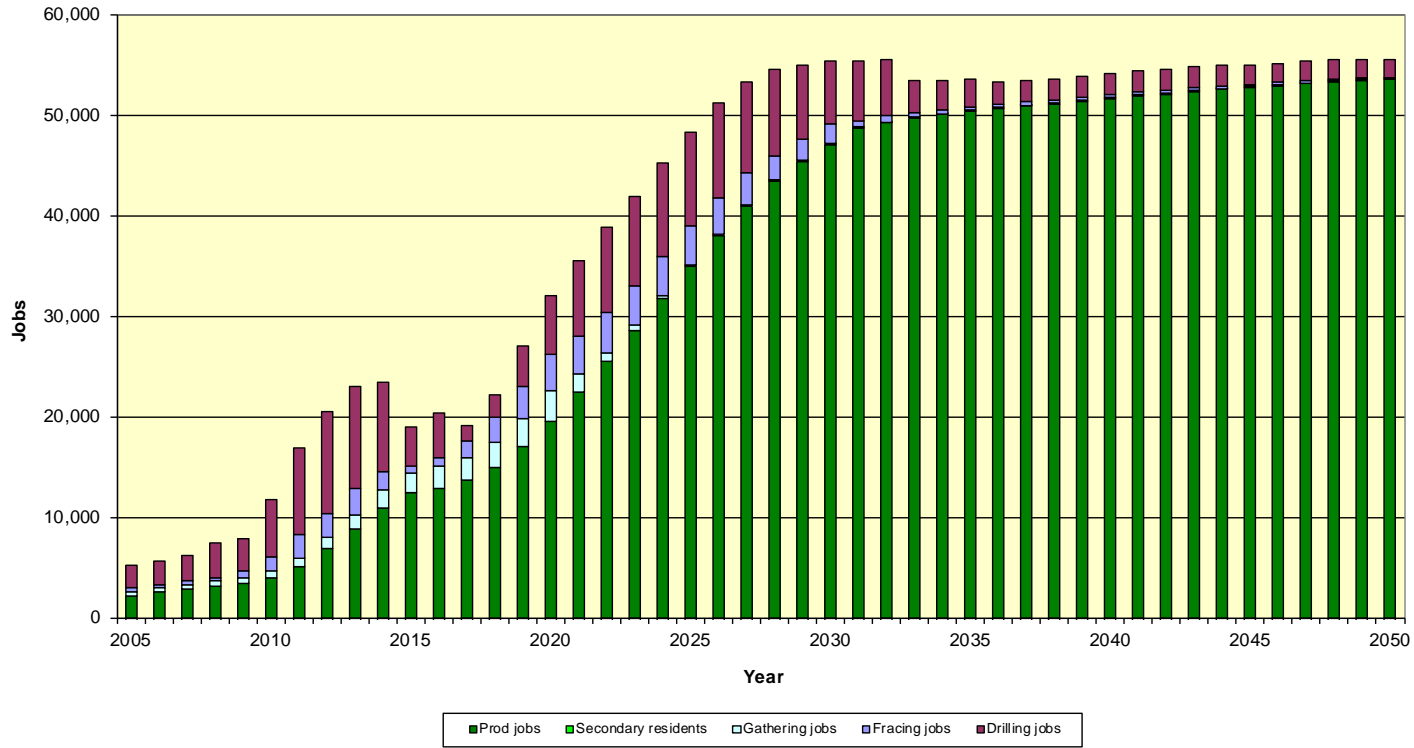
Williston Area



North Dakota Rigs and Wells

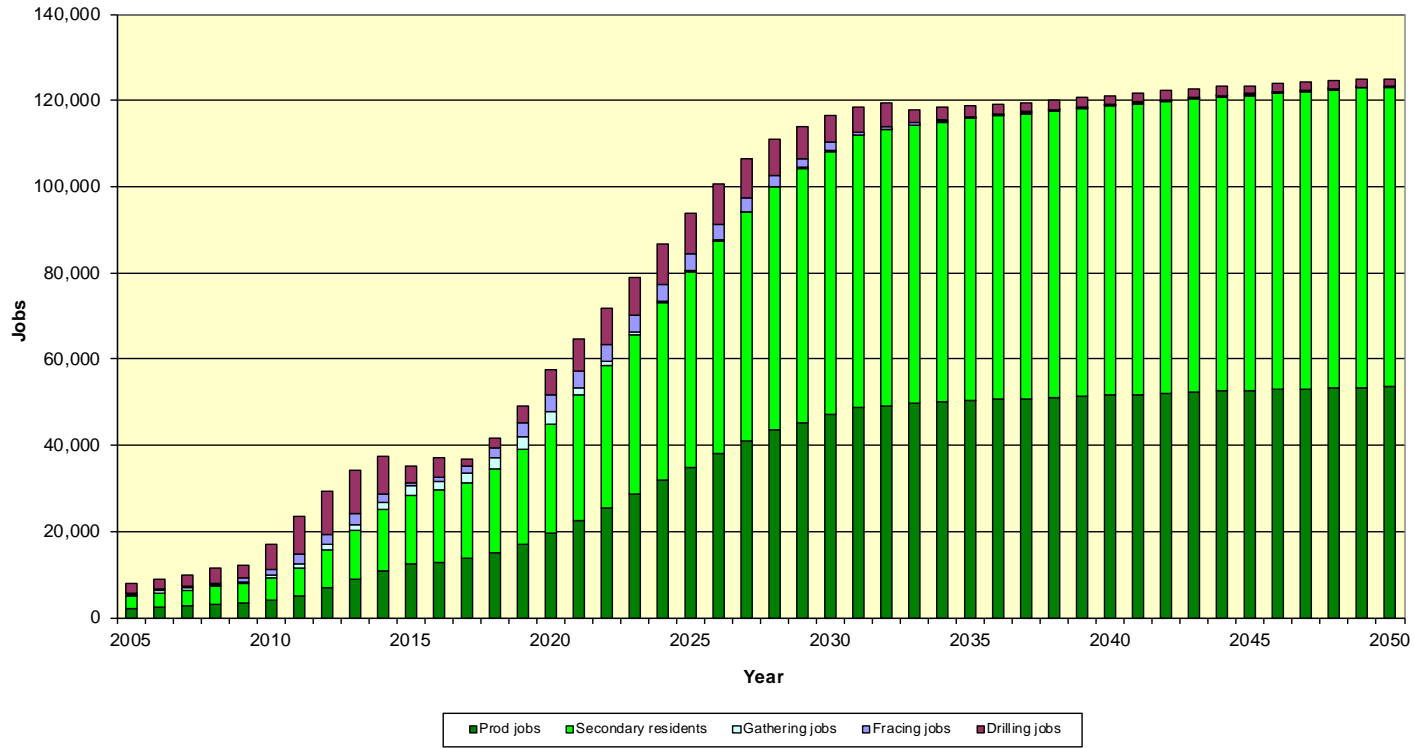


Williston Area



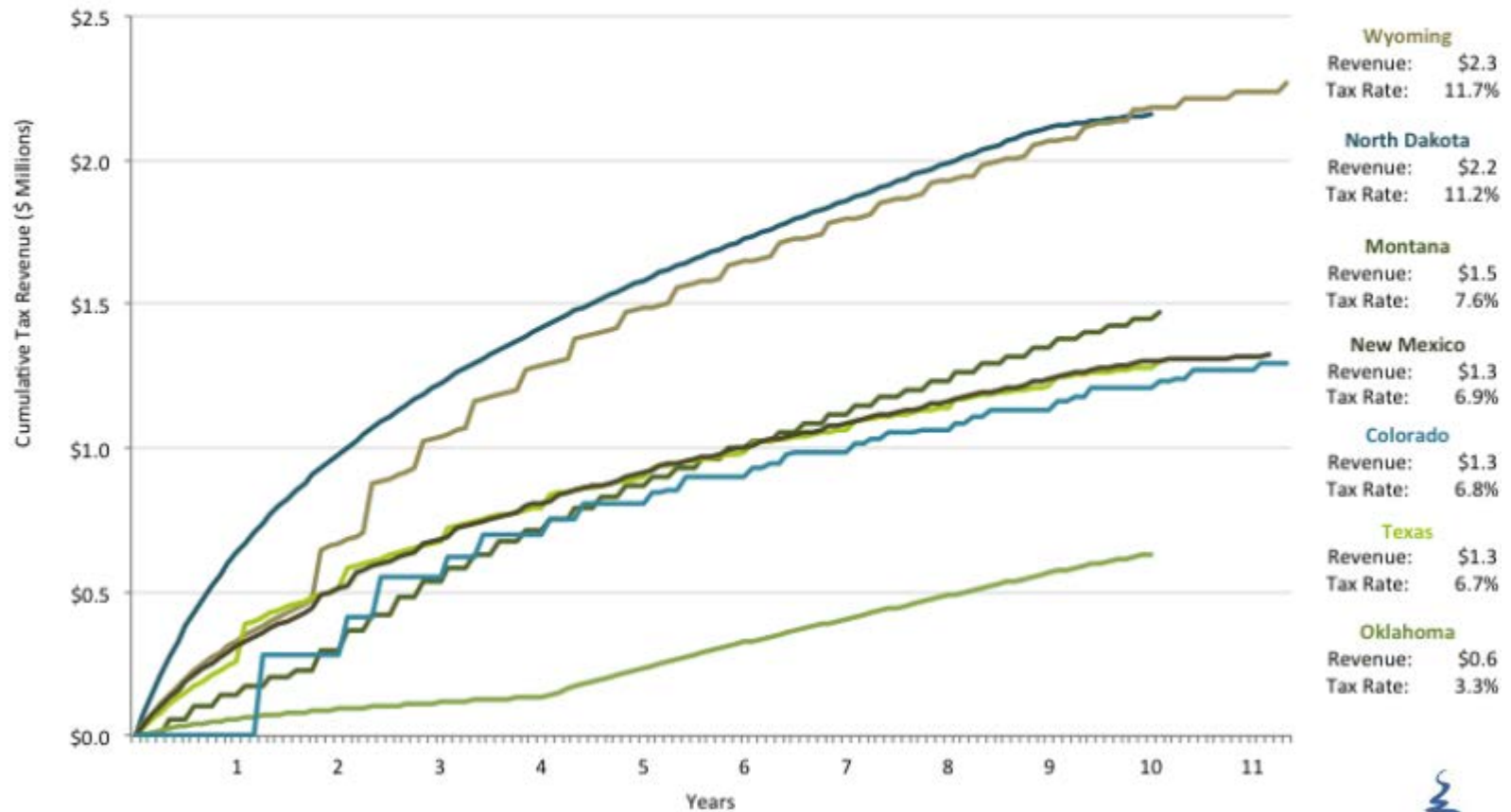
- %
- 0% Billings
- 0% Bottineau
- 0% Bowman
- 25% Burke
- 45% Divide
- 10% Dunn
- 0% Golden Valley
- 0% McHenry
- 40% McKenzie
- 0% McLean
- 0% Mercer
- 30% Mountrail
- 0% Renville
- 0% Slope
- 0% Stark
- 0% Ward
- 85% Williams
- 0% Tyler
- 40% Eastern Montana

Williston Area



- %
- 0% Billings
 - 0% Bottineau
 - 0% Bowman
 - 25% Burke
 - 45% Divide
 - 10% Dunn
 - 0% Golden Valley
 - 0% McHenry
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 - 30% Mountrail
 - 0% Renville
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 - 0% Stark
 - 0% Ward
 - 85% Williams
 - 0% Tyler
 - 40% Eastern Montana

Results: Revenue Curves

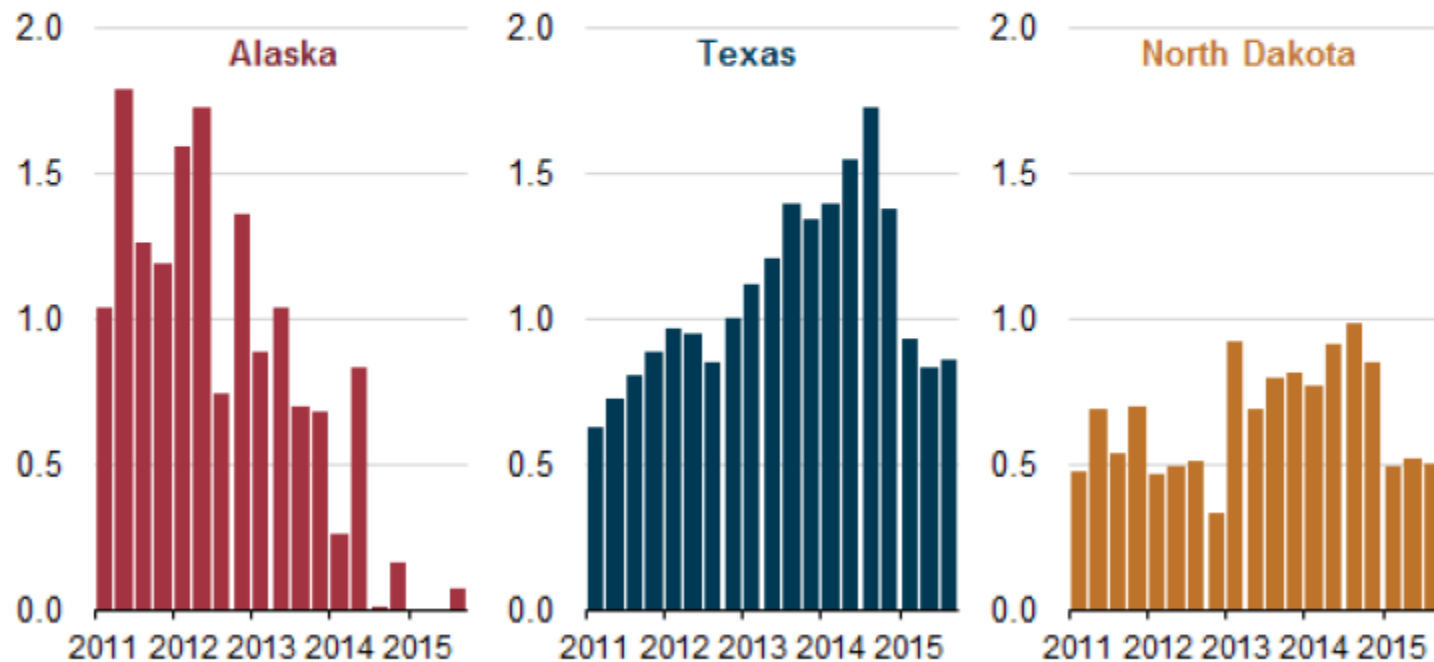


Alaska's severance tax effectively failed in 2015

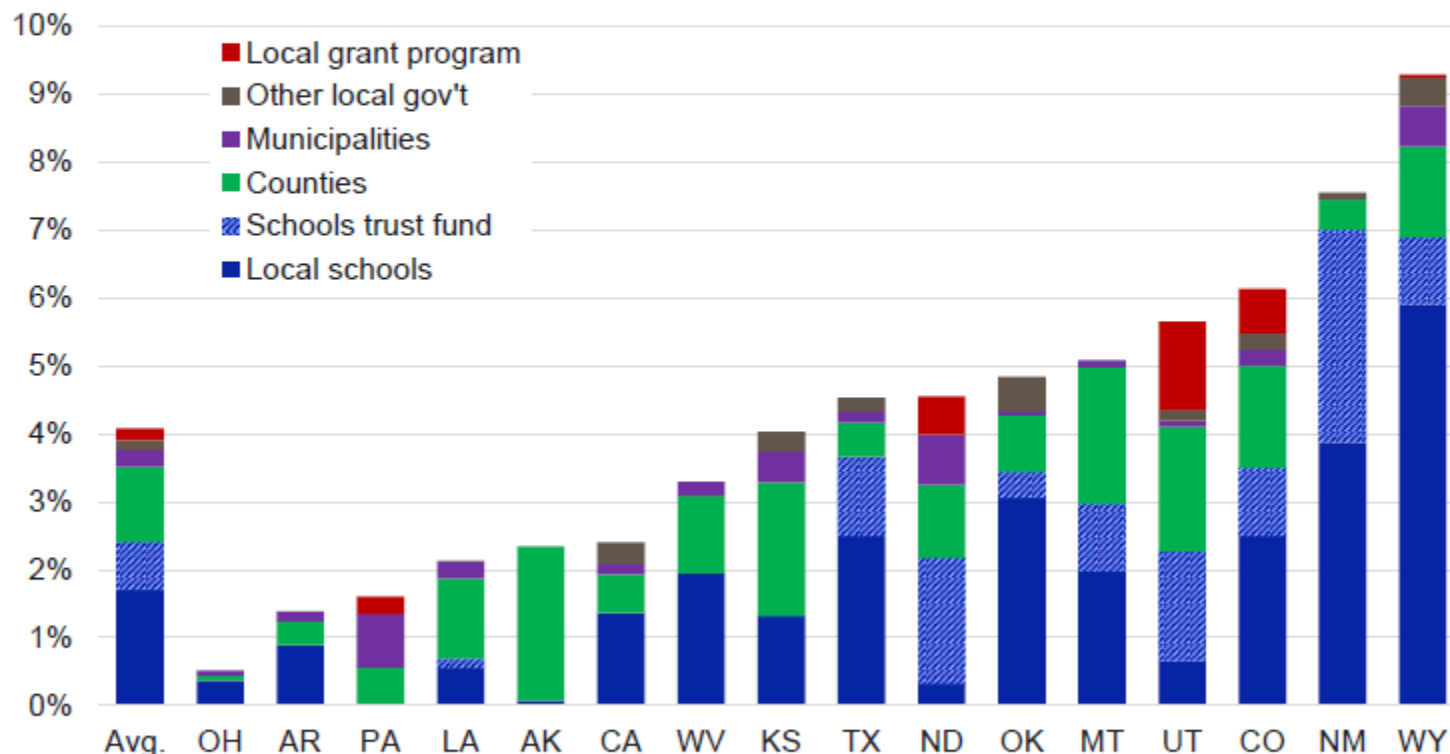
Incentives based on the producers income result in little to no severance tax liability at low prices

Quarterly severance tax revenues (Q1 2011 - Q3 2015)

billion dollars

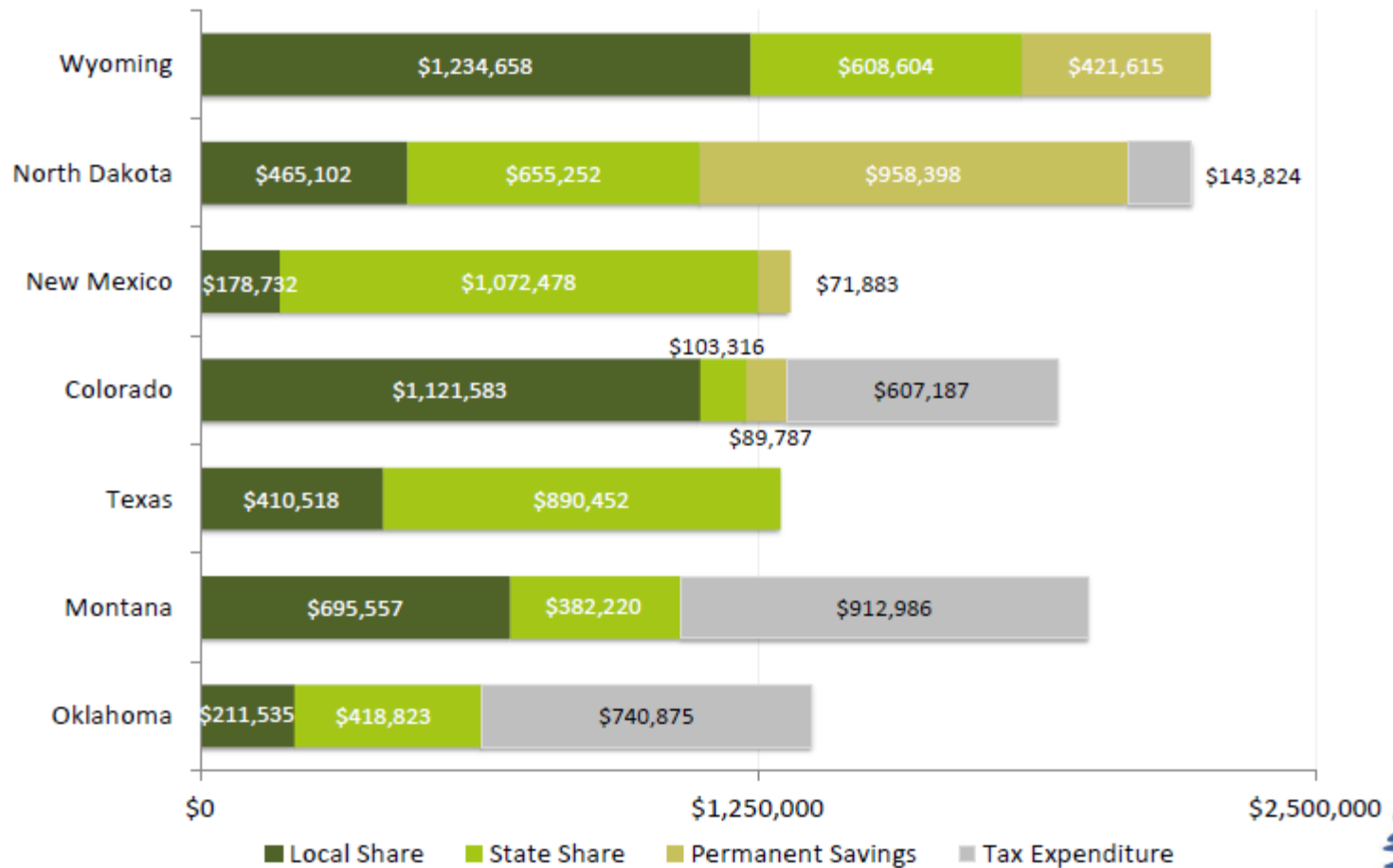


Total share of oil and gas revenue flowing to local governments (FY2014)



Source: Raimi and Newell, forthcoming. Figure shows revenue flowing to local governments from state severance taxes, local property taxes on oil and gas property, state oil and gas lease revenues, and federal oil and gas lease revenues.

Results: Revenue Allocation

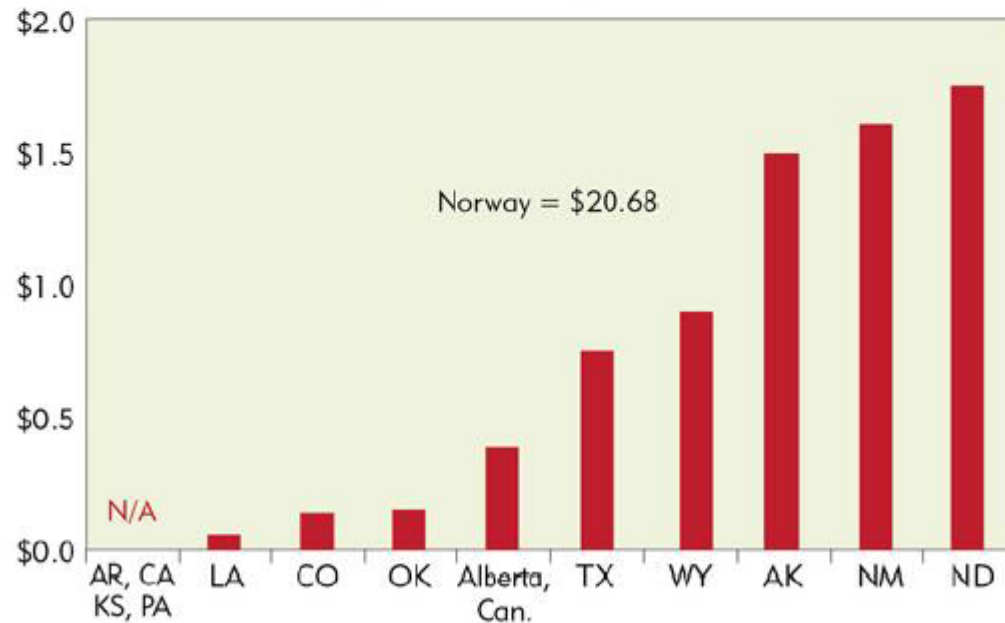


Why Fiscal Policy Matters to Community Prospects

Fossil fuel extraction leaves a lasting legacy in the form of a permanent fund

Trust funds per barrel of oil equivalent,* 1981-2012

Major oil and/or gas producers



Federal Reserve Bank of Minneapolis, 2013

Endangered Species

6 endangered



4 threatened

1 proposed

2 candidate

4 potential

Federal Regulation

BLM (6)



Hydraulic Fracturing

Onshore 3, 4, & 5

Venting/Flaring

Sage Grouse

EPA (5)



Chemical Disclosure

Waters of US

Methane Emissions

Waste Rules Lawsuit

Clean Power Plan

BIA / Tribe



ROW rule

Tax Agreement

TERO

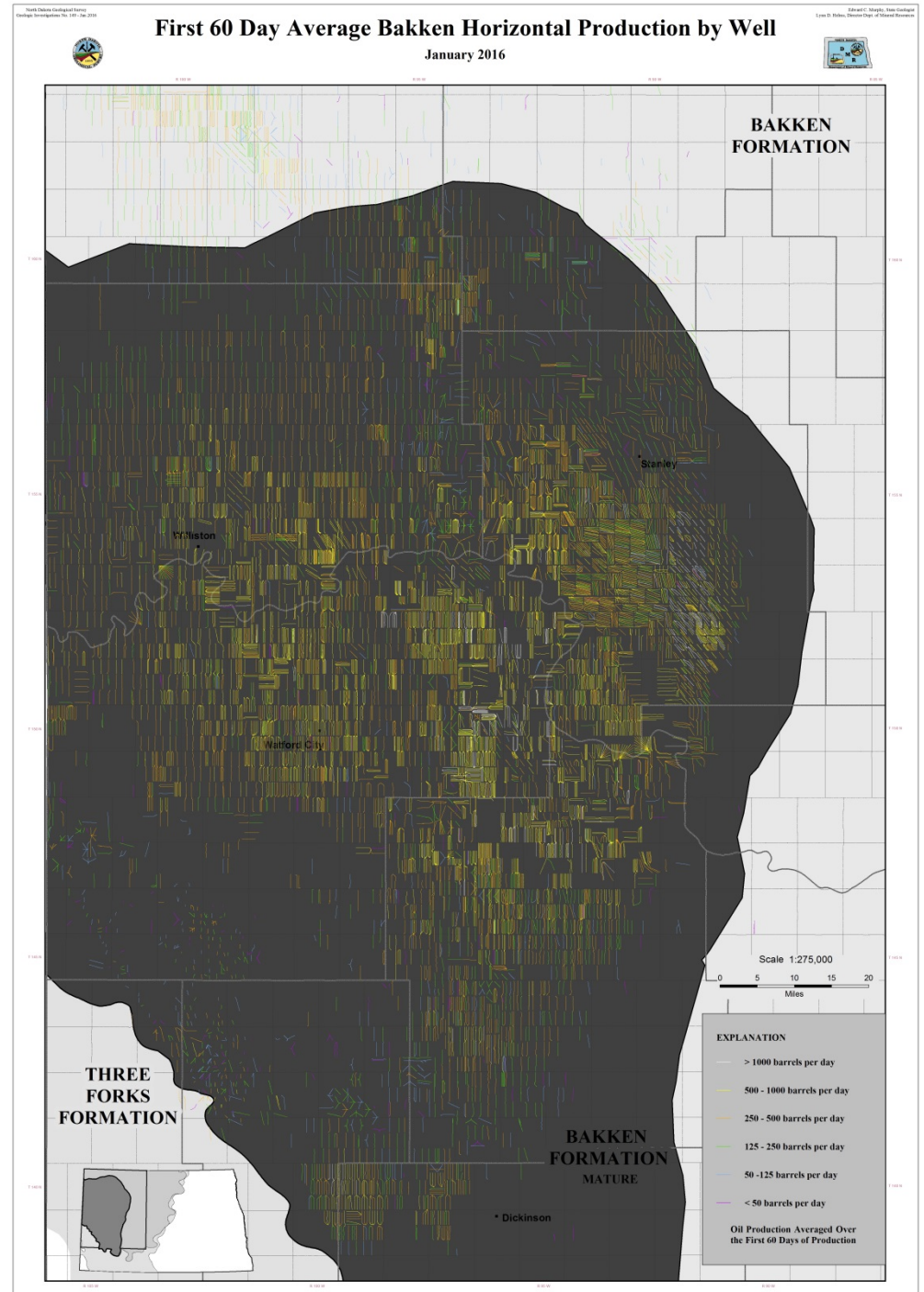
Regulations

Federal Reserve

Strong \$



Raising interest rates



General Guidelines for Not Completed - Waiver of Wells

Policy Goal:

The North Dakota Industrial Commission (NDIC) is charged with "fostering, ... encouraging, and ... promoting the development, production, and utilization of the *state's* natural resources of oil and gas in the state in such a manner as will prevent waste." The Commission is promulgating this Policy to prevent waste.

North Dakota Century Code (NDCC) § 38-08-04 (1) (l) and North Dakota Administrative Code (NDAC) § 43-02-03-55 (1) define what constitutes abandonment of a well and the operator's obligation to plug such a well and reclaim its site.

NDAC § 43-02-03-55 (2) was drafted to give the operator of an abandoned well sufficient time either to restore production or plug and reclaim the well.

This Policy does nothing to change the existing text or application of NDAC § 43-02-03-55 (2) to a well which has previously produced oil or gas.

NDAC § 43-02-03-55 (3) and this policy are drafted to eliminate the waste which would otherwise occur by application of NDAC § 43-02-03-55 (2) to horizontal Bakken wells for which completions have been deferred.

Not Completed – Waiver (NCW) Status may only be given to wells that have been drilled but whose casing has not yet been perforated (i.e. the well is incapable of producing oil or gas because completion operations have not yet been performed).

As of 1/31/16 there were 945 Not Completed wells

The estimated price point for completion is \$50-60 / barrel WTI

General Guidelines for Inactive Well - Waiver

Policy Goal:

The North Dakota Industrial Commission (NDIC) is charged with "fostering, ... encouraging, and ... promoting the development, production, and utilization of the *state's* natural resources of oil and gas in the state in such a manner as will prevent waste." The Commission is promulgating this Policy to prevent waste.

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NDAC § 43-02-03-55 (3) was drafted to give the operator of an abandoned well sufficient time either to restore production or plug and reclaim the well.

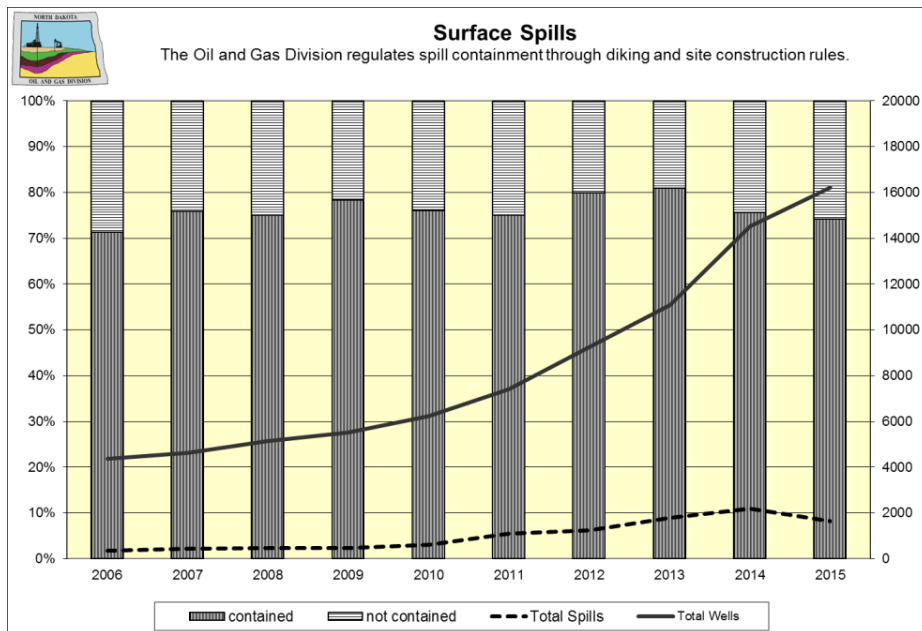
Inactive Well – Waiver (IAW) Status may only be given to wells that have met the following criteria.

1. Proposed IAW Approval Procedure

1. The operator must submit a Sundry Notice – Form 4 intent to request a waiver to plug and reclaim an abandoned well pursuant to NDAC § 43-02-03-55 Part (3). The request must include:
 - a. Documentation of why the well is currently in an inactive or abandoned status.
 - b. A statement that the well is uneconomic to produce at current crude oil price.
 - c. A statement that wellhead equipment complies with NDAC § 43-02-03-28 and 43-02-03-29 with regard to subsurface pressure control and well and lease equipment is in good working order.
 - d. The current casing and tubing pressure.
 - e. If the well was in abandoned status prior to January 1, 2016 (last production prior to October 2014), document why the well was not returned to production at that time.

As of 1/31/16 there were 1,334 inactive wells

The estimated price point for return to production is >\$40-45 per barrel WTI



Spills versus wells – Good

Spills versus volume – OK

Uncontained spills need work

25% pipeline

16% equipment failure

10% fire

9% root cause not reported

8% human error

7% valve-piping leak

6% treater leak

5% stuffing box

5% treater pop off

4% tank overflow

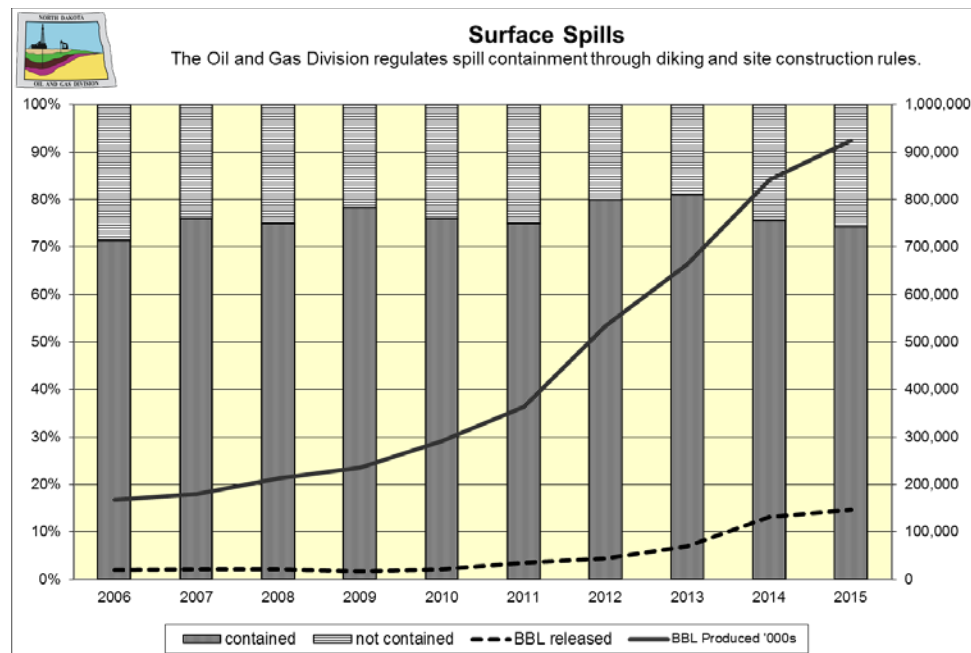
2% tank leak

1% blow out

1% vessel leak

1/2% pump leak

1/2% truck overflow

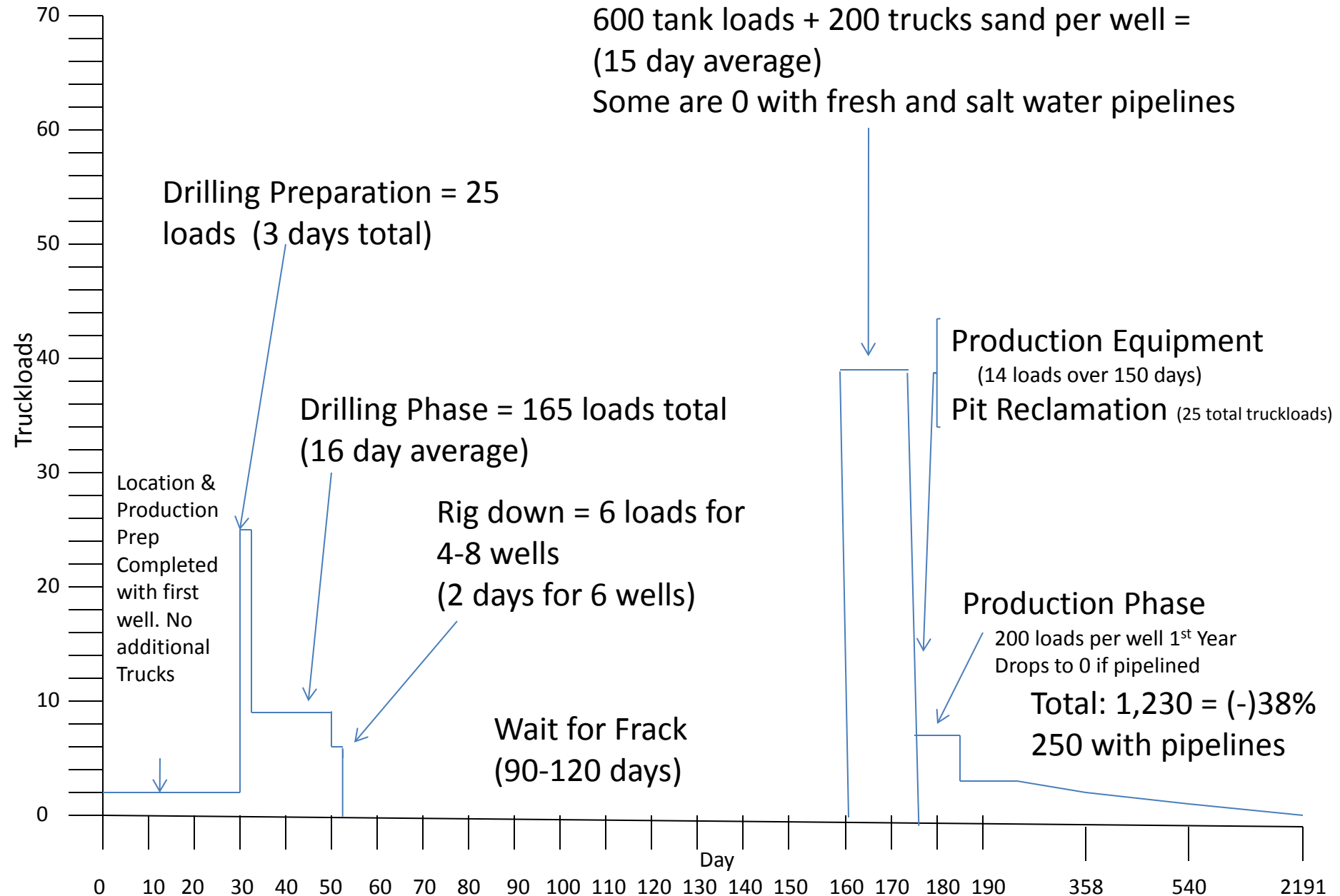


Bakken Wells – Truckload Timeline

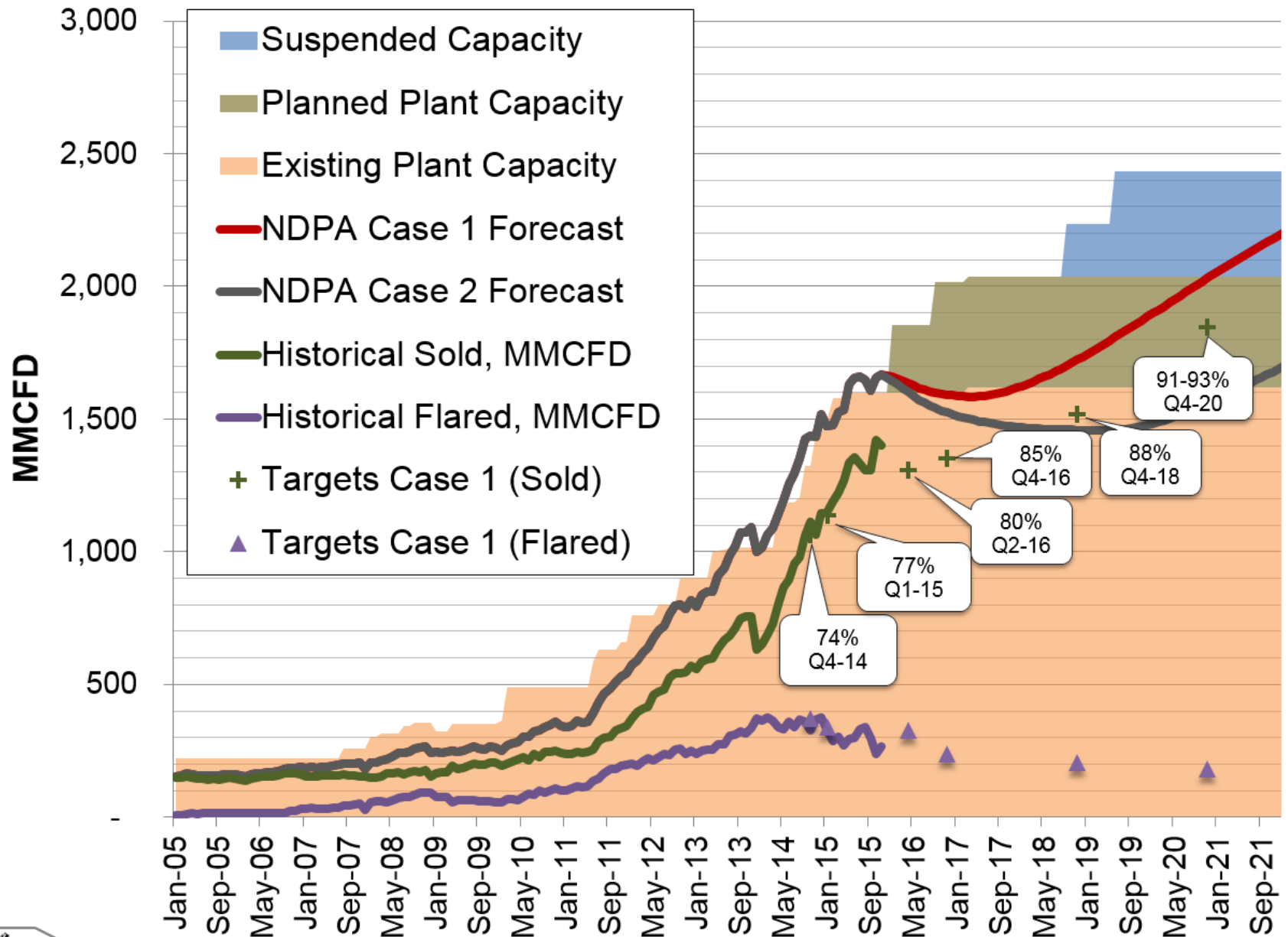
Fracturing Phase – (800 loads)

600 tank loads + 200 trucks sand per well =
(15 day average)

Some are 0 with fresh and salt water pipelines



Solving the Flaring Challenge



**County Occurrence of Endangered, Threatened, Proposed and Candidate Species
Designated and Proposed Critical Habitat in North Dakota**

January 2015

Species	A d a m s	B a r n e s	B e n s o n	B i l l i n g s	B o t t i n e a u	B o w m a n	B u r k e	B u r l e i g h	C a s s	C a v a l i e r	D i c k e y	D i v i d e	D u n n	E d d y	E m m o n s	F o s t e r	G o. V a l l e y	G r. F o r k s	G r a n t	G r i g g s	H e t t i n g e r	K i d d e r	L a m o u r e	L o g a n	M c H e n r y	M c I n t o s h	M c K e n z i e	
Interior Least Tern - E								X					X		X													X
Whooping Crane - E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black-Footed Ferret - E	X			X		X							X				X		X		X							X
Pallid Sturgeon – E								X					X		X													X
Gray Wolf - E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Poweshiek Skipperling – E																												
Piping Plover - T			X				X	X				X	X	X	X								X		X	X	X	X
Western Prairie Fringed Orchid - T																												
Dakota Skipper - T		X			X		X						X	X							X					X		X
Rufa Red Knot - T			X				X	X				X	X	X	X								X		X	X	X	X
Northern Long-Eared Bat - P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sprague’s Pipit – C	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
Greater Sage-Grouse - C						X												X										
Critical Habitat																												
Piping Plover - D			X				X	X				X	X	X	X								X		X	X	X	X
Dakota Skipper - P																									X			X
Poweshiek Skipperling – P																												

E – Endangered

T – Threatened

P – Proposed

C – Candidate

D – Designated

**County Occurrence of Endangered, Threatened, Proposed and Candidate Species
and Designated Critical Habitat in North Dakota**

January 2015

Species	M c L e a n	M e r c e r	M o r t o n	M o u n t r a i l	N e l s o n	O l i v e r	P e m b i n a	P i e r c e	R a m s e y	R a n s o m	R e n v i l l e	R i c h l a n d	R o l e t e	S a r g e n t	S h e r i d a n	S i o u x	S l o p e	S t a r k	S t e e l e	S t u t s m a n	T o w n e r	T r a i l l	W a l s h	W a r d	W e l l s	W i l l i a m s	
Interior Least Tern - E	X	X	X	X		X										X											X
Whooping Crane - E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Black-footed Ferret - E		X	X			X										X	X	X									
Pallid Sturgeon - E	X	X	X	X		X										X											X
Gray Wolf - E	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Poweshiek Skipperling – E												X		X													
Piping Plover - T	X	X	X	X		X		X			X				X	X					X				X	X	X
Western Prairie Fringed Orchid - T										X		X															
Dakota Skipper - T	X			X		X		X		X		X		X							X				X	X	
Rufa Red Knot - T	X	X	X	X		X		X			X				X	X					X				X	X	X
Northern Long-Eared Bat - P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sprague=s Pipit - C	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X		X	X		X	X	X	X	X
Greater Sage-Grouse – C																	X										
Critical Habitat																											
Piping Plover - D	X	X	X	X		X		X			X				X	X					X				X		X
Dakota Skipper - P										X		X	X													X	
Poweshiek Skipperling – P												X		X													

E – Endangered

T – Threatened

P – Proposed

C – Candidate

D - Designated