[AV]U.S. Shale Gas - Trends and Expansion*

By
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Abstract

High prices and increased success in exploration and production are the incentives behind the sharp increase in shale gas exploration in the U.S. Without doubt the Barnett has the most recent completions and a continuous increase in production. However, other gas shales in the U.S. are proving to be highly productive, and these plays are expanding and the center of sharply increased activity in several areas of the county. Drilling in shale gas plays in the U.S. has increased from over 2900 completions in 2004 to over 3400 in 2005, with 2006 completions totaling over 3600. Permits for shale gas drilling also have increased in 2006 and 2007. What are the expanding shale gas plays in the U.S.? Based on 2006 activity, gas shales in several basins are showing increased activity, including the Fayetteville Shale in the Arkoma Basin, the Lewis and Mancos shales in the Uinta and San Juan basins, and the Devonian and Antrim shales in the Eastern U.S. basins. The Barnett shale continues to have increased activity. Total cumulative gas production from the Barnett shale is now over 2800 bcf. An analysis of completion maps and graphing of production figures illustrate the expansion and success of gas shale exploration and development in the U.S. The shale gas activity in the U.S. indicates that such production will continue to be an increasing source of unconventional gas in the U.S. and a model for international shale gas exploration.

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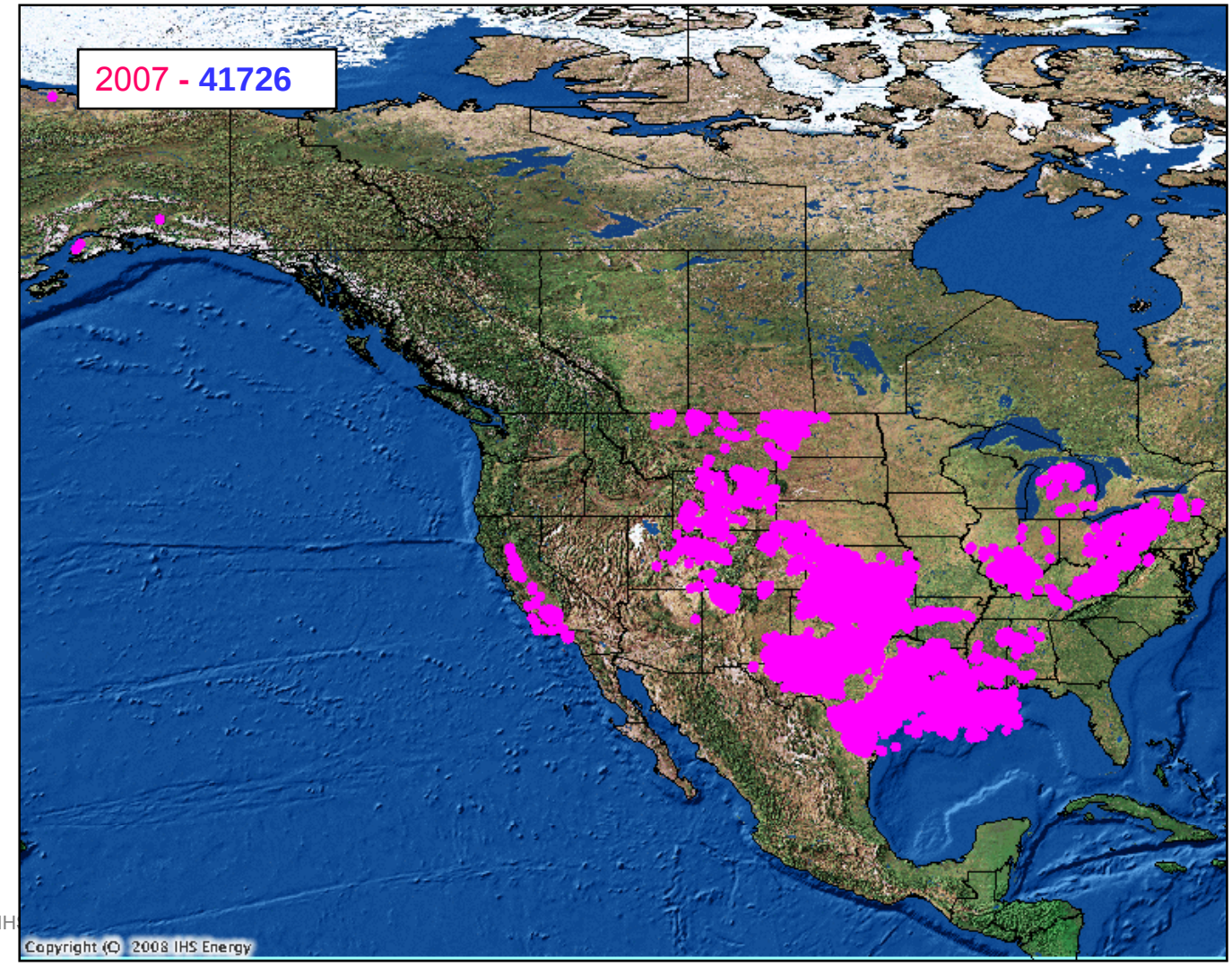
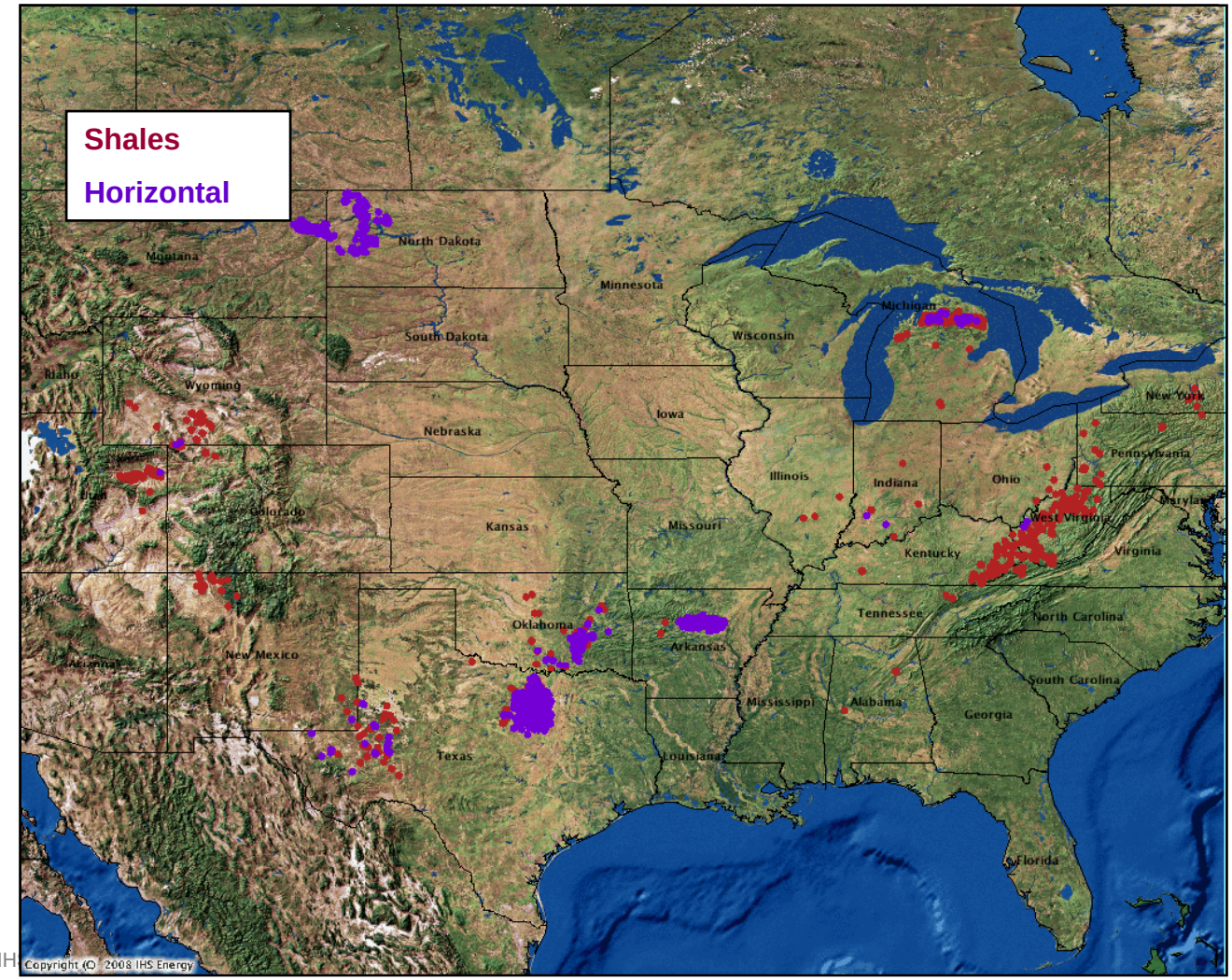
U.S. Shale Gas Trends and Expansion

David D. Reimers

2007 U.S. Completions



2007 U.S. Shale Completions



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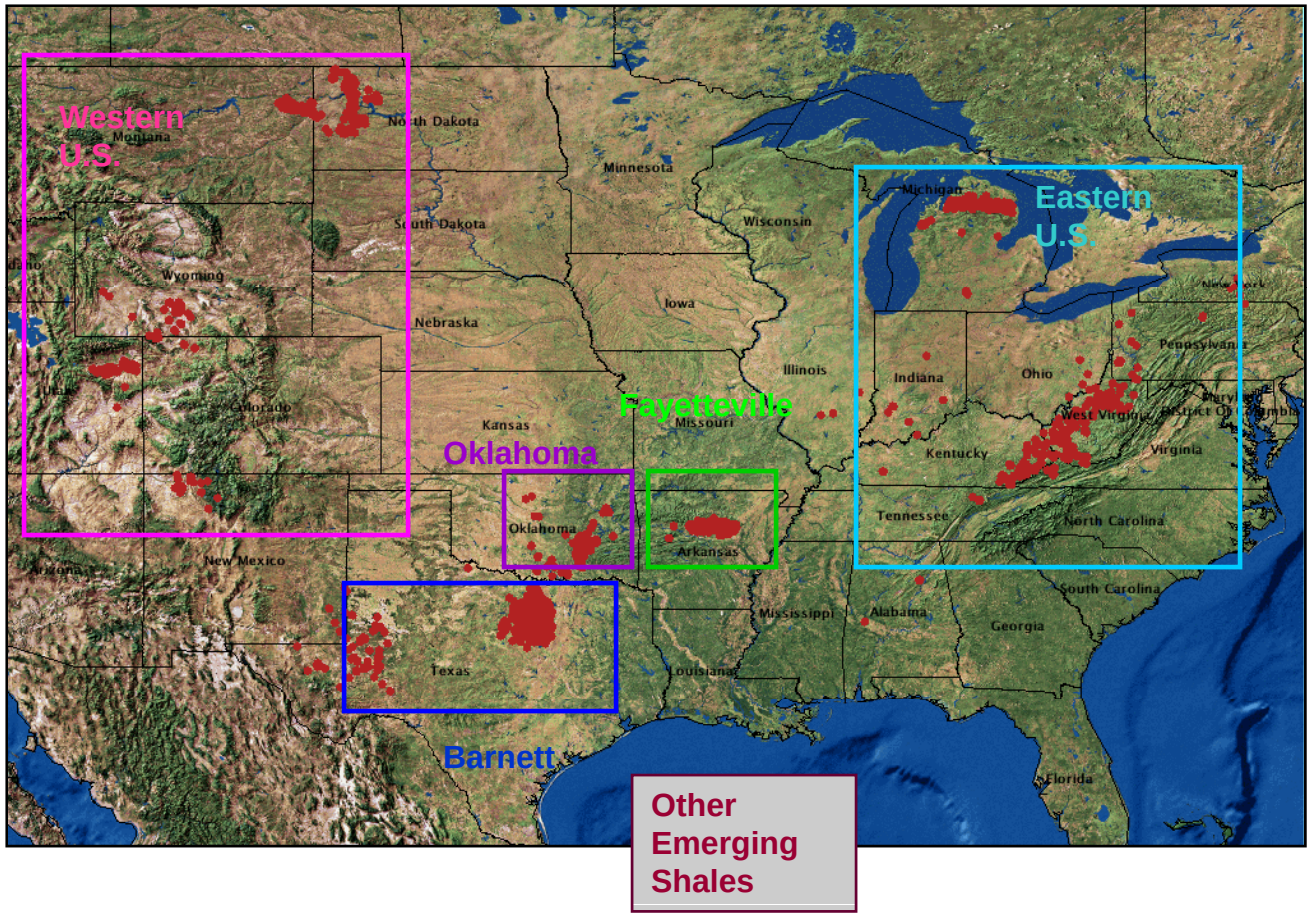
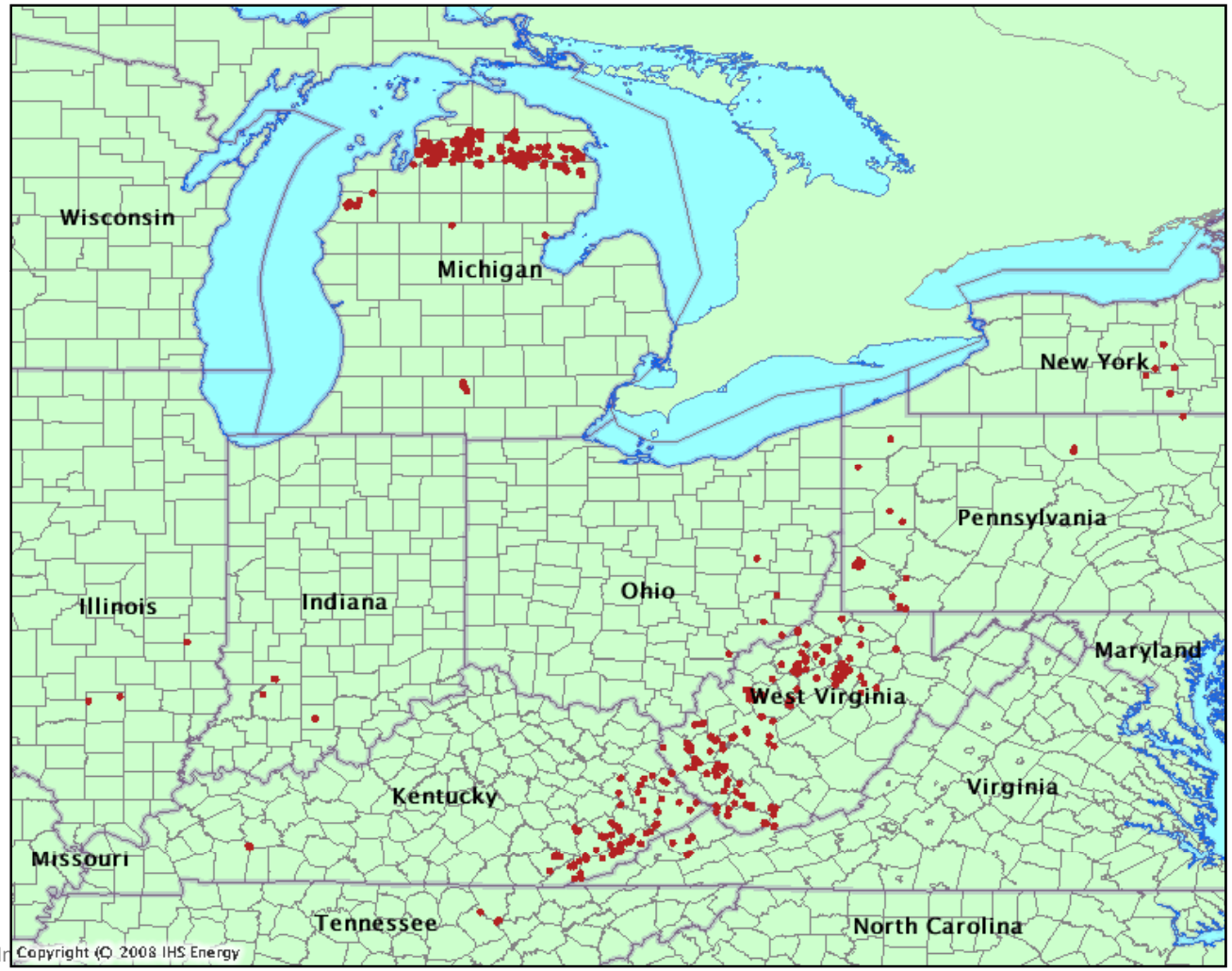
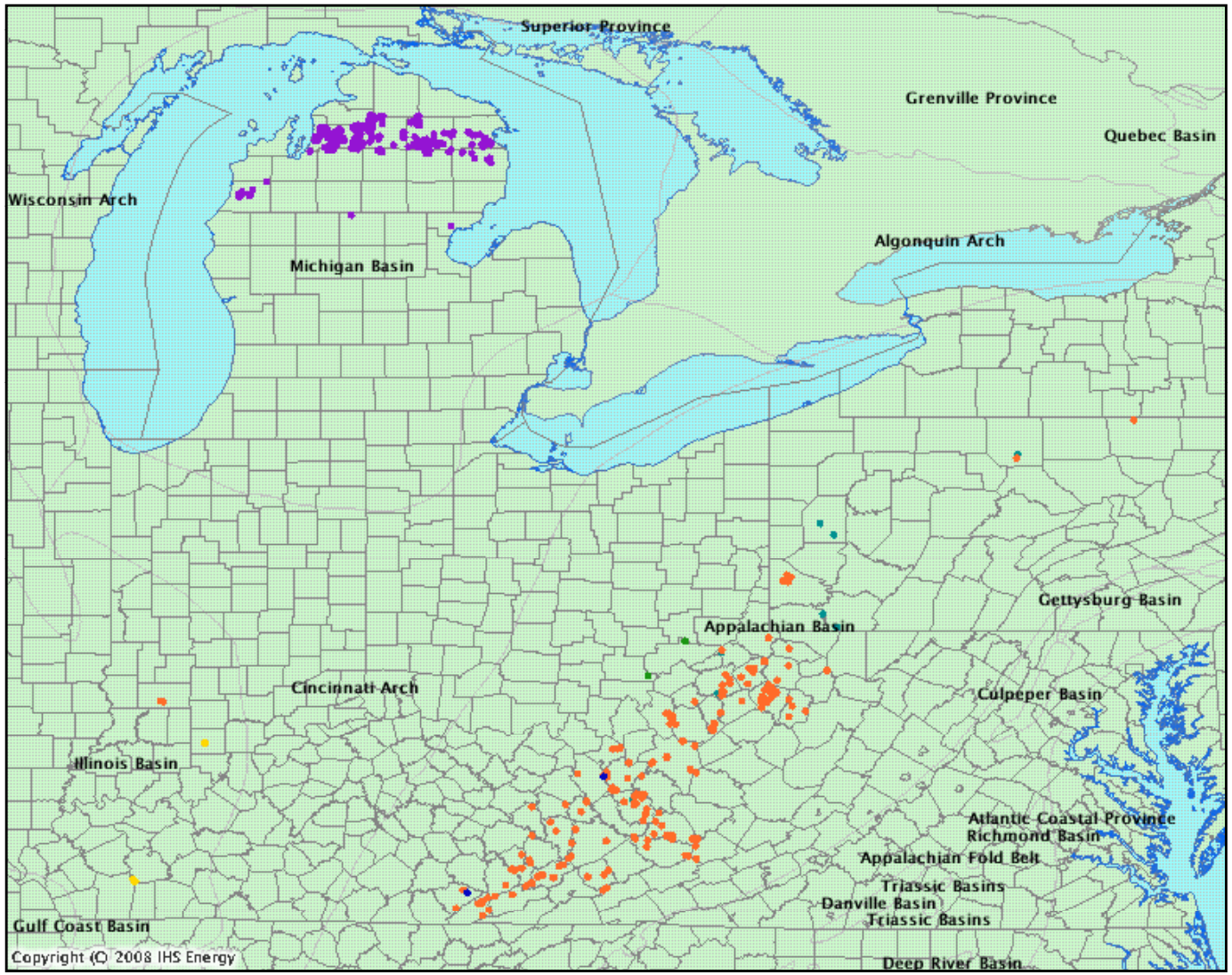


Northeast U.S. Area

2007 Northeast Shale Completions



2007 Northeast Shale Completions



Devonian

Antrim

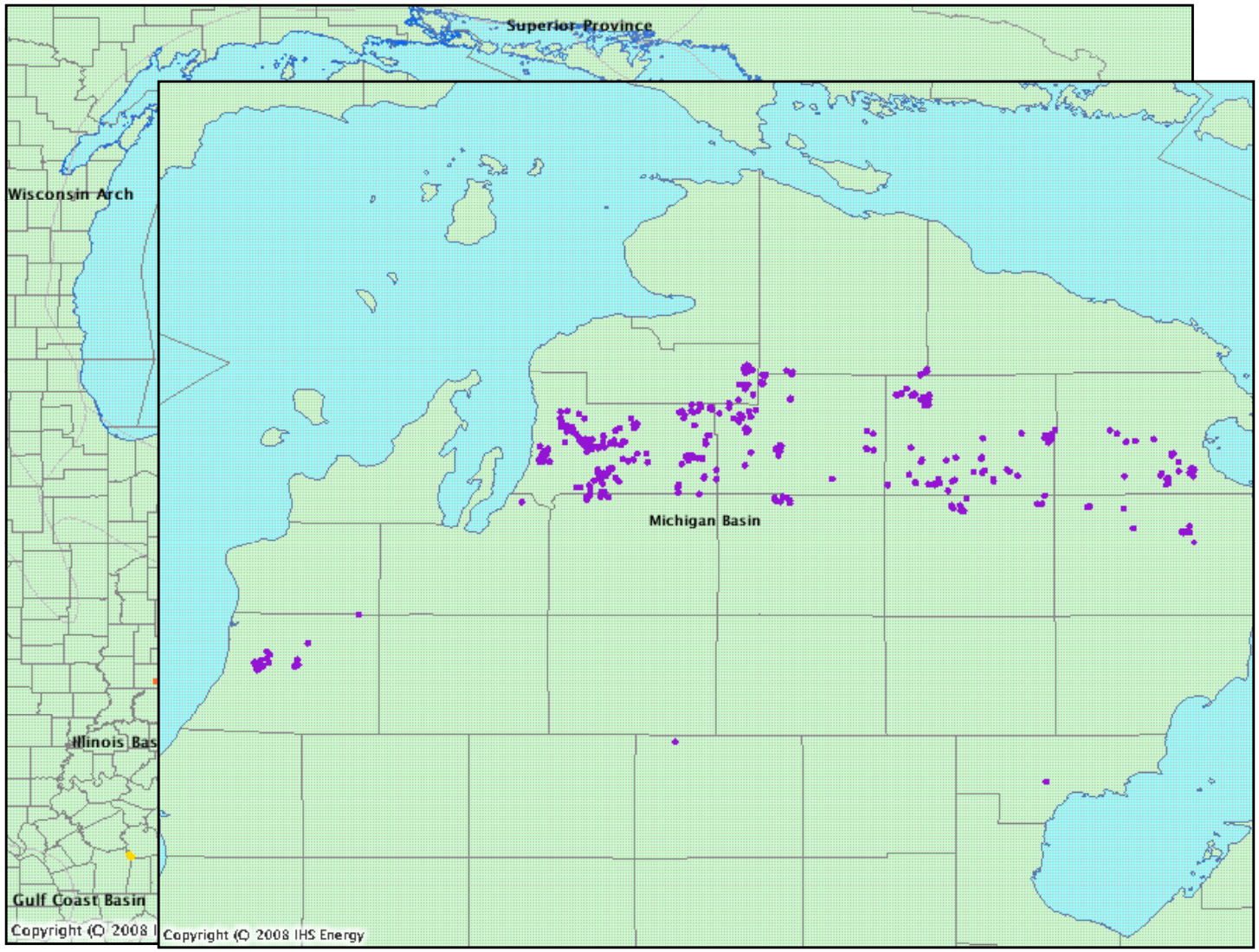
Ohio

Sunbury

New Albany

Marcellus

2007 Northeast Shale Completions



Devonian

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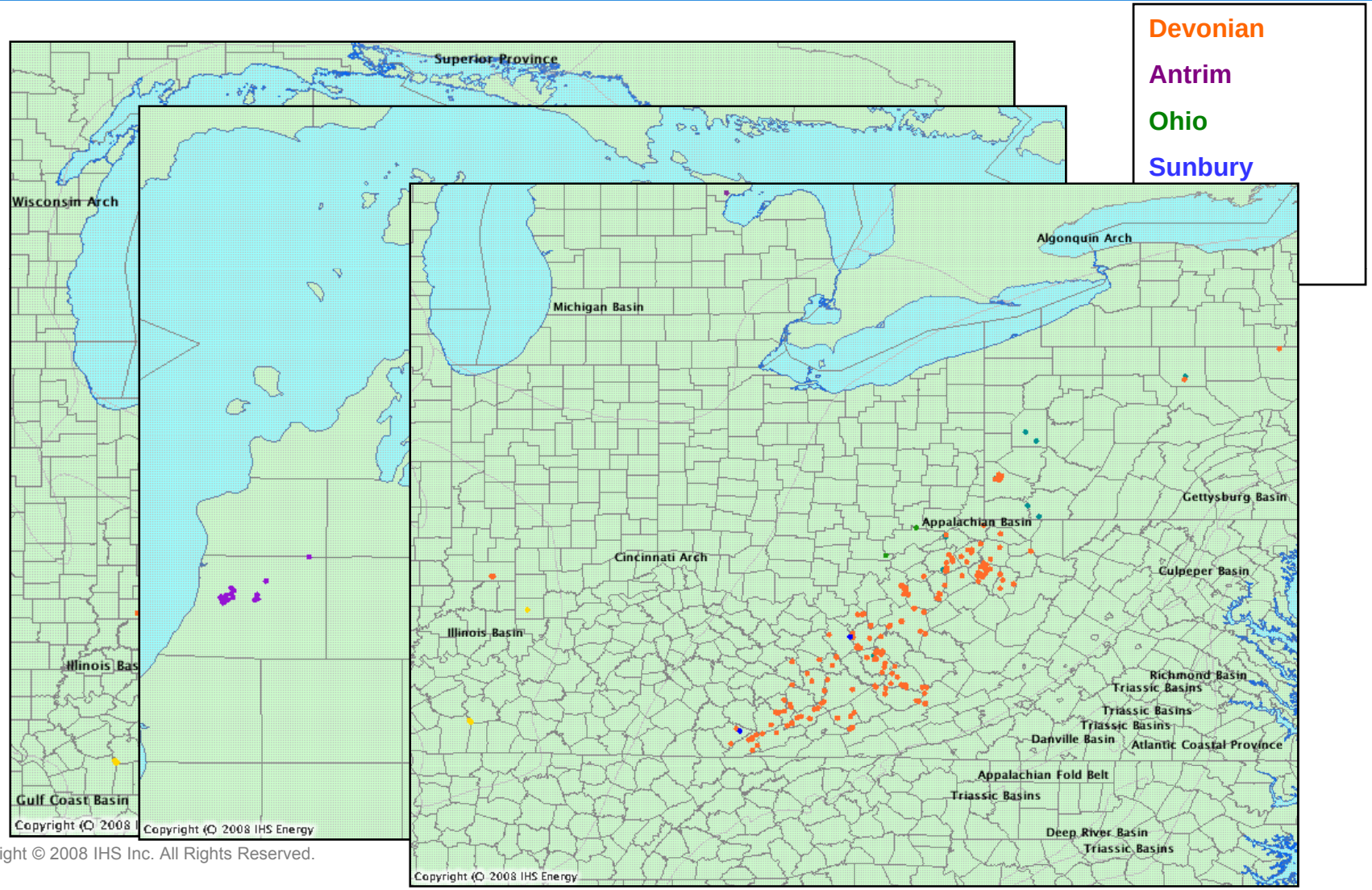
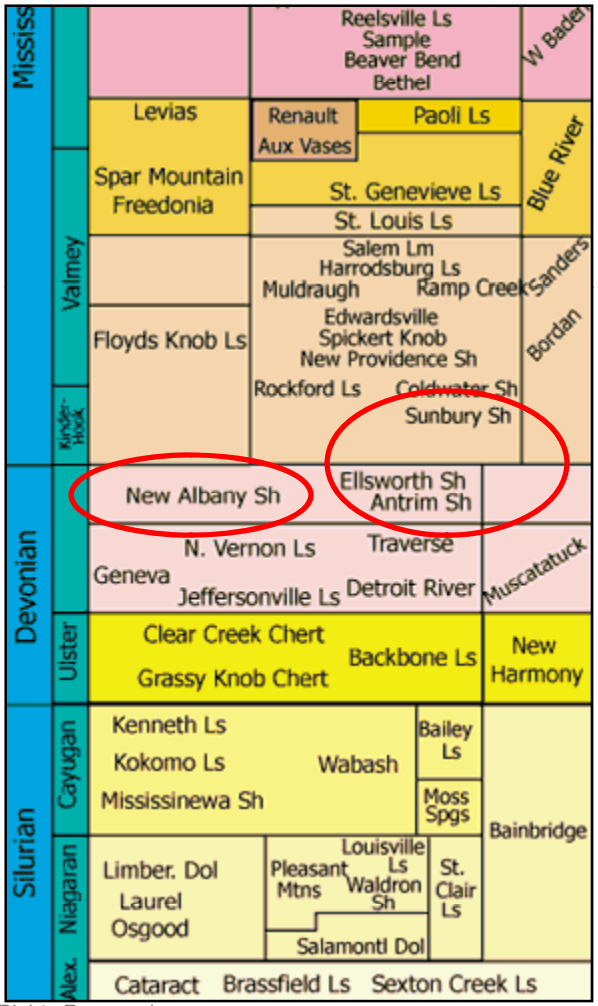
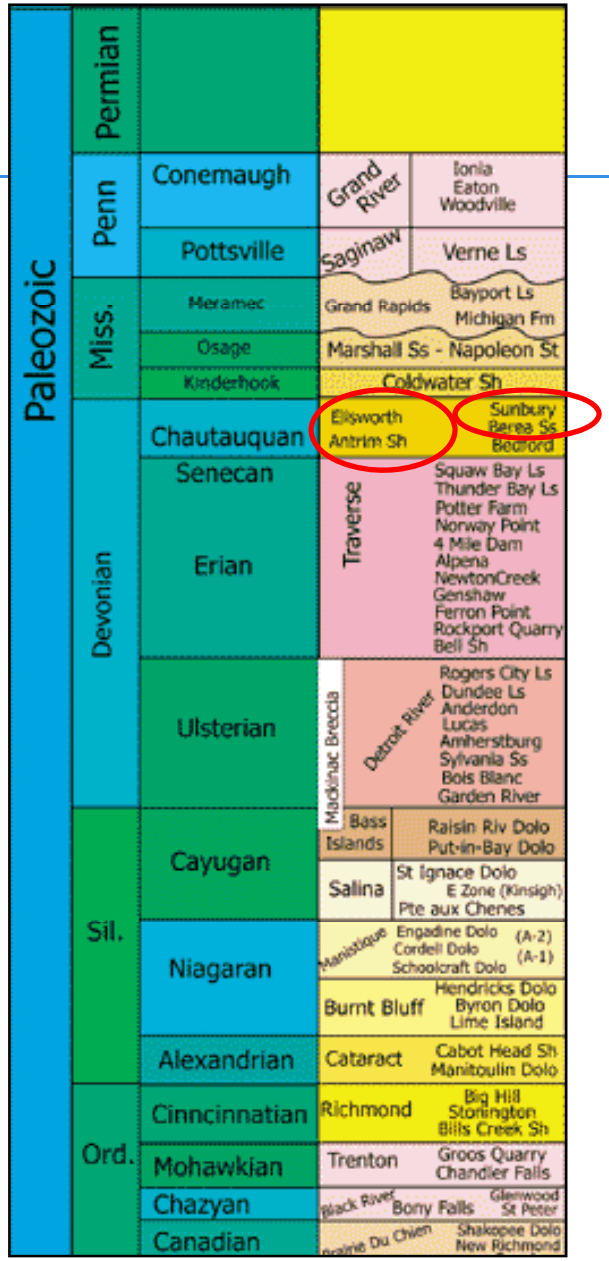
2007 Northeast Shale Completions

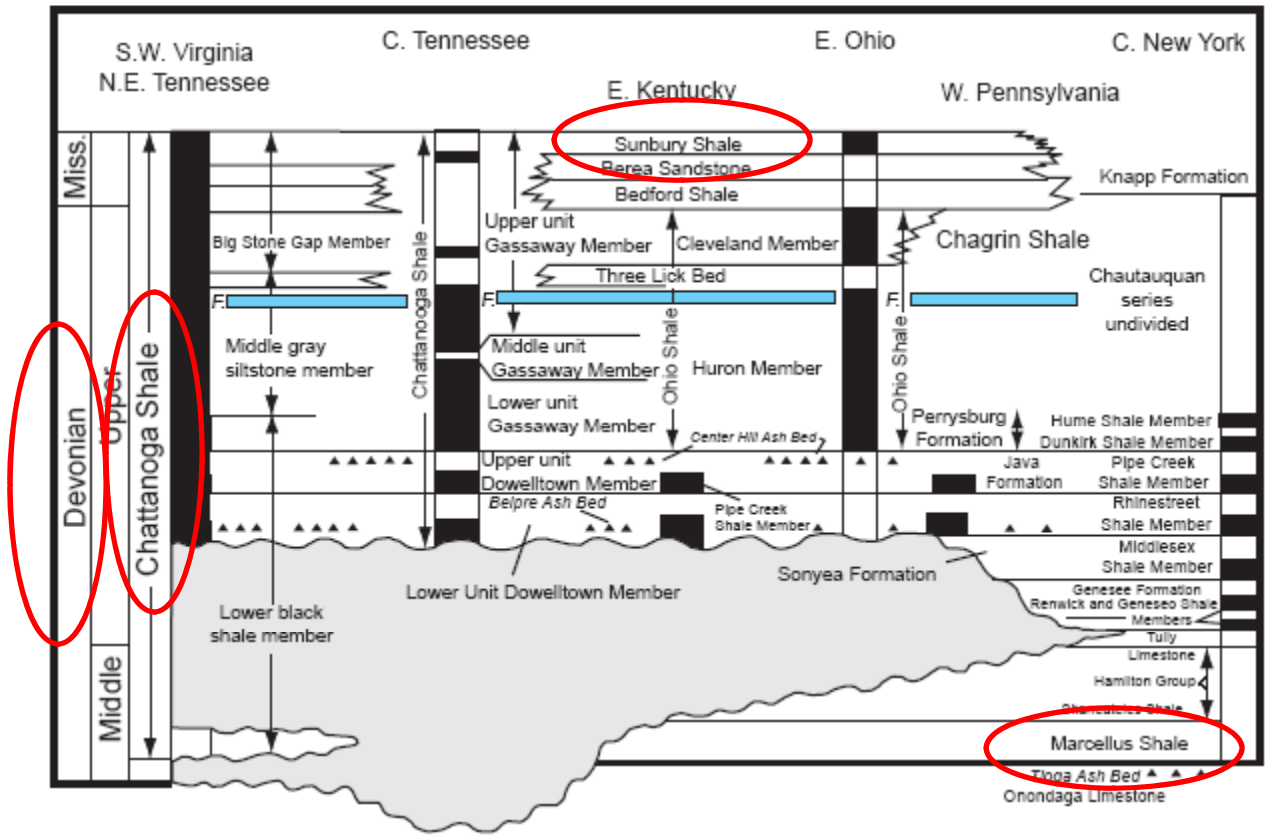


Stratigraphy

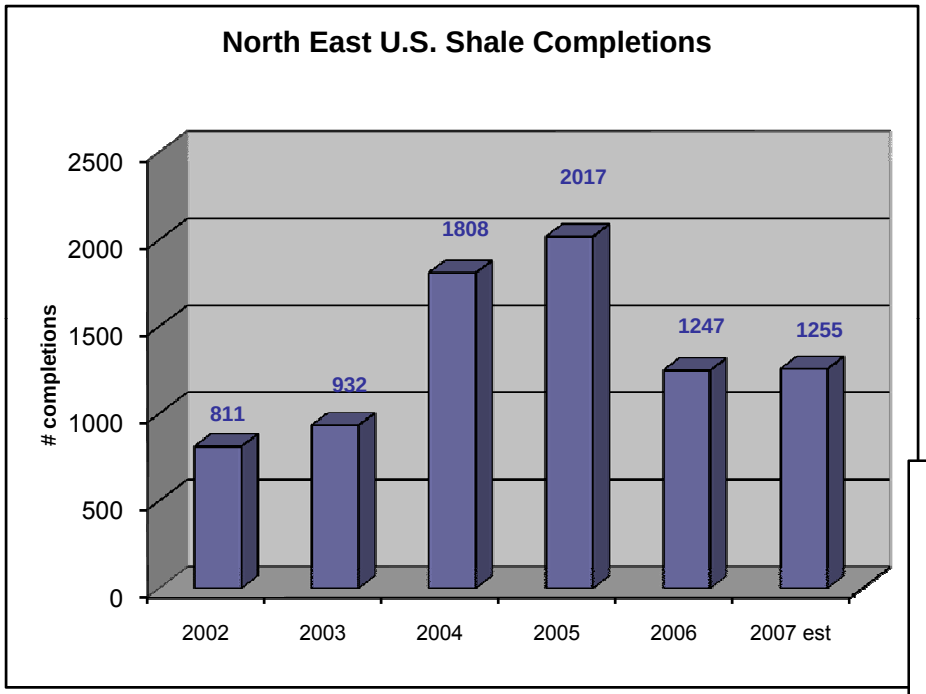


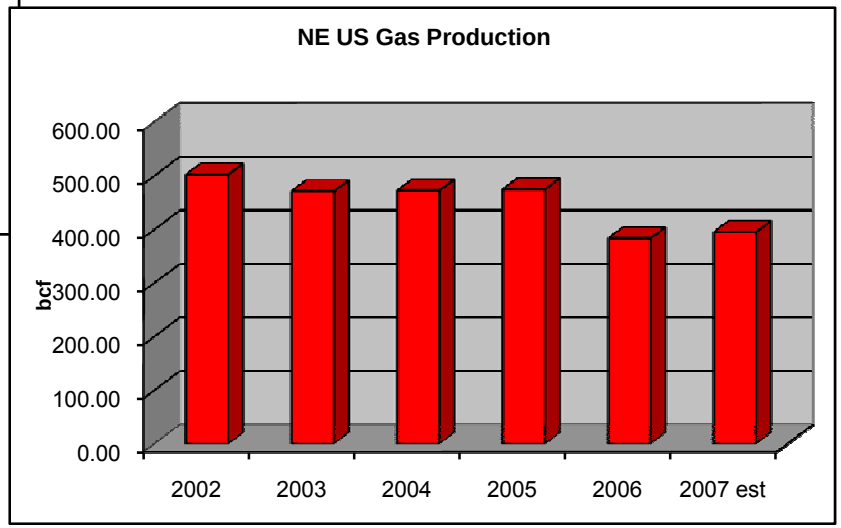


Stratigraphy

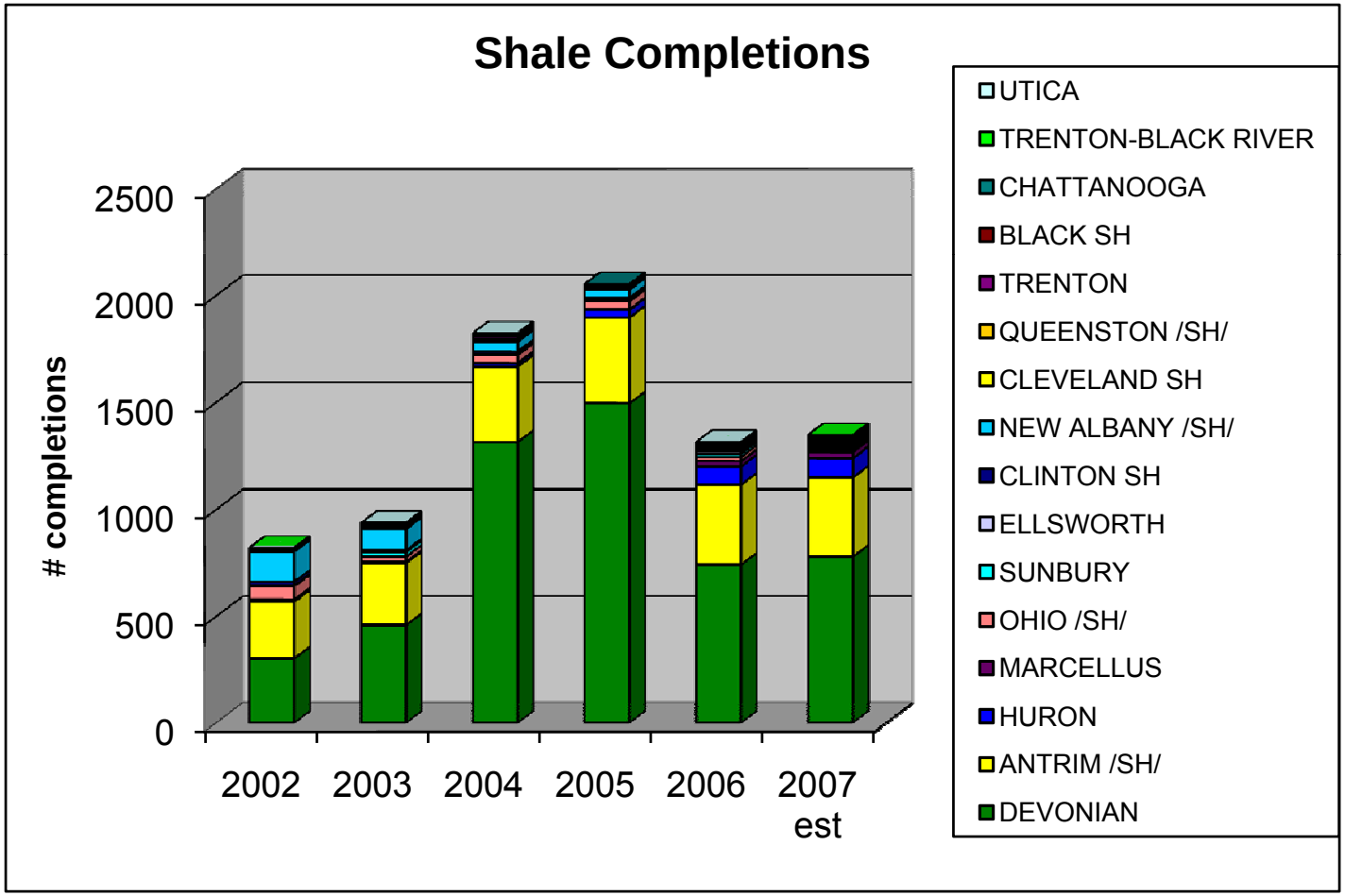


Northeast U.S. Shale Production

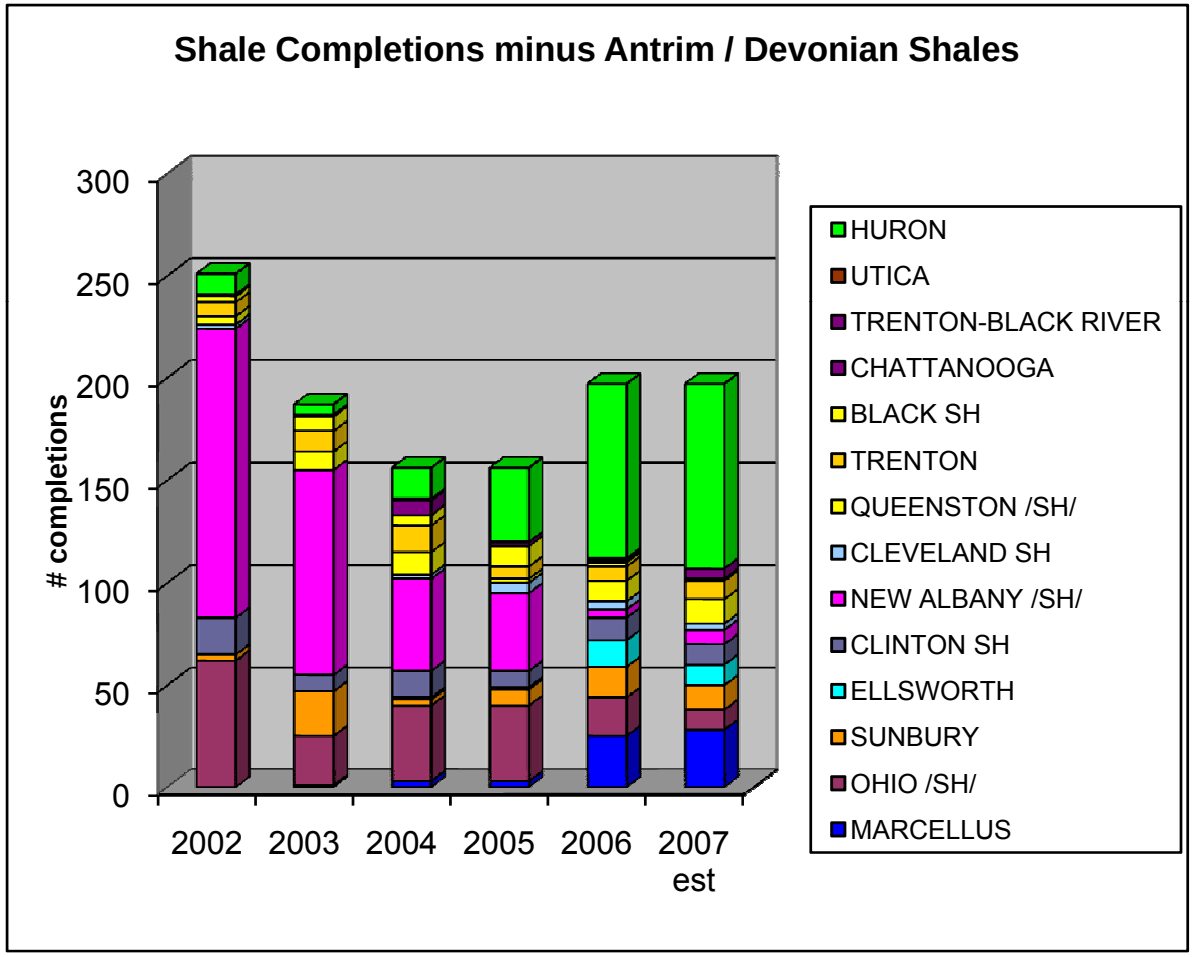




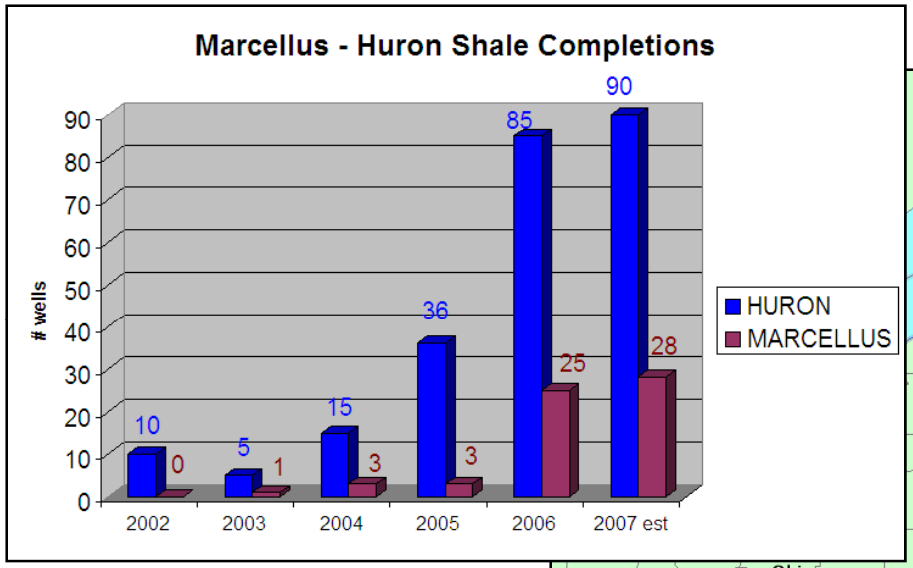
Shale Completion Formations 2002-2007

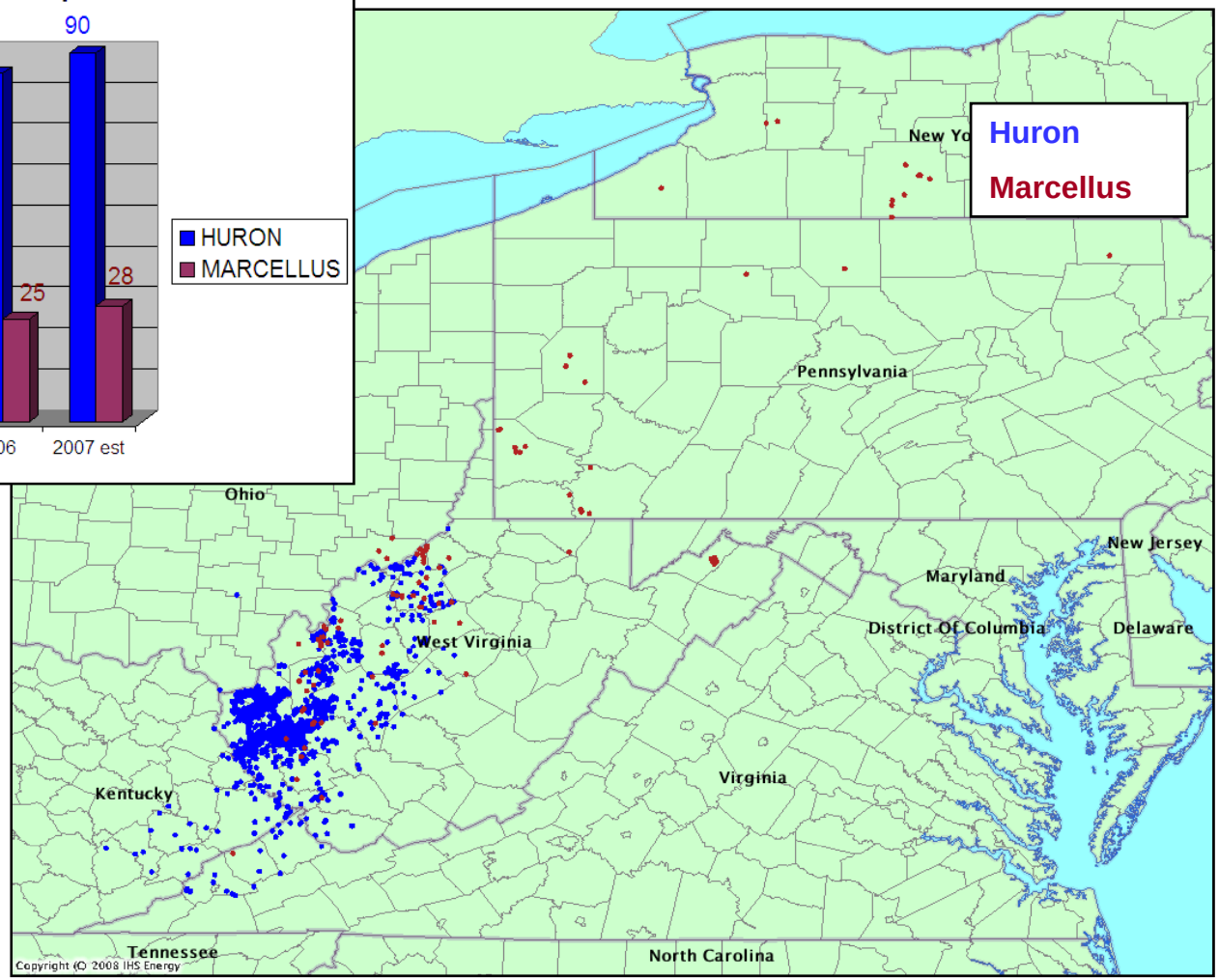


Shale Completion Formations 2002-2007
(without Devonian and Antrim)

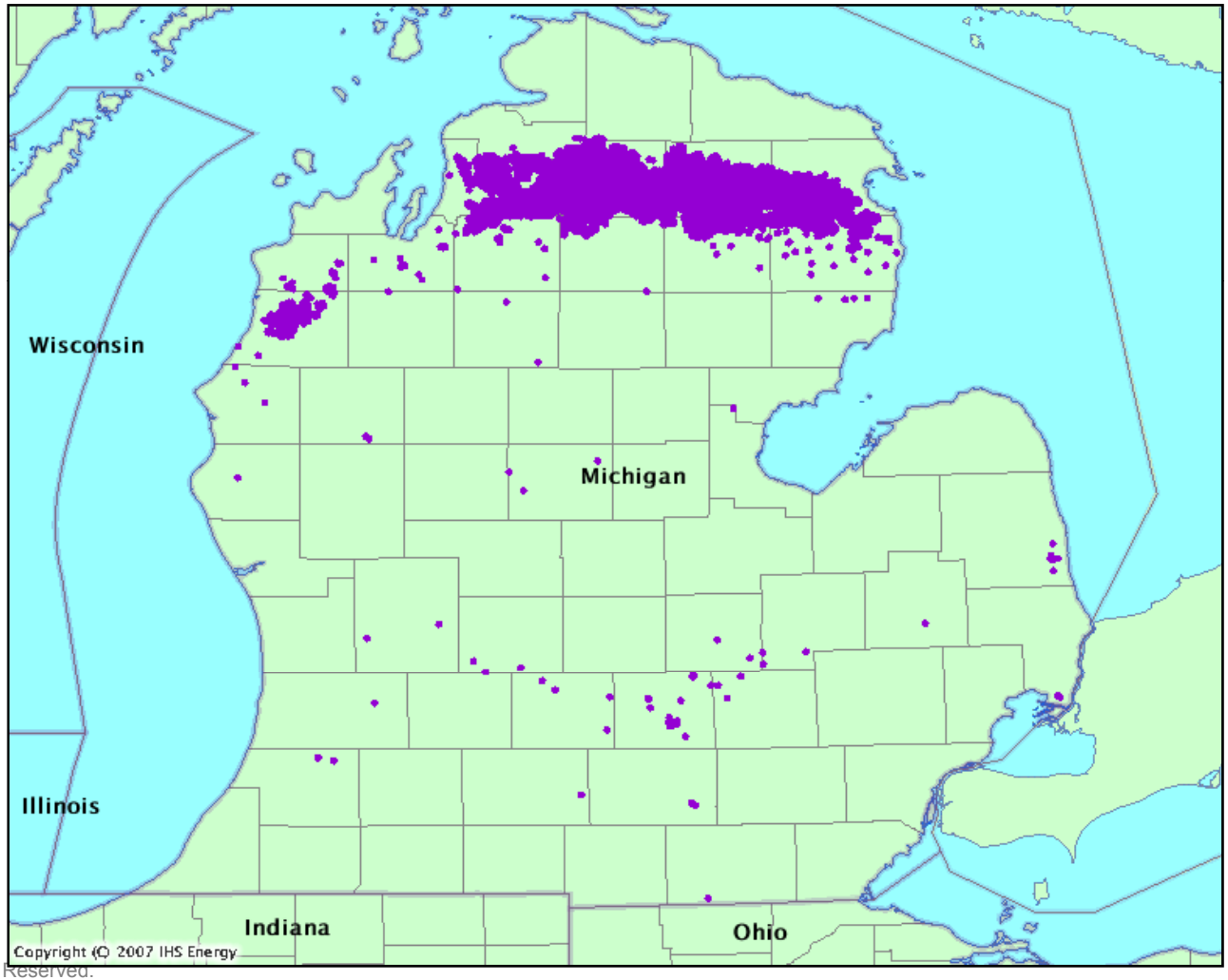


Marcellus – Huron Shales

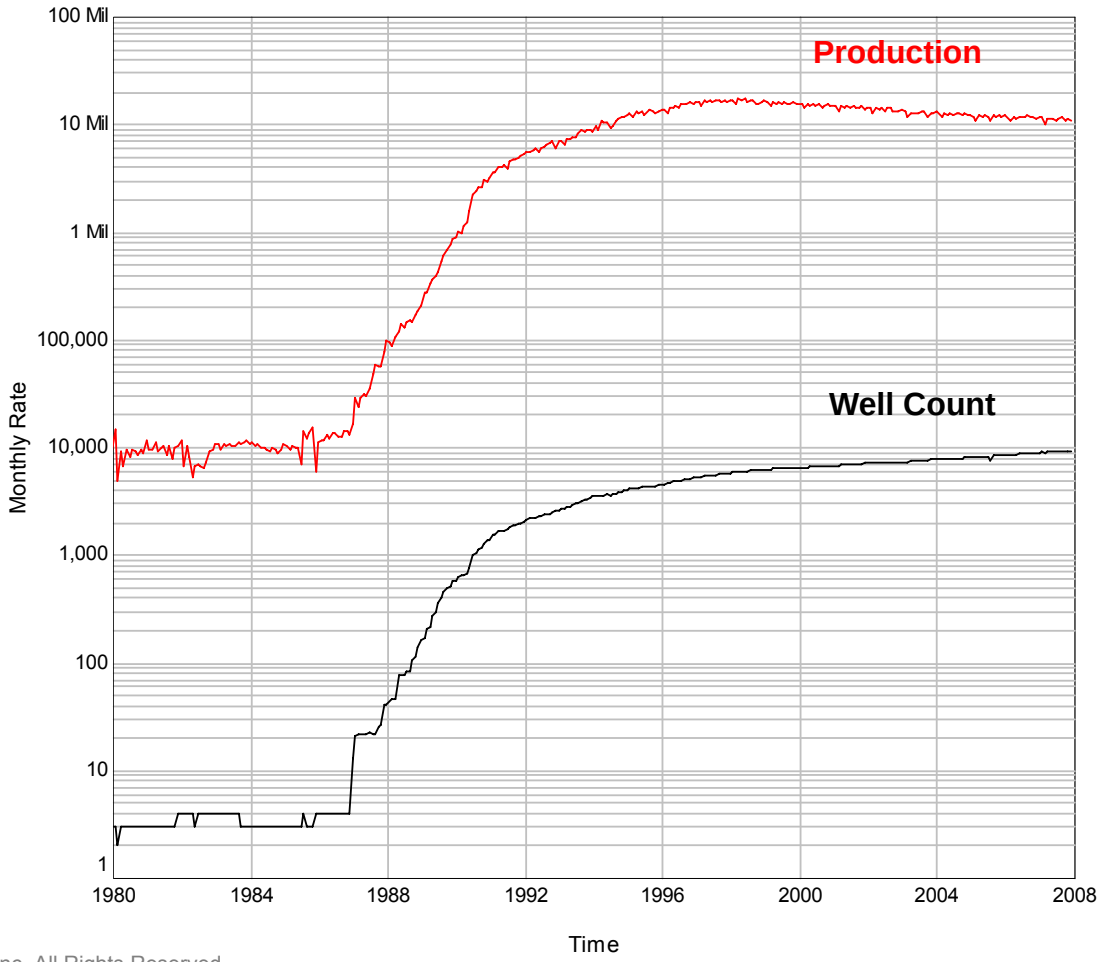




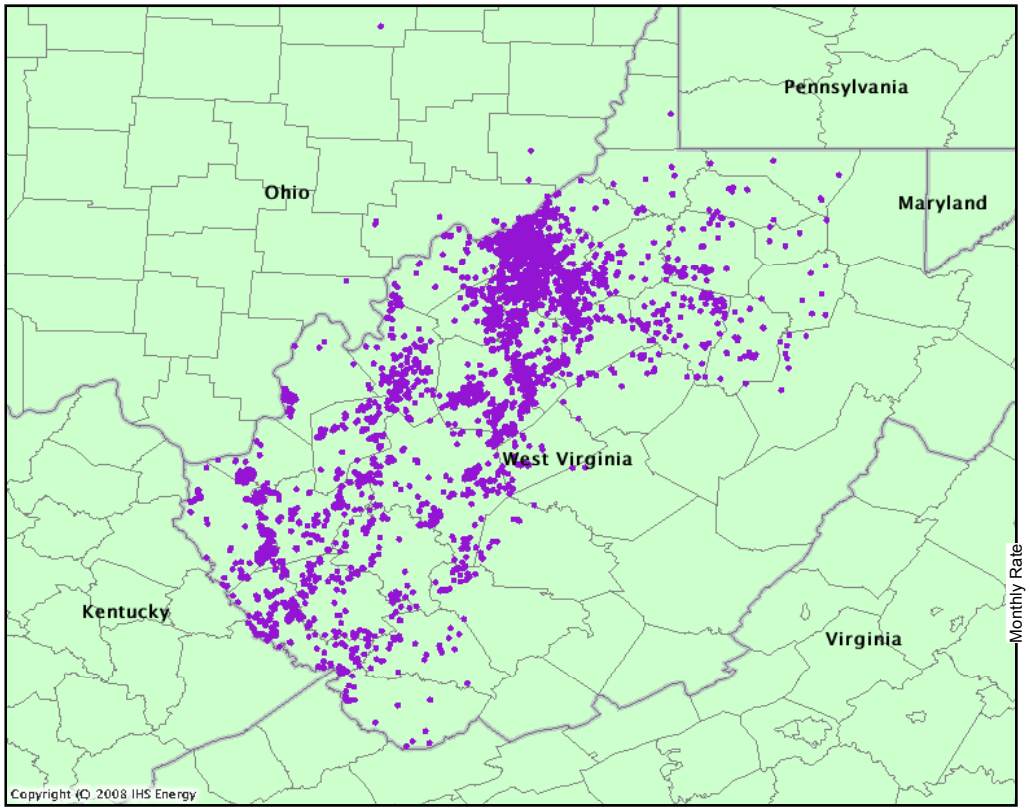
Antrim Shale Production

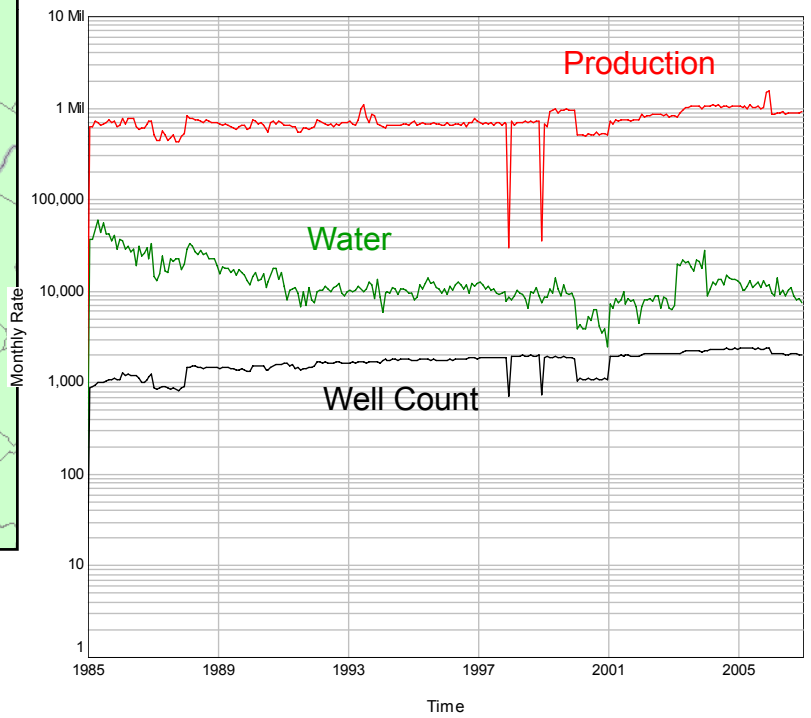


Antrim Production (monthly rate vs. time) (with well count)

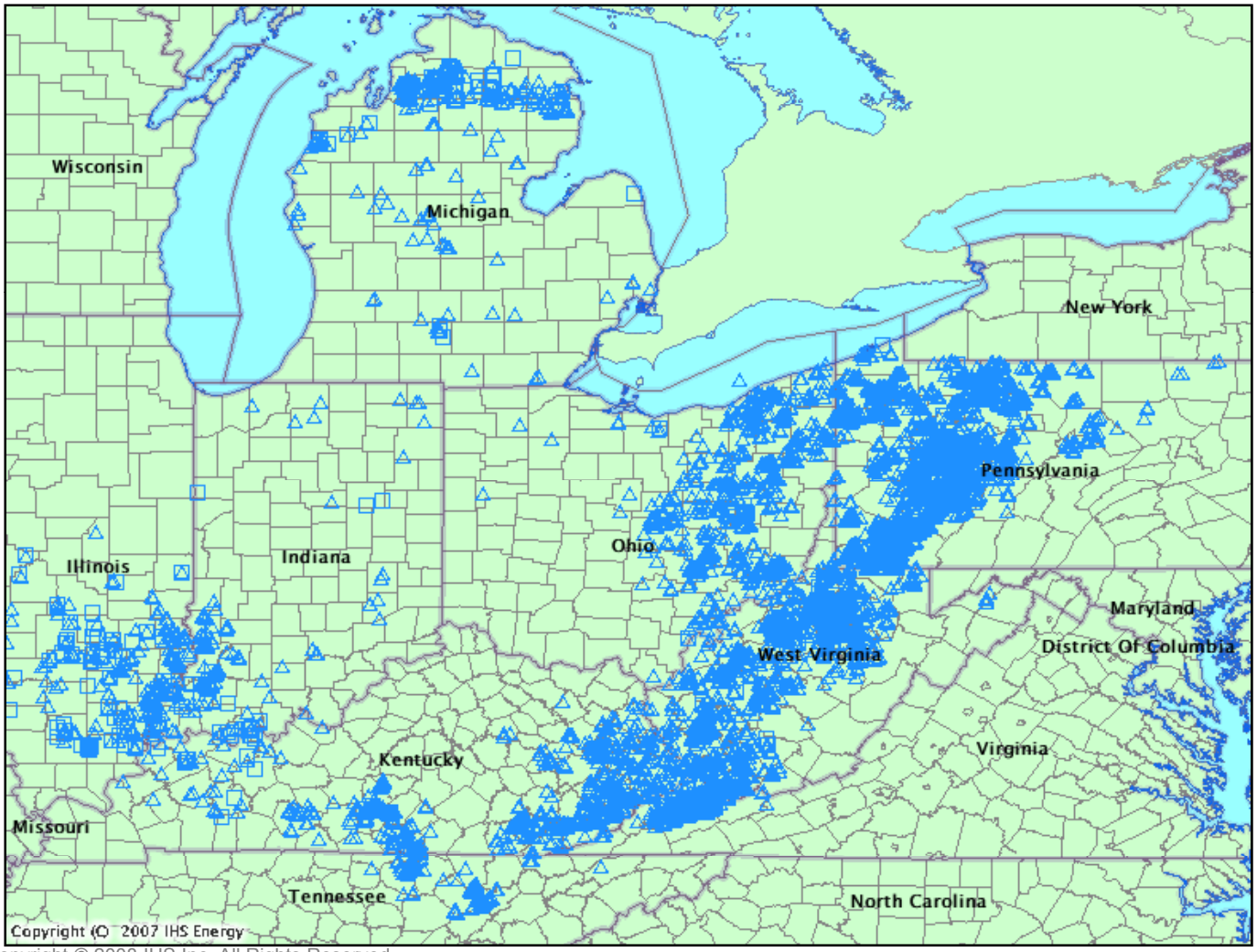


West Virginia Devonian Shale Production

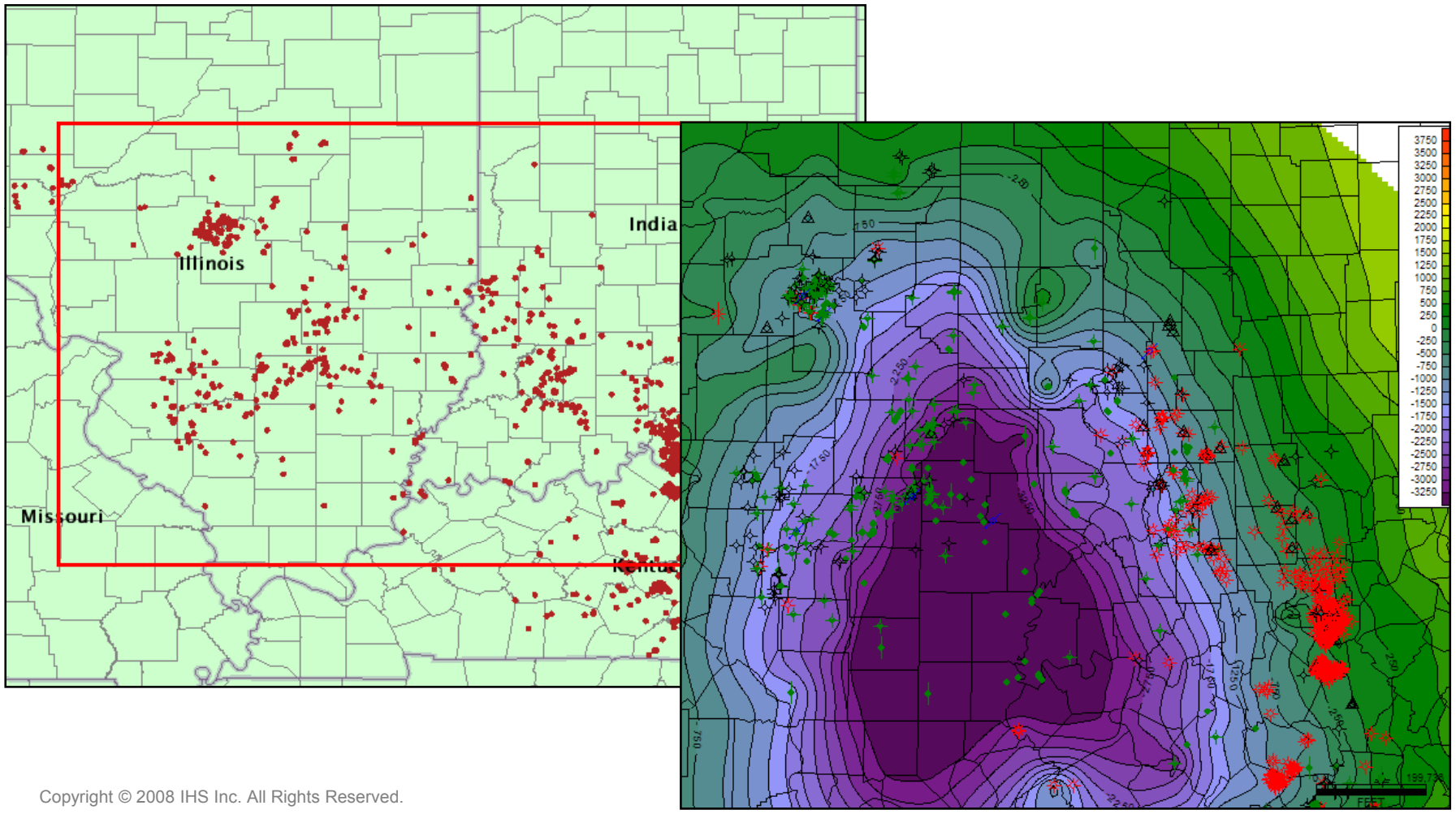




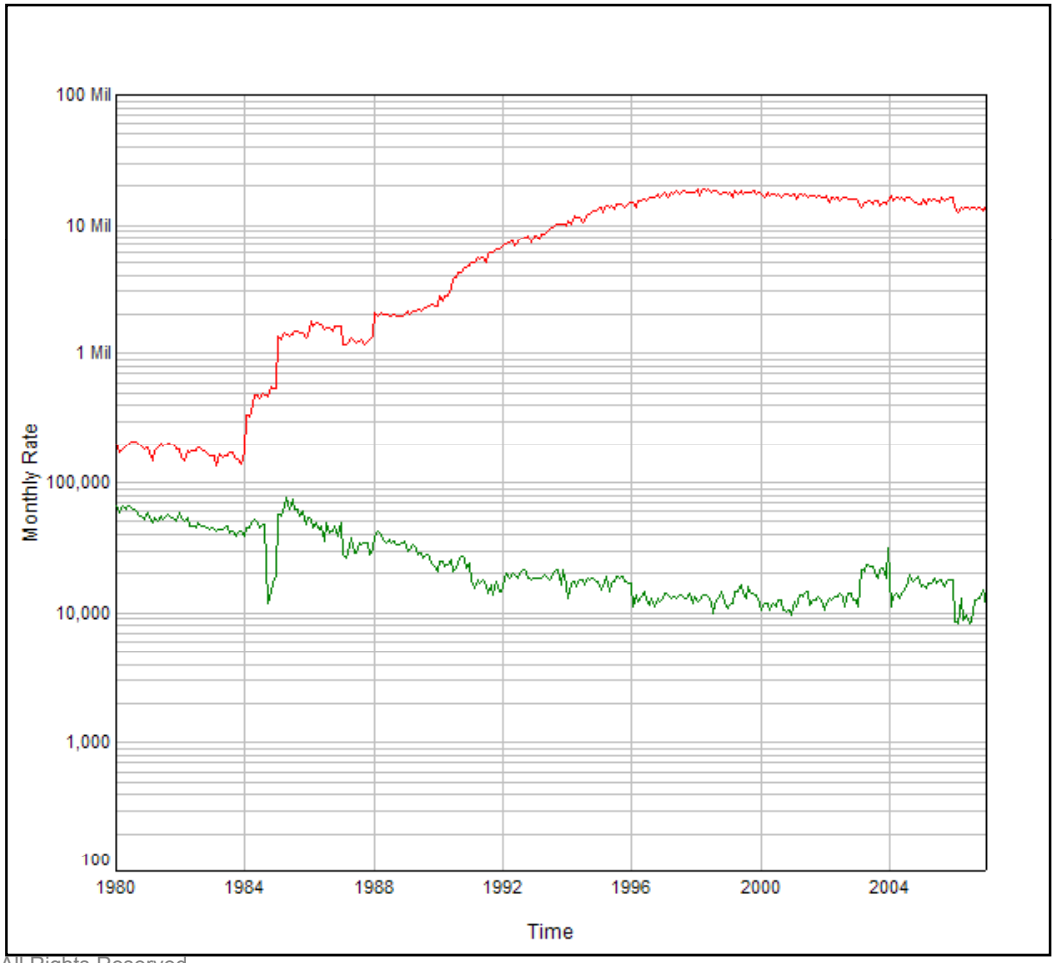
2007 Shale Permits



New Albany Structure map



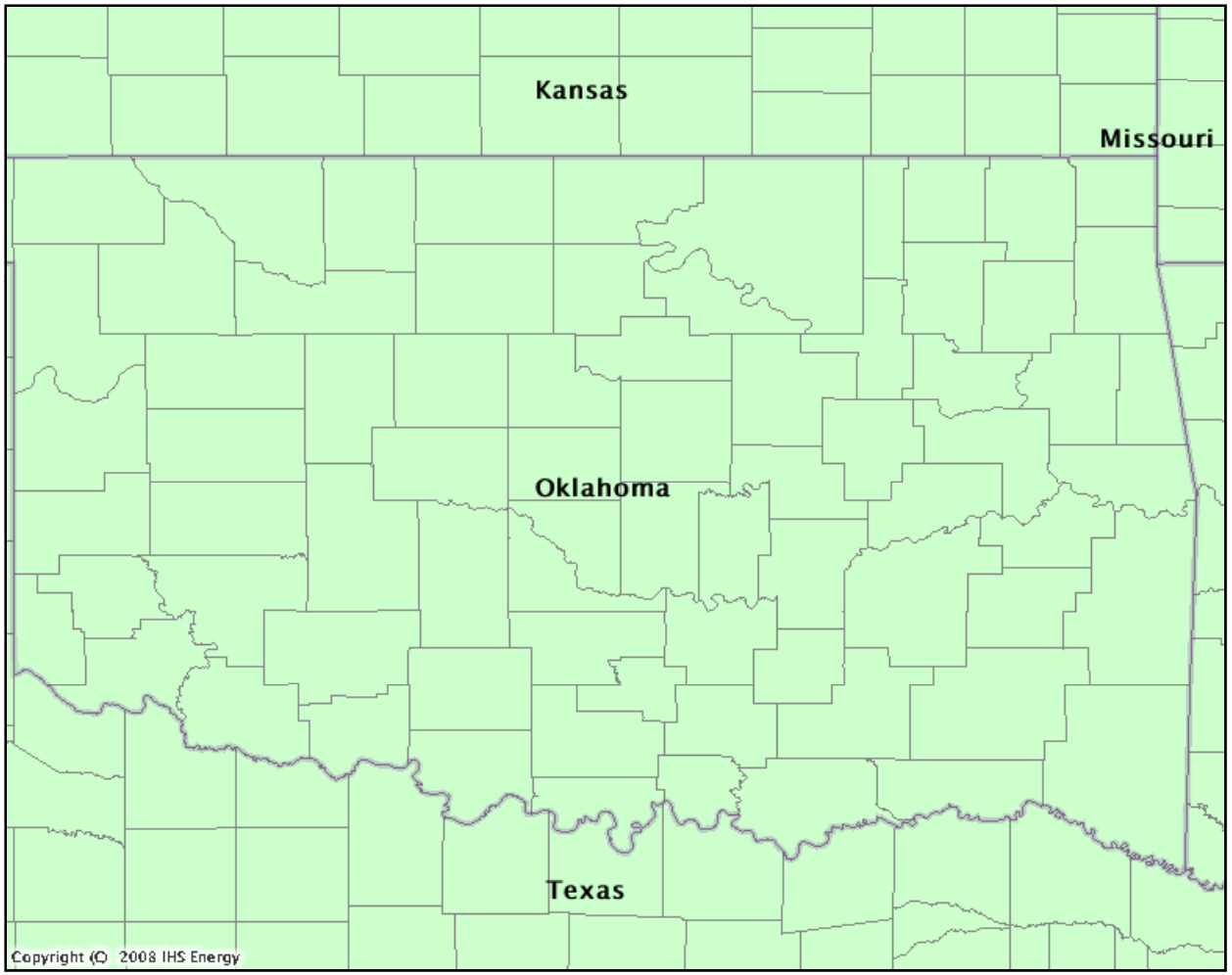
North East U.S. Shale Production



Northeast U.S. Shale Conclusions

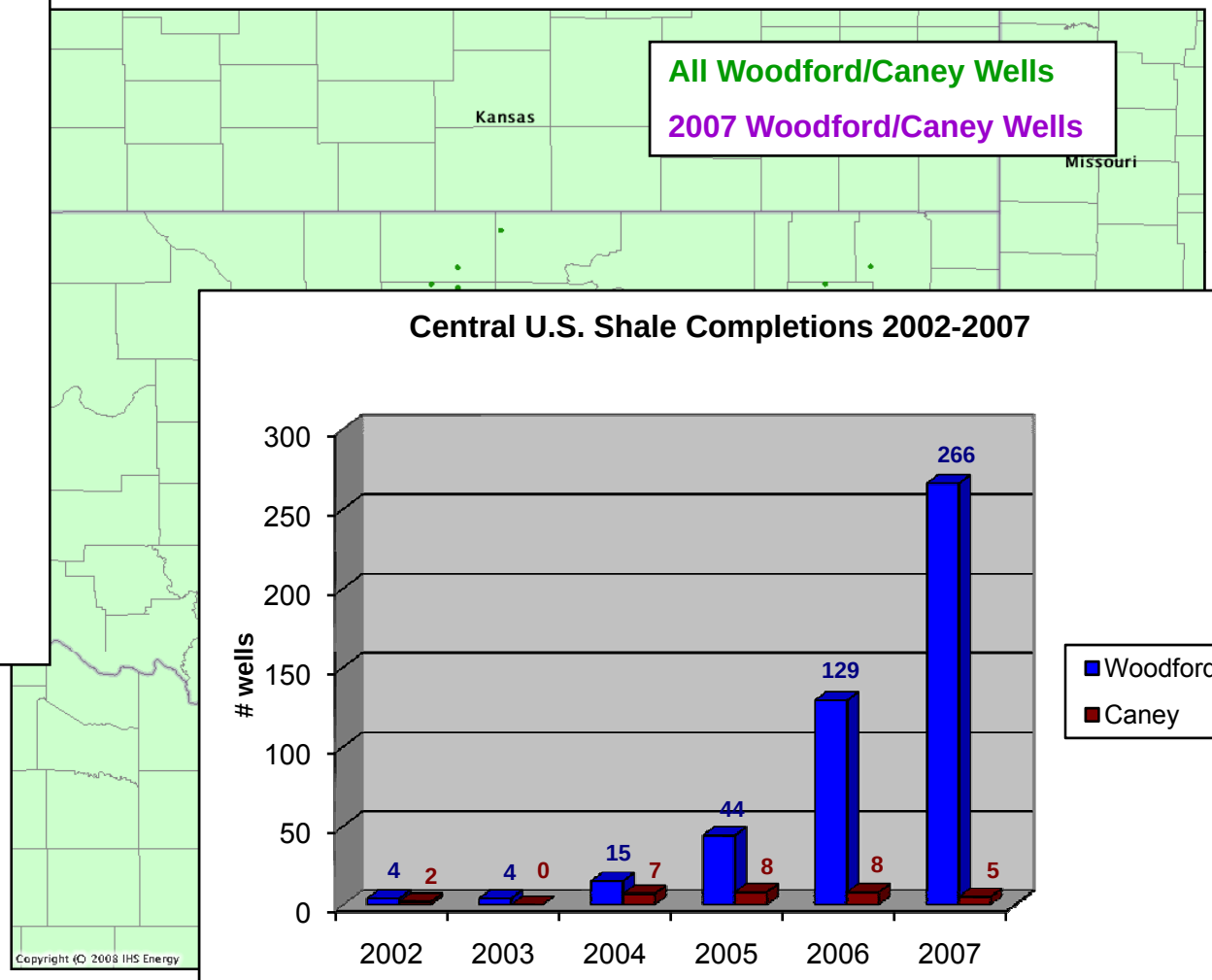
- Northeast total U.S. completions continue to increase
- Northeast shale completions are level
- Resulting in level gas production

Central U.S. Area

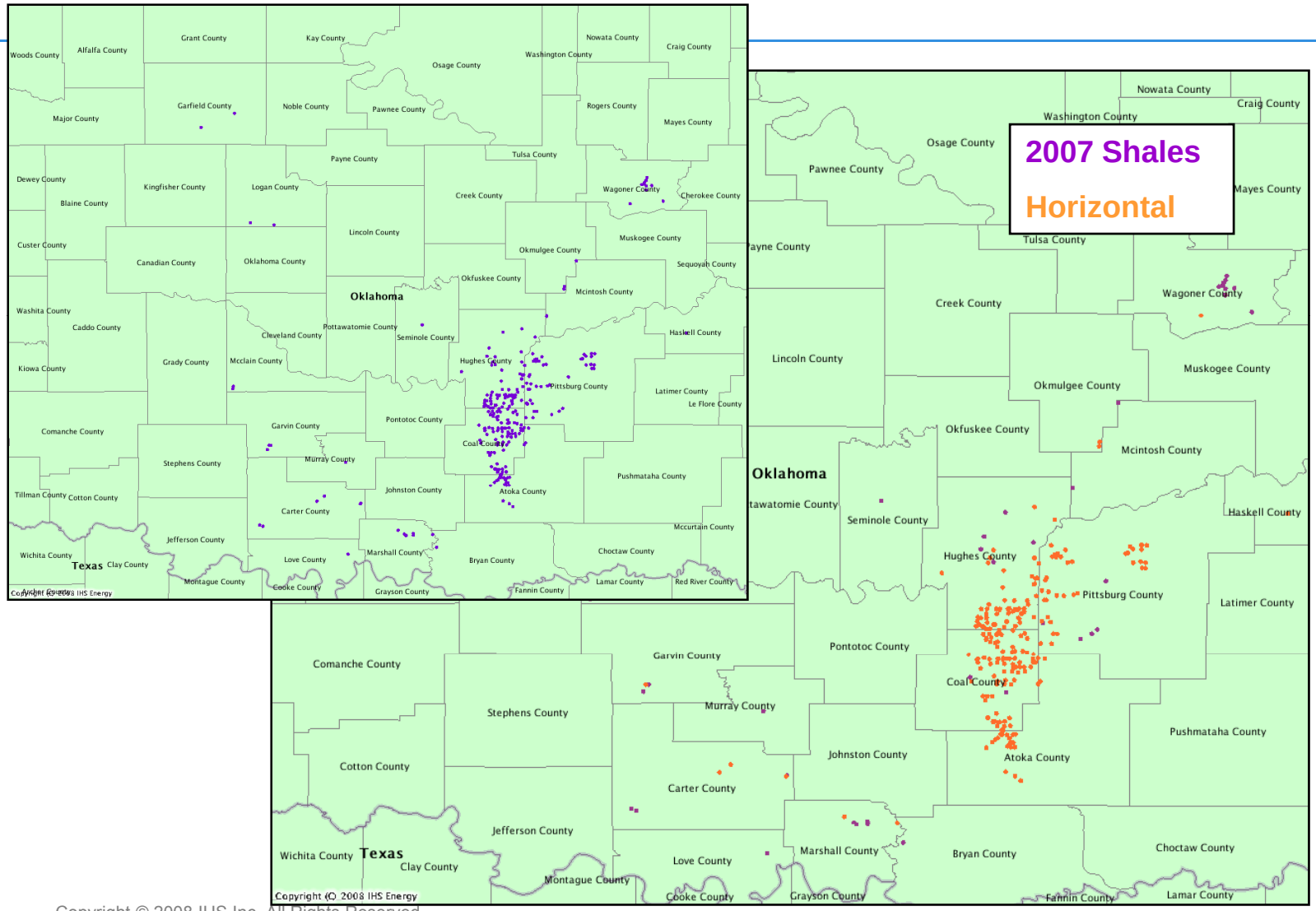


Oklahoma Shales 2007 and Before

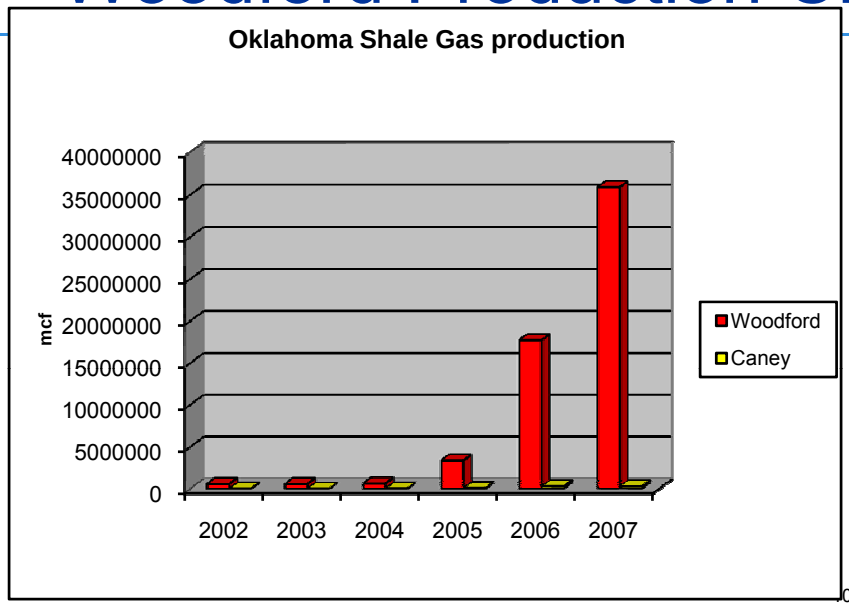
SYSTEM	SERIES	FORMATION
Pennsylvanian	Des Moines	Boogy
		Hartshorne
	Atoka	Atoka
	Morrow	Morrow
Mississippian		Springer
		Caney Shale
		Woodford
Devonian		Hunton
Silurian		

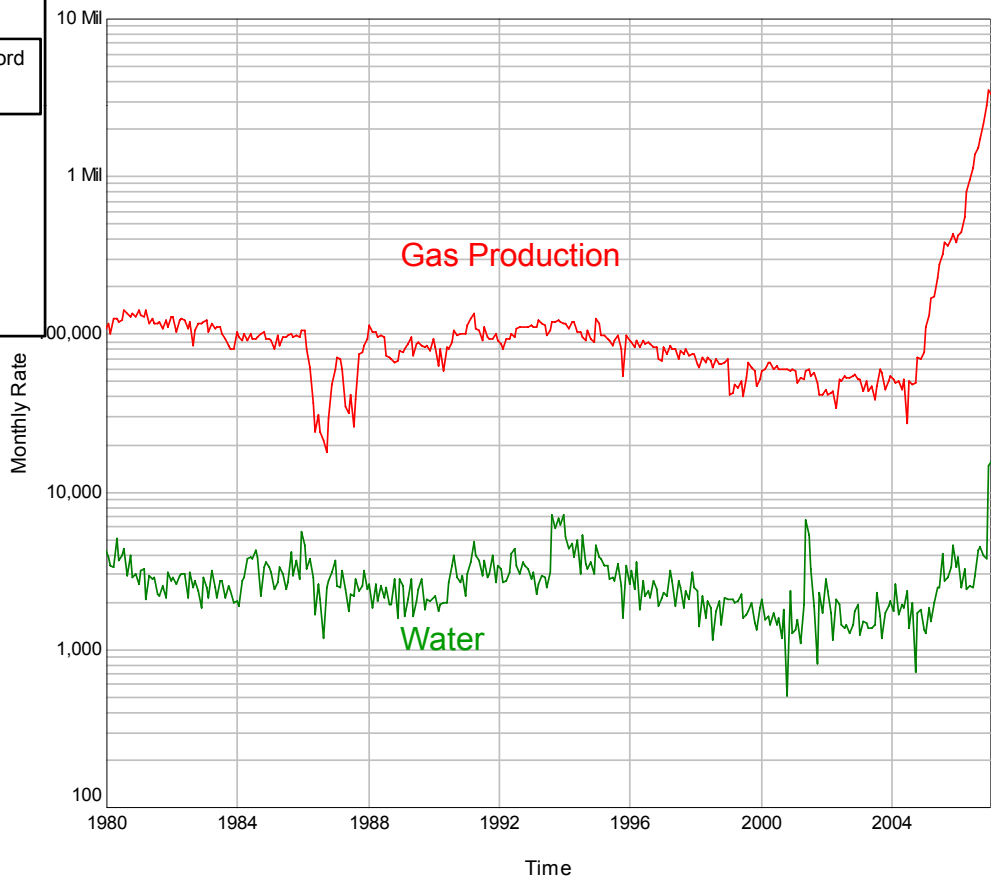


2007 Oklahoma Horizontal Shale Completions



Woodford Production Chart

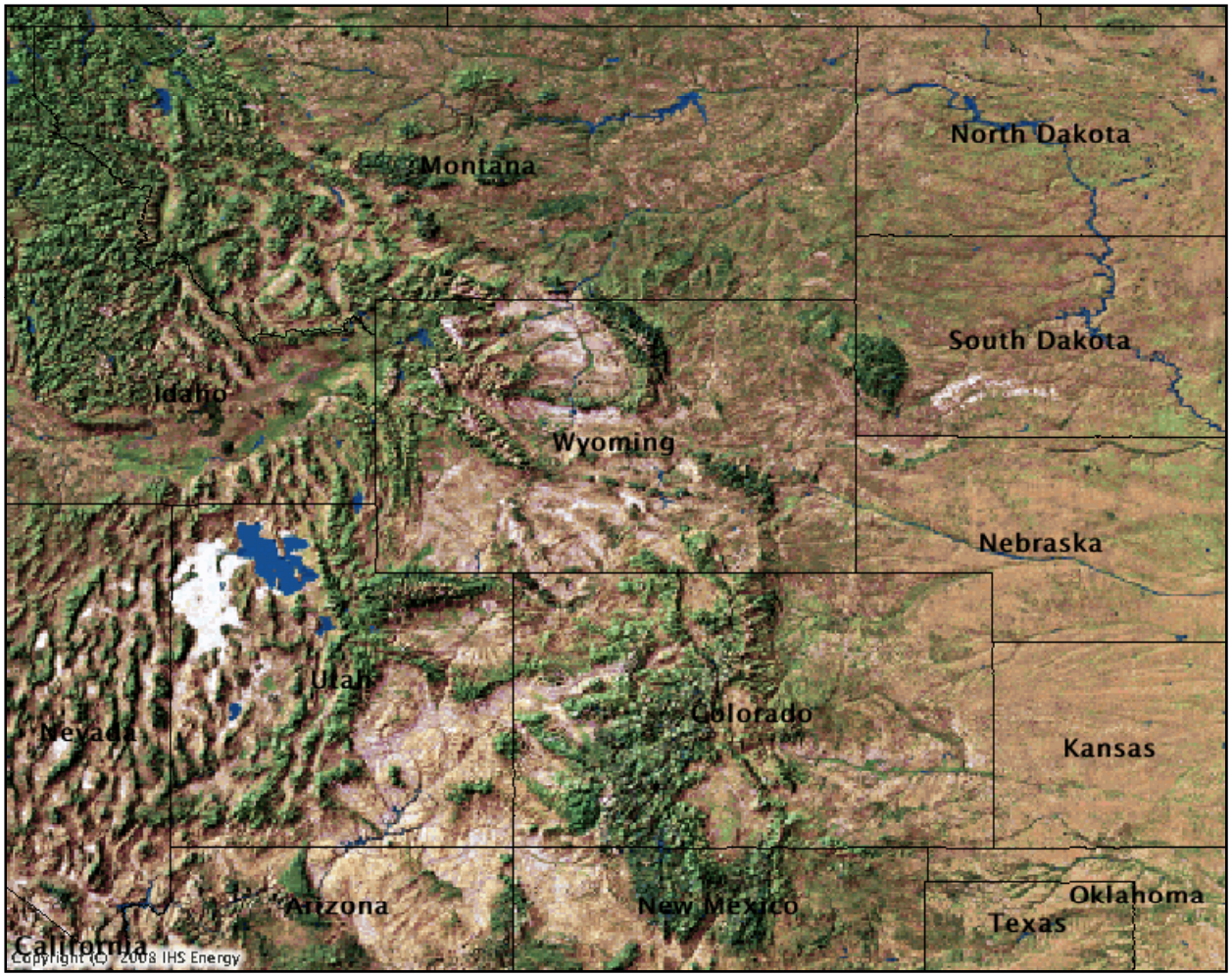




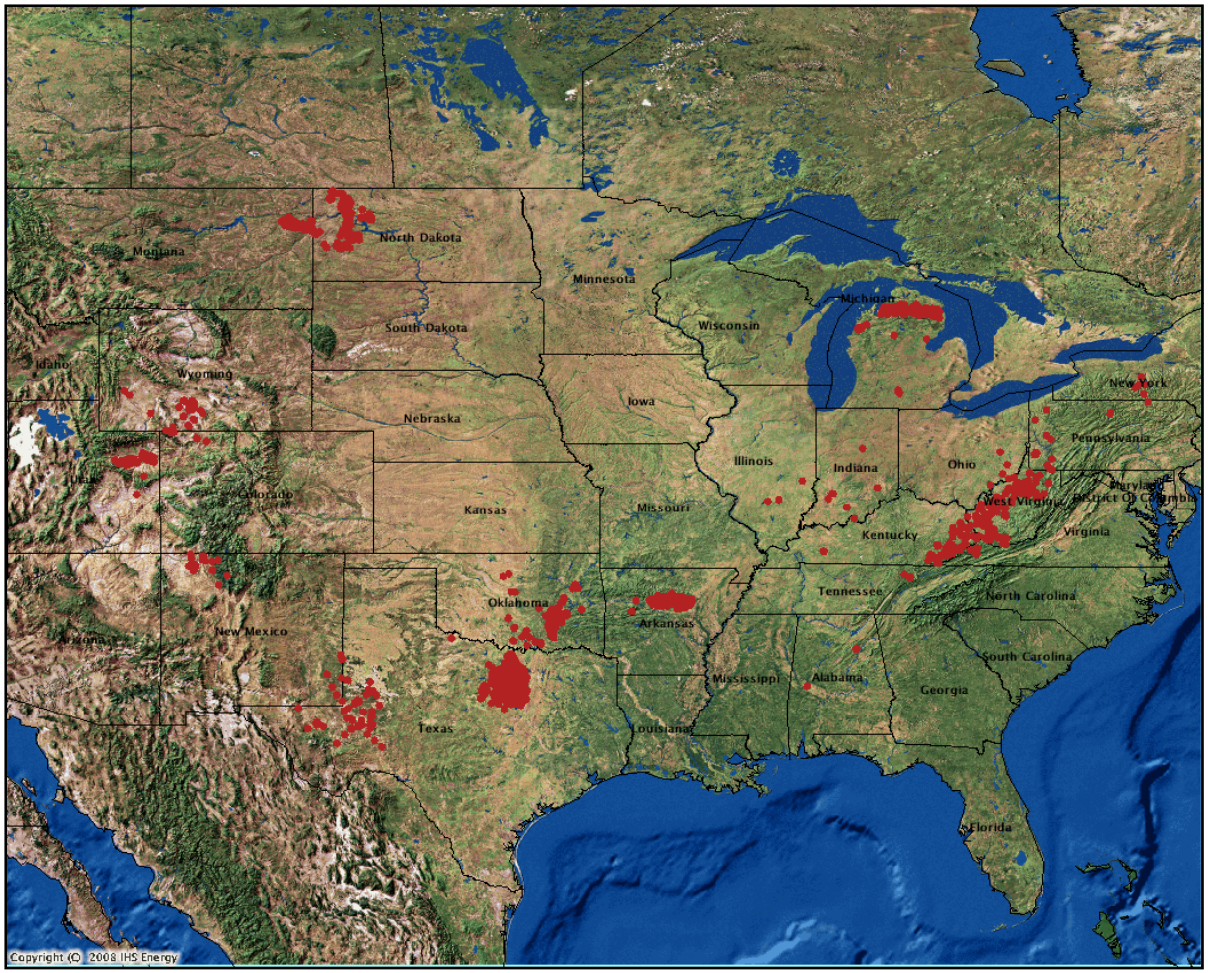
Central U.S. Shale Conclusions

- Woodford Shale completions continue to increase
- Woodford production also shows continued increase

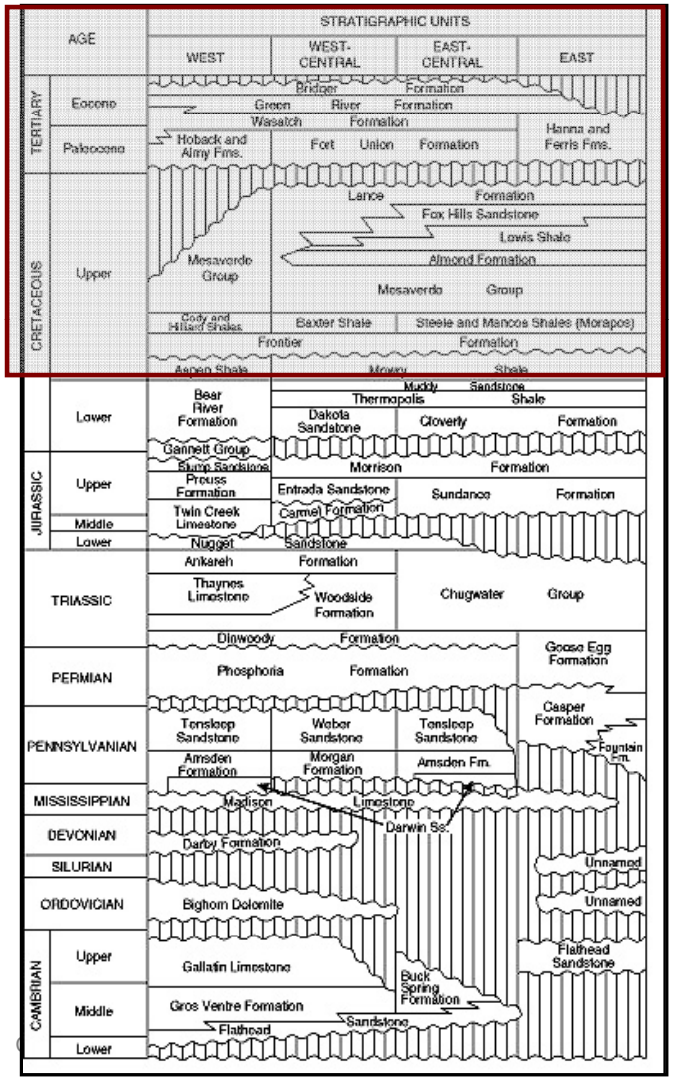
Western U.S. Area

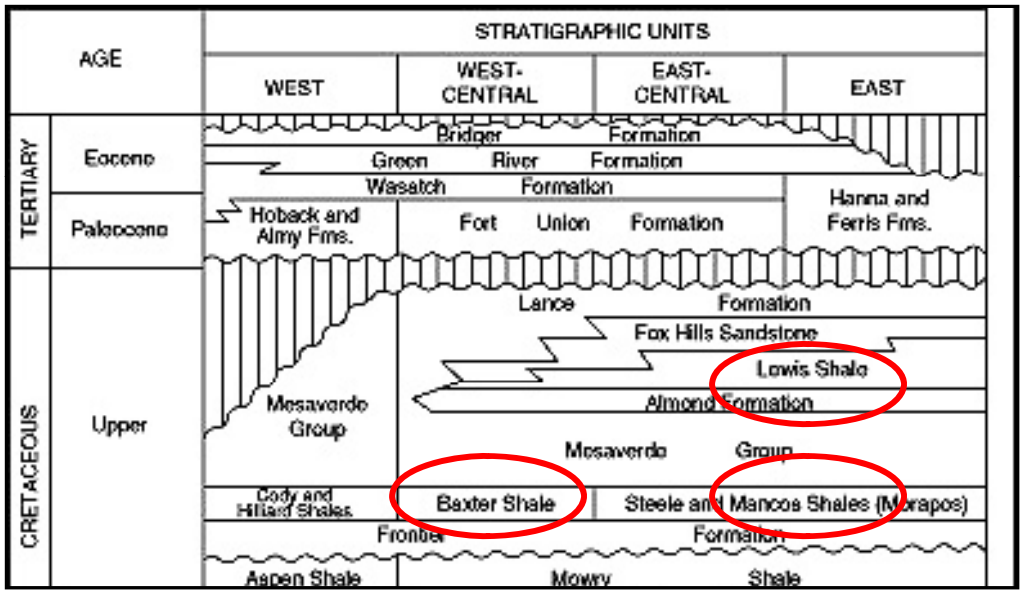


2007 U.S. Shale Completions



Stratigraphy





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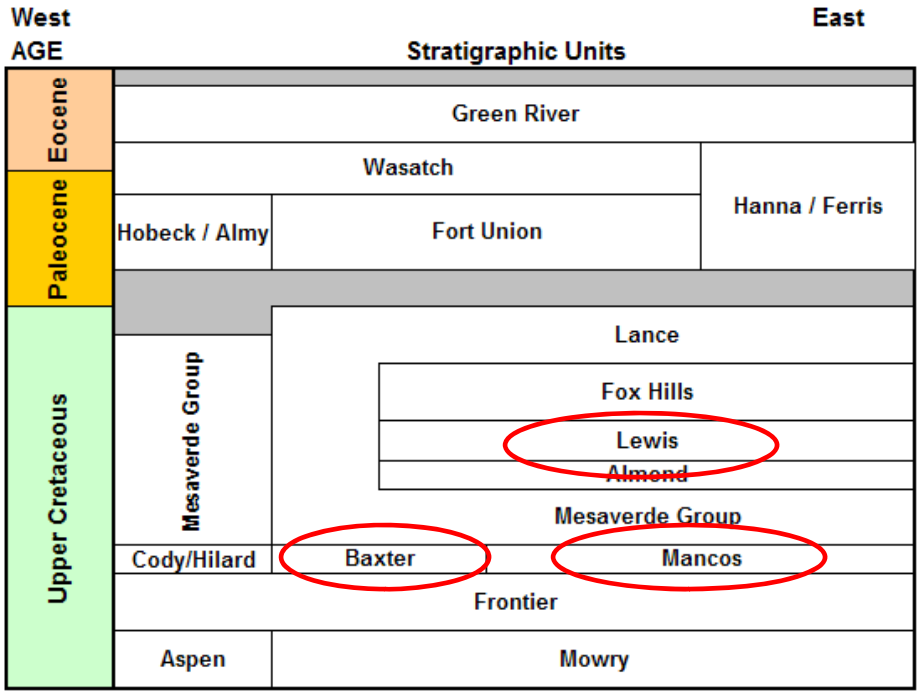
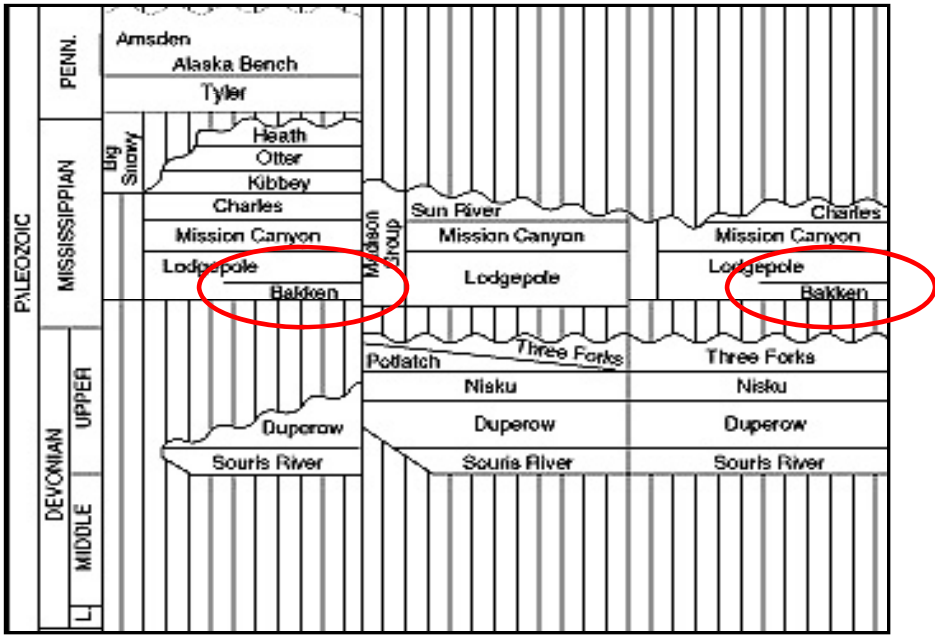
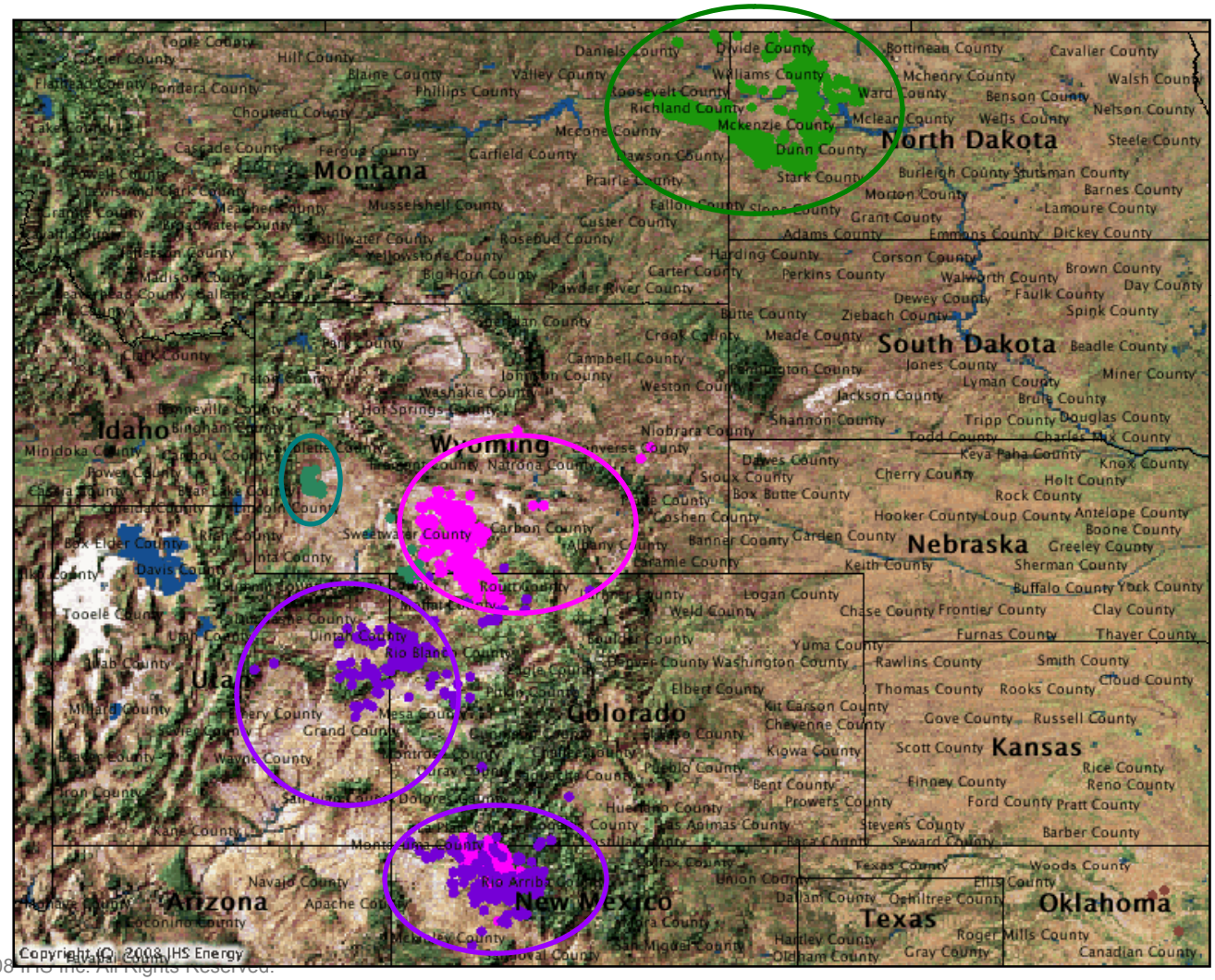




Western U.S. Shales 2007



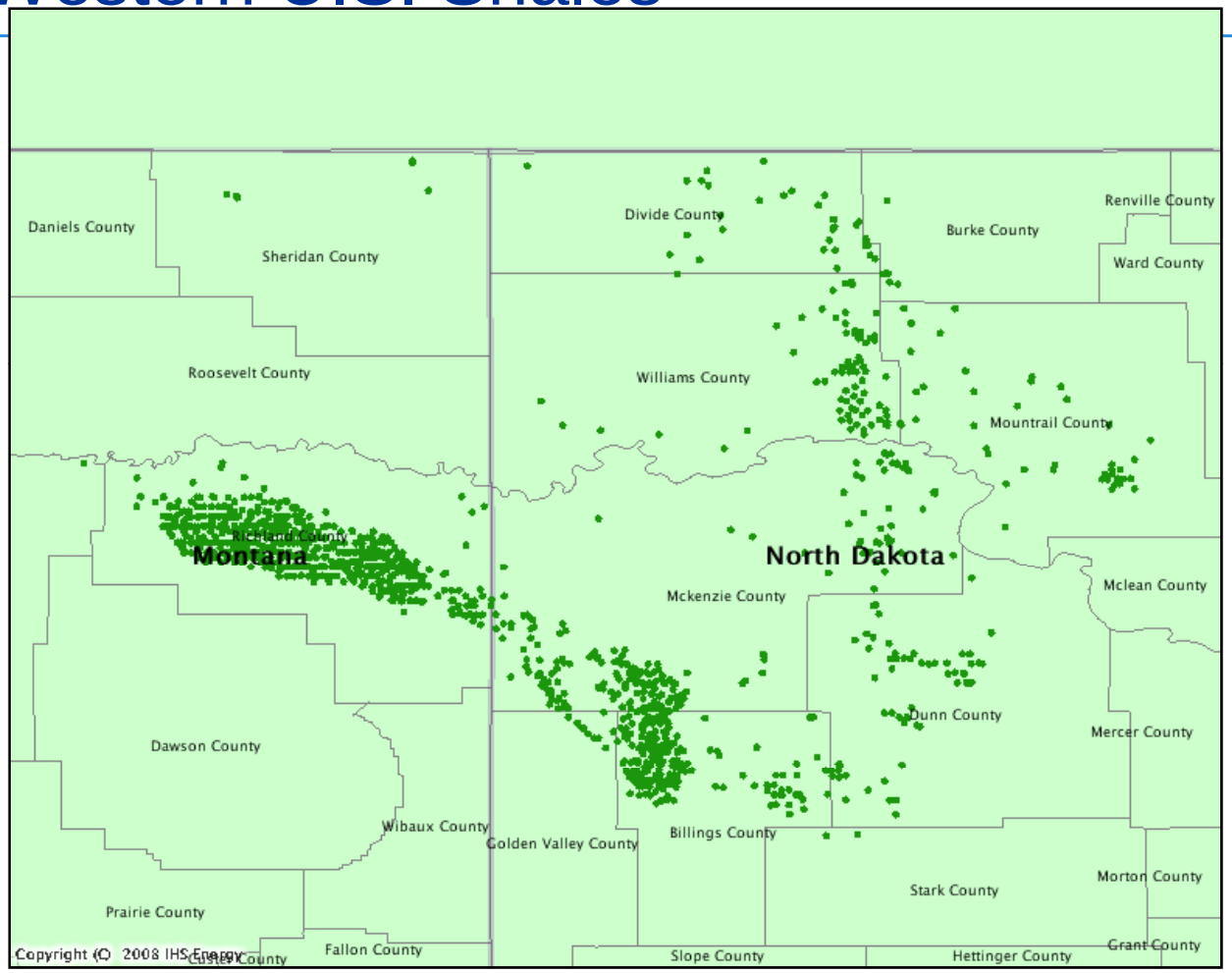
Bakken

Lewis

Mancos

Baxter

Western U.S. Shales



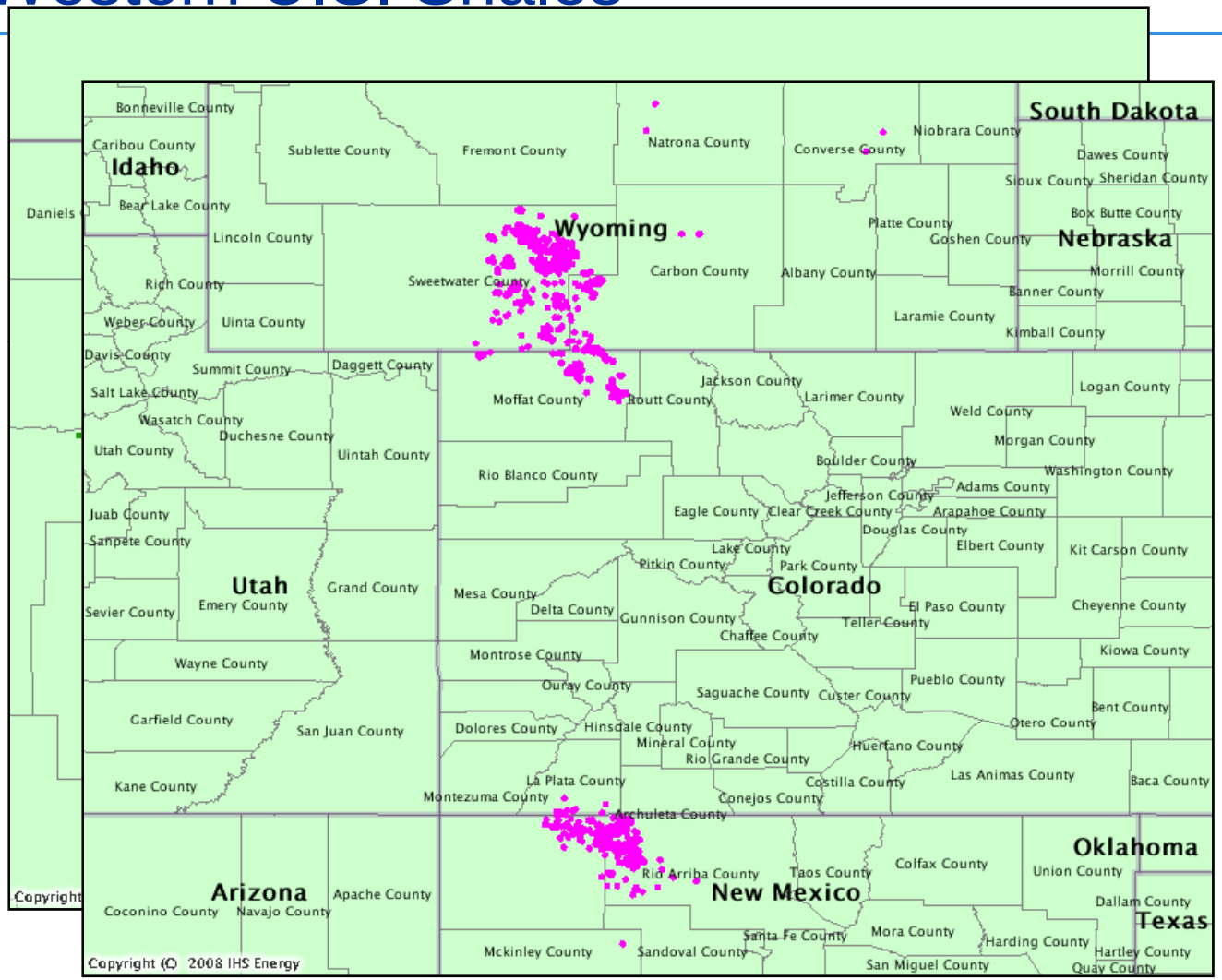
Bakken

Lewis

Mancos

Baxter

Western U.S. Shales



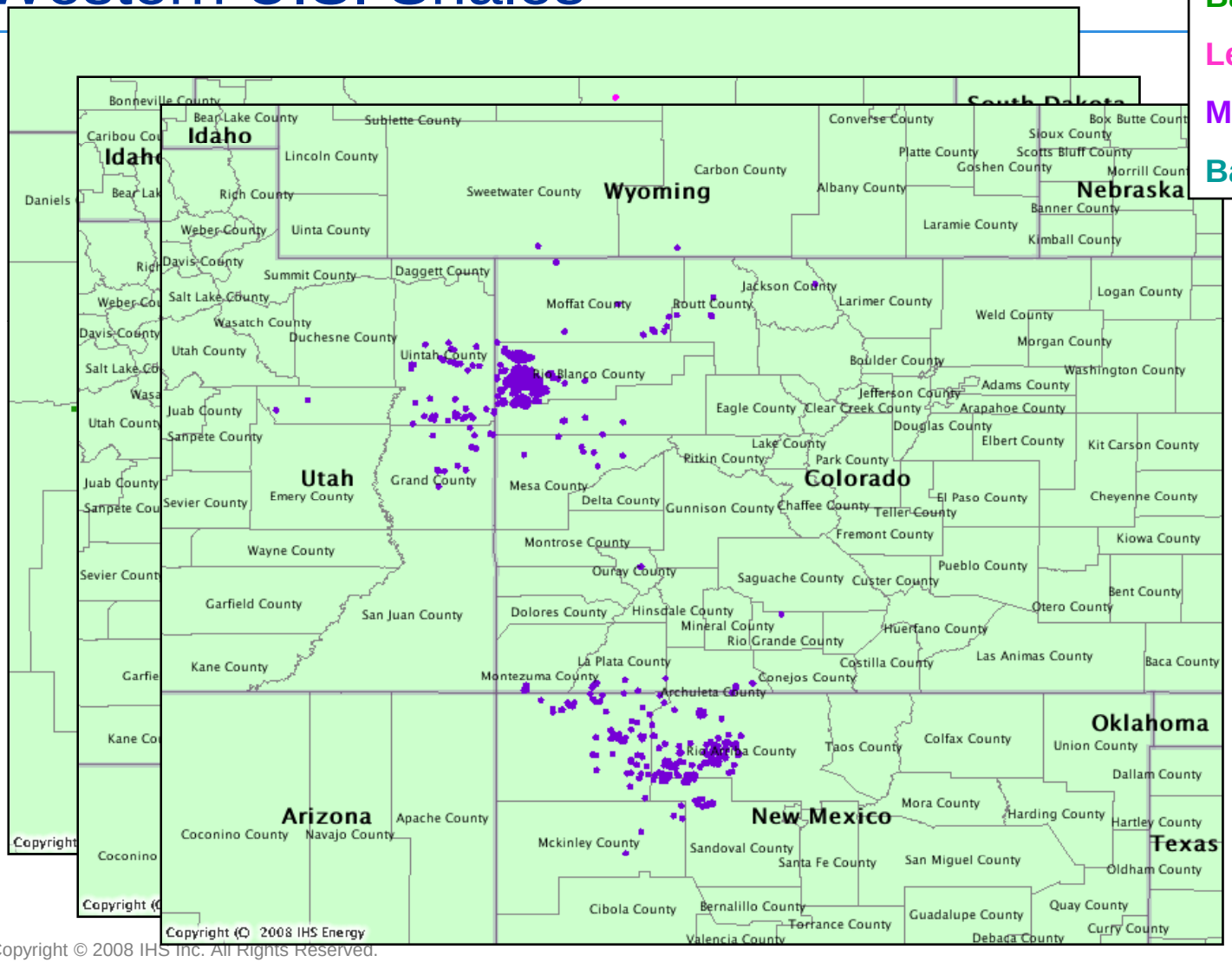
Bakken

Lewis

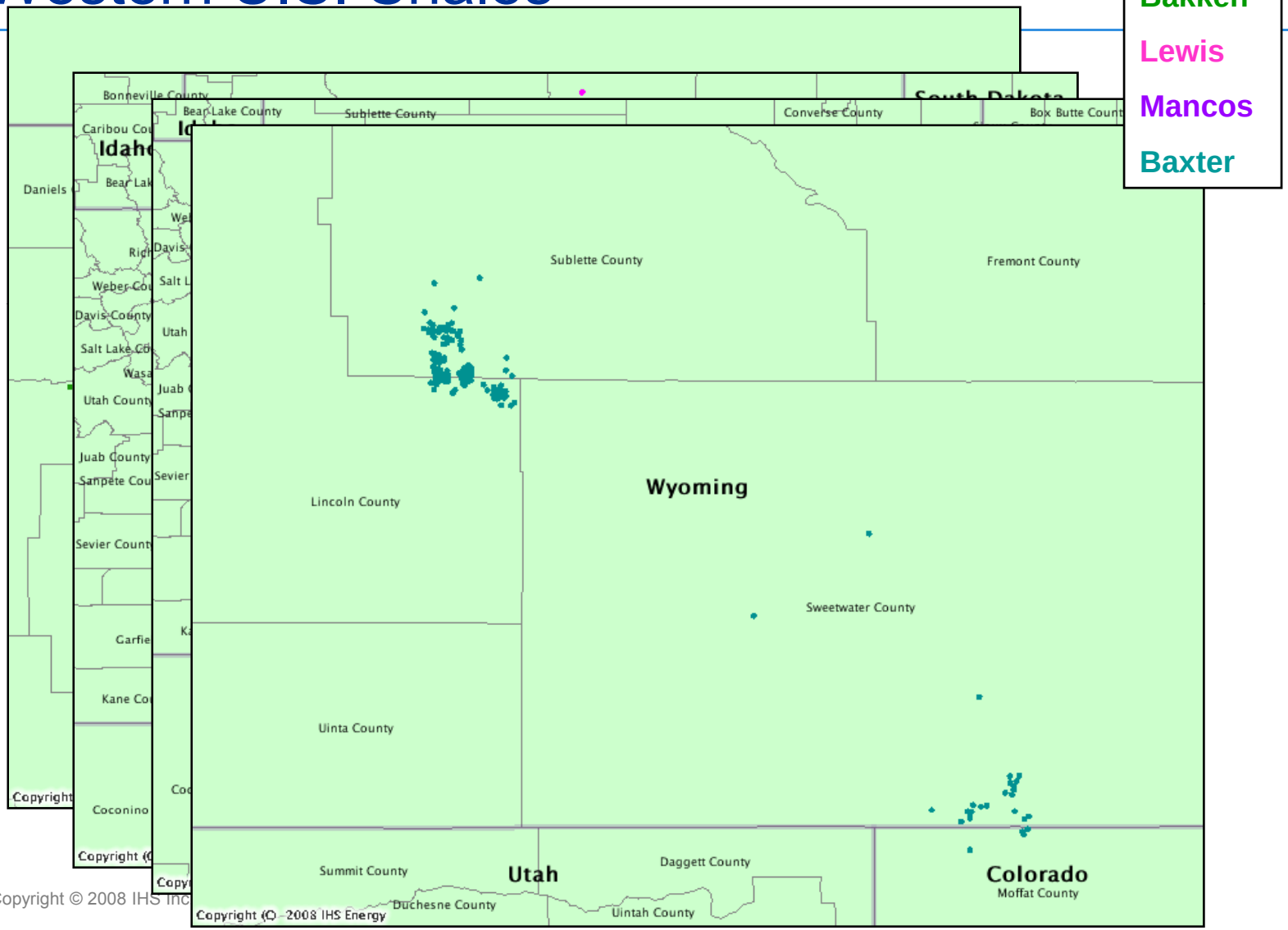
Mancos

Baxter

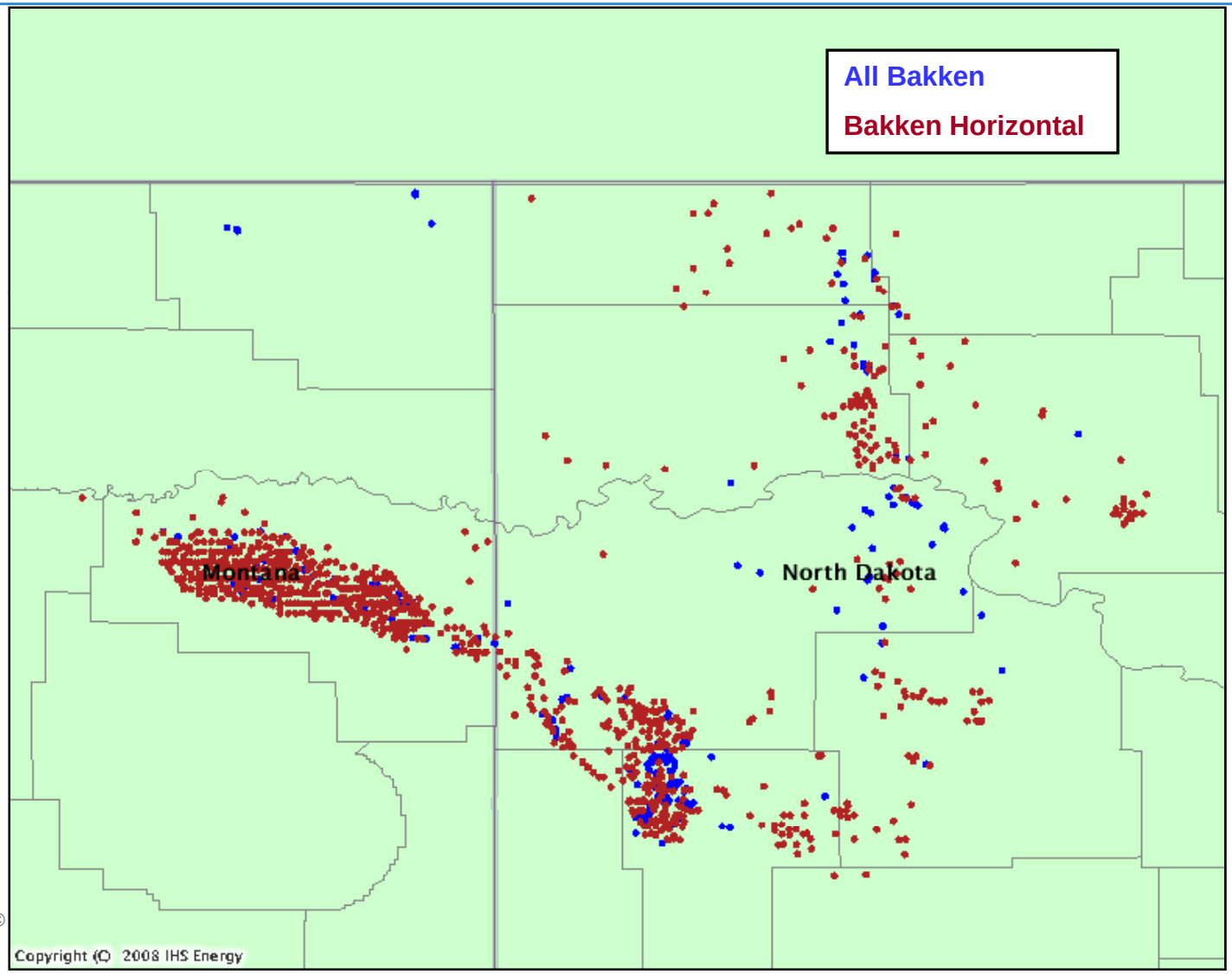
Western U.S. Shales



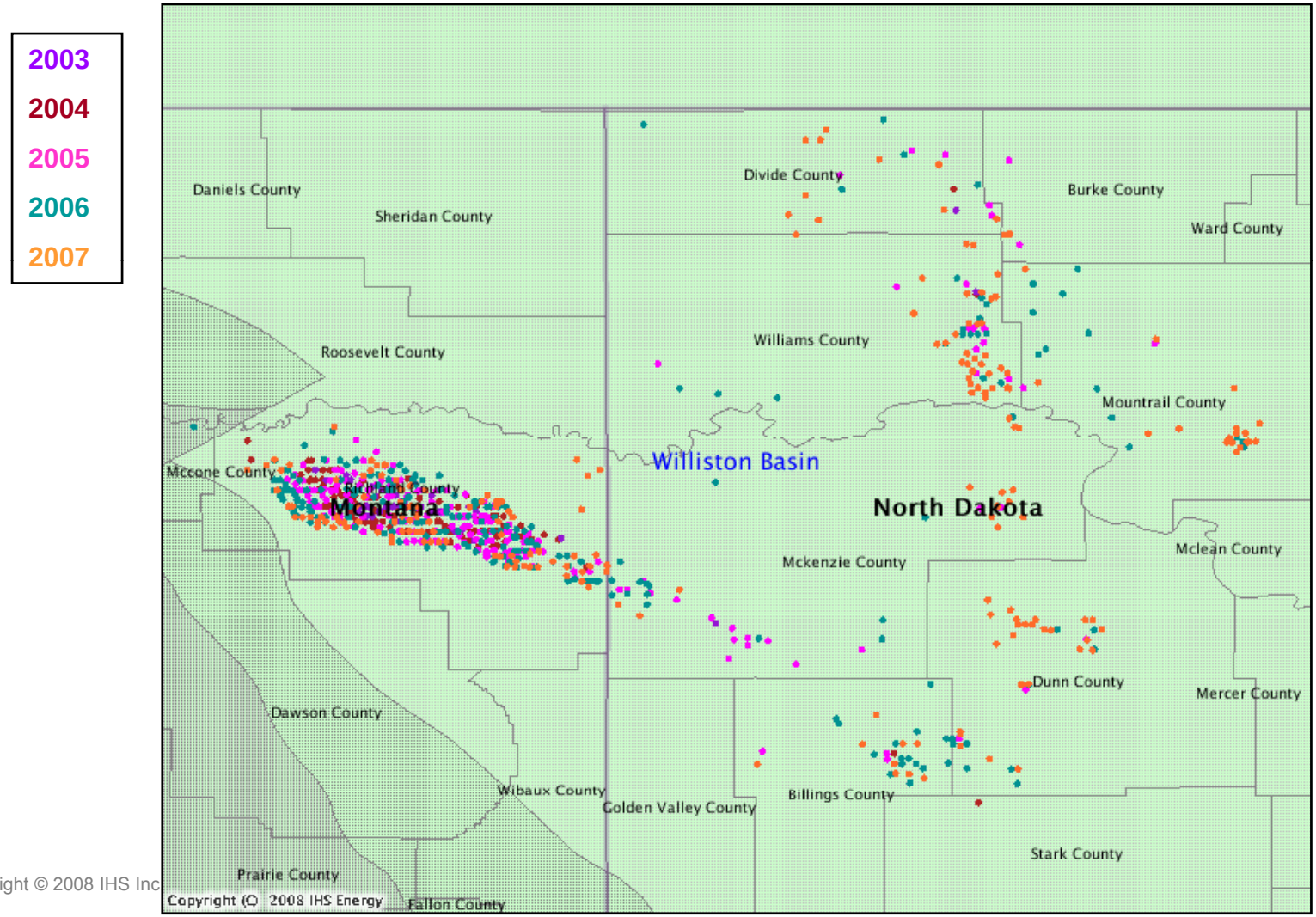
Western U.S. Shales



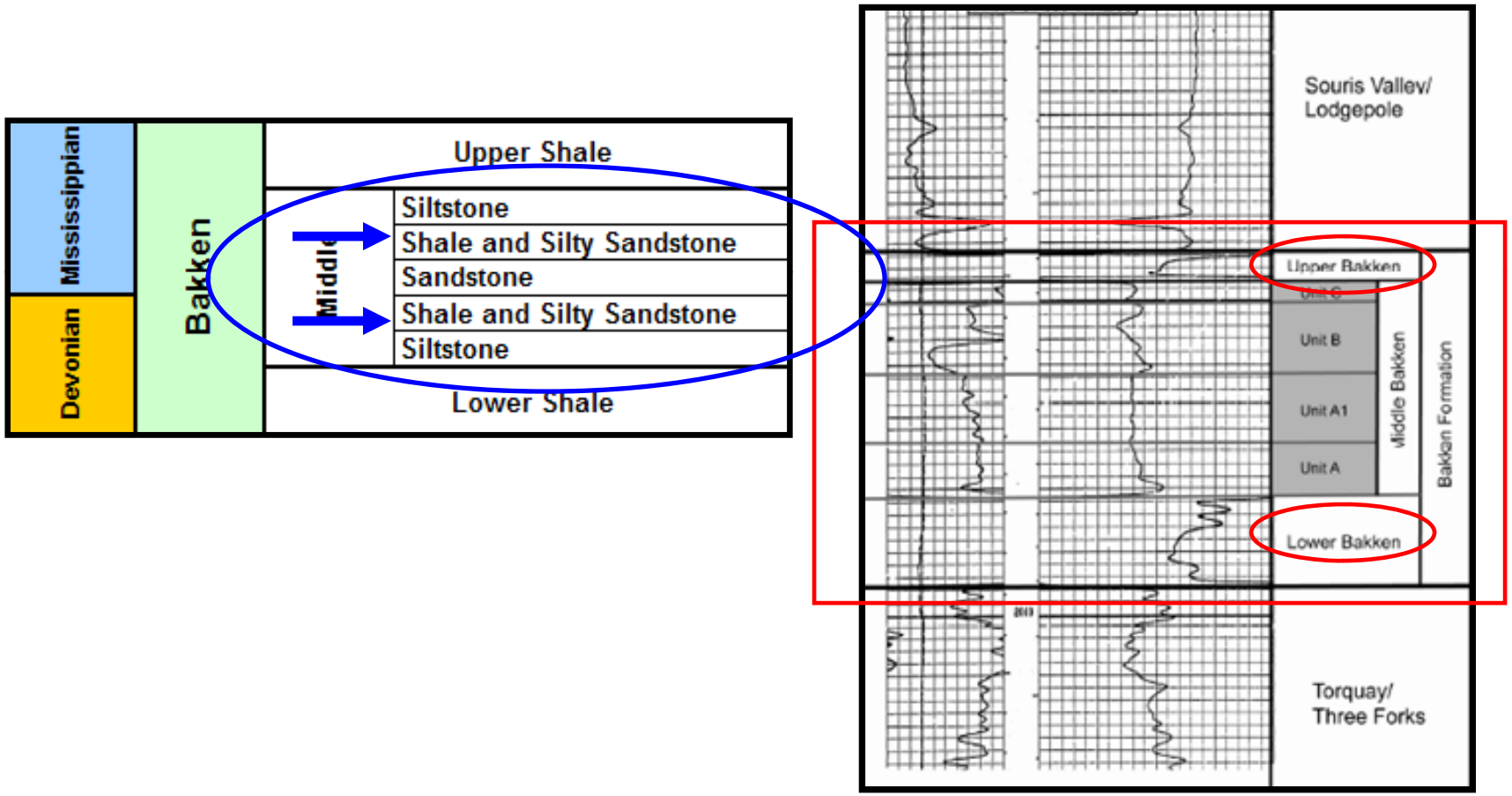
Horizontal Bakken



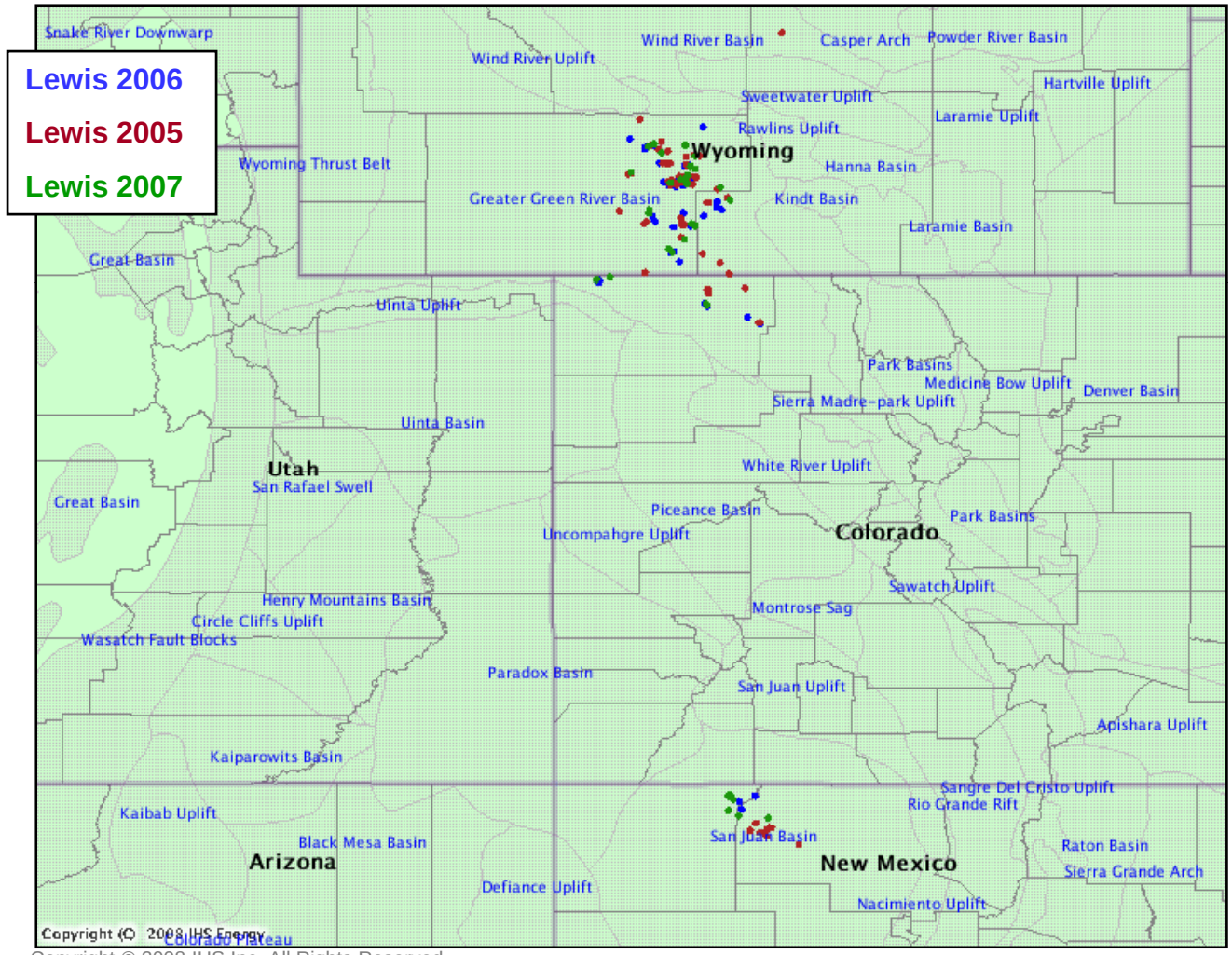
Bakken 2004-2006



Bakken Stratigraphy and Lithology



Lewis



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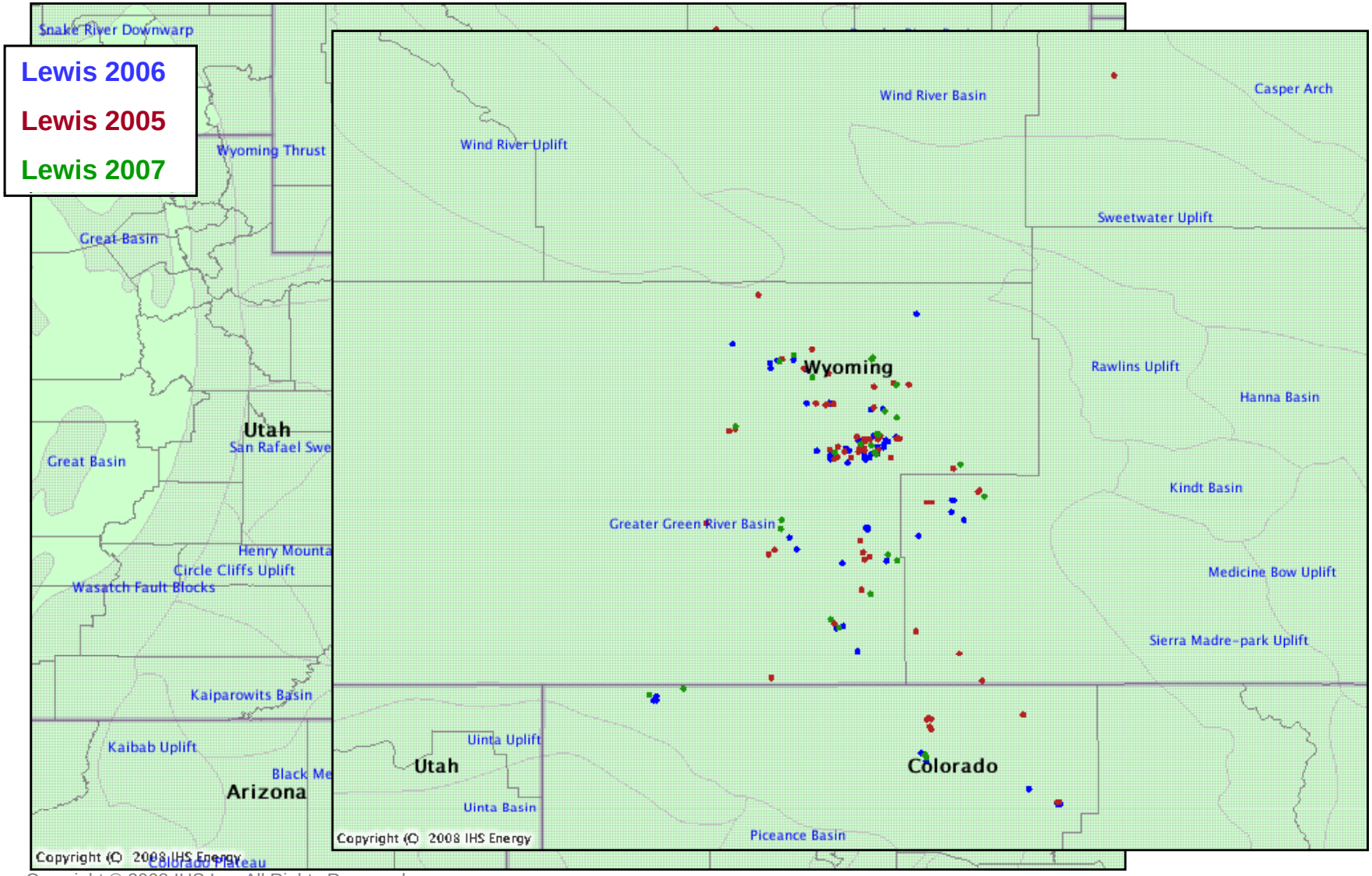

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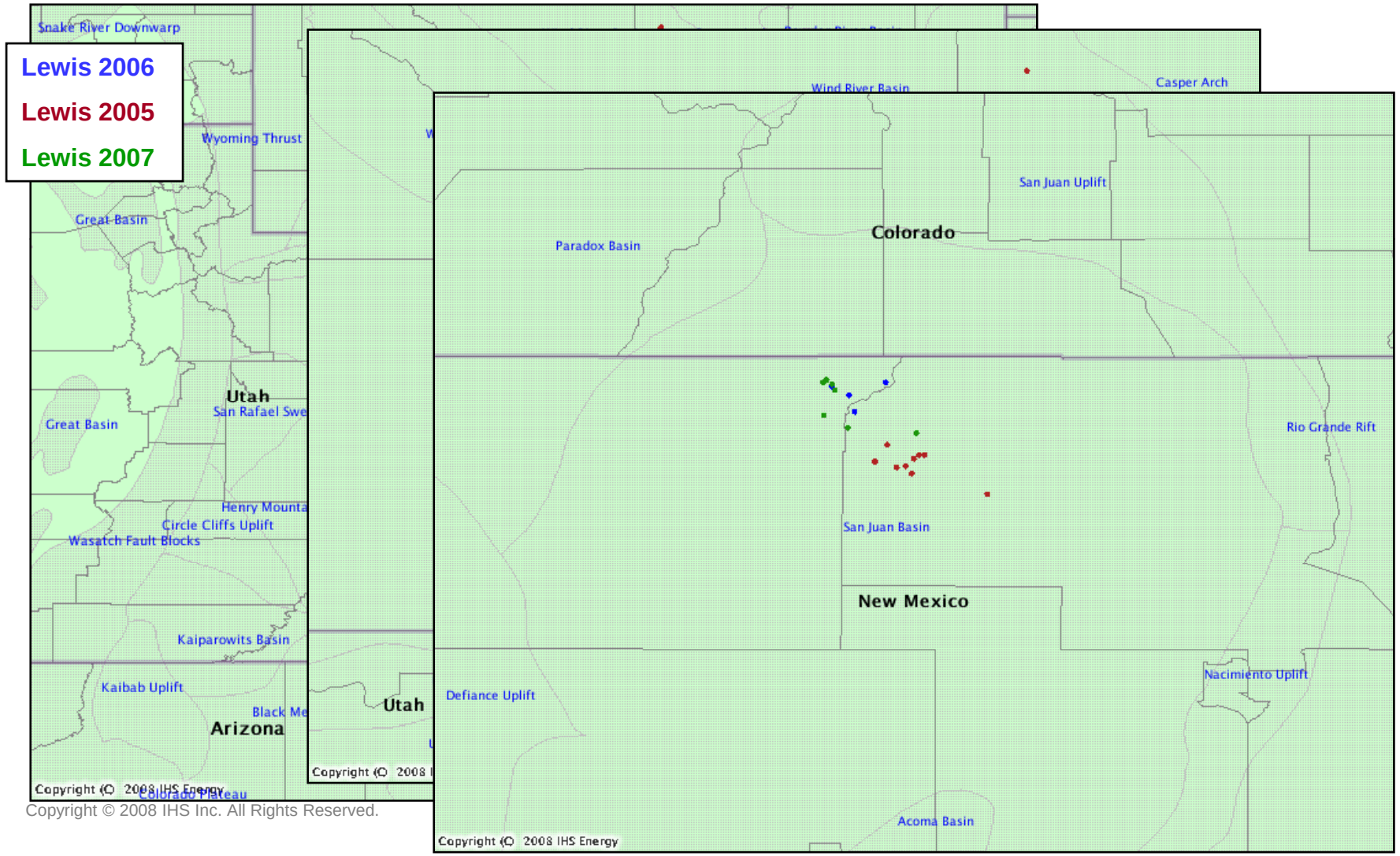
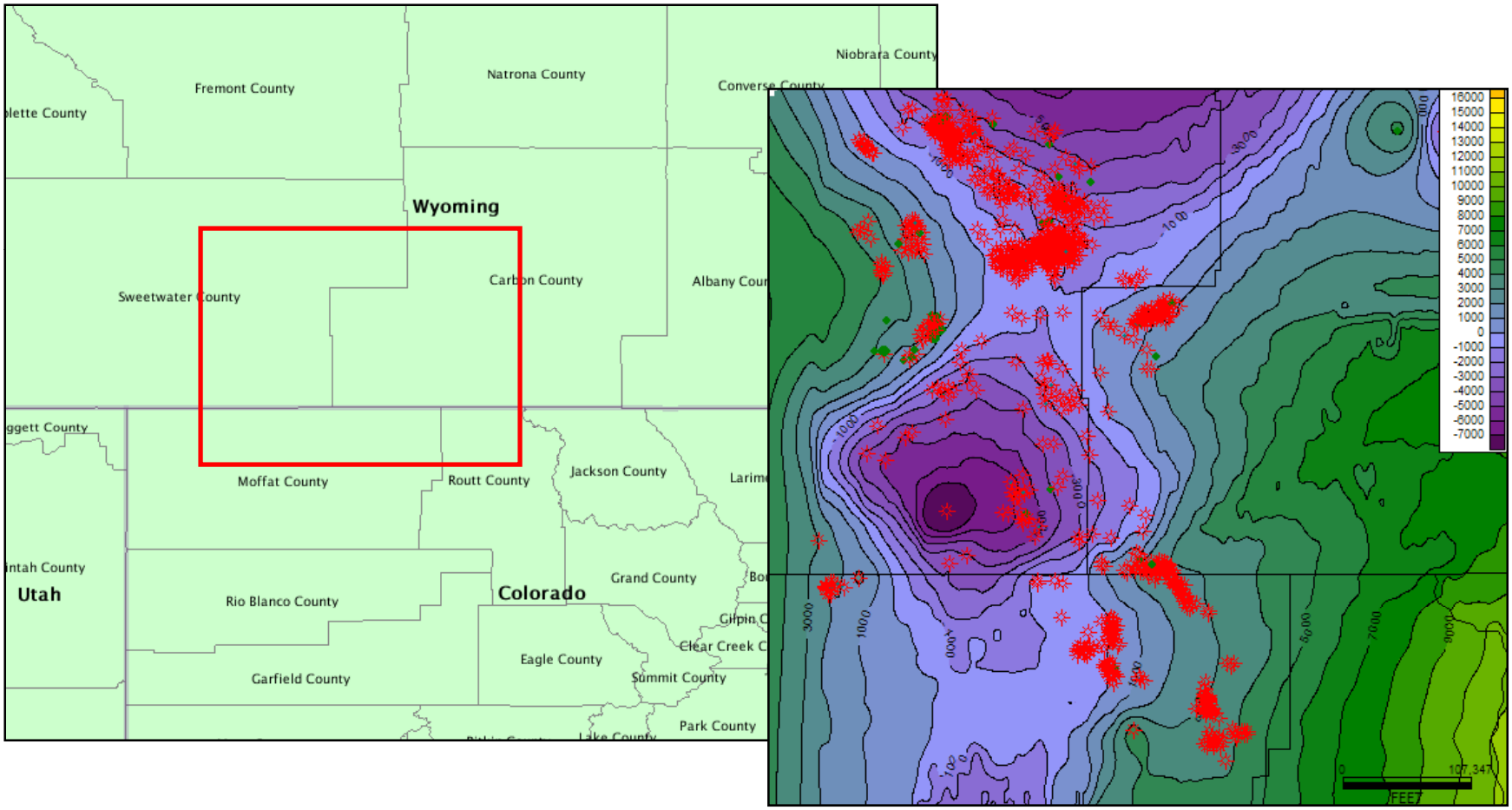
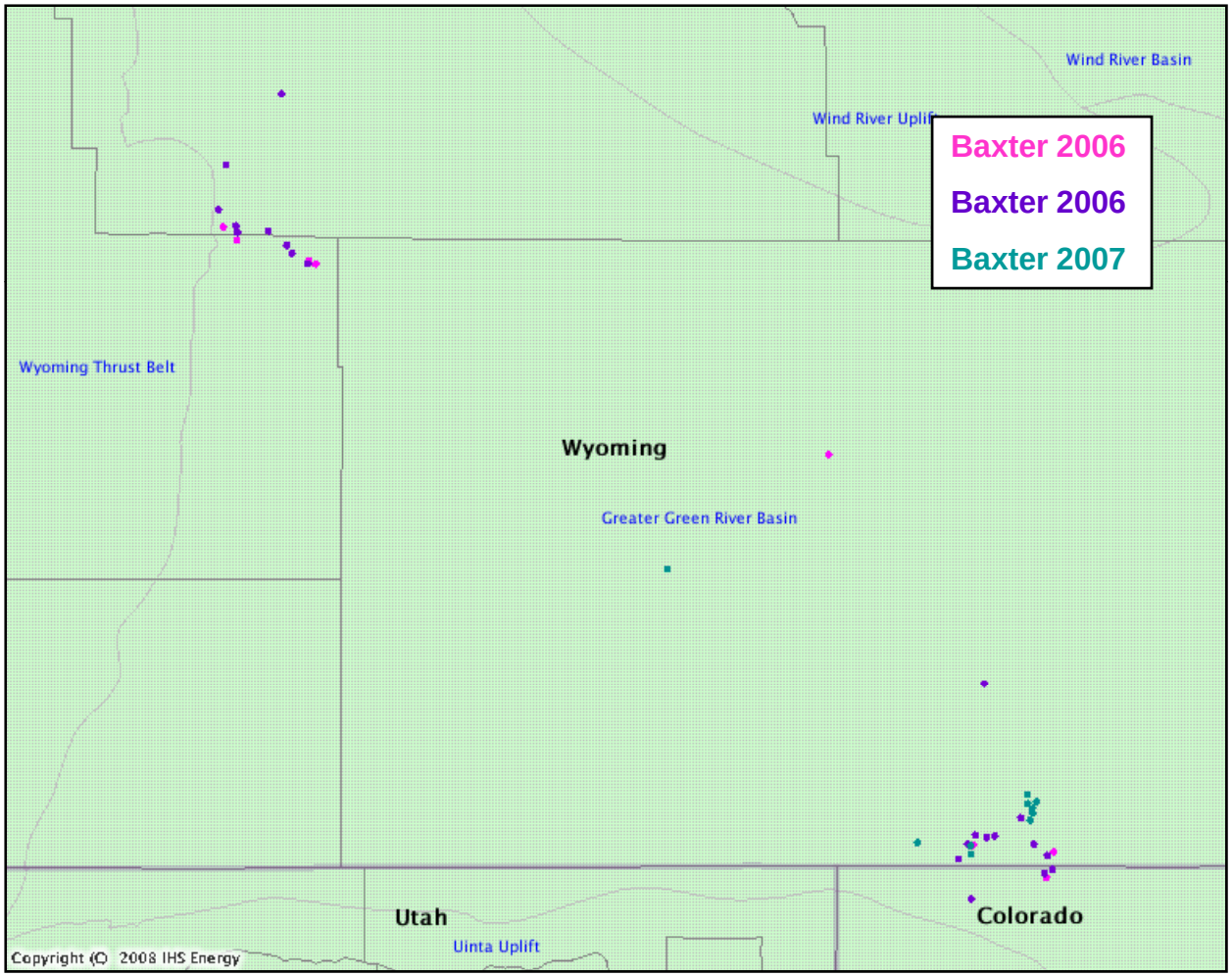


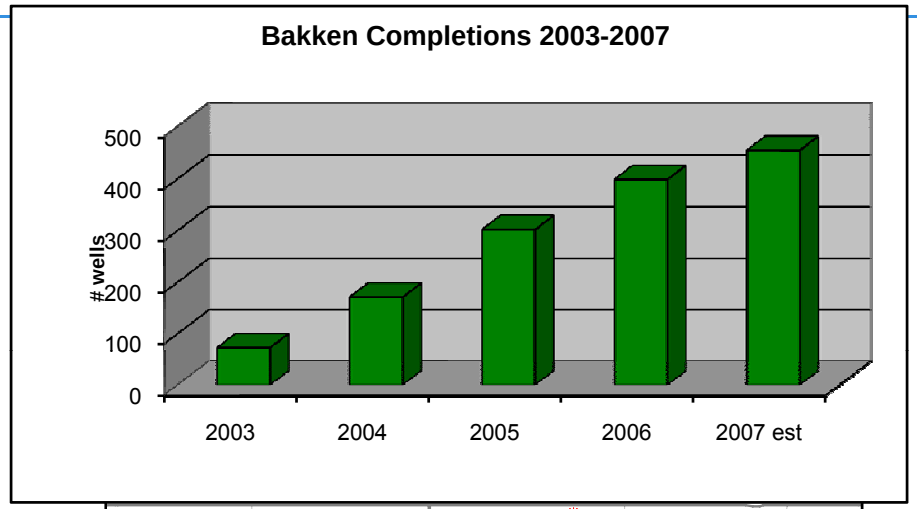
Top of Lewis Structure Map

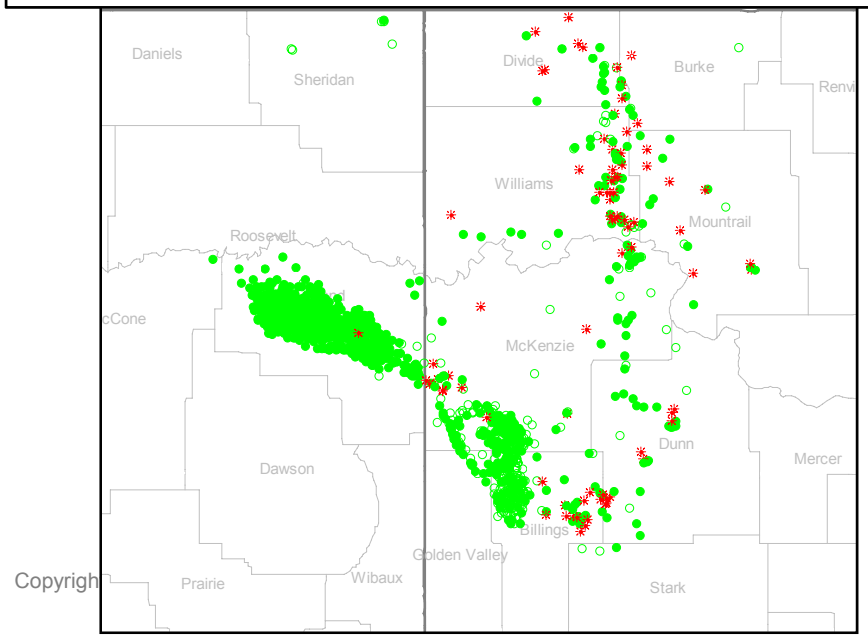


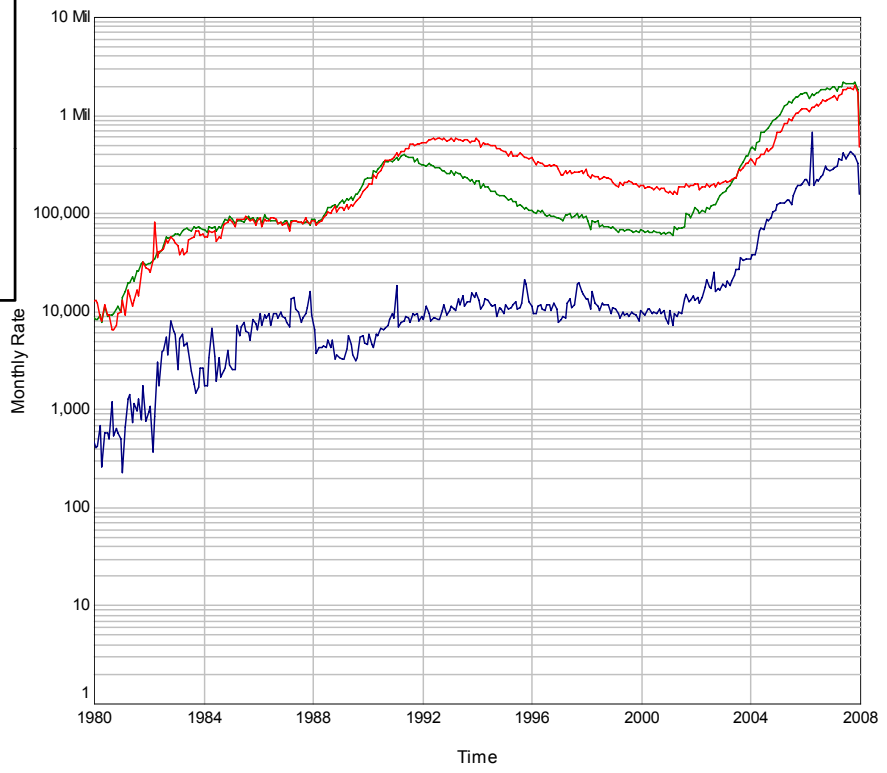
Baxter



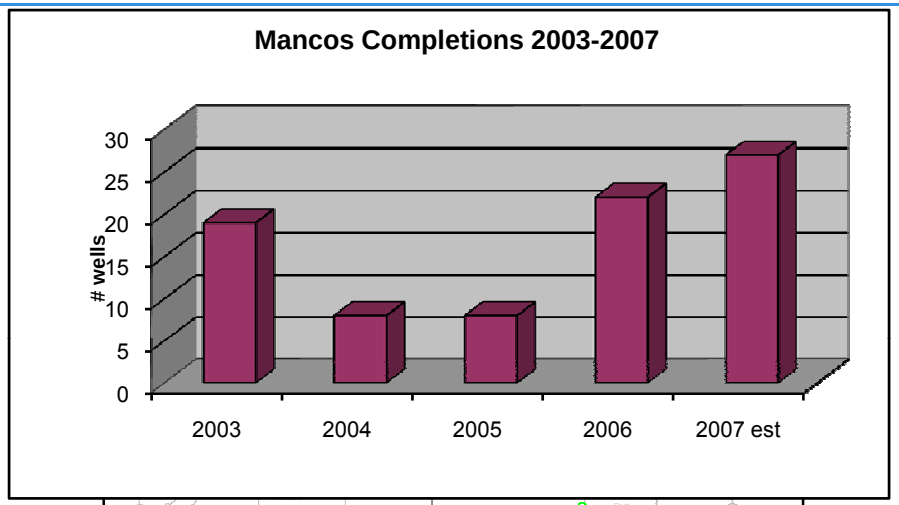
Bakken Production

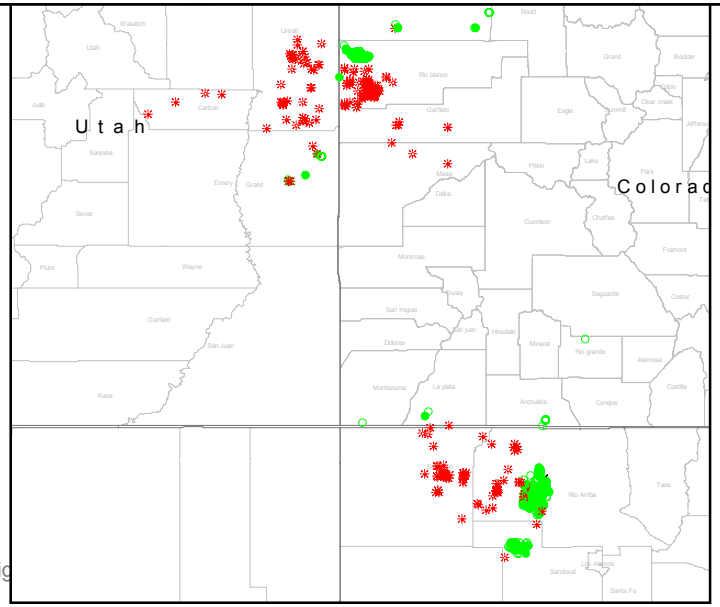


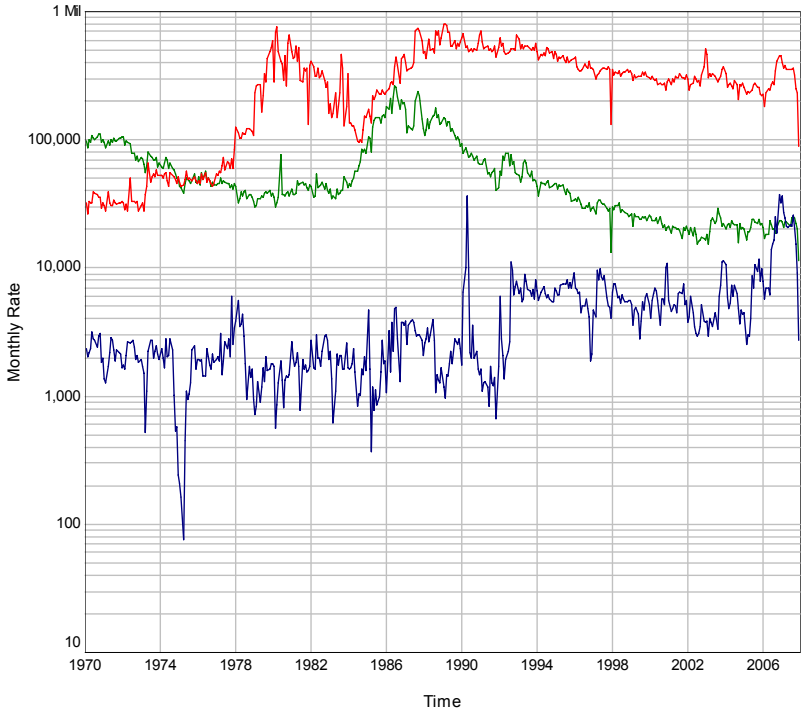




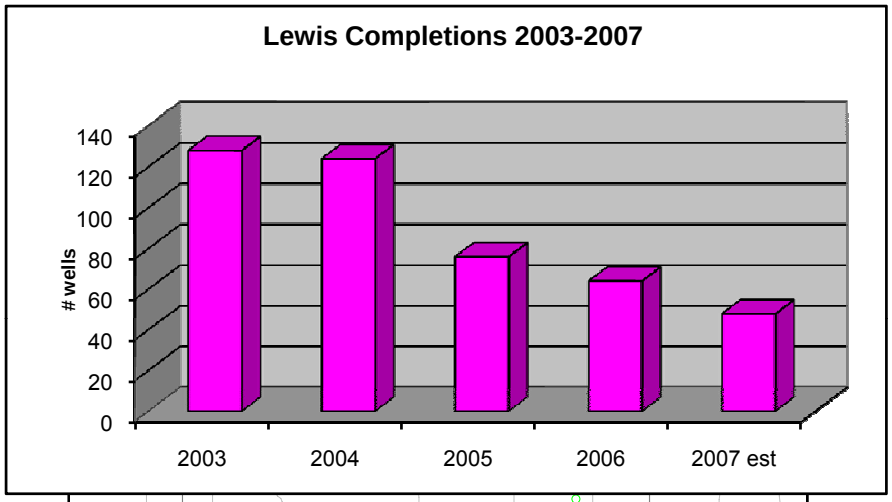
Mancos Production

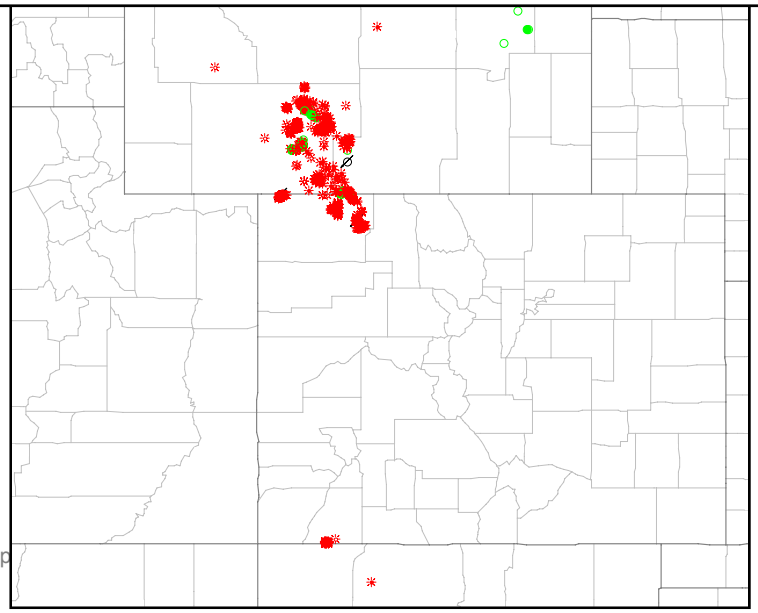


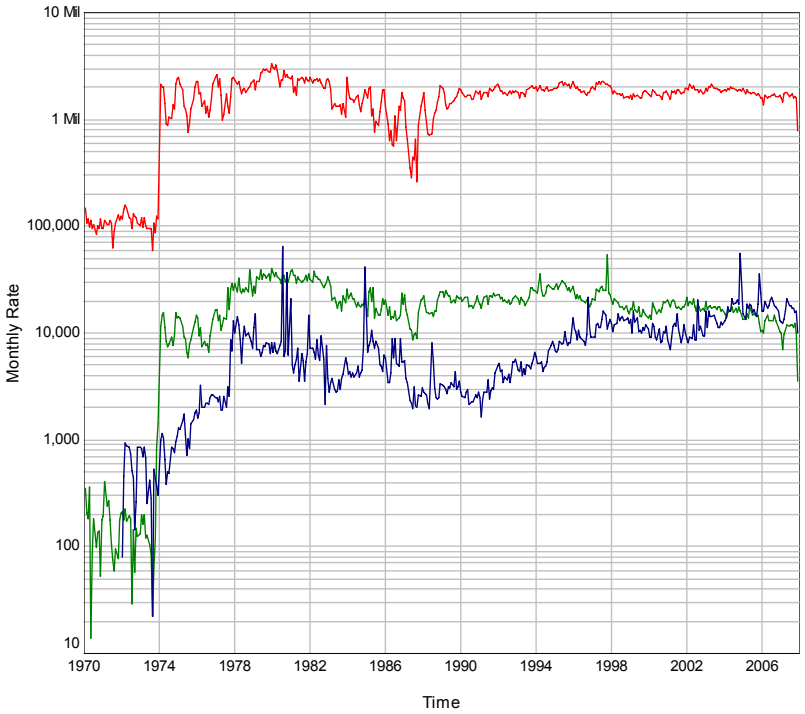




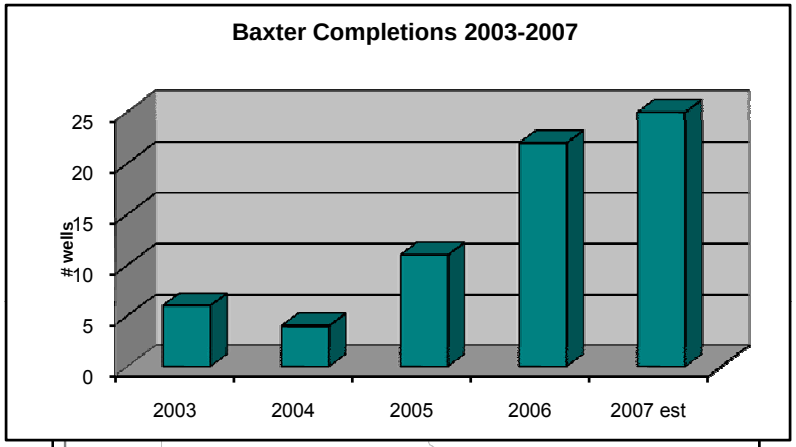
Lewis Production

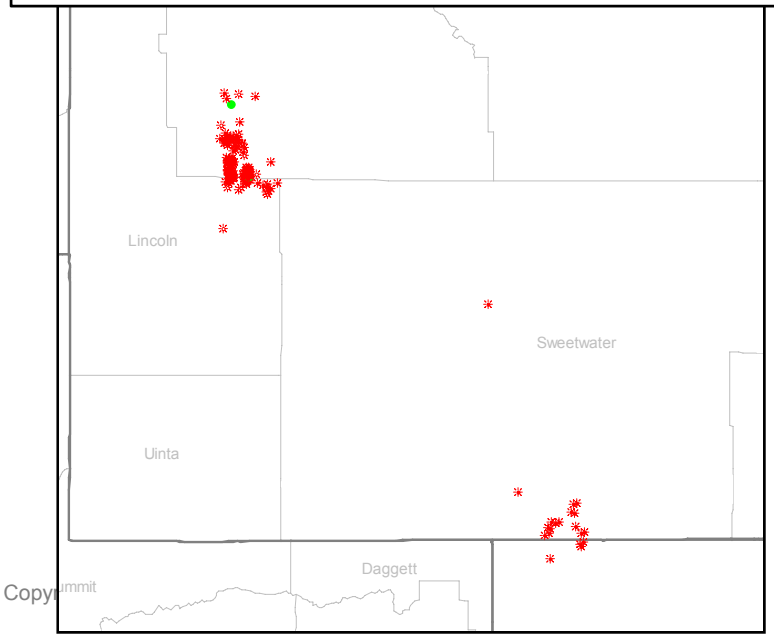


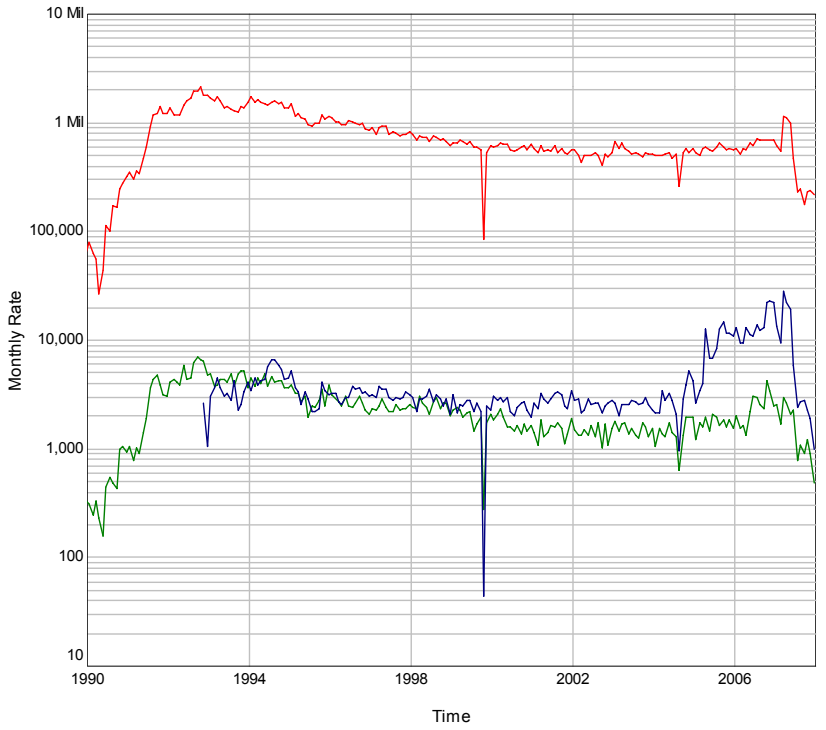




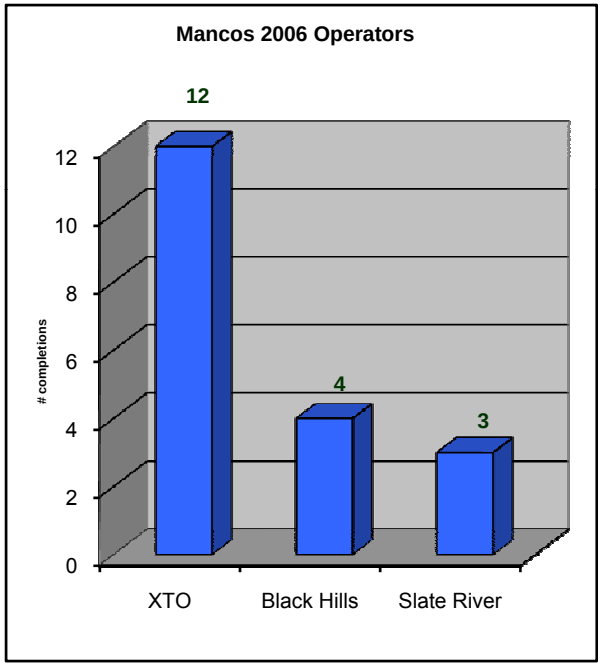
Baxter Production

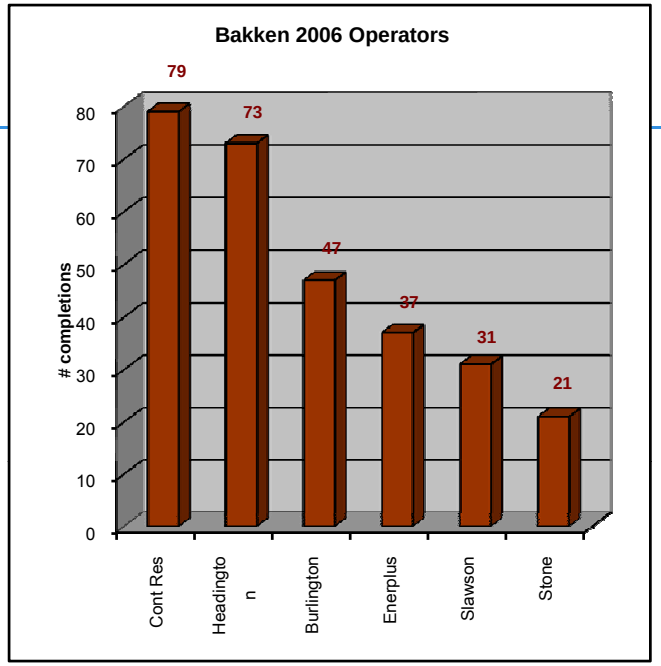


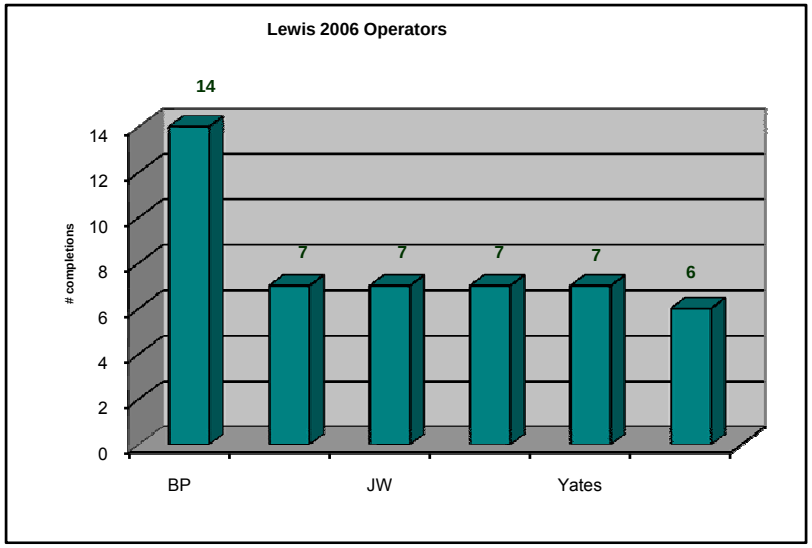




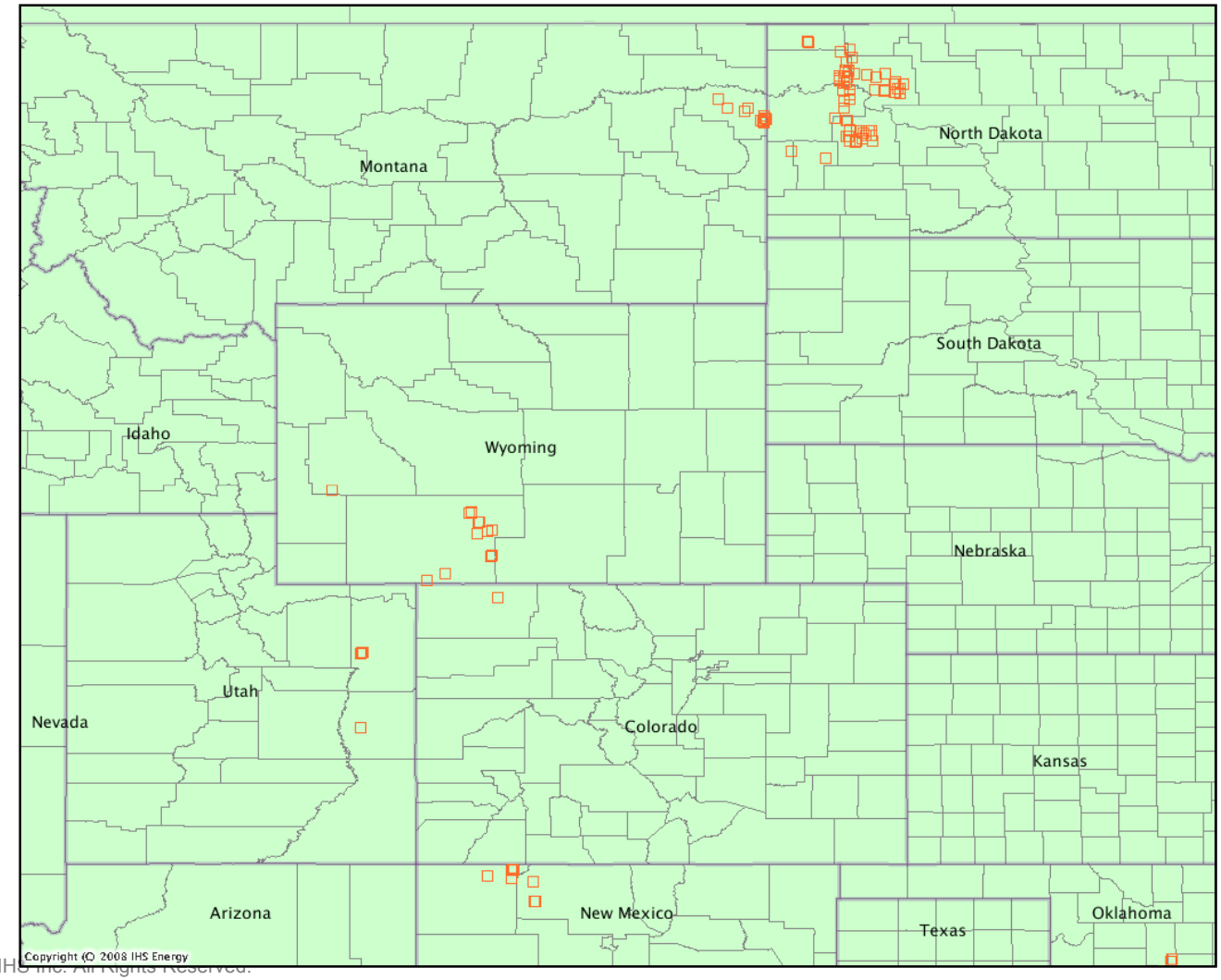
2006 Operators







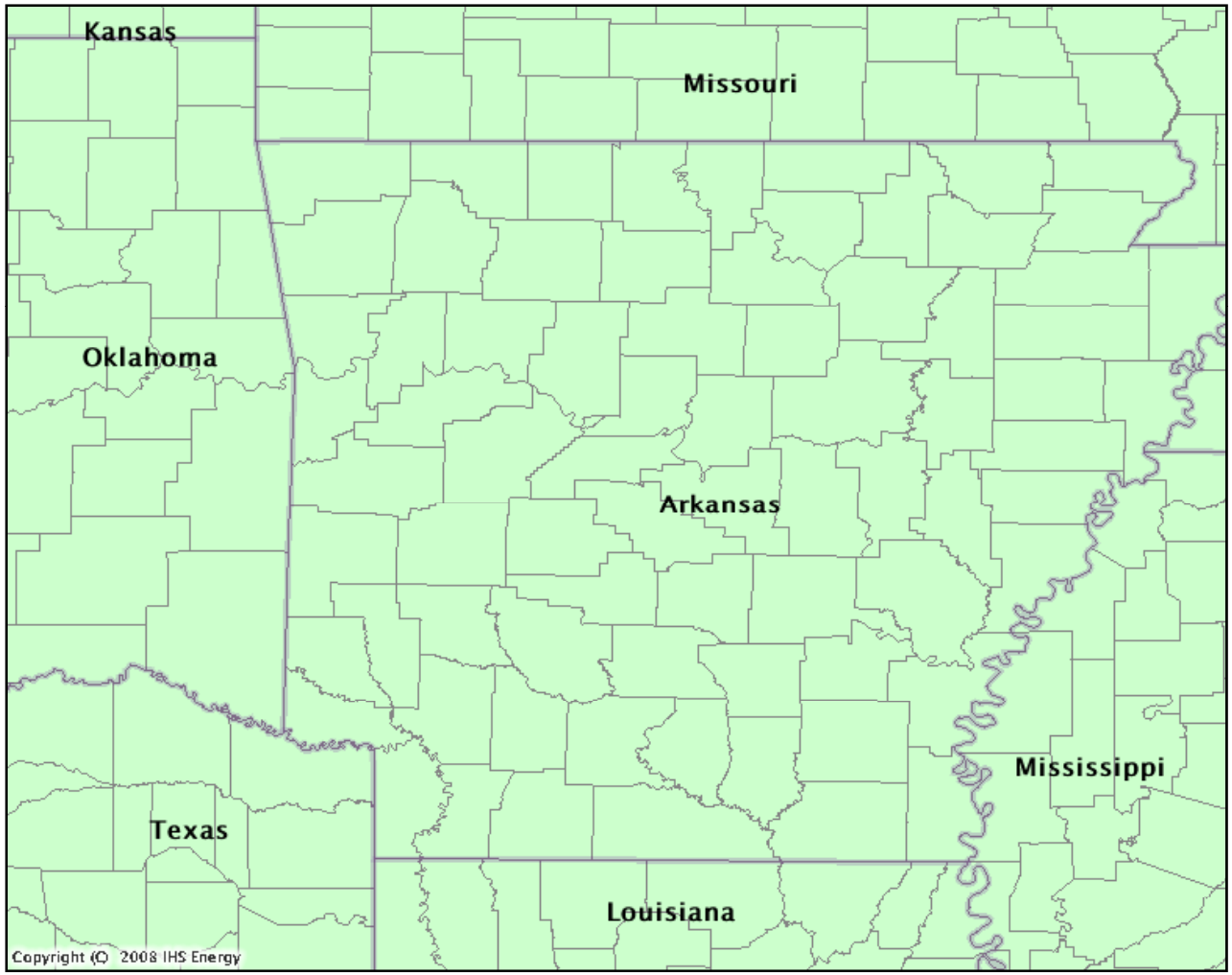
Shale Completions – Last 6 Months



Western U.S. Shale Conclusions

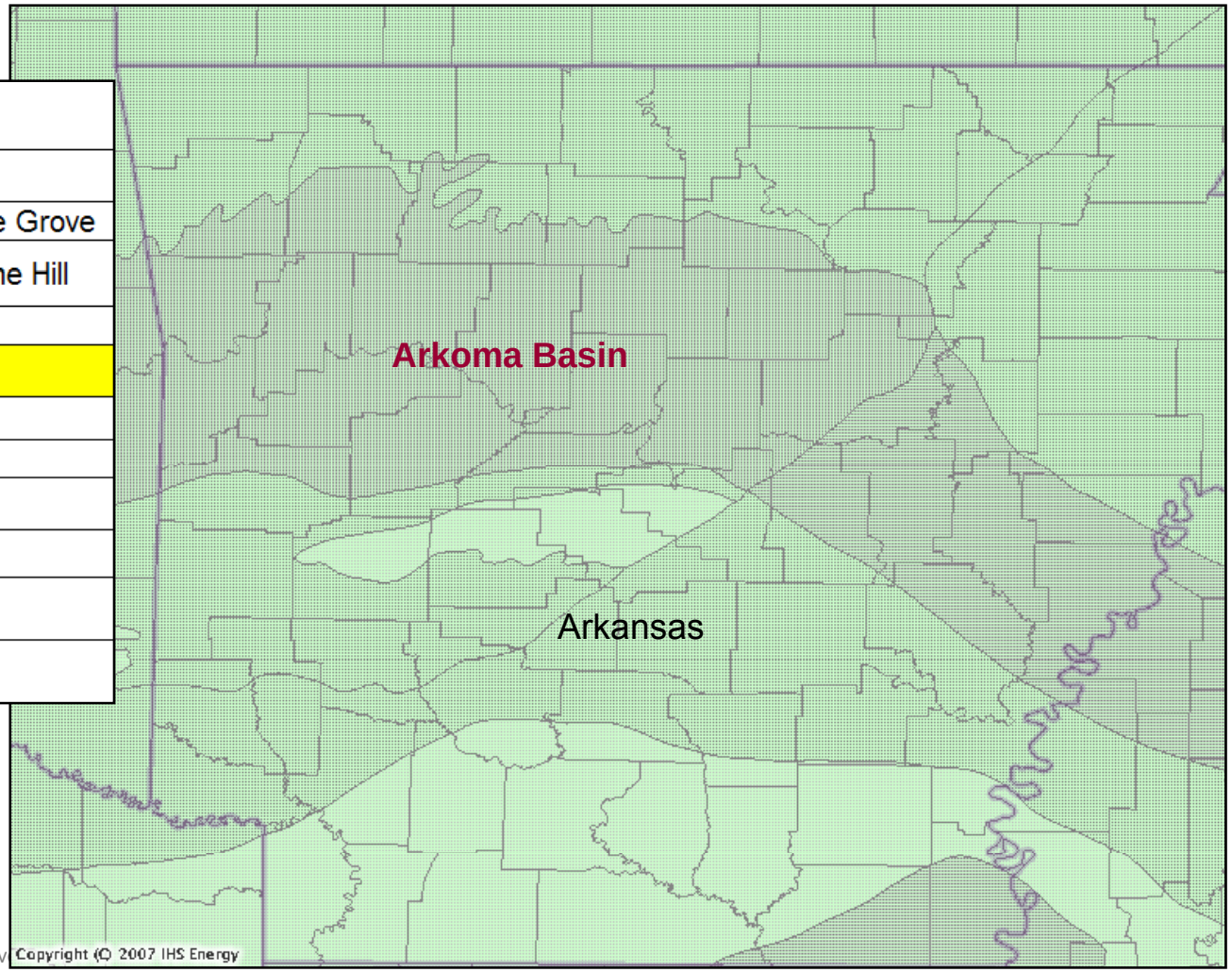
- U.S. Western shale completions have declined over the past 2-3 years
- Result is a slight decrease in production from these shales
- Permits in 2007-08 seem to represent a renewed interest in these shales, but most of the activity is in the Bakken

Fayetteville Shale Area



Fayetteville Shale - Arkoma Basin

Pennsylvanian	Atoka	
	Bloyd	
	Hale	Praire Grove
		Cane Hill
Mississippian	Pitkin	
	Fayetteville	
	Batesville	
	Ruddell	
	Boone	
Devonian	Chattanooga	
	Clify	
	Pentera	

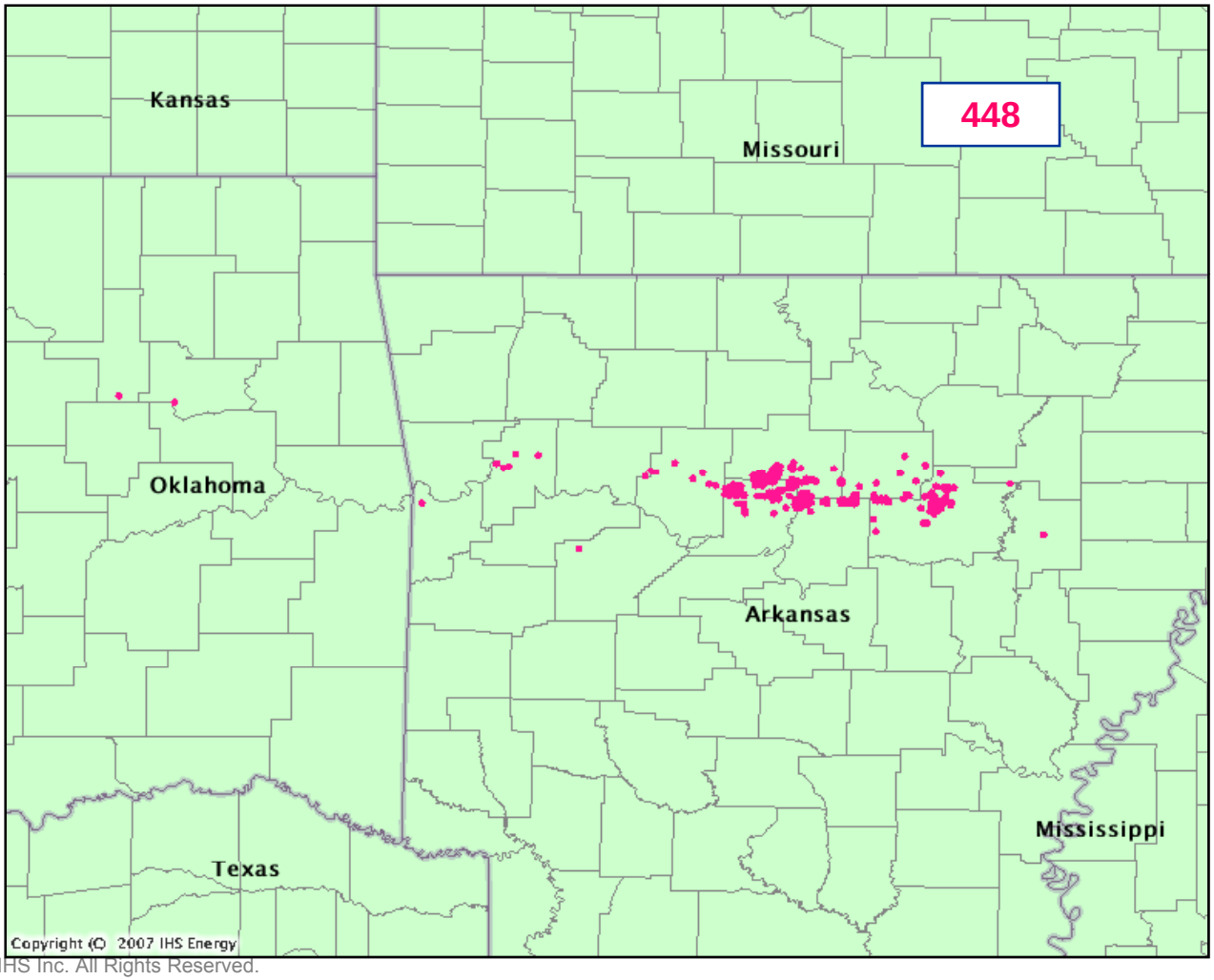


Fayetteville Shale Lithology

The Fayetteville Shale is a black, fissile, concretionary, clay shale. Dark grey, fine-grained limestones commonly interbed with the shales. The Fayetteville ranges in thickness from 10 to 400 feet and rests conformably on the Batesville Formation.

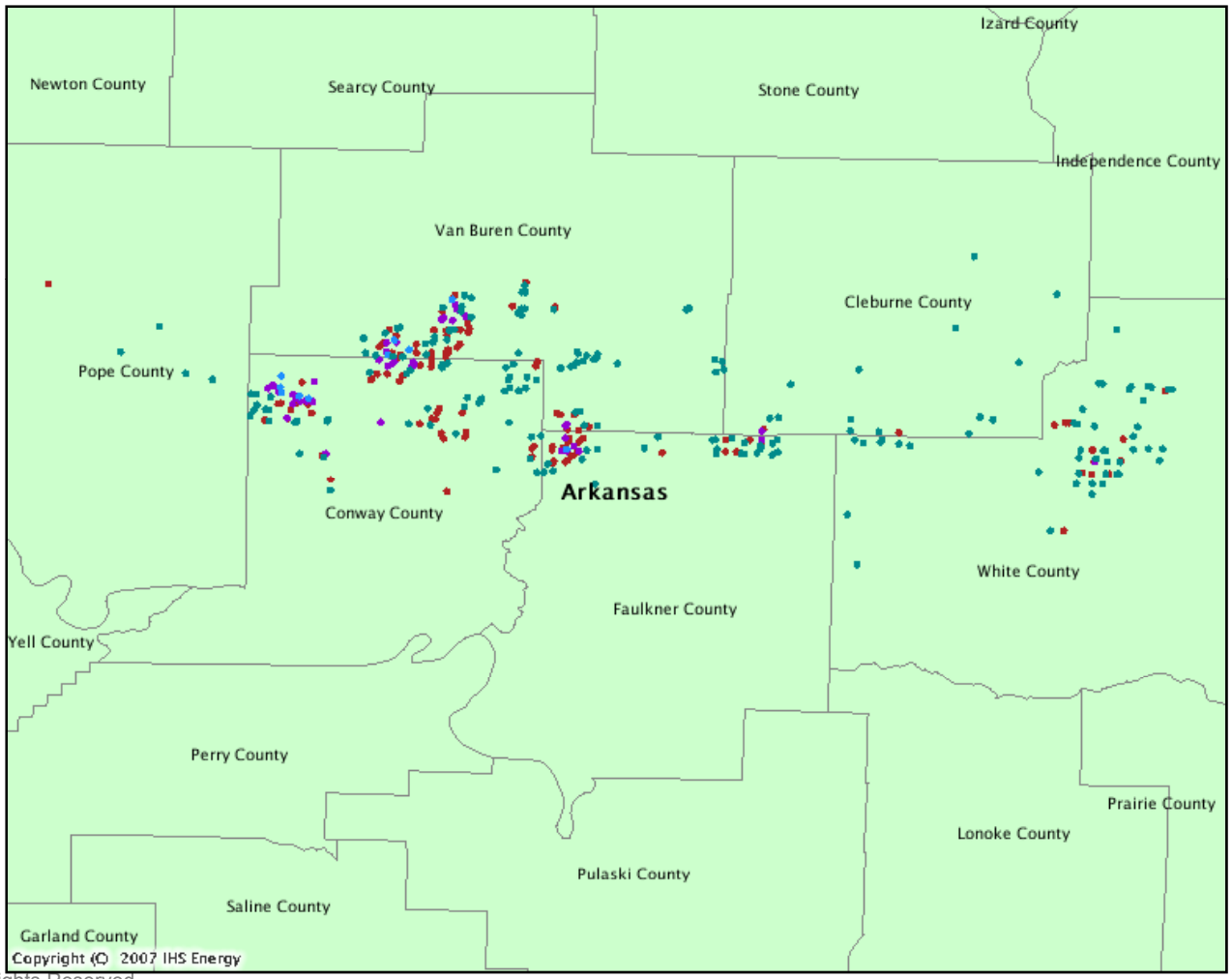
Pennsylvanian	Atoka	
	Bloyd	
	Hale	Praire Grove
		Cane Hill
Mississippian	Pitkin	
	Fayetteville	
	Batesville	
	Ruddell	
	Boone	
Devonian	Chattanooga	
	Clify	
	Pentera	

Fayetteville Shale Completions

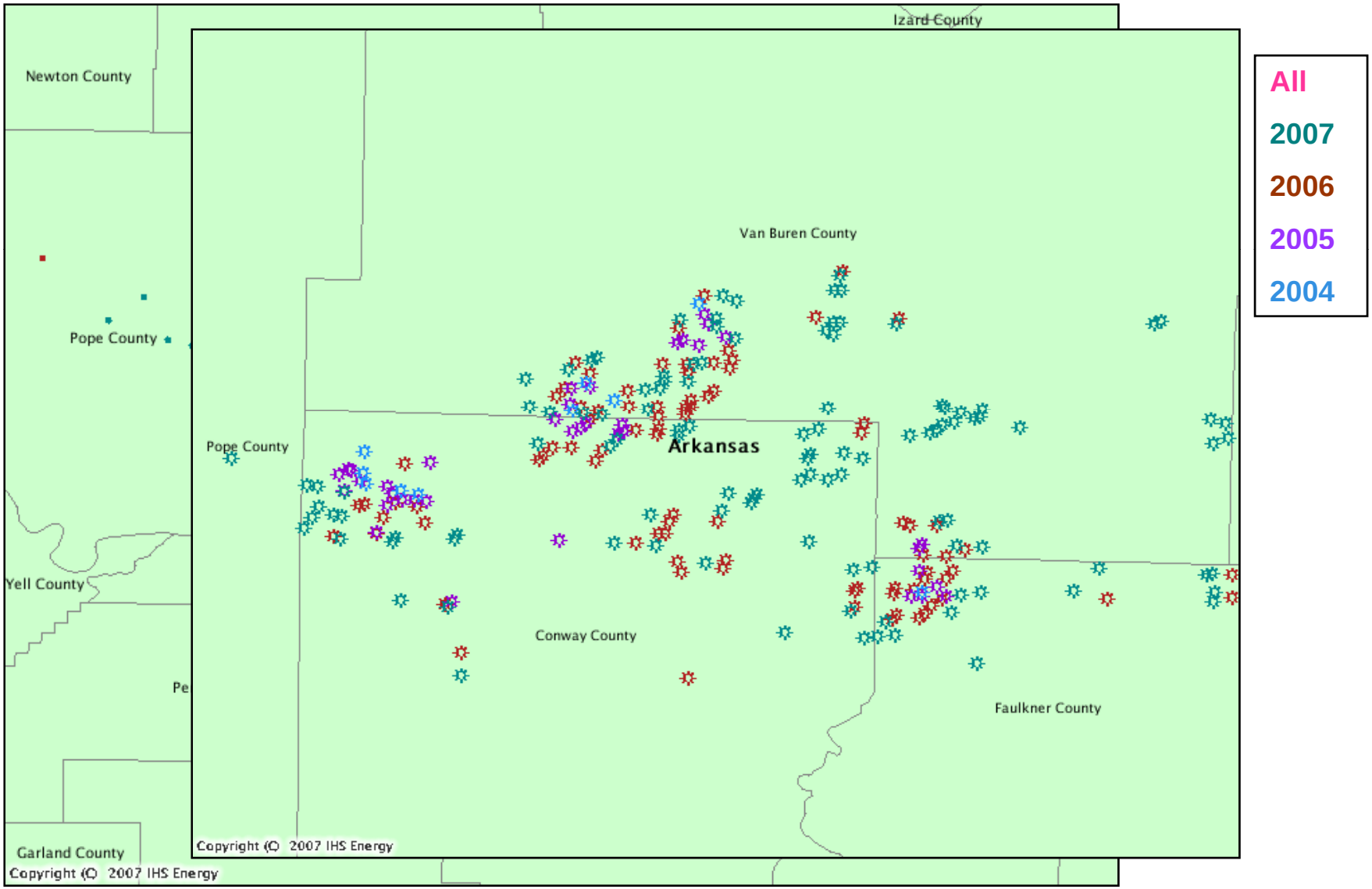


Fayetteville Completions by Year

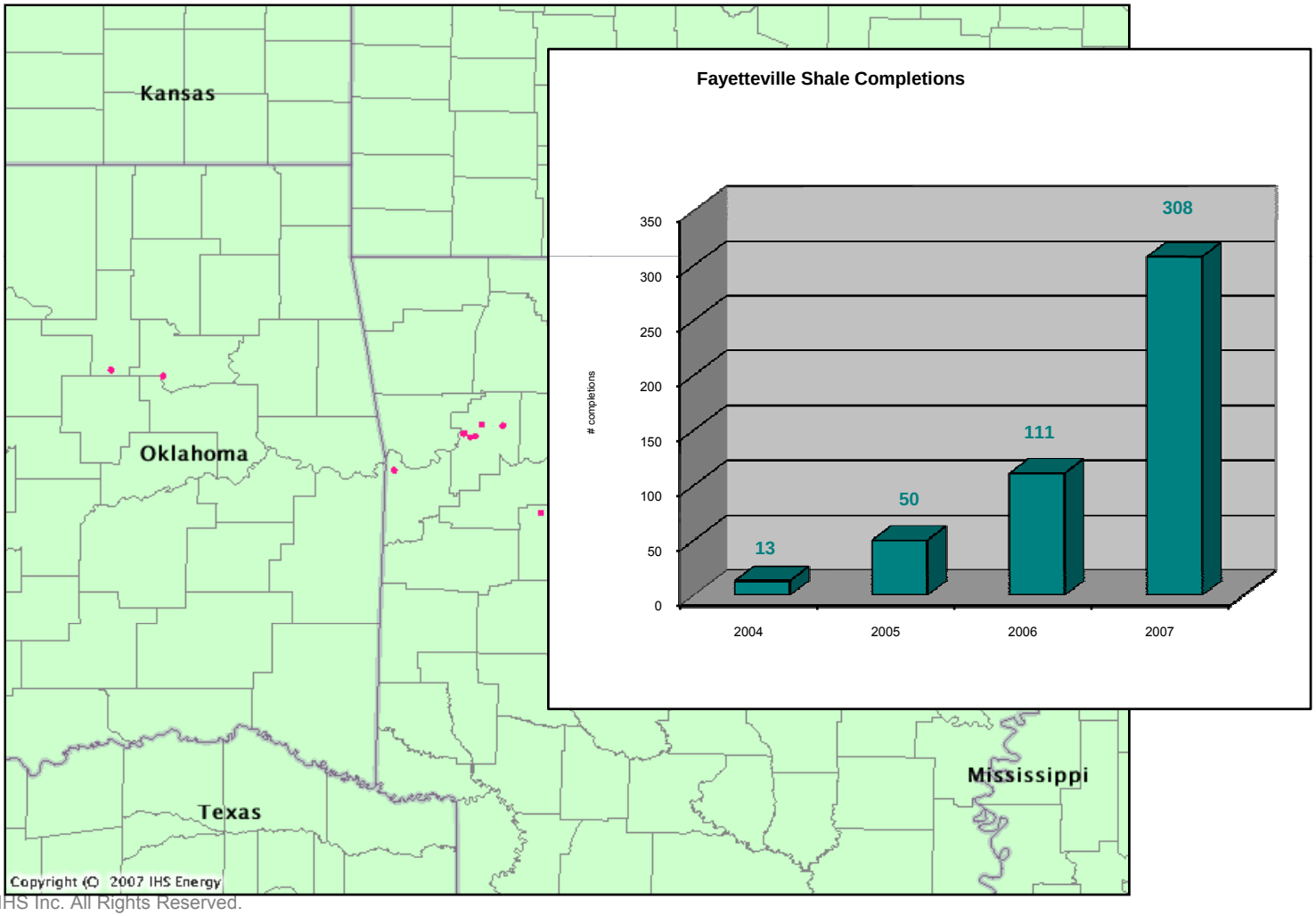
All
2007
2006
2005
2004



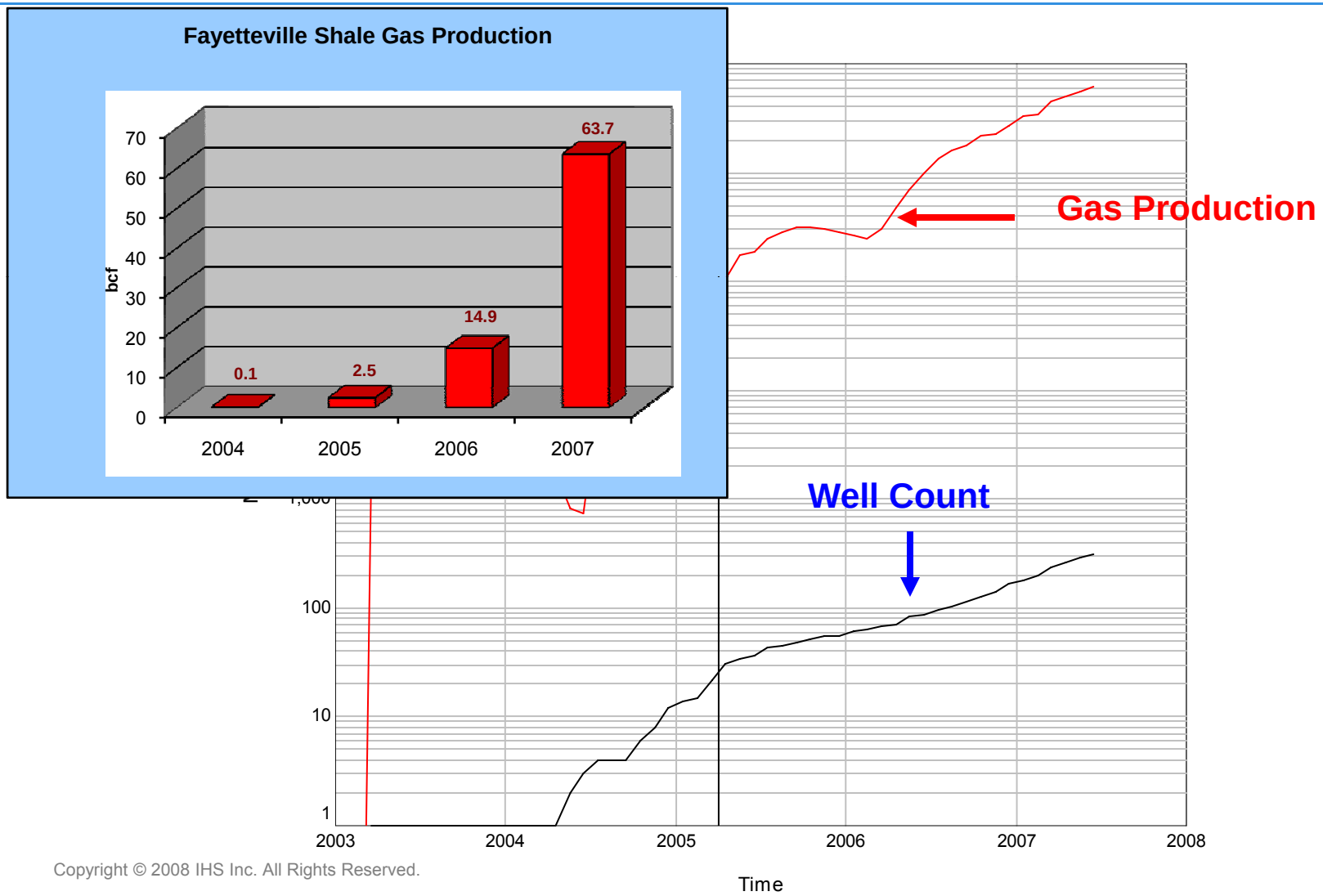
Fayetteville Completions by Year



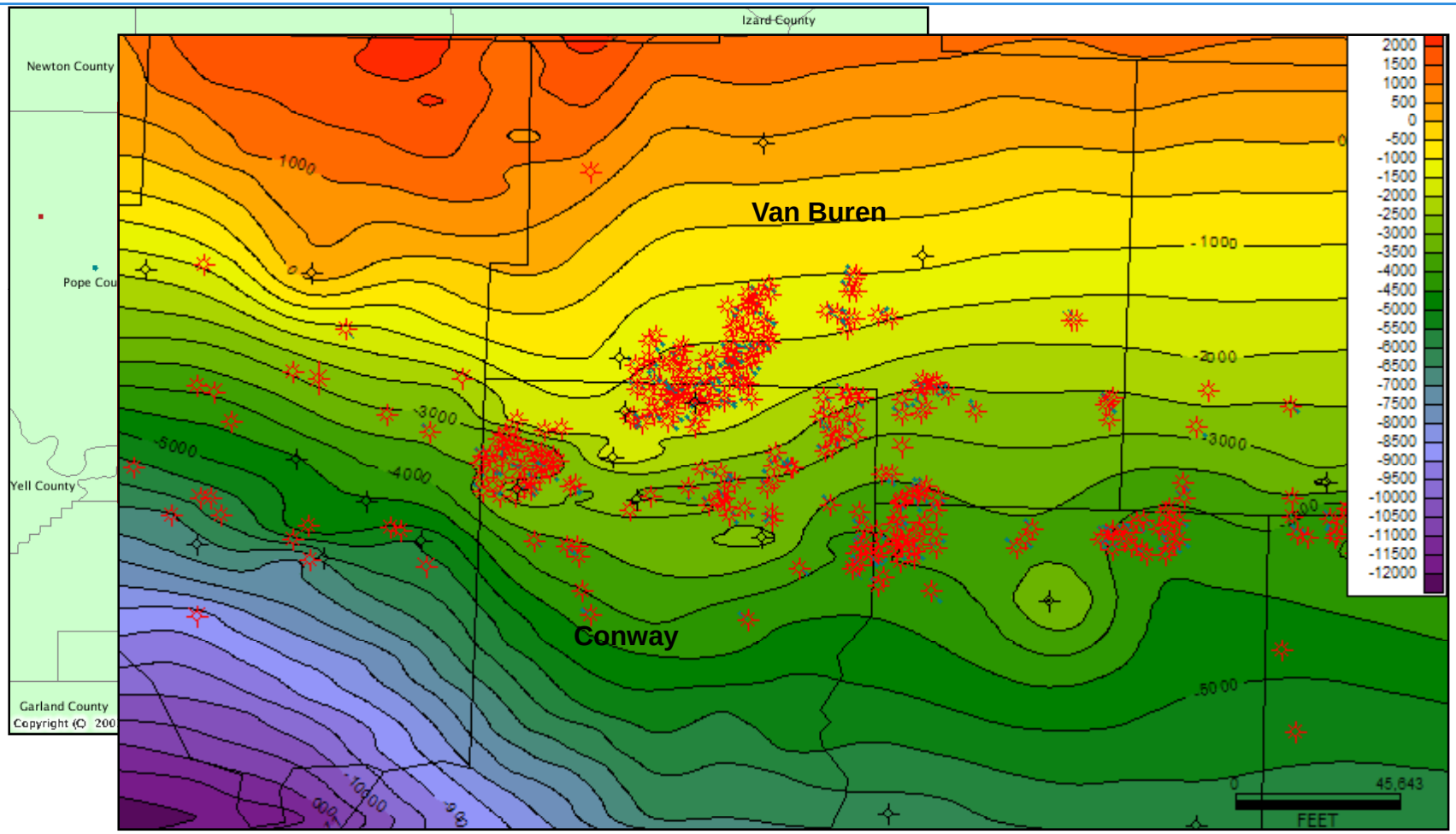
Fayetteville Completion Chart by Year



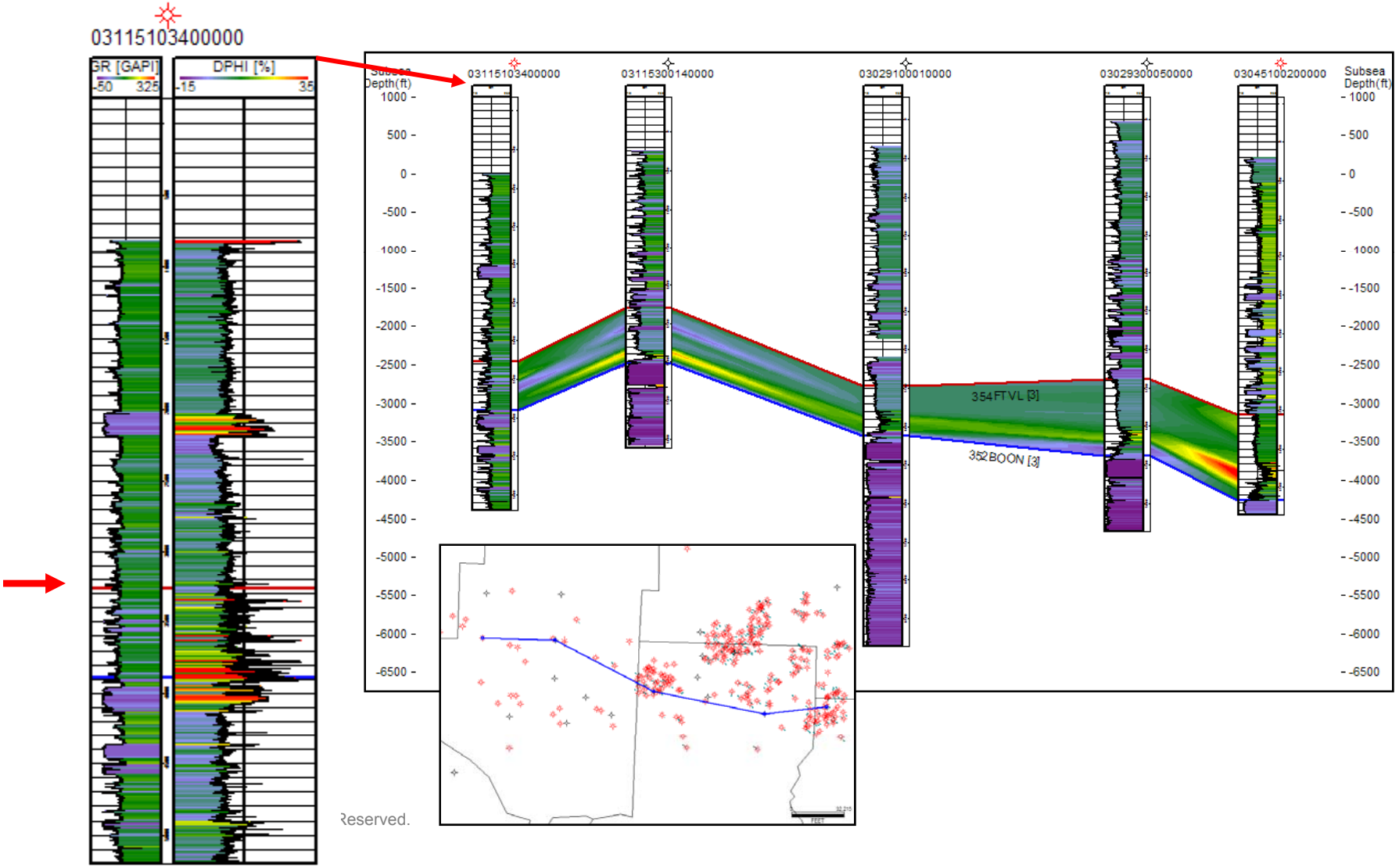
Fayetteville Production Chart



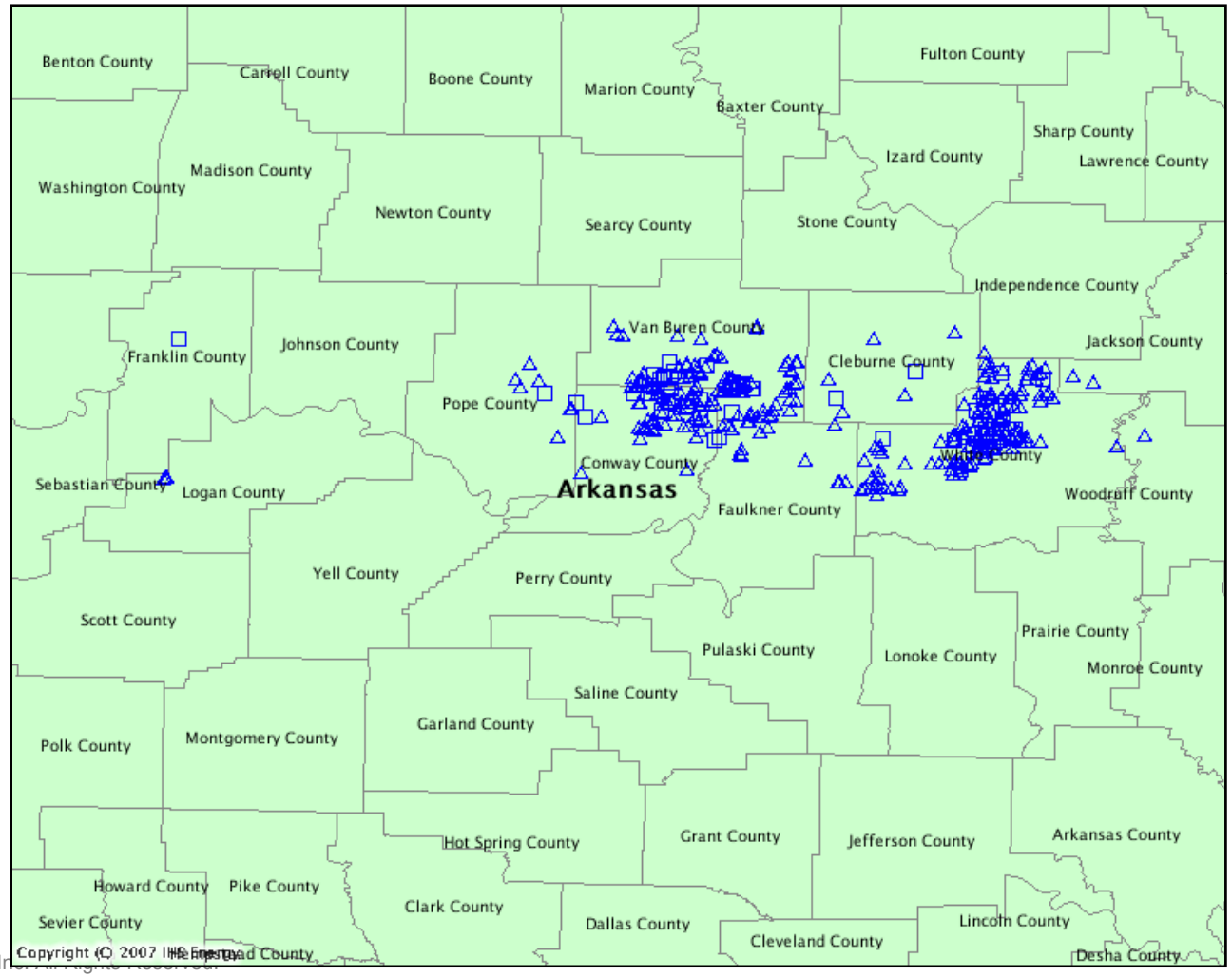
Petra Fayetteville Structure Map



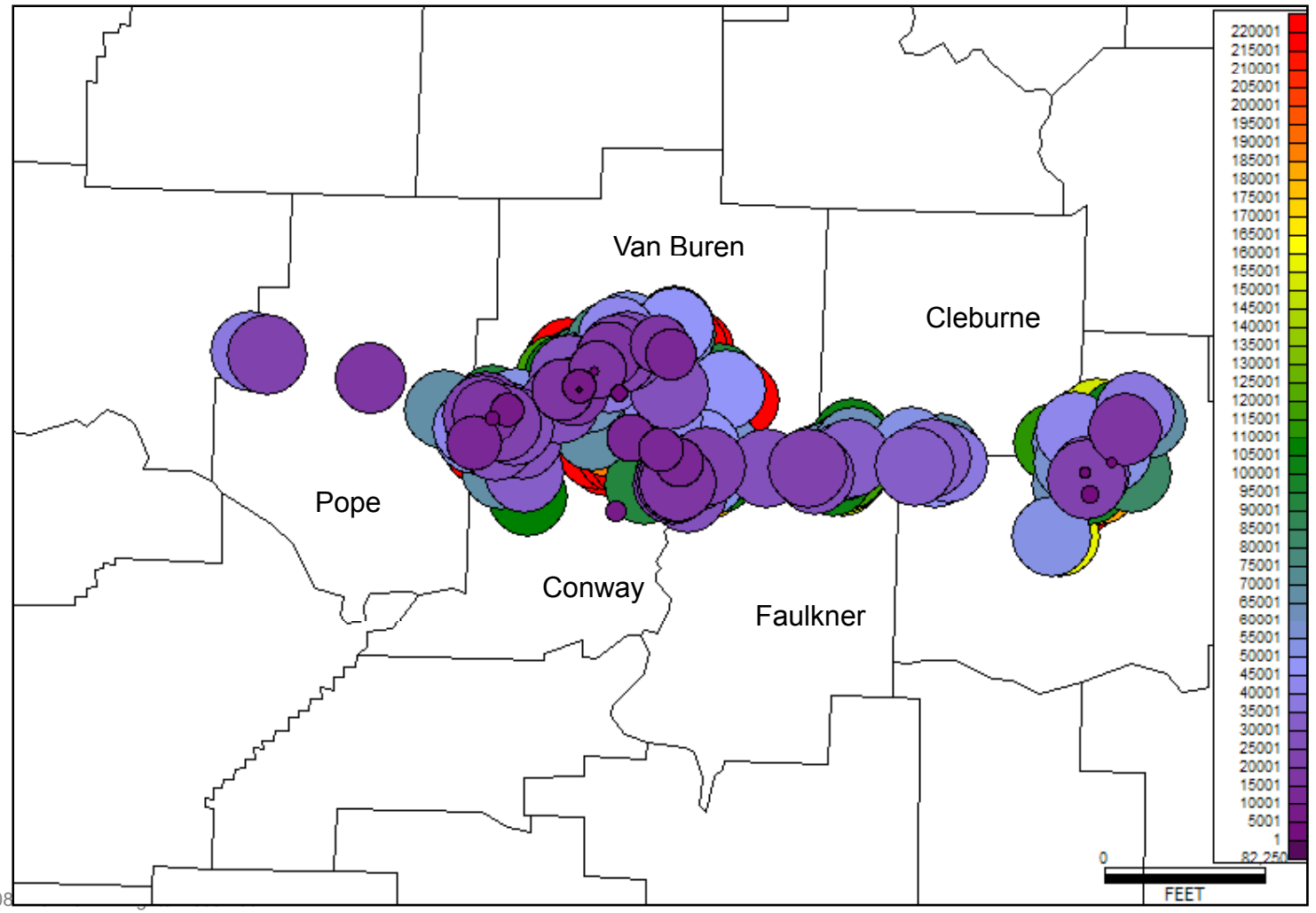
Fayetteville Logs



2007 Fayetteville Permits



Petra Production Bubble Maps

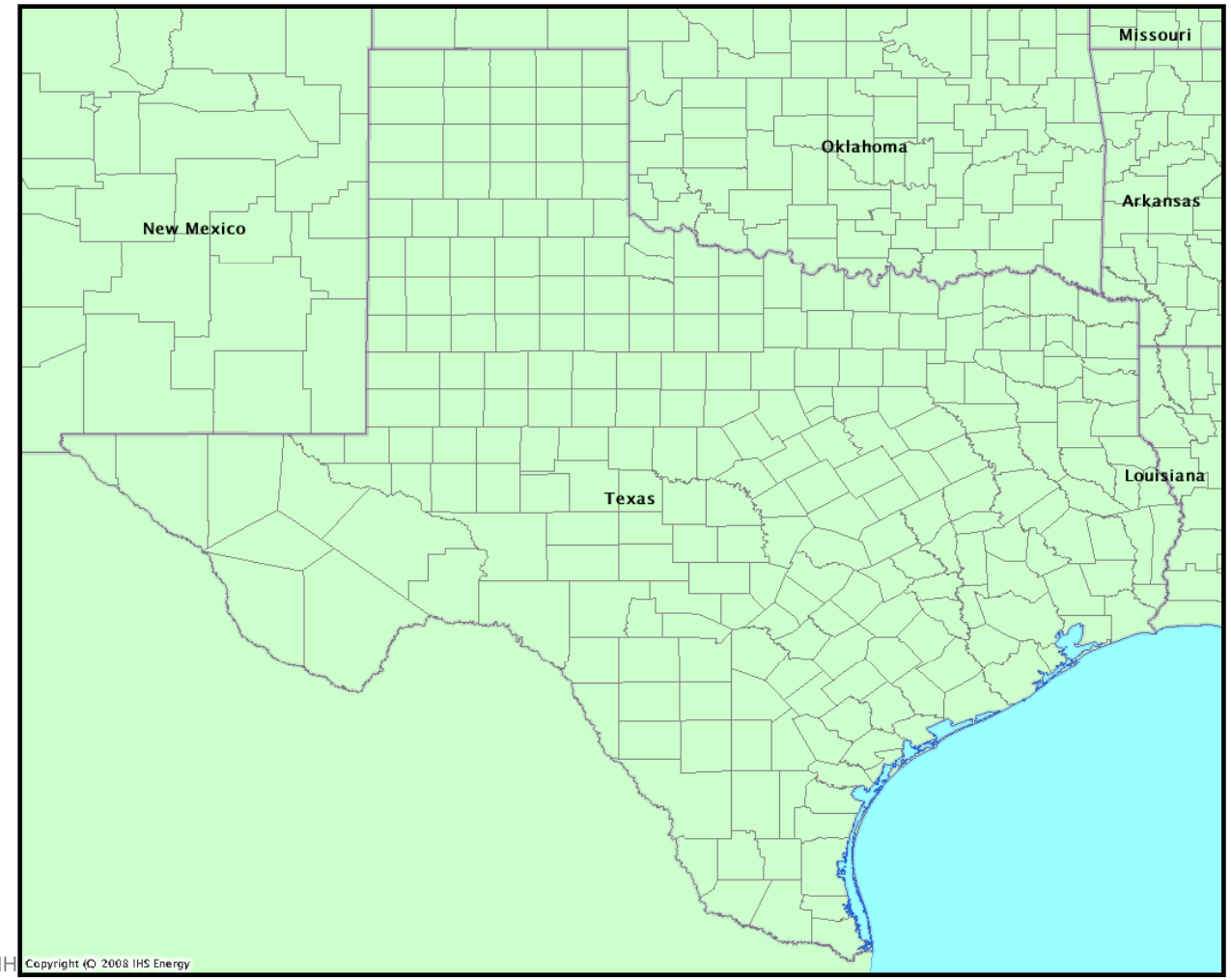


Fayetteville Shale Conclusions

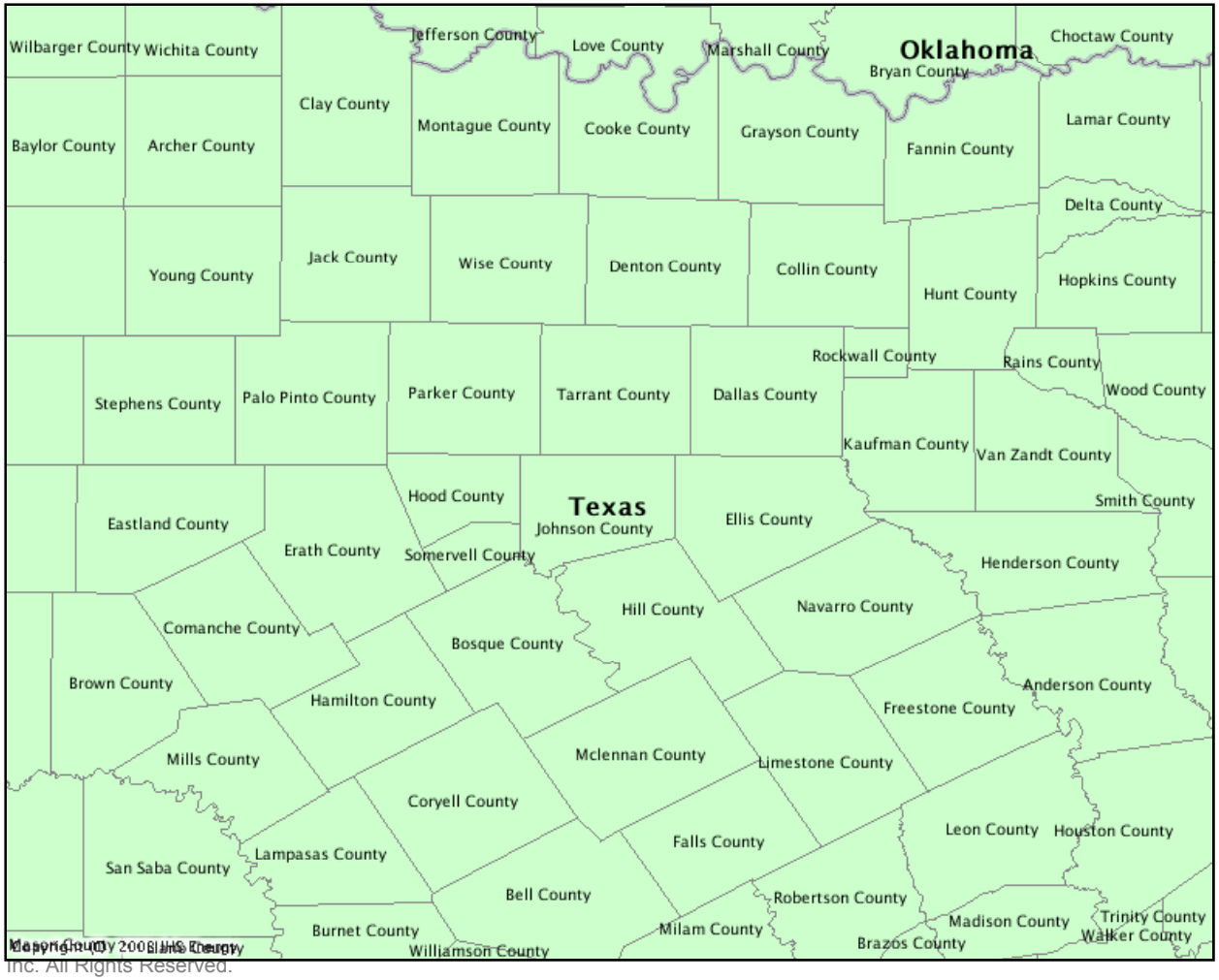
- The Fayetteville Shale in Arkansas continues to show sharp increases in drilling – over 200 % increase in 2007

- And a resulting sharp increase in gas production – over 28 bcf in 2007 – an increase of 189% over 2006

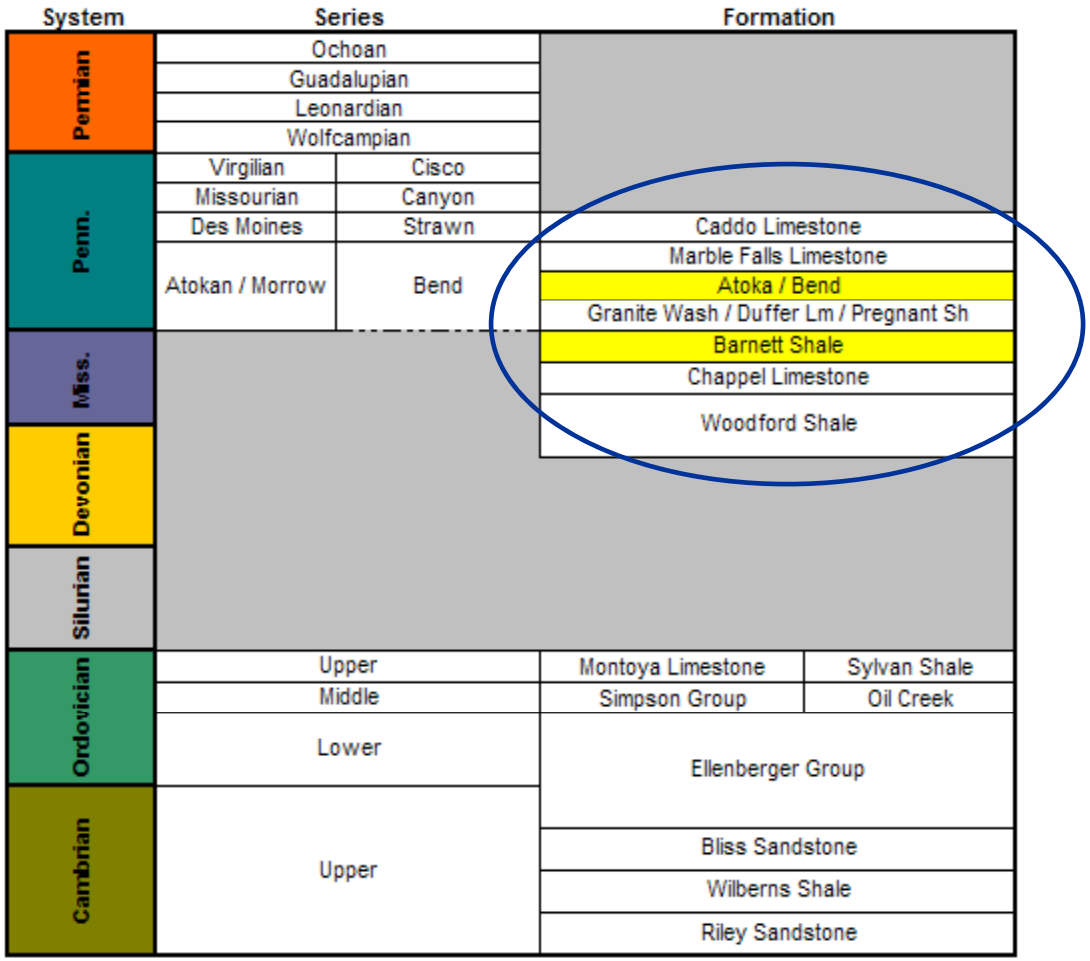
Texas



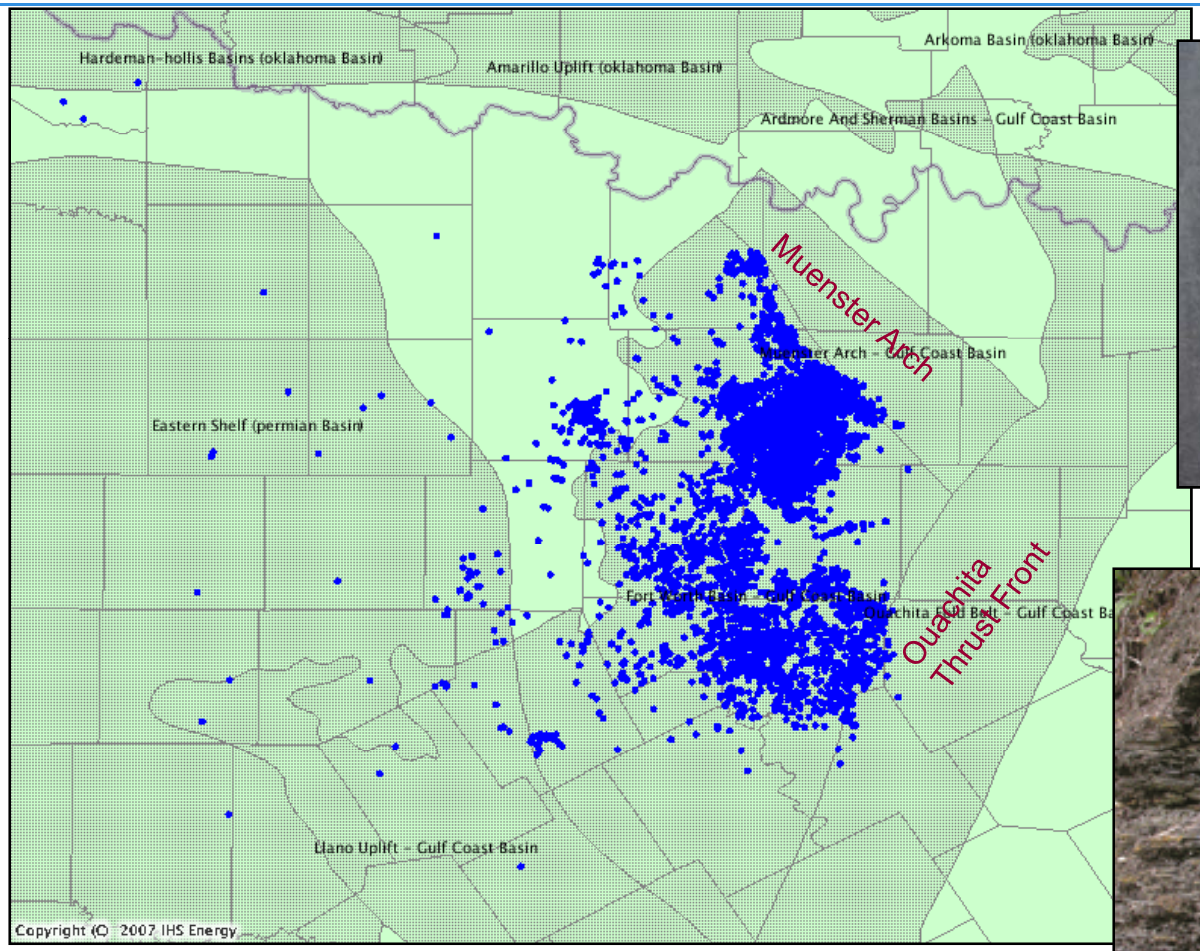
Barnett Shale Area

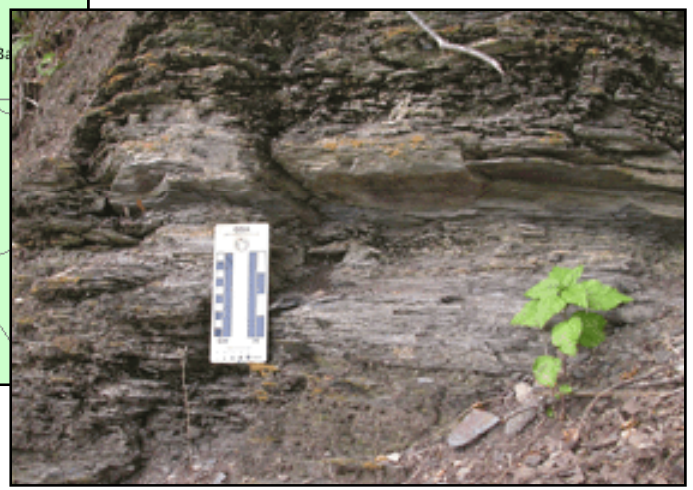


North Central Texas Stratigraphic Chart

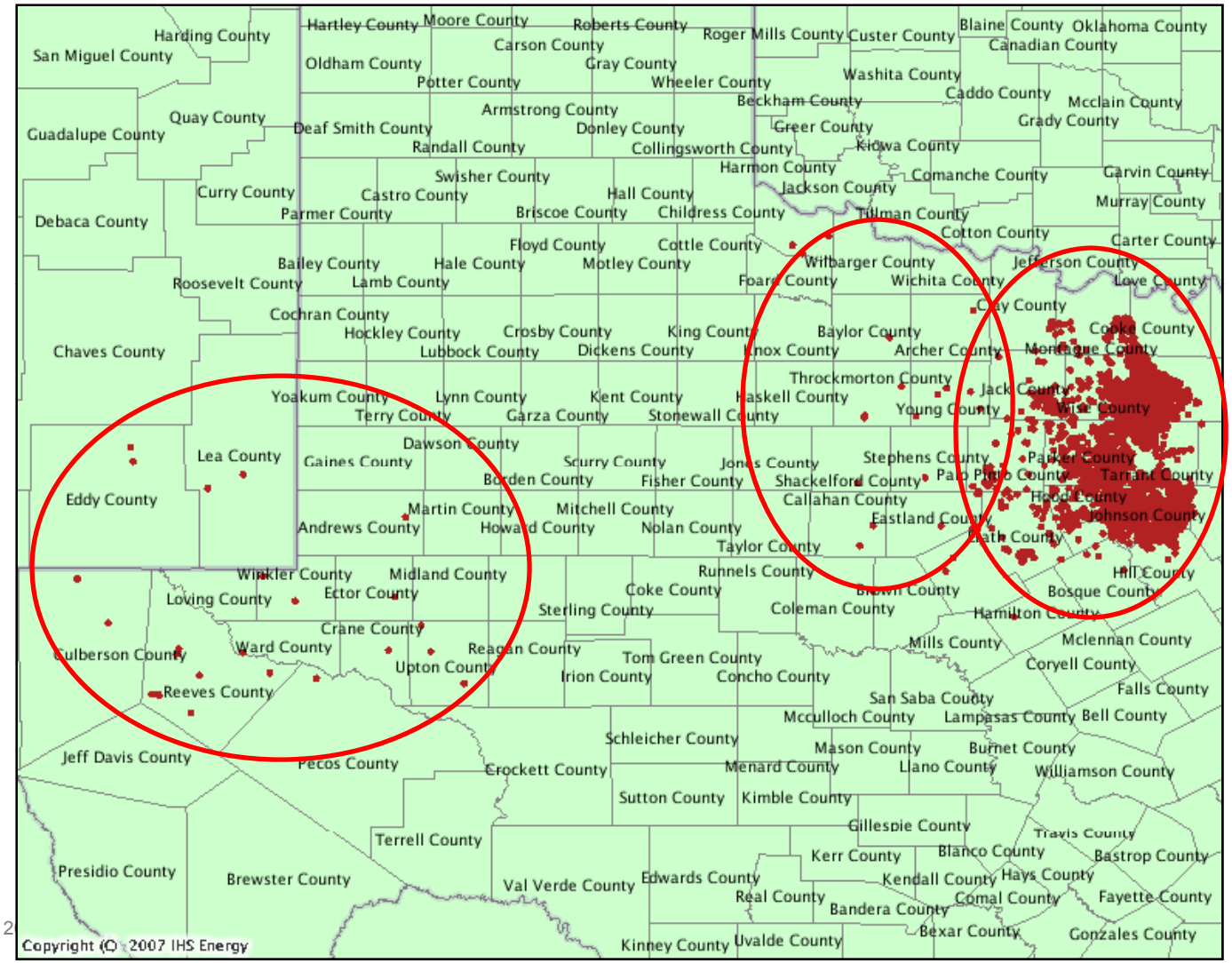


Barnett Shale

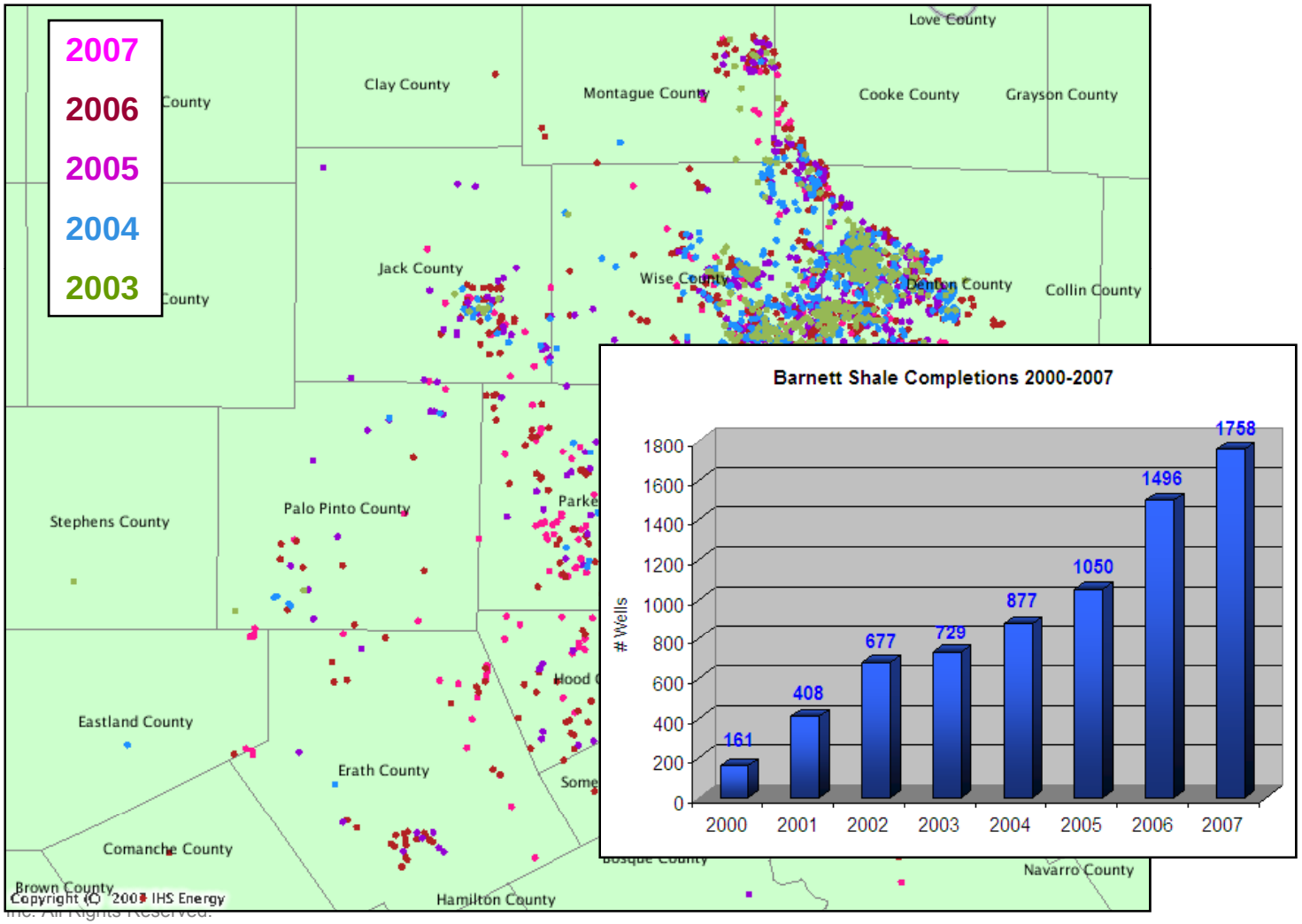




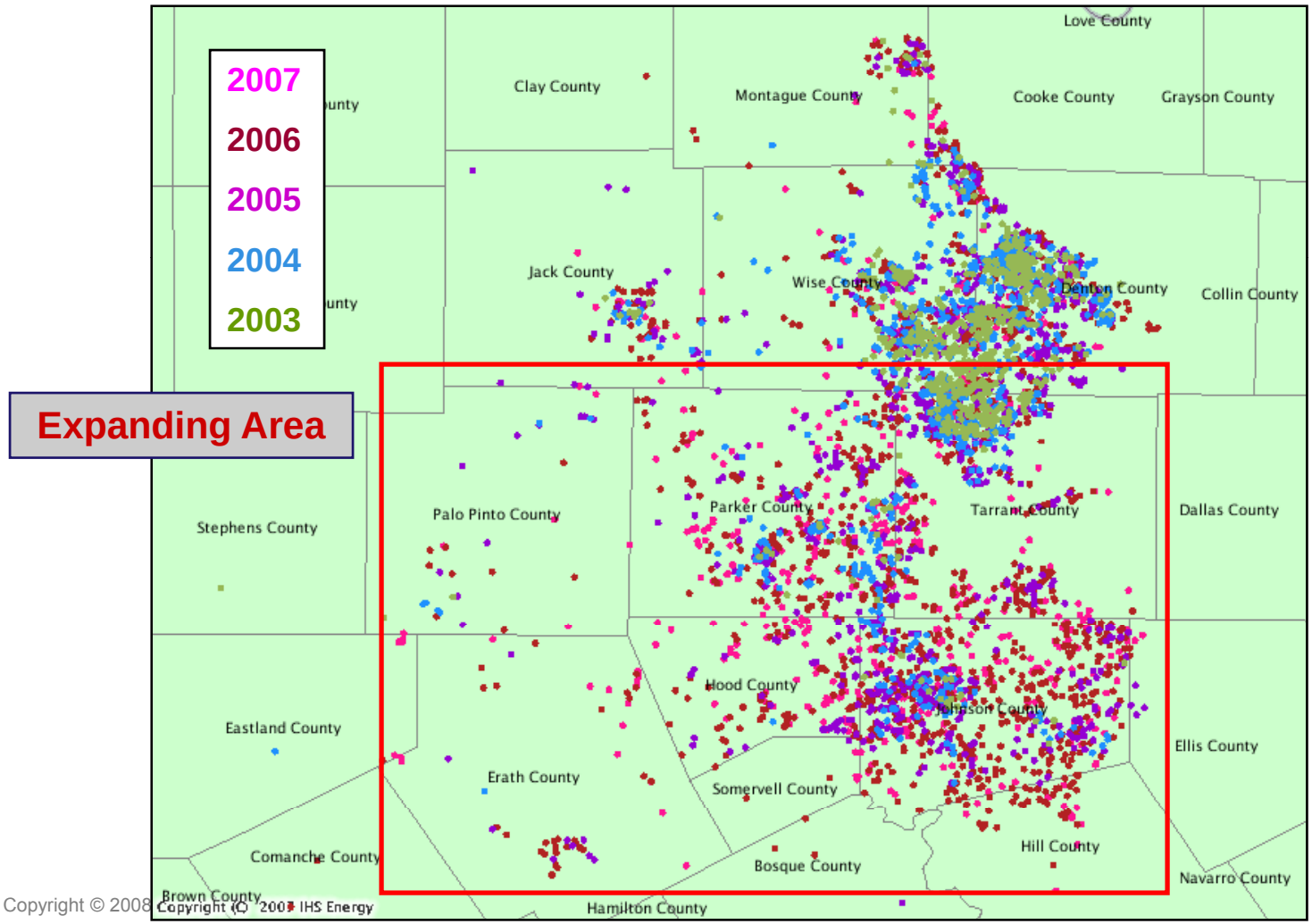
Barnett Shale Completions to Date



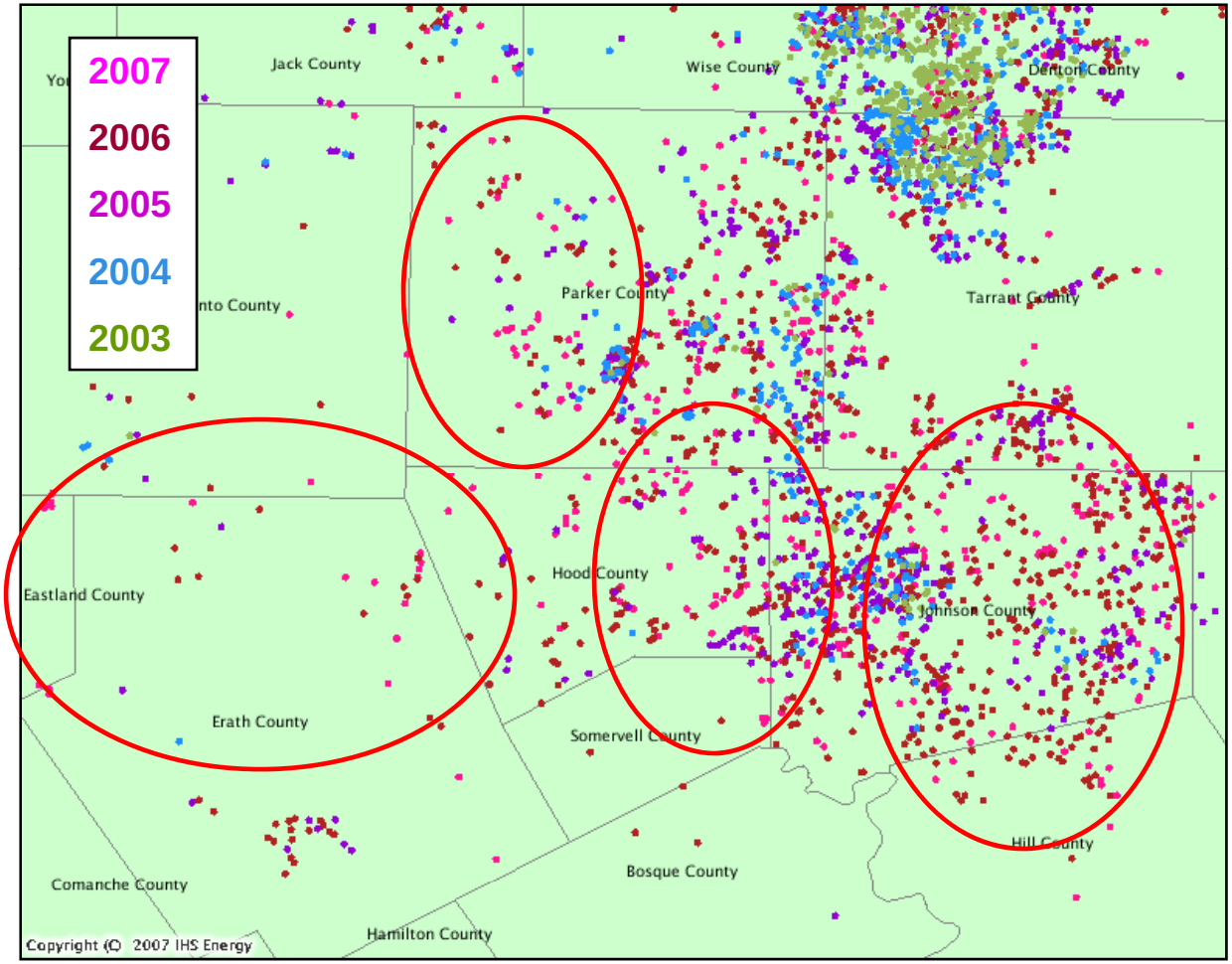
Barnett Shale Completions 2000-2007



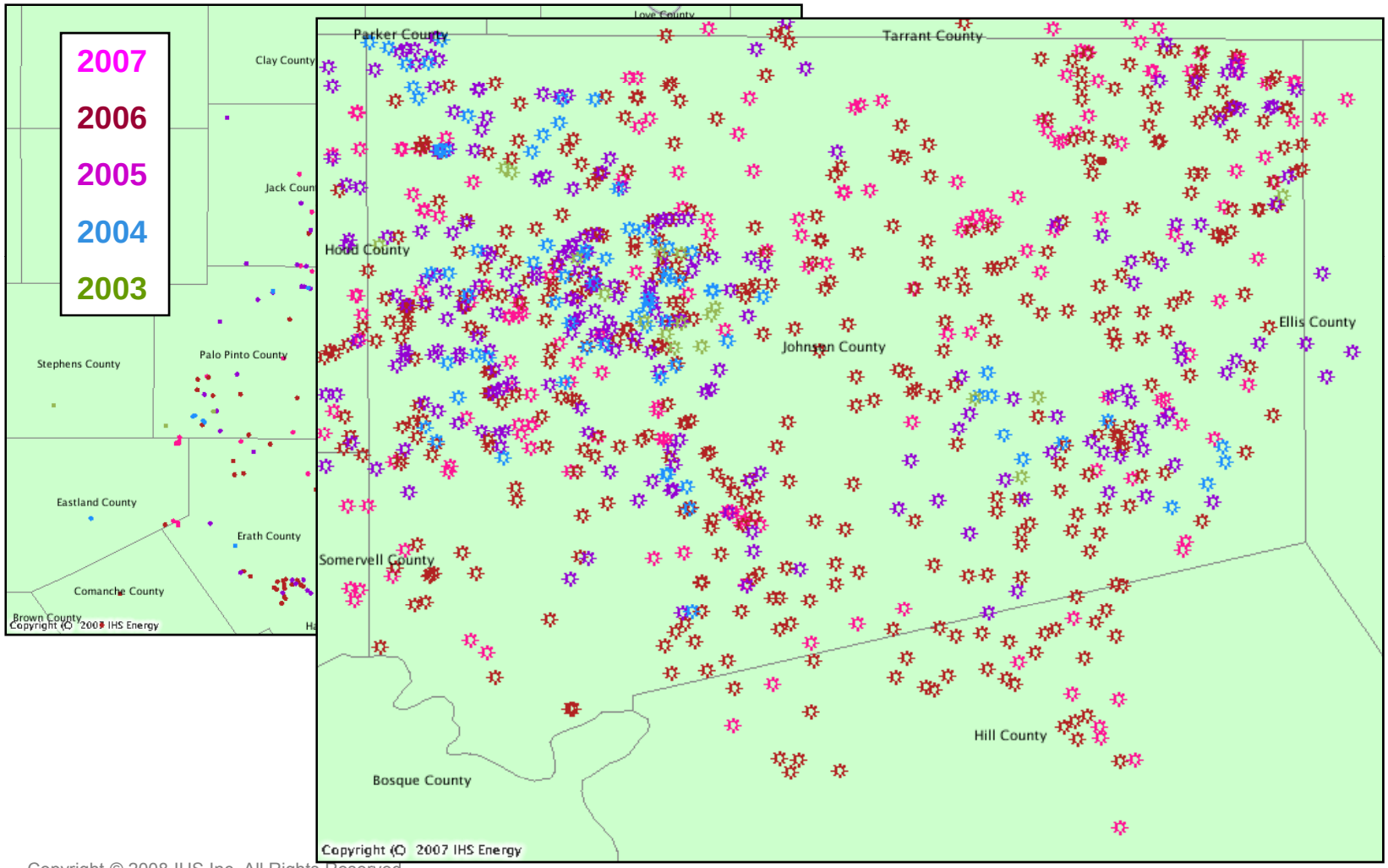
Barnett Shale Completions 2003-2007



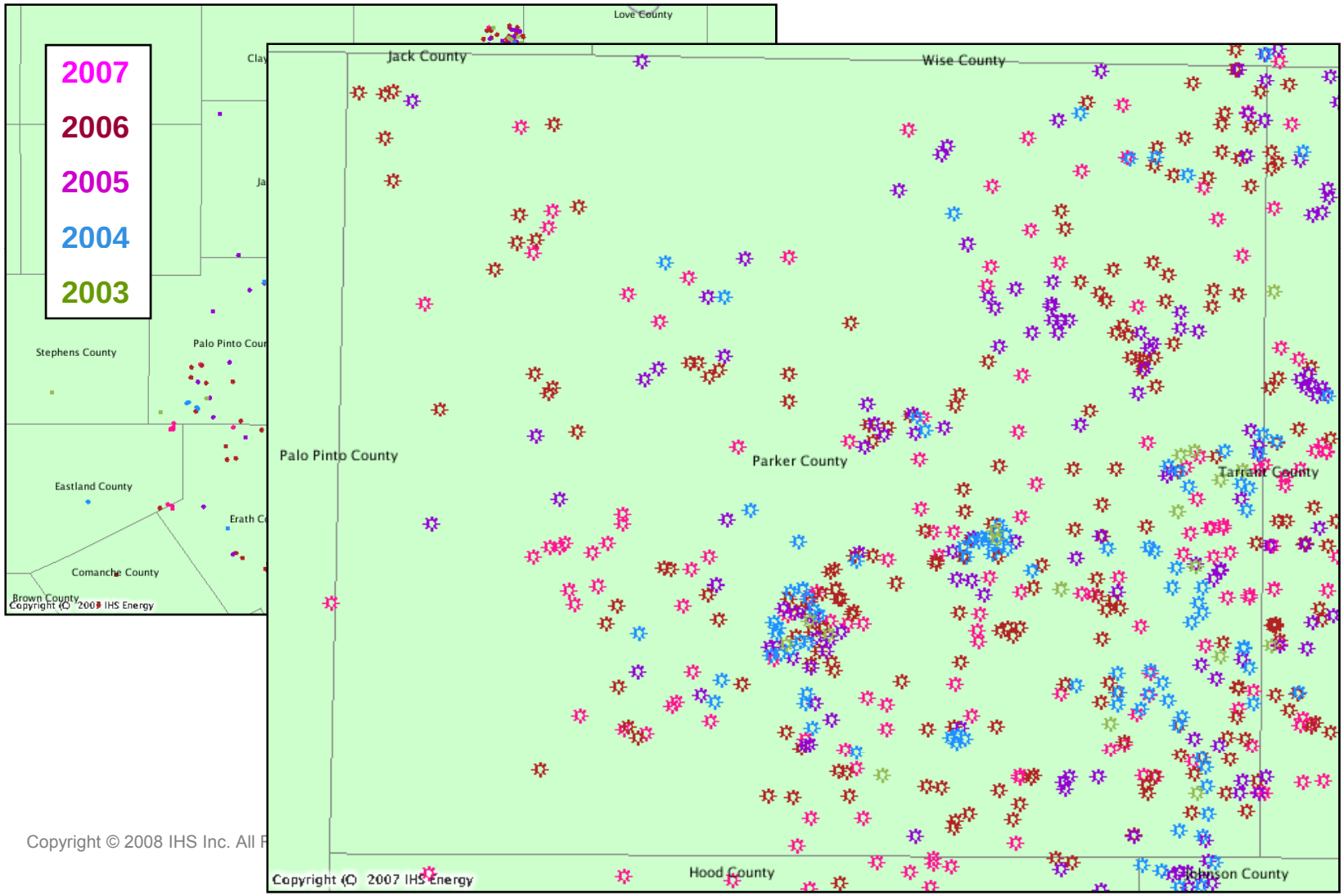
2007 Expansion Area



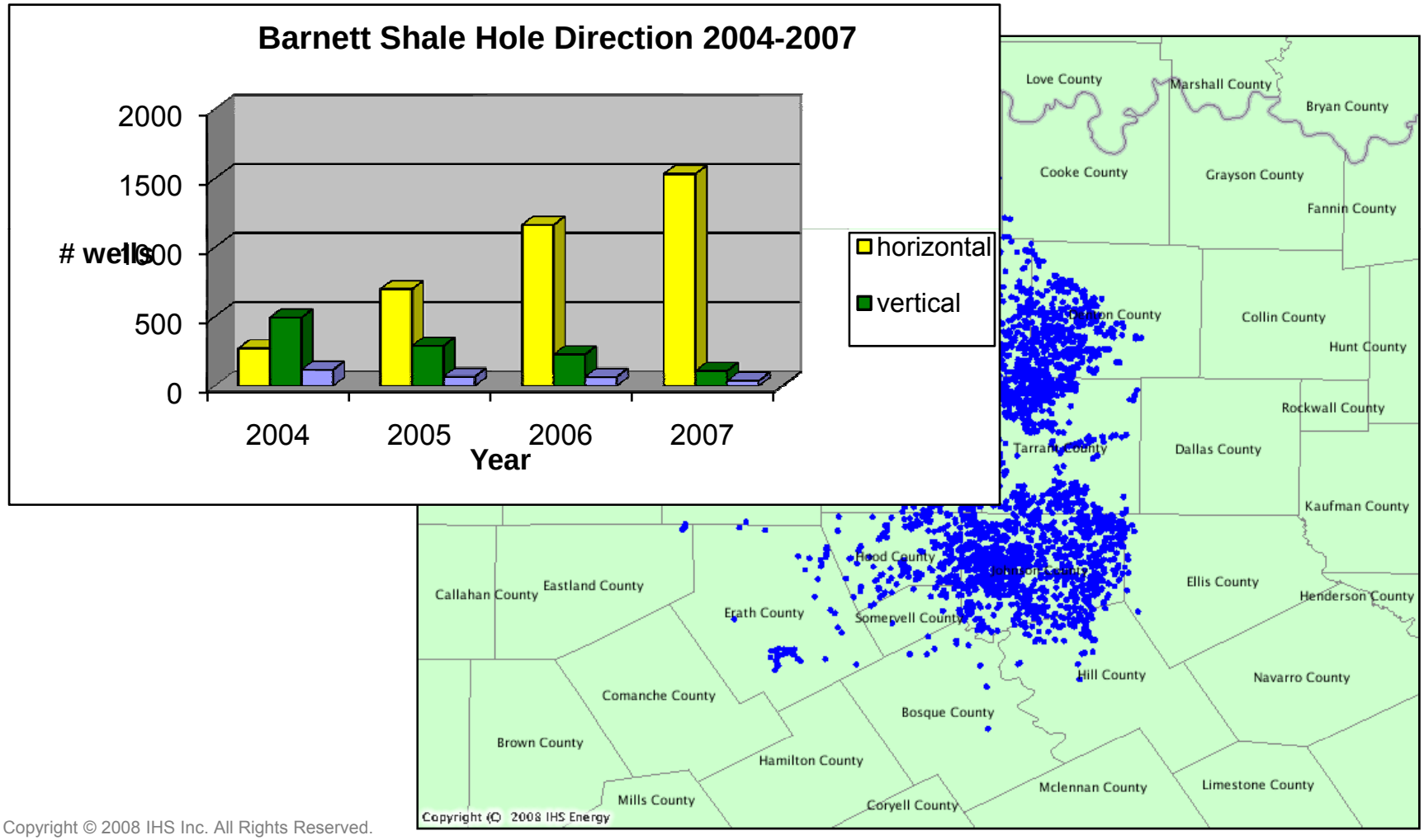
Barnett Shale Area – Johnson County



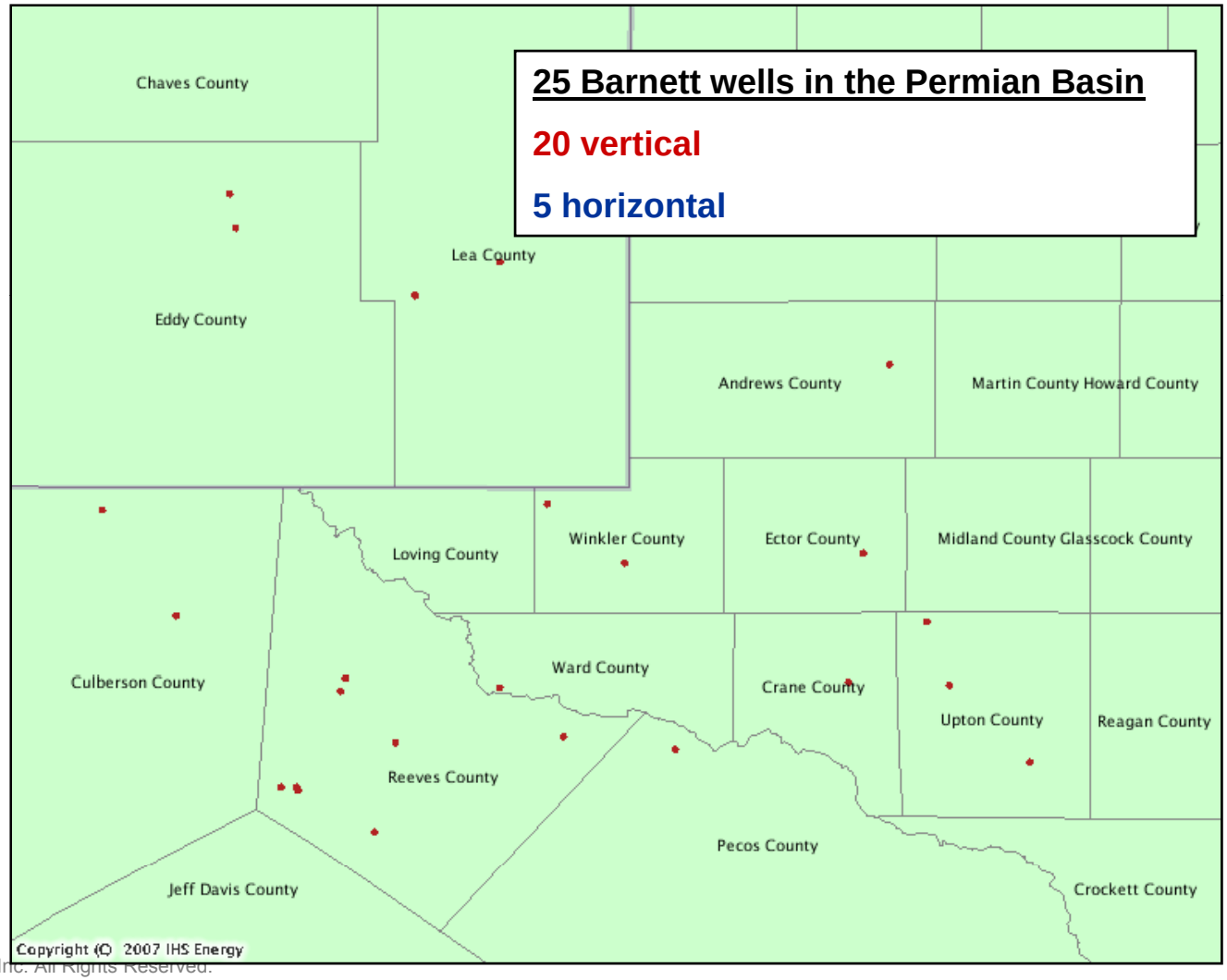
Barnett Shale Area – Parker County



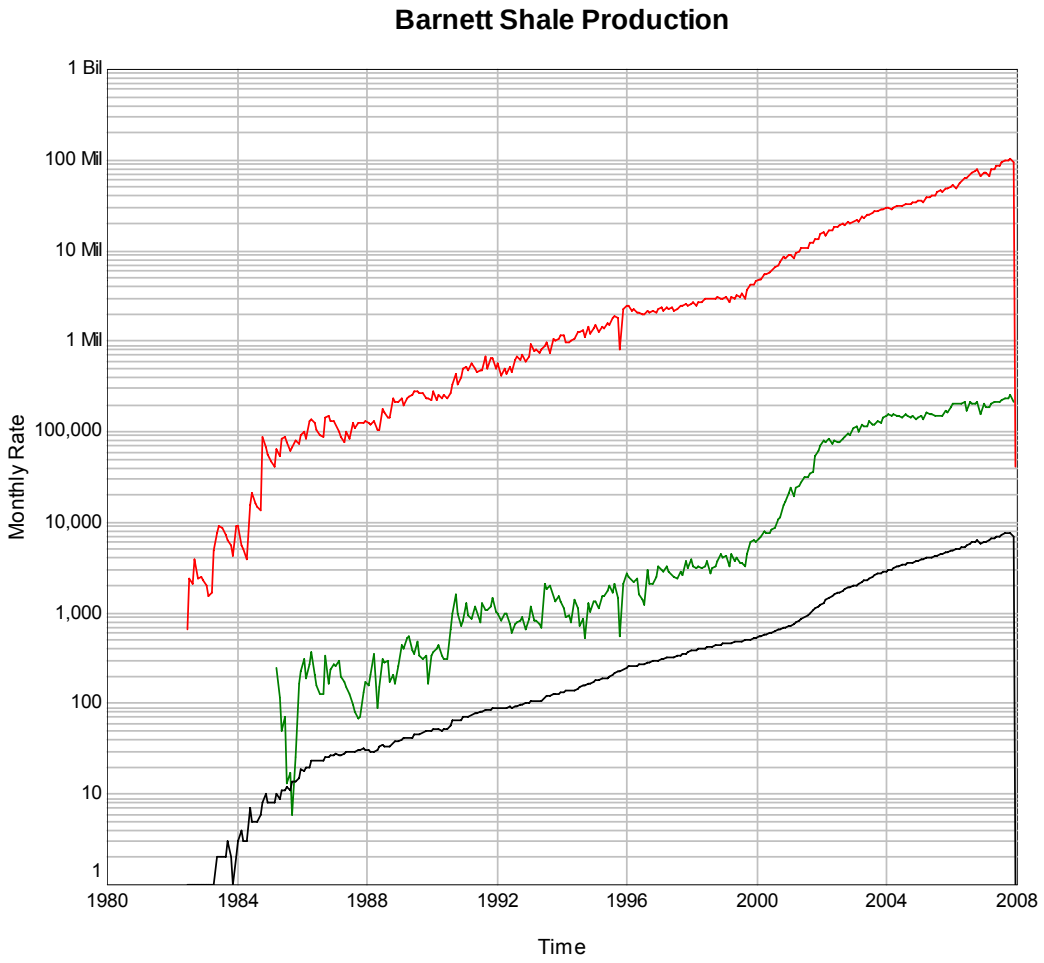
Barnett Horizontal Wells



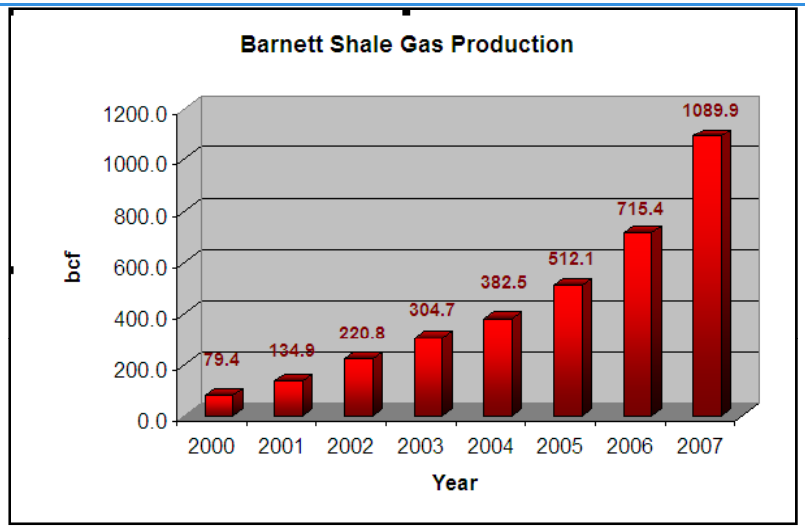
25 wells in West Texas – New Mexico

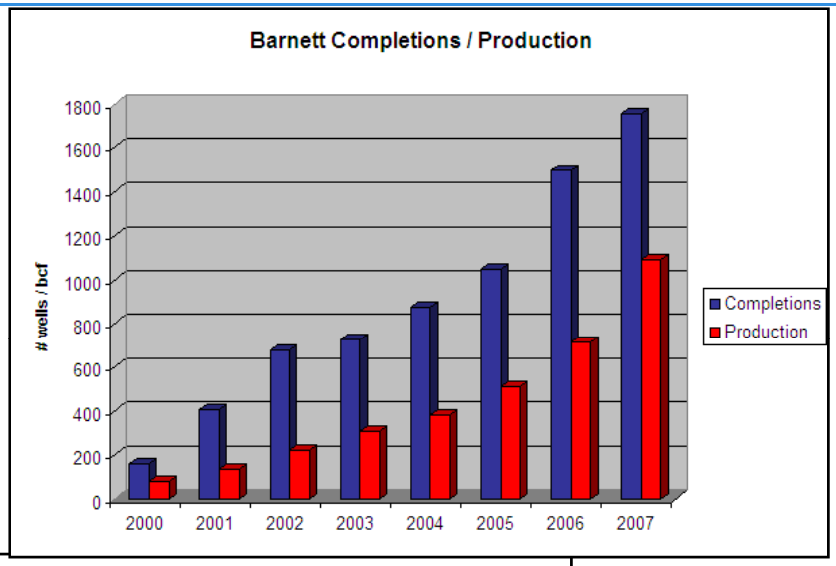


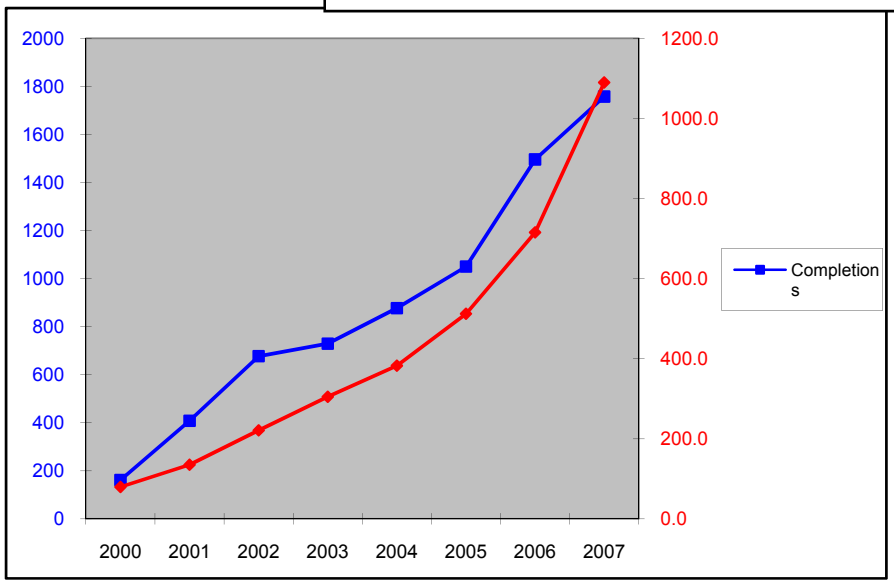
Barnett Shale Production Chart



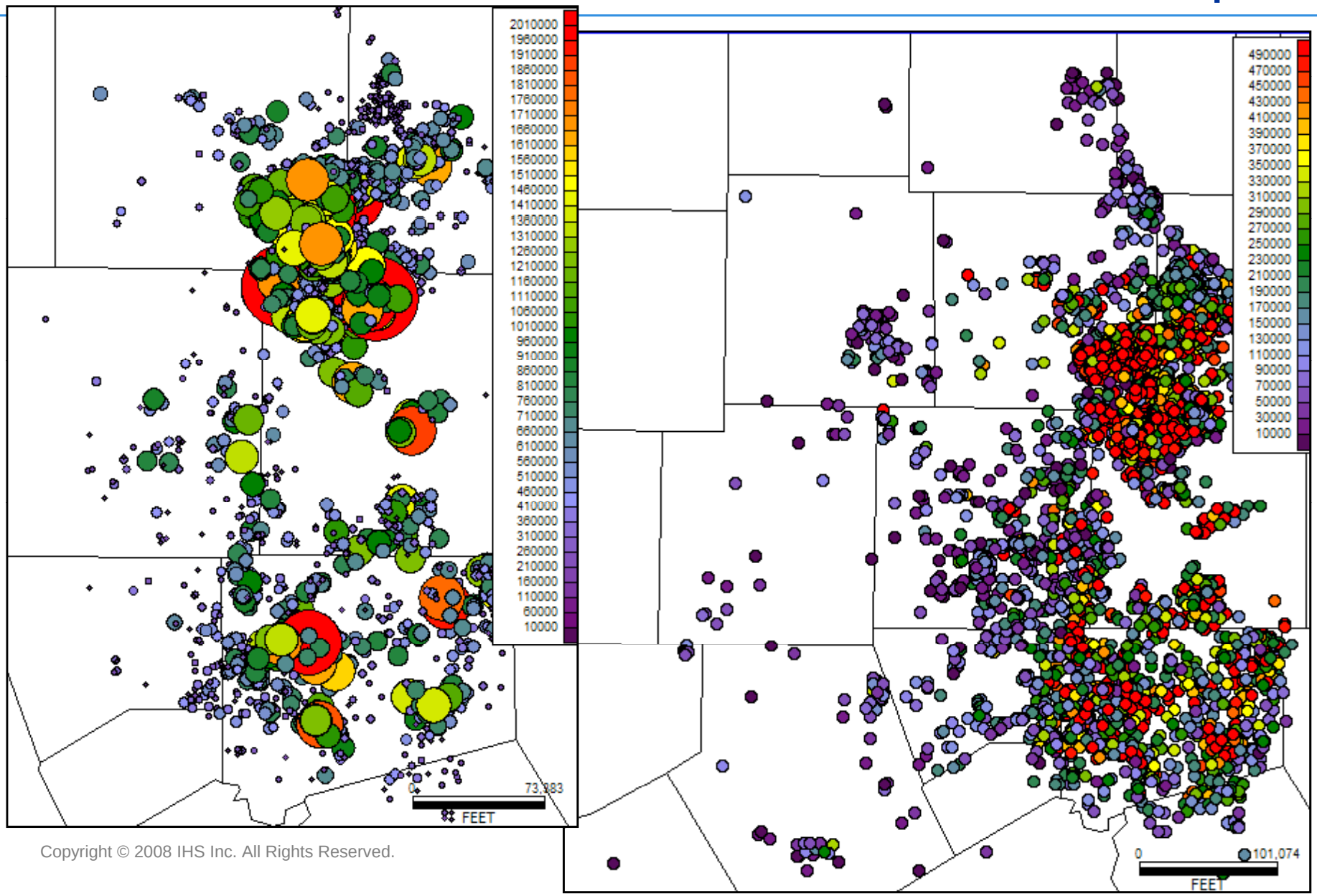
Barnett Shale Gas Production 2000-2007



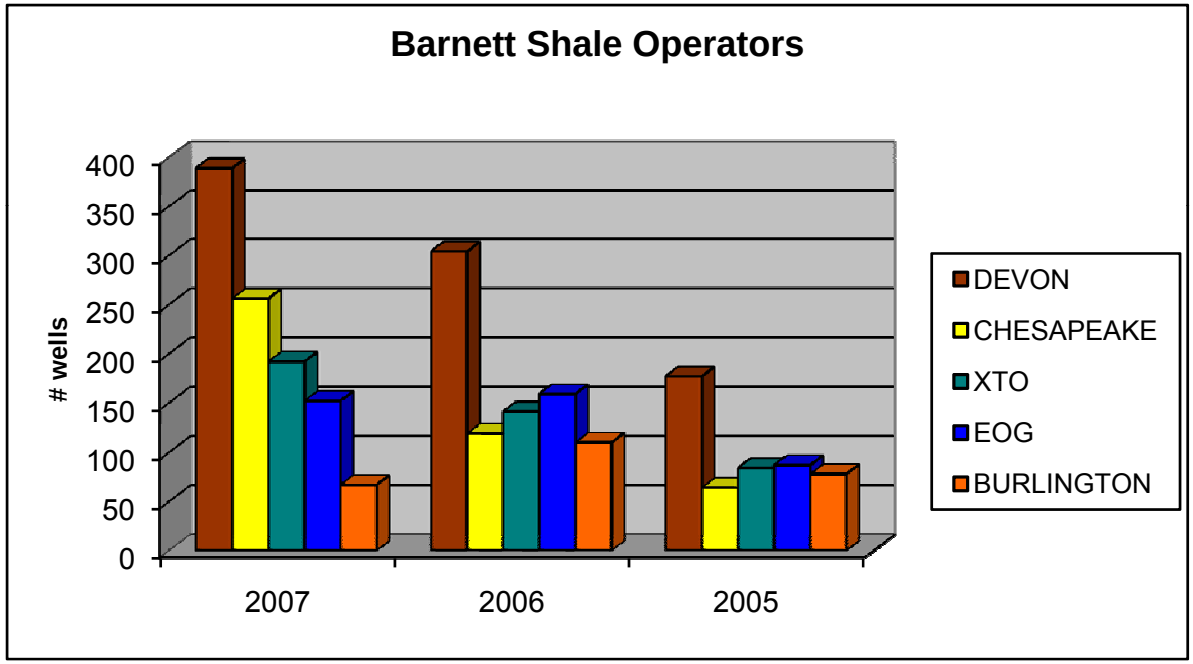




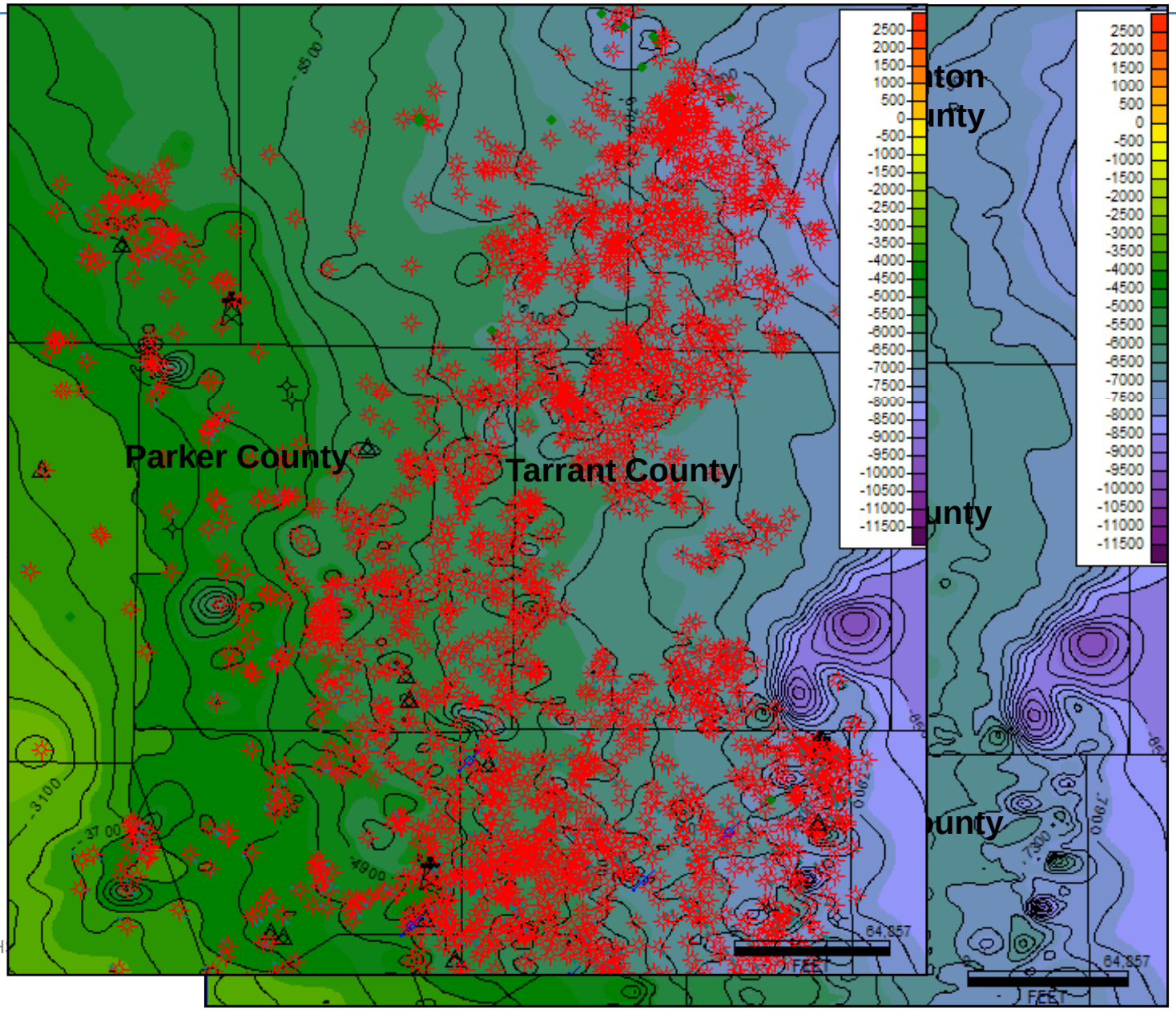
Petra Cumulative Gas Production Bubble Map



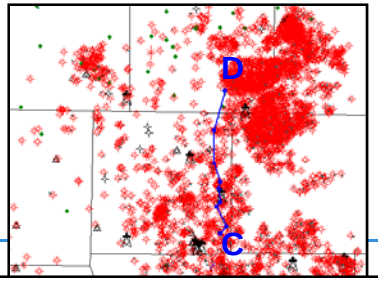
Barnett Top Five Operators

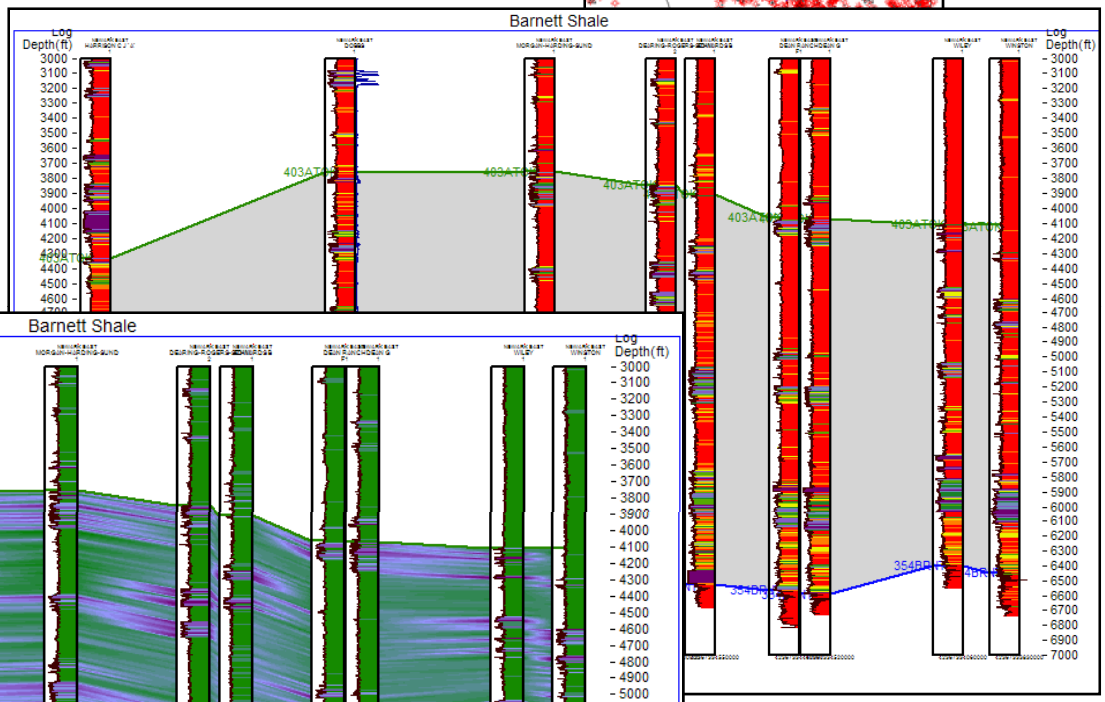


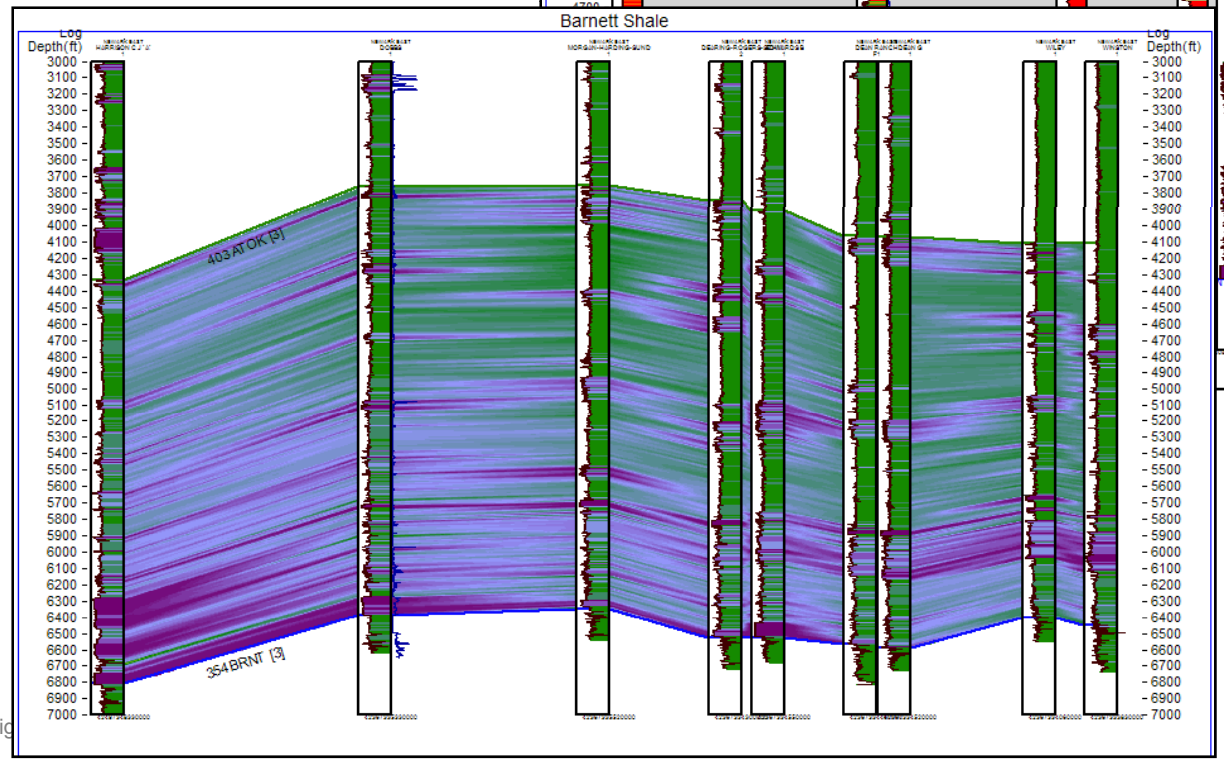
Barnett - 300 foot contours



Barnett Cross Section
Parker-Wise Counties



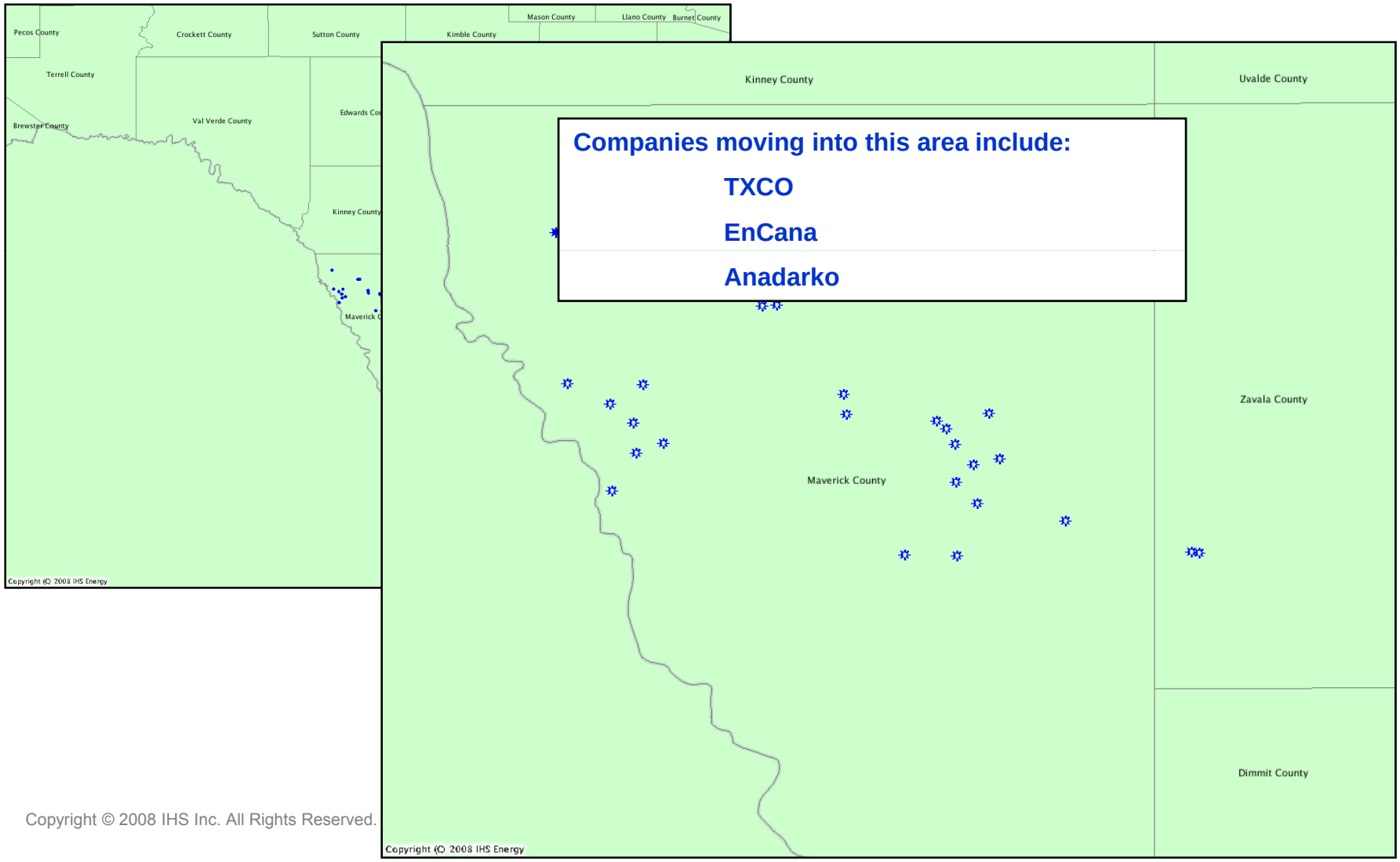




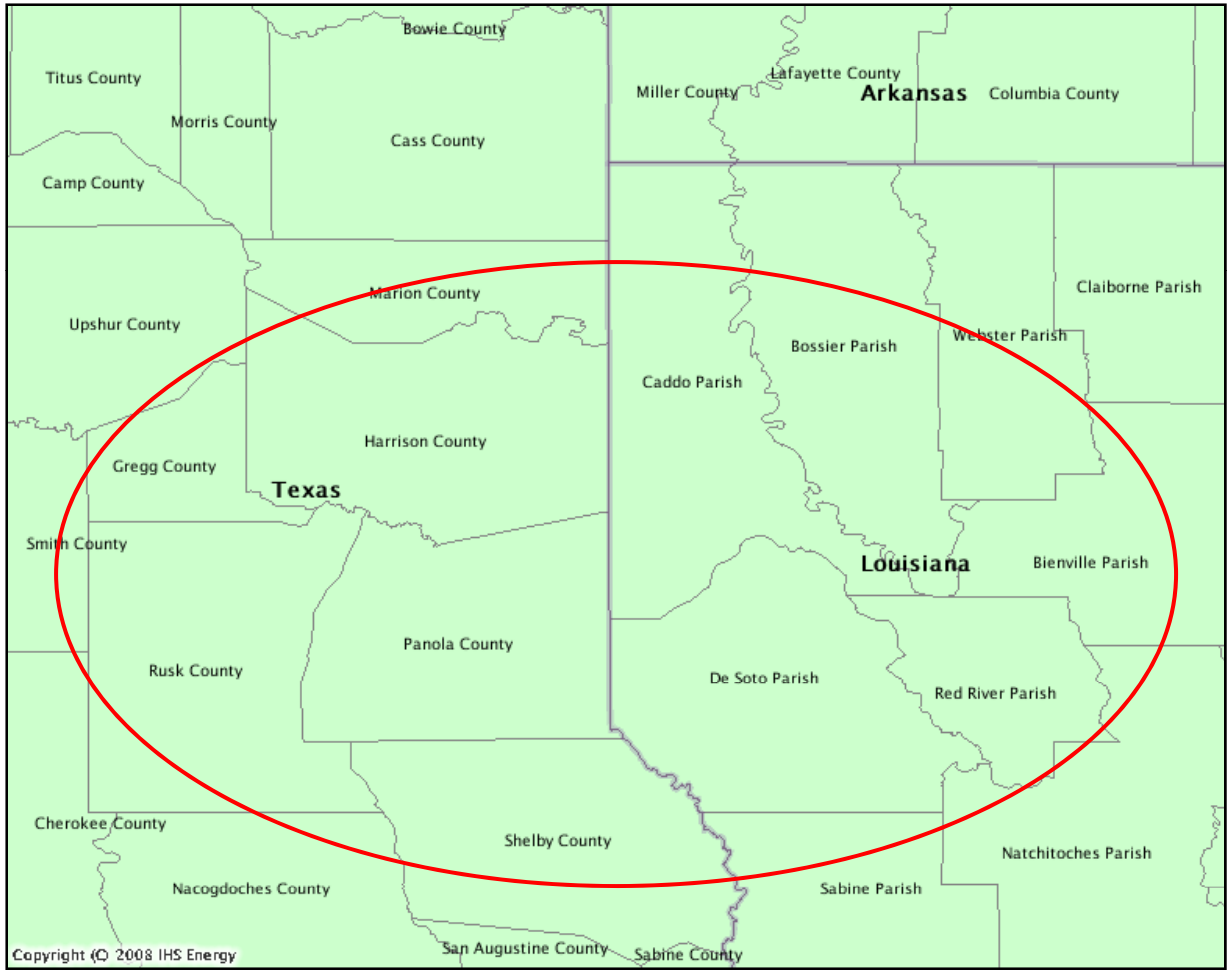
Barnett Shale Conclusions

- Completions up 15% in 2007
- 2007 Completions - 1766 wells
- Total gas production has surpassed 3700 bcf
- Expansion tends to be in the south-western part of the Barnett active area

Pearsall Shale – West Texas



Bossier Shale



Bossier Shale

Cubic Energy, GMX Resources, Penn Virginia

Cubic Energy, Inc. ("Cubic" or the "Company") announces today the results of specialized log analysis of the Bossier/Haynesville shale formations in the Company's Gloria's Ranch LLC 16 No. 1 well (Section 16 T15N-R15W) and in the Daniels 3 No. 1 well (Section 3 T15N-R15W).

The reservoir characteristics of the Bossier/Haynesville shale formations in the Gloria's Ranch LLC 16 No. 1 and in the Daniels 3 No. 1 are very **similar to the productive reservoir characteristics of the Barnett Shale, Fayetteville Shale and the Woodford Shale gas plays.**

Log analysts identified two zones in the Gloria's Ranch LLC 16 No. 1. The lower zone is located between **11,350' and 11,600'** in depth and calculates an estimated 93 BCF of Total Shale Gas and 72 BCF of Free Shale Gas per square mile of reservoir. The upper zone is located between 10,550' and 10,760' in depth and calculates an estimated 54 BCF of Total Shale Gas and 43 BCF of Free Shale Gas per square mile of reservoir.

Log analysts identified two geologically equivalent zones in the Daniels 3 No. 1. The lower zone is located between 11,400' and 11,600' in depth and calculates an estimated 84 BCF of Total Shale Gas and 70 BCF of Free Shale Gas per square mile of reservoir. The upper zone is located between 10,570' and 10,770' in depth and calculates an estimated 52 BCF of Total Shale Gas and 39 BCF of Free Shale Gas per square mile of reservoir.

GMX Resources

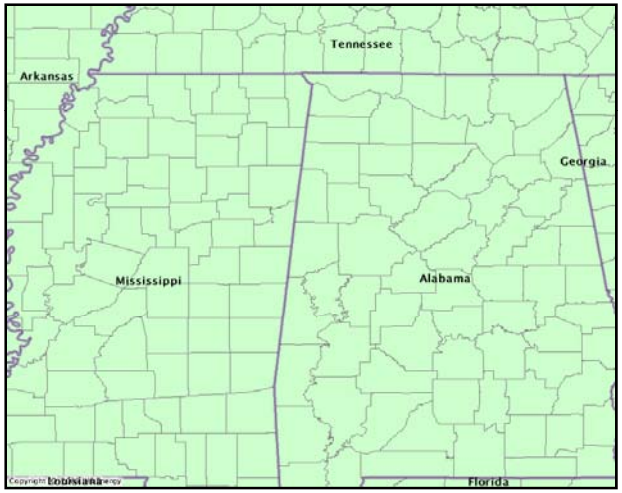
To continue research in our 20 acre pilot project, we have just finished coring 397 feet; consisting of 72 feet of the Taylor Lime, all 313 feet of the Taylor Sands, and 12 feet of the Bossier Shale. We are **currently coring 60 feet more of Upper Bossier Shale** and will conduct several studies on the cores to enhance our stimulation treatments as well as to better understand the amount of gas-in-place in our Taylor Reservoir

Penn Virginia

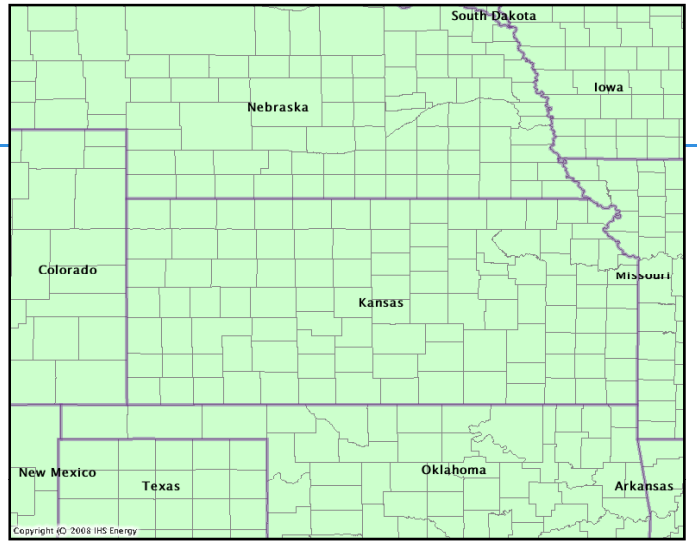
Lower Bossier Shale

- Reserve potential of 800 bcfe
- Depth in range of 11,000 feet (approximately 500 below Cotton Valley Sands
- PVOG has drilled 15 vertical wells to test this formation
- Plan is to drill a horizontal well in 2008

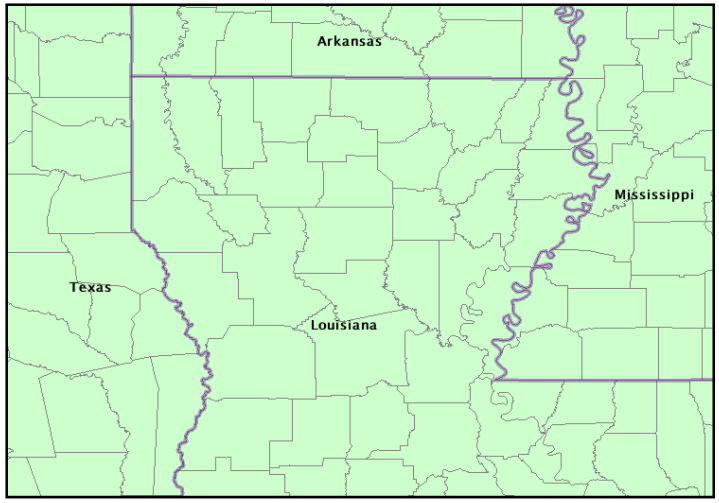
Other Emerging Shales



Floyd – Northern Mississippi and Alabama



Niobrara – Central U.S.



Haynesville – North Louisiana

U.S. Gas Shale Trends - Conclusions

- Increasing drilling – completions up >10% since 2006
  and up >75% since 2000
- Increasing production – Barnett > 3700 bcf
  Fayetteville > 8.1 bcf
- New shales being tested

U.S. Shale Gas
Trends and Expansion

David D. Reimers

Thank you !