

“Creating Successful Community Partnerships – Carrizo-Wilcox Aquifer Collaboration in Louisiana”

Marcellus Shale Summit October 11, 2010

- Jim Welsh** --- Louisiana Commissioner of Conservation
- Gary Hanson** --- Louisiana State University – Shreveport,
Red River Watershed Management Institute
- Mike Mathis** --- Chesapeake Energy Corporation,
Water Planning Manager





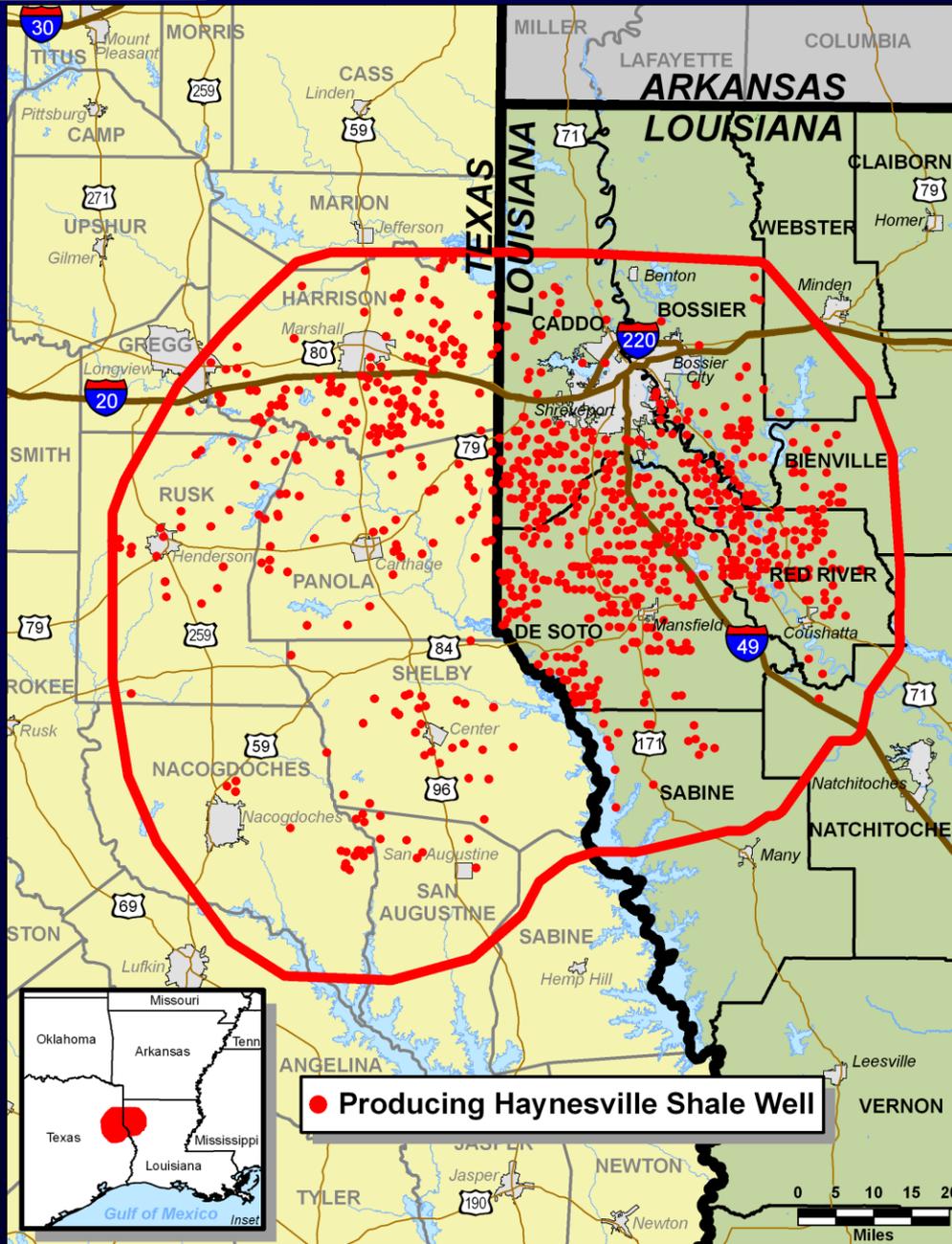
LOUISIANA HAYNESVILLE SHALE OVERVIEW



Shale Gas Plays, Lower 48 States



Current Haynesville Shale Activity



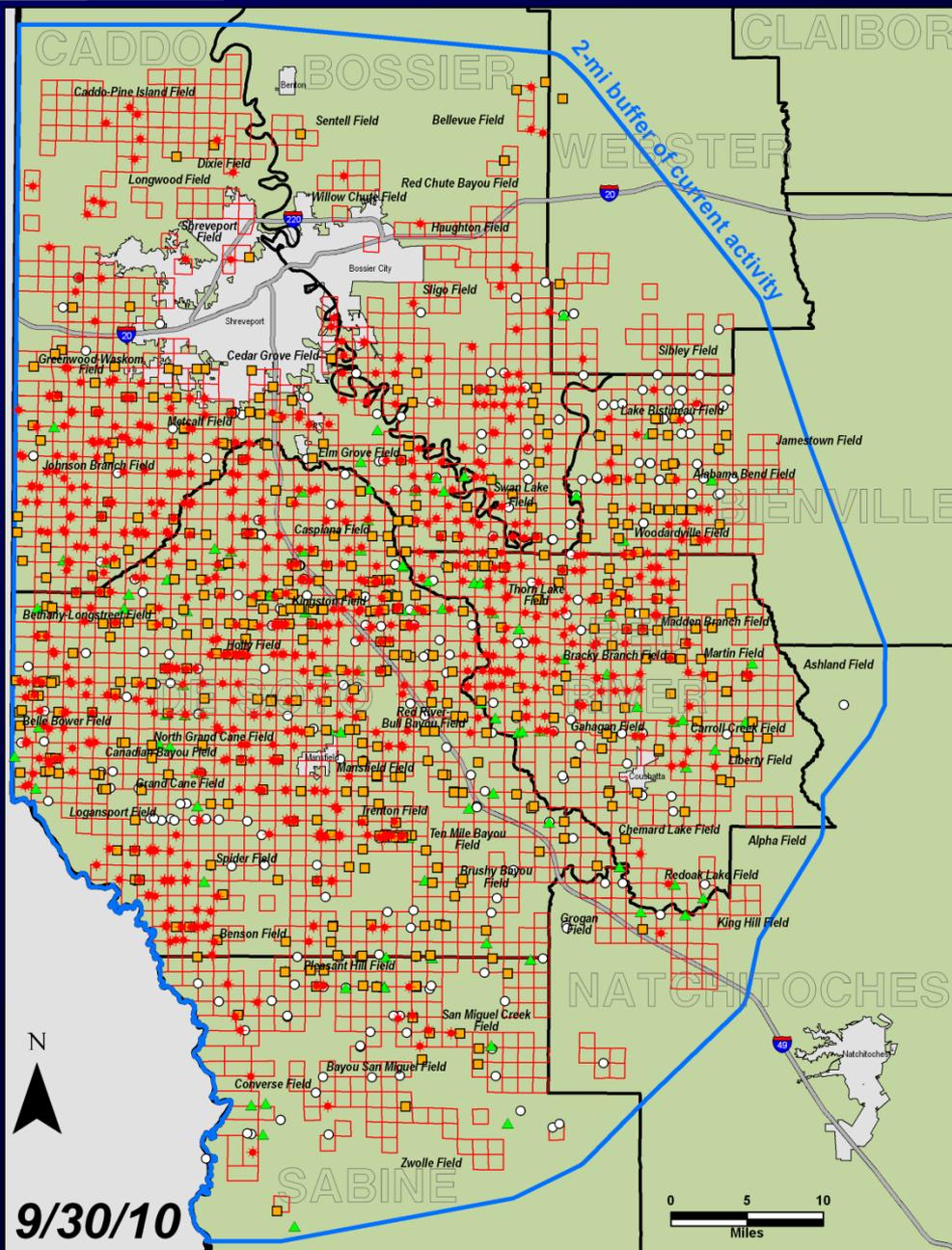


Northwest Louisiana Haynesville Shale Area Generalized Lithostratigraphic Column

ERA	SYSTEM	FORMATION <small>Surface</small>	DEPTH (Feet)	LITHOLOGY	
CENOZOIC	TERTIARY Paleocene	Wilcox <i>USDW</i>		Sand, Gravel, Clay, Lignite (Exposed at Surface)	
		Midway Shale	400	Shale	
			600		
MESOZOIC	CRETACEOUS	Nacatoch Sand	1,000	Sandstone, Chalk, Limestone, Shale	
			2,000		
		Paluxy		Sandstone/Shale	
			3,000	Sandstone, Shale, Anhydrite	
		Mooringsport Shale		Shale	
			4,000		
		Rodessa		Limestone, Shale	
		Pine Island Shale	5,000	Shale	
	JURASSIC		Sligo	6,000	Sandstone, Shale
			Hosston	7,000	
				8,000	
			Cotton Valley	9,000	Sandstone, Shale, Limestone
			10,000		
Bossier Shale			11,000	Shale Organic Rich Black Shale	
Haynesville Shale	12,000	Organic Rich Black Shale			
Smackover		Limestone			



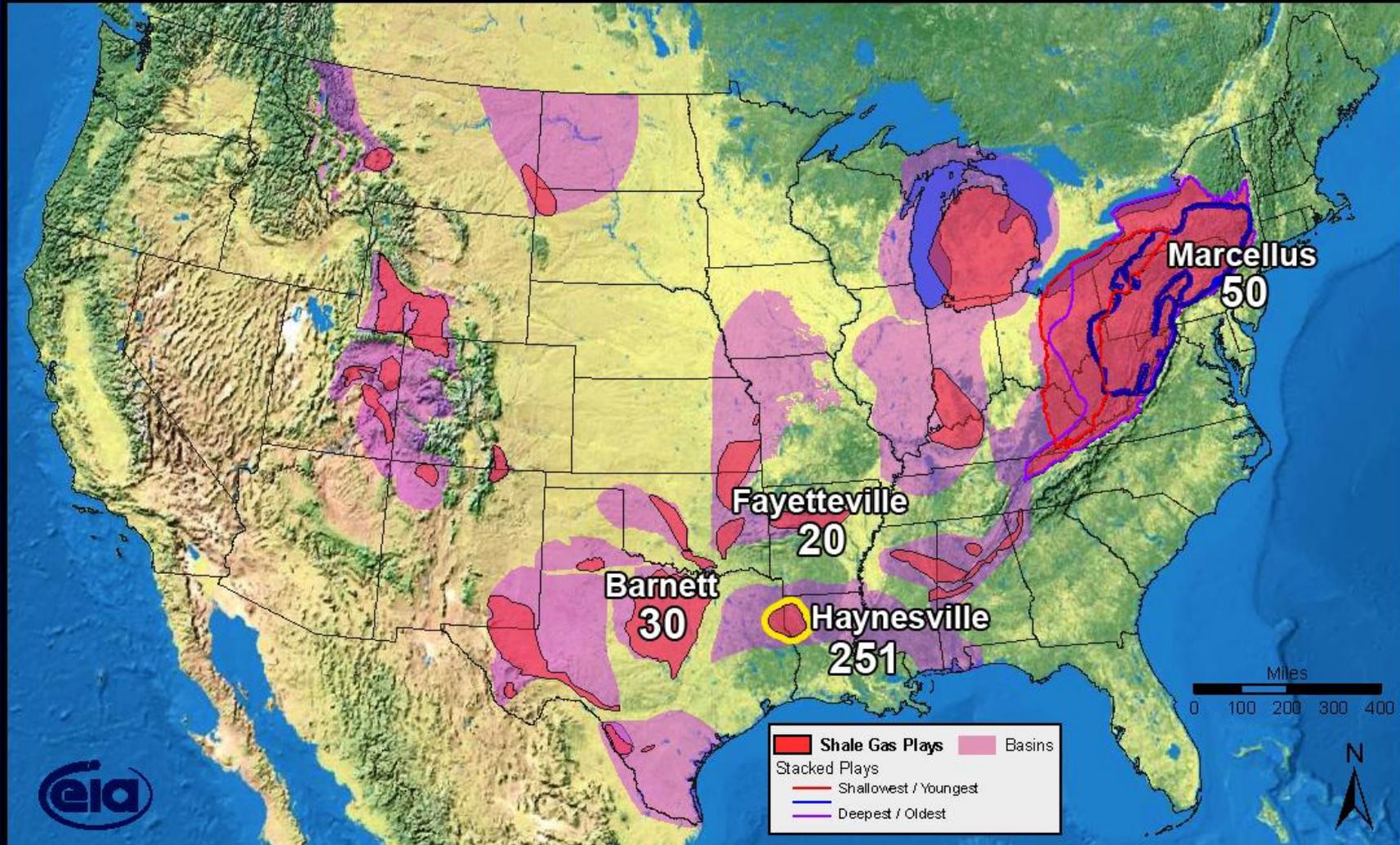
Current Haynesville Shale Activity in LA



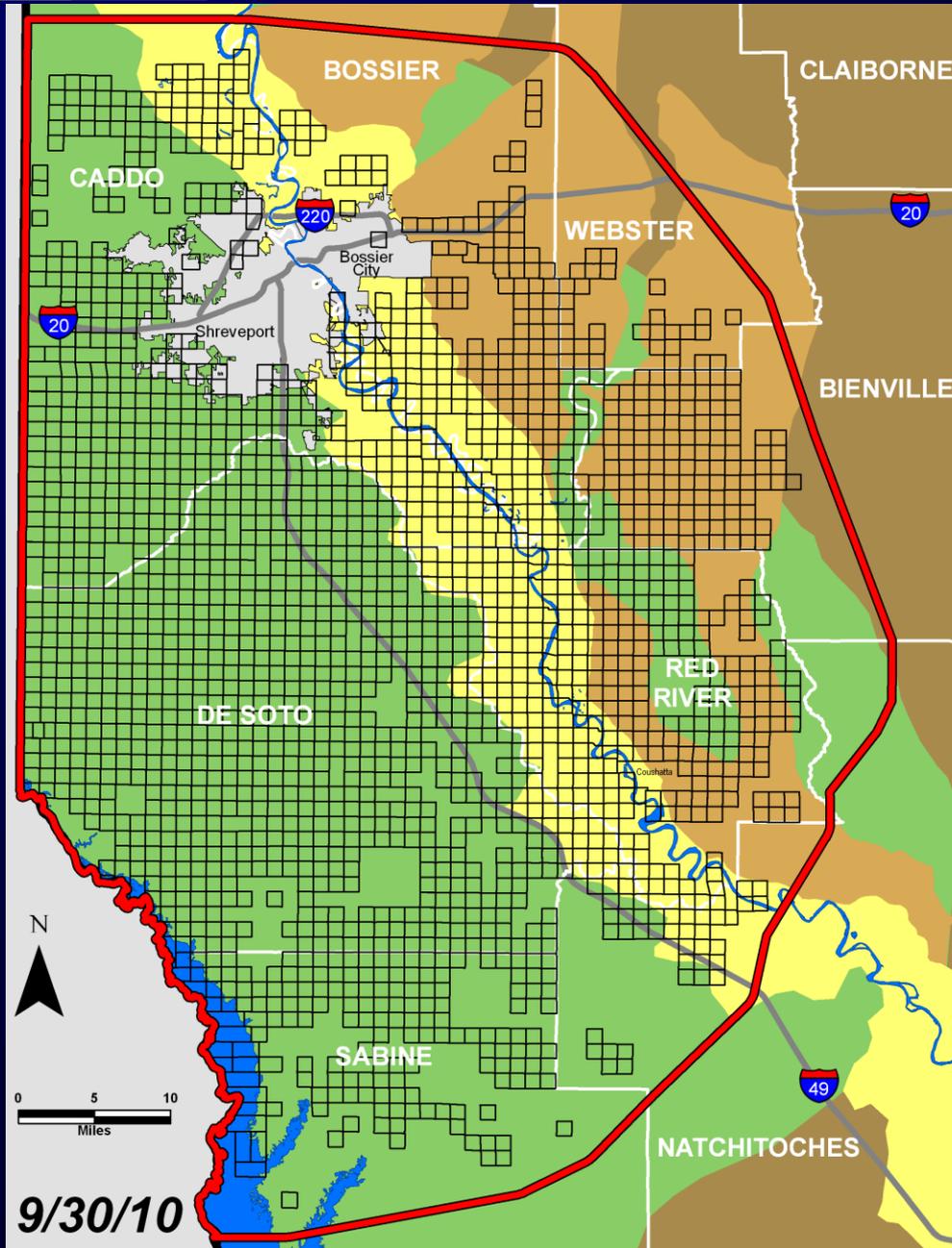
- ★ Producing Well (702)
 - Permitted Well
 - Waiting on Completion/ Fracturing/ Testing/ Other Operations (478)
 - ▲ Permitted Well Drilling in Progress (141)
 - Permitted Well Not Drilling (298)
- 1,619 Total Wells**
- Adopted Unit (1,980)
- 1,980 Adopted Units**



Estimated Ultimate Recovery in Tcf (Tcf = Trillion cubic feet)



Aquifers of Northwest Louisiana



- Red River Alluvial
- Upland Terrace
- Sparta
- Carrizo-Wilcox
- Adopted Unit (1,980)

9/30/10



Ground Water Use Advisory



Louisiana.gov > Department of Natural Resources

For Release:
October 16, 2008

Web Posting

Ground Water Use Advisory: Commissioner of Conservation Recommends Wise Water Use Planning in the Haynesville Shale

Commissioner of Conservation Jim Welsh recommends that oil and gas operators with interest in developing the Haynesville Shale in Northwest Louisiana choose their water sources for use in drilling or hydraulic fracture stimulation operations wisely. Of particular interest are areas in the lower Caddo and Bossier Parishes and DeSoto Parish where the Carrizo - Wilcox aquifer is used as the main source of drinking water supply for domestic

Therefore, if ground water must be used for drilling or hydraulic fracture stimulation purposes, it is recommended that the Red River Alluvial aquifer be utilized for these purposes, where feasible, as the source of ground water supply in lieu of the Carrizo - Wilcox aquifer.

Based on USGS and other published information on ground water resources in Northwest Louisiana, the Red River Alluvial aquifer system is a high yield system comprised of coarse gravel and sand formations continuously recharged by the surface waters of the Red River. It is further documented that the Red River Alluvial aquifer system, due to its hardness and high dissolved solids, is seldom used for domestic and public supply

The Commissioner further encourages oil and gas operators to use the available surface water resources or other acceptable alternative water sources in Northwest Louisiana, where practical and feasible.

Carrizo - Wilcox aquifer for hydraulic fracture stimulation operations according to state law.

The Commissioner further encourages oil and gas operators to use the available surface water resources or other acceptable alternative water sources in Northwest Louisiana, where practical and feasible.

Provided below are links to published documents, resources and references available for water quality and use in Northwest Louisiana. If you have any questions or need further clarification, please contact Environmental Division staff at 225-342-8244 or by email at <http://dnr.louisiana.gov/gwater>.



Directive Issued to Industry for Frac Water Reporting



BOBBY JINDAL
GOVERNOR

State of Louisiana
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CONSERVATION
MEMORANDUM

SCOTT A. ANGELLE
SECRETARY
JAMES H. WELSH
COMMISSIONER OF CONSERVATION

September 15, 2009

TO: All Concerned
FROM: James H. Welsh
Commissioner of Conservation
SUBJECT: Reporting Requirements for Water Use in E&P Operations

To promote effective groundwater resource management and to aid in the development of policies and regulations to protect these resources, it is the policy of this Office to require the reporting of information related to water use in drilling, completion, stimulation and workover operations.

Specifically, the water source and associated volume must be reported on page two (2) of the 'Well History and Work Resume Report'(Form WH-1) which must be filed within twenty days after completion or recompletion operations. The water sources must be identified by either the water well number or water body name, as appropriate. Separate water volumes for rig supply use and stimulation operation use must be provided. A completed example of page two (2) of the 'Well History and Work Resume Report'(Form WH-1) is attached.

Due to revisions of the WH-1 form, water source and associated volumes are now reported on page 3. fracturing stimulation operations.

A revised 'Well History and Work Resume Report'(Form WH-1) is available from the department web site at the following address:<http://dnr.louisiana.gov/cons/CONSEREN/documents/WH-1.dot>

The policy is effective immediately. Questions on implementation may be directed to Mr. Robert "Bob" Romero at (225) 342-8242 or robert.romero@la.gov.

OFFICE OF CONSERVATION
OF THE STATE OF LOUISIANA


JAMES H. WELSH
COMMISSIONER OF CONSERVATION

JHW:CS
Attachment



Haynesville Shale Natural Gas Well Development Drilling and Stimulation Operations

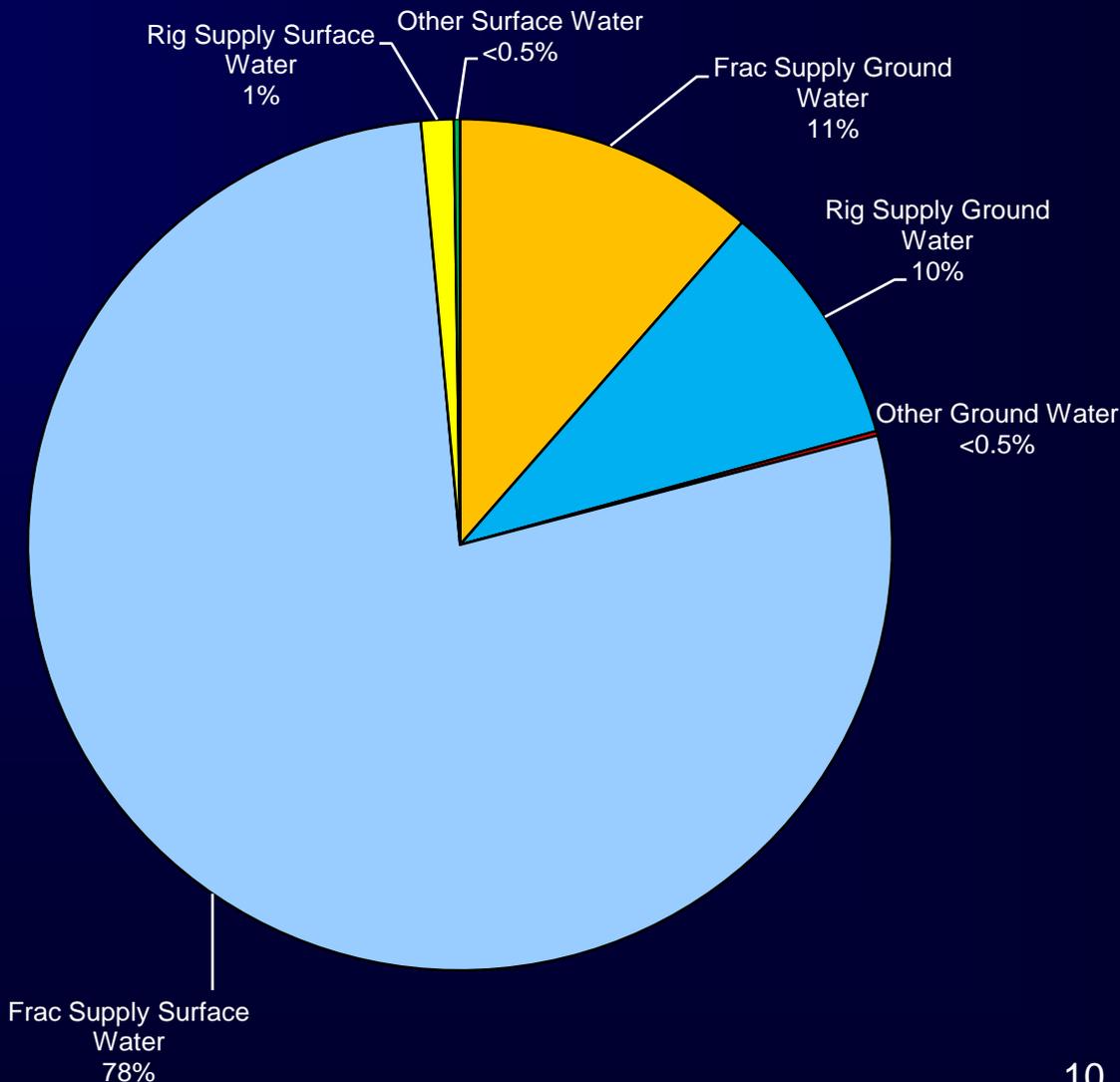
Reported Usage from 10/1/2009 to 8/25/2010

Water Usage Data for 494 Haynesville Shale Natural Gas Wells

Source	Volume (Gallons)
Frac Groundwater	275,151,196
Frac Surface Water	1,853,007,067
Drilling Rig Groundwater Supply	223,467,598
Drilling Rig Surface Water Supply	29,078,243
Other Groundwater	4,033,153
Other Surface Water	10,001,189

Water Stats

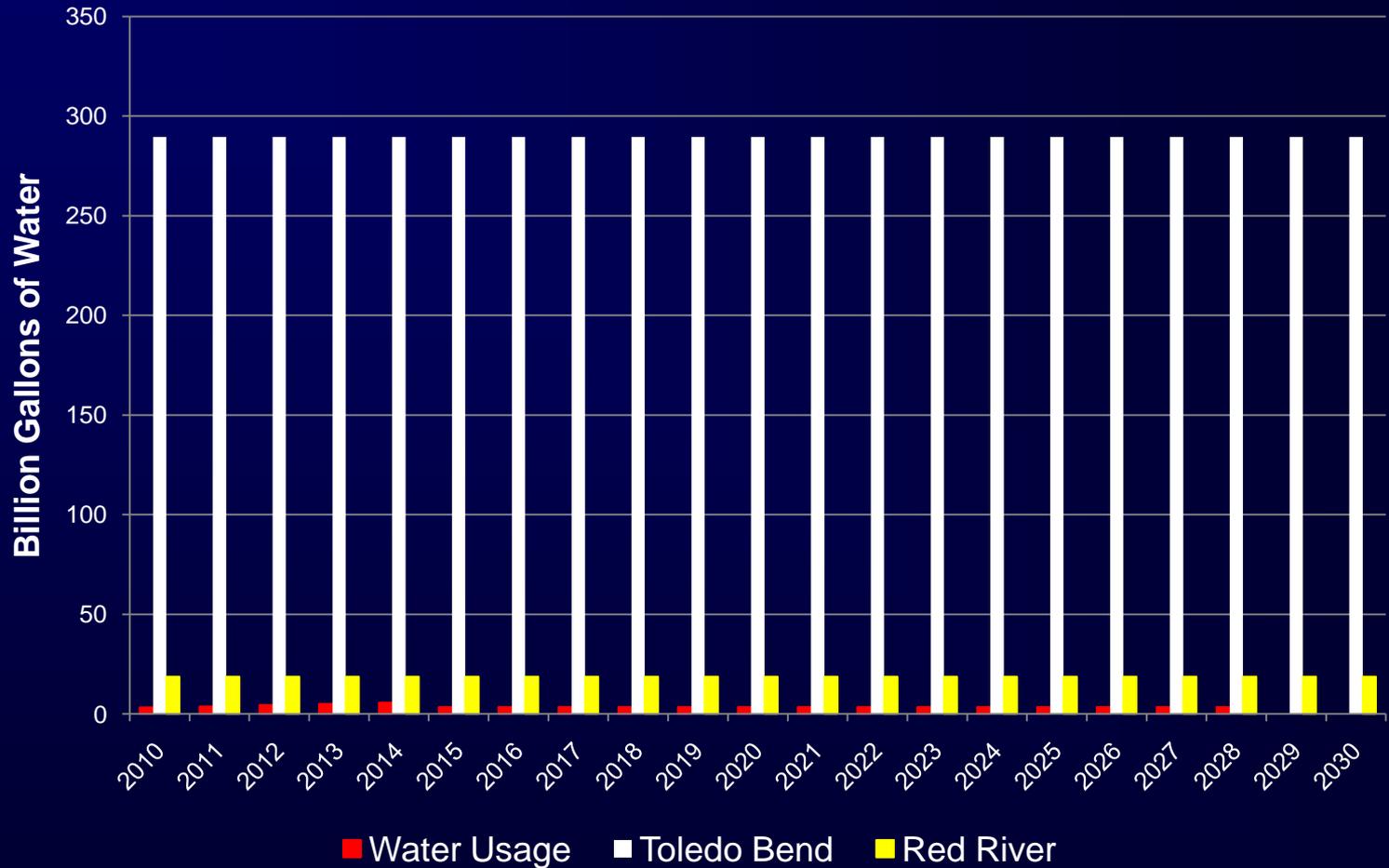
Frac Stages	4,801
Total Frac Water Used (gallons)	2,123,158,263
Volume per Frac Stage(gallons)	442,232
Average Frac Stages per Well	9.7
Average Water Use per Well	4,828,464
Average Frac Water Use per Well	4,297,891





Red River & Toledo Bend Yield Capacity

Red River & Toledo Bend Yield Capacity vs. Projected Surface Water Usage at 70 % Level



Source: Jim Pratt, Executive Director – Sabine River Authority

Jamie Triplett, Hydraulic Eng. – US Army Corps of Eng.



CONCLUSION

[http://dnr.louisiana.gov/haynesvilleshale/
MarcellusShaleSummit.ppsx](http://dnr.louisiana.gov/haynesvilleshale/MarcellusShaleSummit.ppsx)