

Air & Waste Management Association

Louisiana Section 2010 Fall Conference

Haynesville Shale Natural Gas Development Waste and Water Regulatory Issues

Presented by:

Gary W. Snellgrove

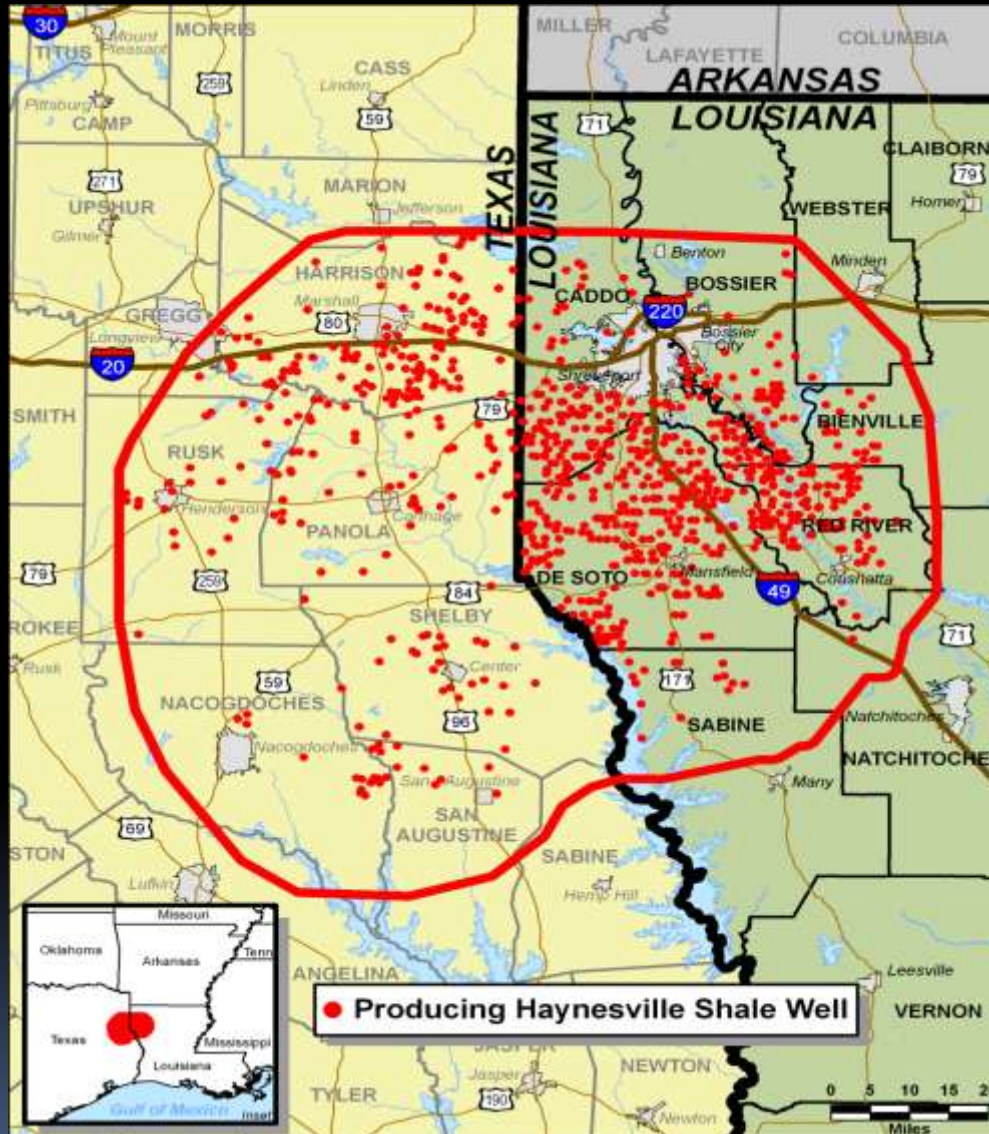
**Louisiana Department of Natural Resources
Office of Conservation**

Presentation Overview

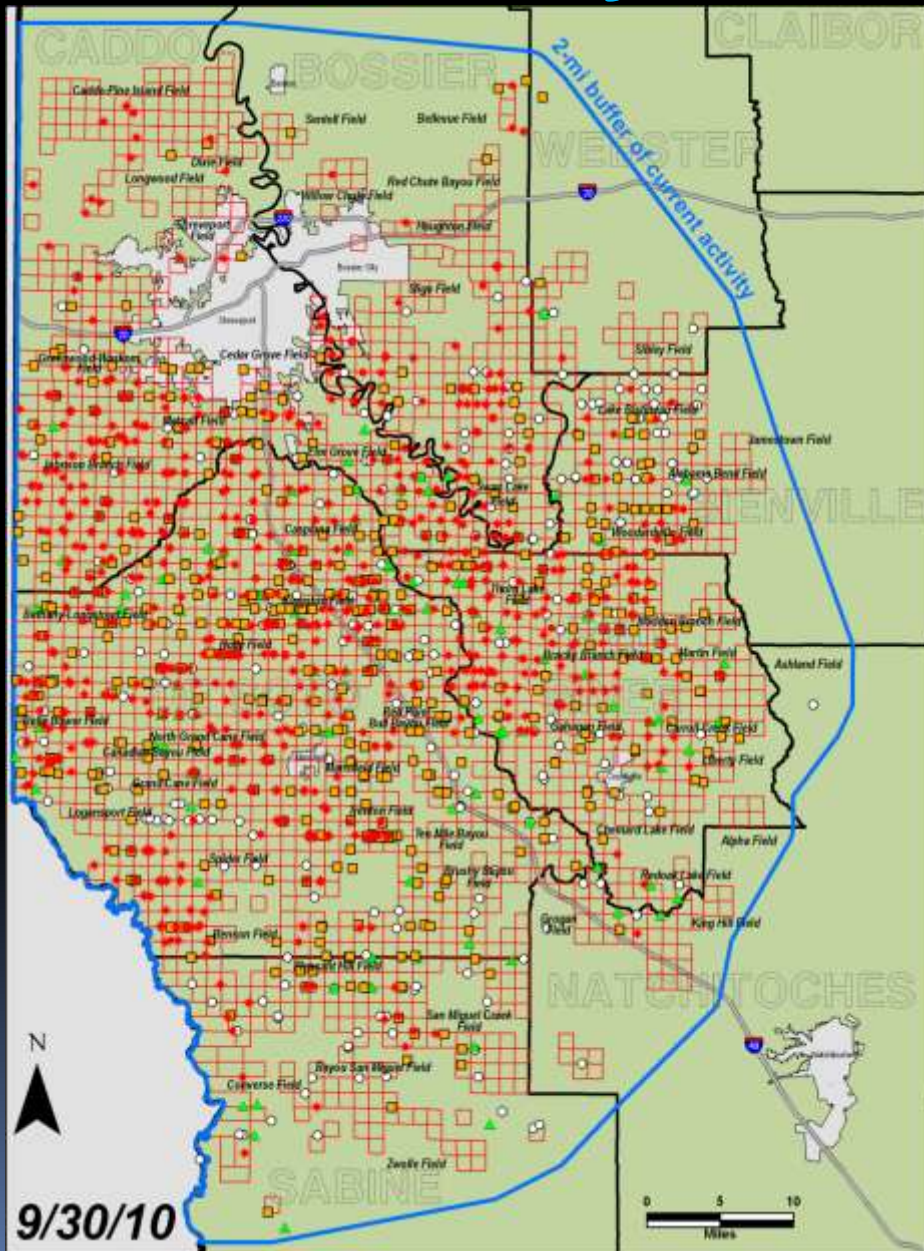
Focus on Water Resources Management

- Haynesville Shale Area
- Water Demand
- Water Resources
- Agency Action
 - Ground Water Use Advisory
 - Water Use Reporting
 - E&P Waste Fluid / Frac Water Supply Use Regulation
 - ACT 955 of 2010 (Running Surface Water Use Mgmt.)
- Proposed Action
 - Fracture Stimulation Reclamation Fluid Regulation
- Resource Management Summary
- Agency Contact Information

Haynesville Shale Area



Louisiana Hayneville Shale Activity



- ★ 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

Haynesville Shale Stratigraphic Location

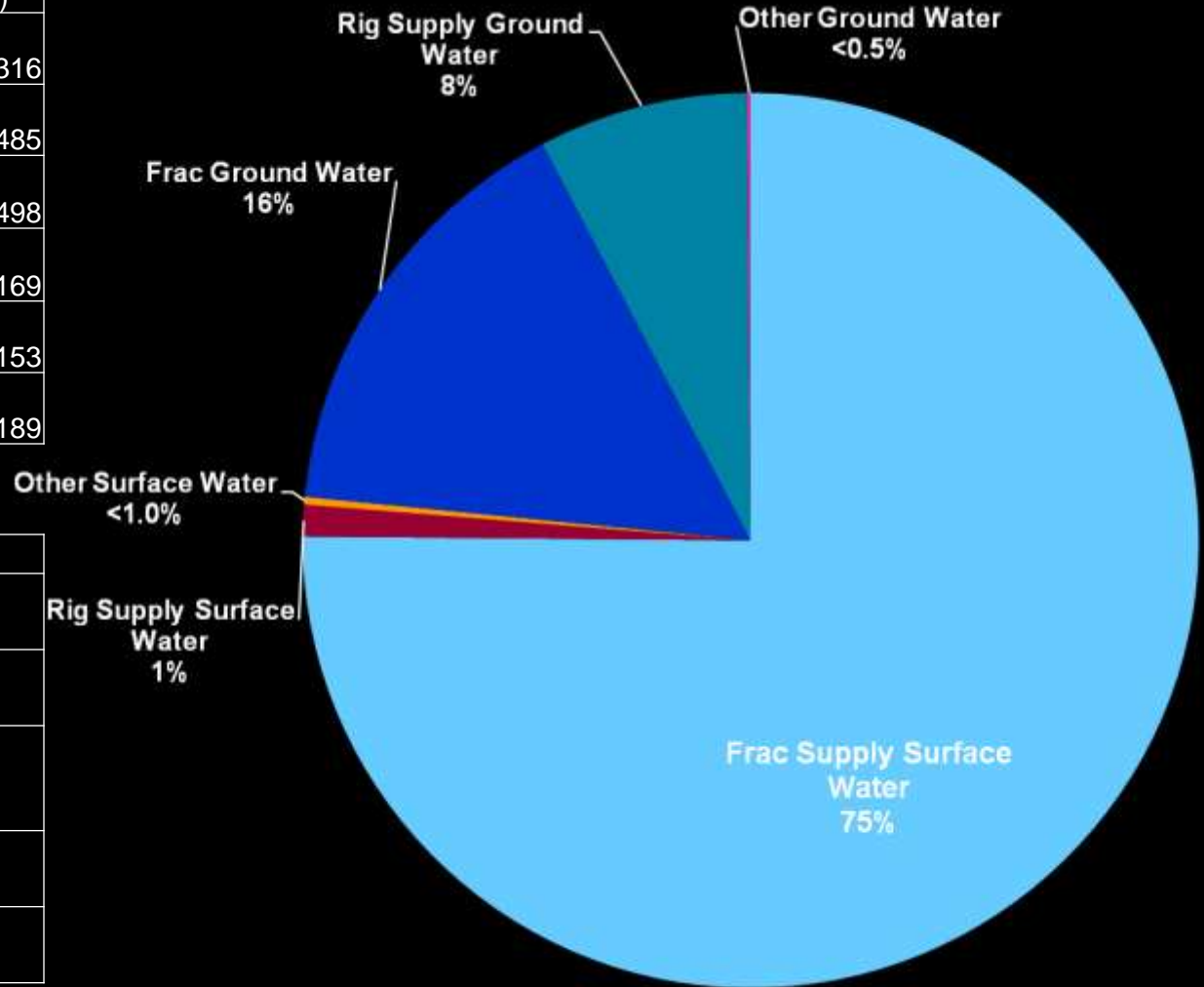
ERA	SYSTEM	FORMATION <small>Surface</small>	DEPTH (Feet)	LITHOLOGY	
CENOZOIC	TERTIARY Paleocene	Wilcox <i>USDW</i>		Sand, Gravel, Clay, Lignite (Exposed at Surface)	
		Midway Shale	400	Shale	
			600		
MESOZOIC	CRETACEOUS	Nacotech Sand	1,000	Sandstone, Chalk, Limestone, Shale	
			2,000		
		Paluxy		Sandstone/Shale	
			3,000	Sandstone, Shale, Anhydrite Shale	
		Mooringsport 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	
			11,000	Shale Organic Rich Black Shale	
Haynesville Shale		Organic Rich Black Shale			
	12,000	Limestone			
Smackover					

Water Demand

Water Usage from 10/1/2009 to 9/30/2010

Source	Volume (Gallons)
Frac Groundwater	453,316,316
Frac Surface Water	2,163,131,485
Drilling Rig Groundwater Supply	217,404,498
Drilling Rig Surface Water Supply	32,684,169
Other Groundwater	4,033,153
Other Surface Water	10,001,189

Frac Stages	5695
Total Frac Water Used (gallons)	2,626,728,527
Volume per Frac Stage(gallons)	461,234
Average Frac Stages per Well	9.4
Average Water Use per Well	4,734,750
Average Frac Water Use per Well	4,320,277



Water Resources

Surface Water

- Red River
- Toledo Bend Reservoir
- Other Lakes and Bayous

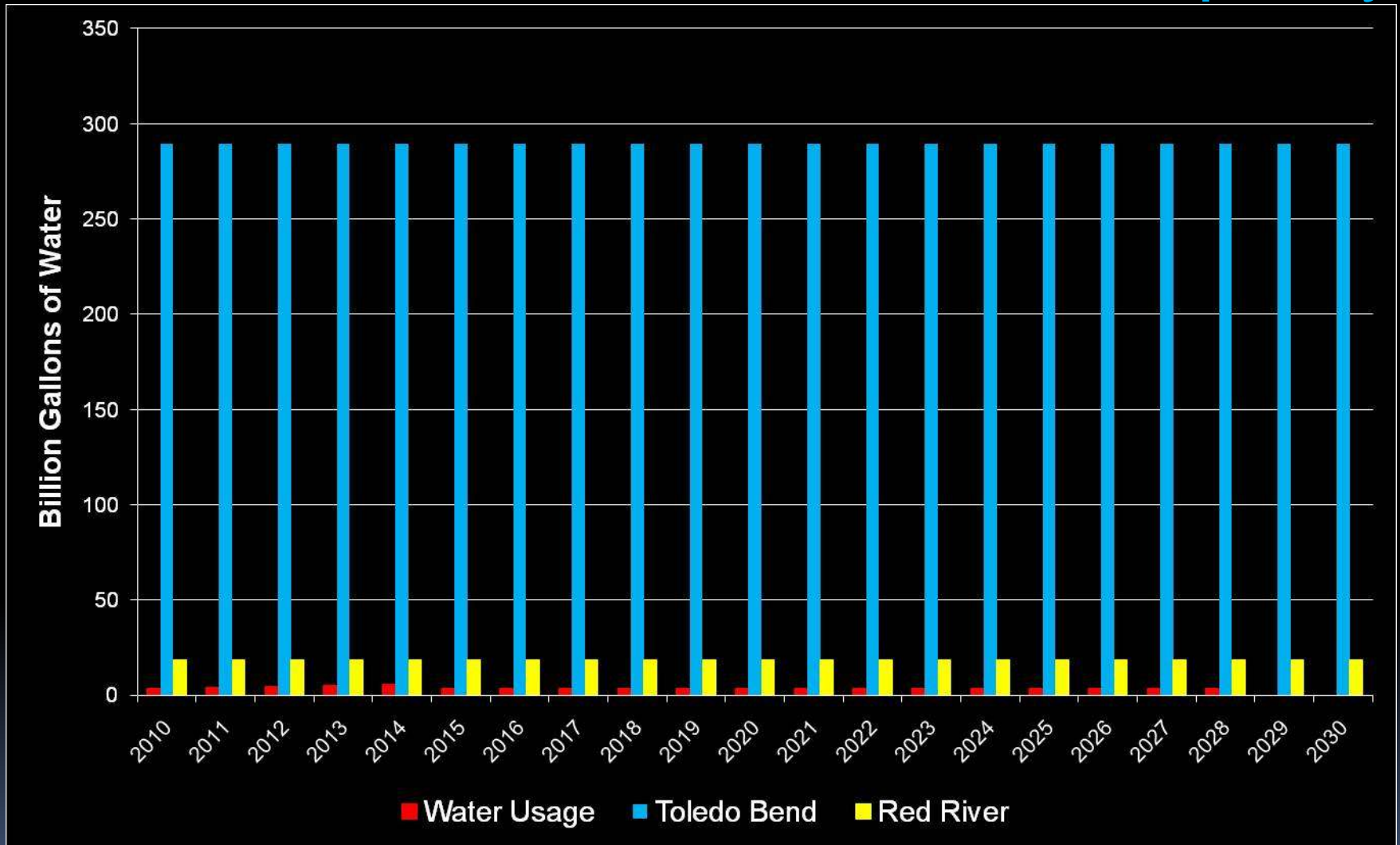
Ground Water

- Red River Alluvial
- Upland Terrace
- Carrizo-Wilcox

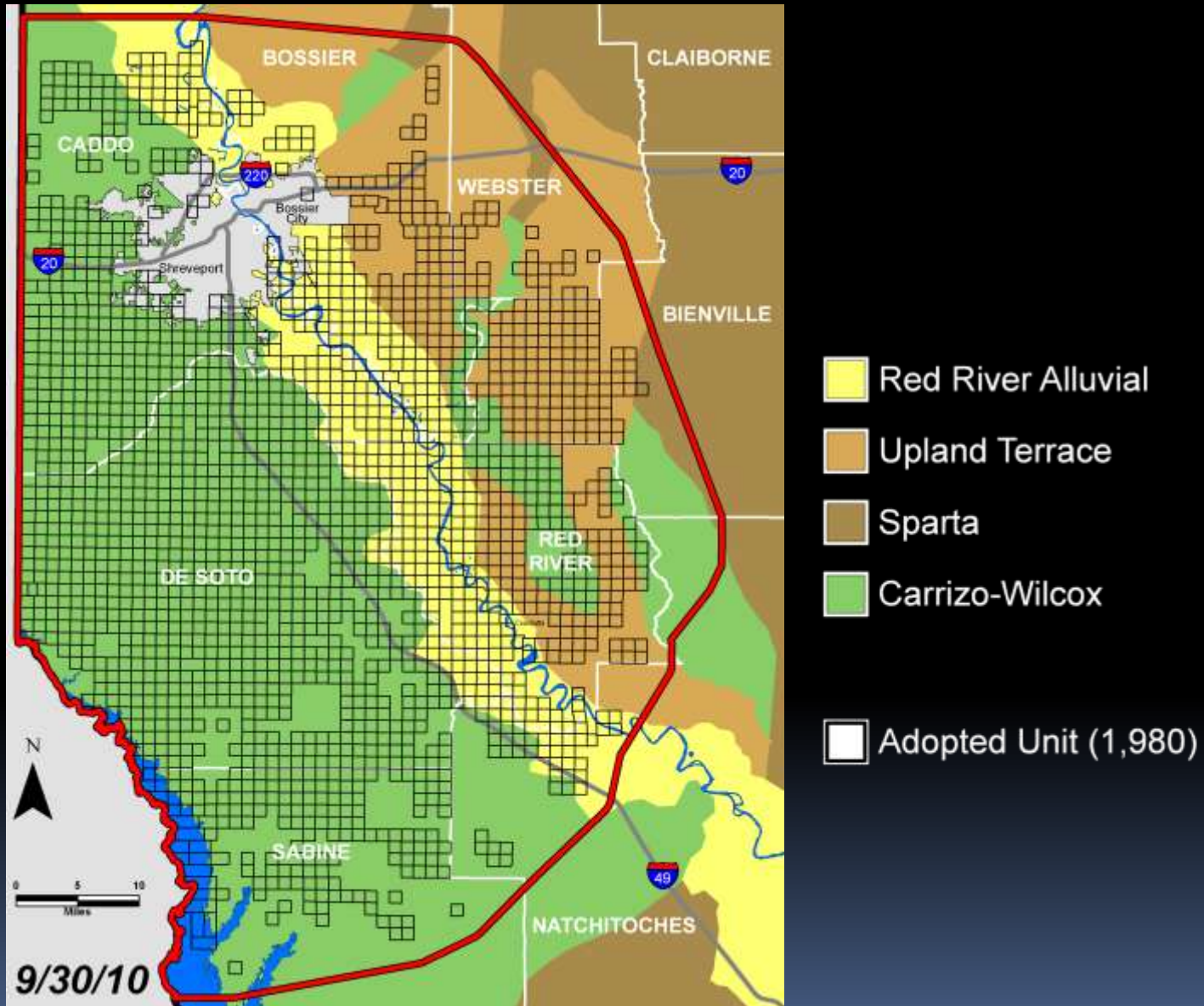
•Waste Water

- Reserve Pits
- Other

Red River & Toledo Bend Yield Capacity



Northwest Louisiana Aquifers



Ground Water Use Advisory



Louisiana.gov > Department of Natural Resources

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

For Release:
October 16, 2008

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.

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>.

Water Use Reporting Requirement


State of Louisiana
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CONSERVATION
MEMORANDUM

BOBBY JINDAL
GOVERNOR

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.

At this time, the policy shall only apply to wells for which a work permit is issued to conduct hydraulic 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/com/CONSEREN/documents/WH-1.doc>

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

Post Office Box 94275 • Baton Rouge, Louisiana 70804-9275 • 617 North 3rd Street • 9th Floor • Baton Rouge, Louisiana 70802
Phone (225) 342-5540 • Fax (225) 342-2584 • www.dnr.state.la.us/conservation
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E&P Waste Fluids Use for Frac Water Supply

LAC 43:XIX.Subpart 1.Chapter 3 Amendment

Allows Operators to Use E&P Waste Fluids for Frac Supply Purposes

- 1) Promulgated November 20, 2009
- 2) Amended June 20, 2010
- 3) Limitations:
 - i. Used as Frac Supply Only
 - ii. By the Same Operator
 - iii. With Operator Affidavit Confirming Landowner Consent

ACT 955 of 2010

Running Surface Water Management

DNR Responsibility to Implement:

- Surface Water Use Application
- Cooperative Endeavor Agreement

Fracture Stimulation Reclamation Fluid LAC 43:XIX.Subpart 1.Chapters 3 & 5 Proposed Amendment

Allows Off-site (Commercial) Waste Fluid Treatment for On-site Frac Water Supply Purposes

- 1) NOI Published September 20, 2010
- 2) Public Hearing Held October 25, 2010
- 3) Limitations:
 - i. Commercial Facility Permit Required
 - ii. Frac Supply Use only at OC Permitted Frac Operations
 - iii. Well Operator Held Solely Responsible for Use
 - iv. Waste Disposition Reporting Required

DNR / Conservation

Haynesville Shale Water Resource Management Summary

Agency Action:

1. Timely Response
2. Sufficient Oversight
 - i. Policy and Regulation Adjustments
 - ii. Resource Use Reporting and Monitoring
 - iii. Increased Waste Minimization / Recycling Opportunities
 - iv. Industry and Public Education / Outreach

Contact Information

**LAC 43:XIX.Subpart 1.Chapter 3 (On-site Pollution Control)
Waste Fluid / Frac Supply Amendment**

Mr. Chris Sandoz

Phone: 225-342-5524

Email: Chris.Sandoz@LA.GOV

**LAC 43:XIX.Subpart 1.Chapter 5 (Commercial Facility Regulations)
Proposed Fracture Stimulation Reclamation Fluid Amendment**

Mr. John Adams

Phone: 225-342-7889

Email: Johnny.Adams@LA.GOV

ACT 955 of 2010 (Running Surface Water Use Management)

Mr. O. C. Smith

Phone: 225-342-5524

Email: O.C.Smith@LA.GOV

Gary Snellgrove

Phone: 225-342-7222

Email: Gary.Snellgrove@LA.GOV

Website Links

Haynesville Shale Webpage

<http://dnr.louisiana.gov/haynesvilleshale/>

**LAC 43:XIX.Subpart 1.Chapter 3 (On-site Pollution Control)
Waste Fluid / Frac Supply Amendment**

<http://www.doa.louisiana.gov/osr/reg/0911/0911.pdf> (Nov 20, 2009, page 2464)

<http://www.doa.louisiana.gov/osr/reg/1006/1006.pdf> (Jun 20, 2010, page 1264)

**LAC 43:XIX.Subpart 1.Chapter 5 (Commercial Facility Regulations)
Proposed Fracture Stimulation Reclamation Fluid Amendment**

<http://www.doa.louisiana.gov/osr/reg/1009/1009.pdf> (Sep 20, 2010, page 2117)

ACT 955 of 2010 (Running Surface Water Use Management)

<http://dnr.louisiana.gov/sec/955/955.htm>

Ground Water Resources Management Webpage

<http://dnr.louisiana.gov/cons/groundwater/>

E&P Waste Management Webpage

<http://dnr.louisiana.gov/cons/CONSERIN/Waste.ssi>

Water Use Reporting (Form WU-1, Work History and Well Resources Report)