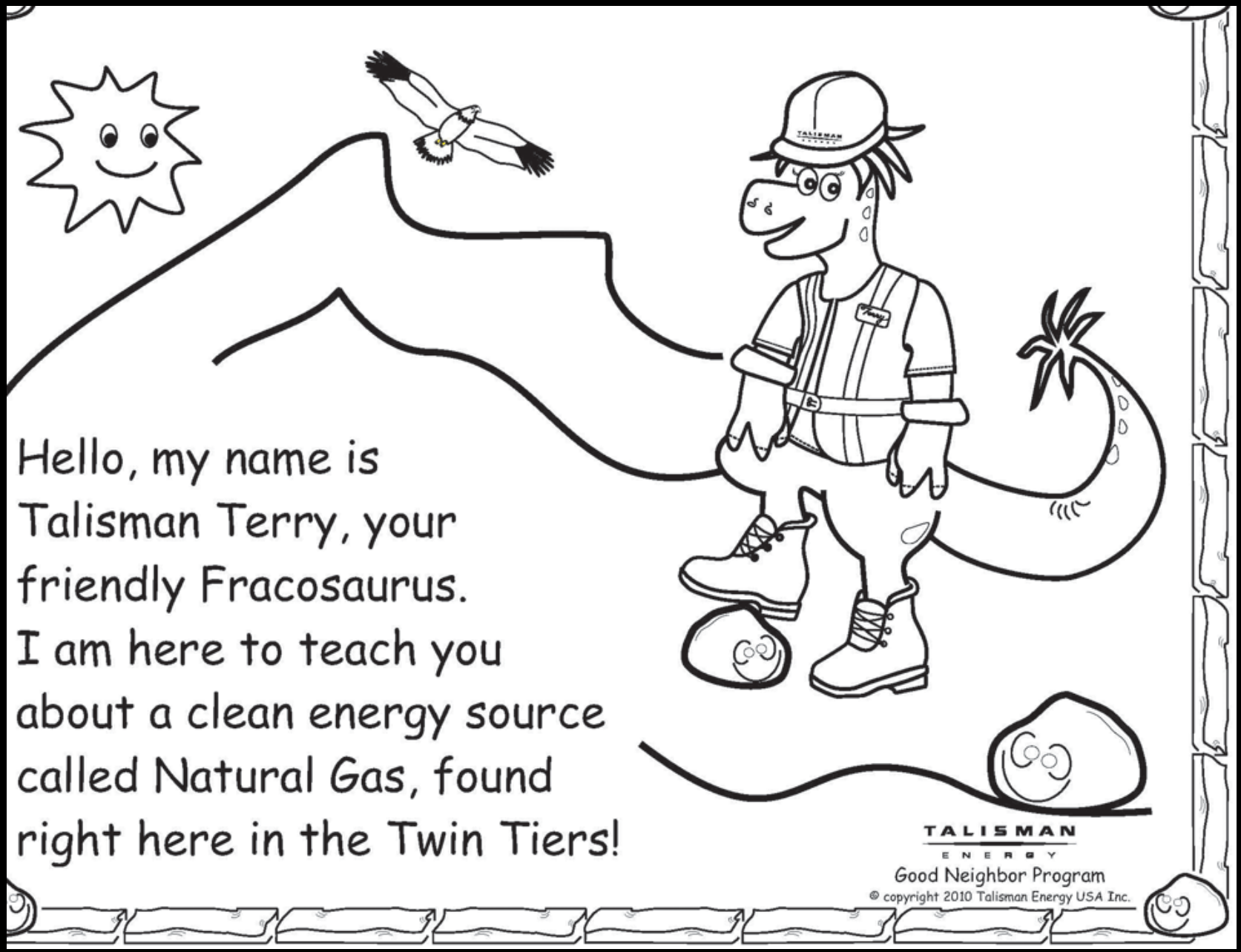

ENCORE
Horsey
Los Angeles Times
"SOMEBODY'S GOING TO BE VERY ANNOYED THAT YOU OPENED THIS PLACE TO FRACKING!"
"BUT THEY SAID IT COULD BE DONE IN AN ENVIRONMENTALLY FRIENDLY WAY!"
OIL LEASE

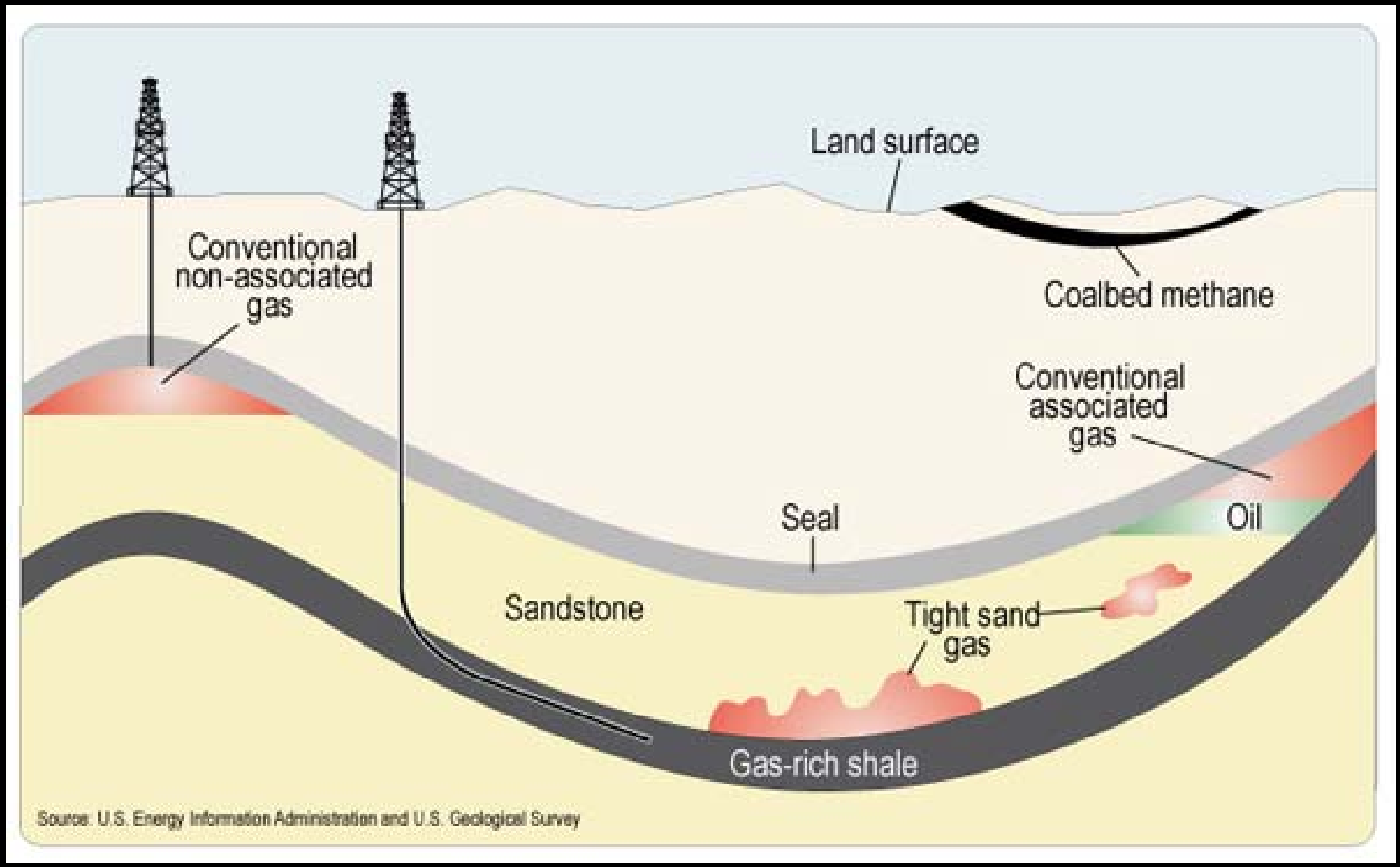
Talisman Terry's Energy Adventure

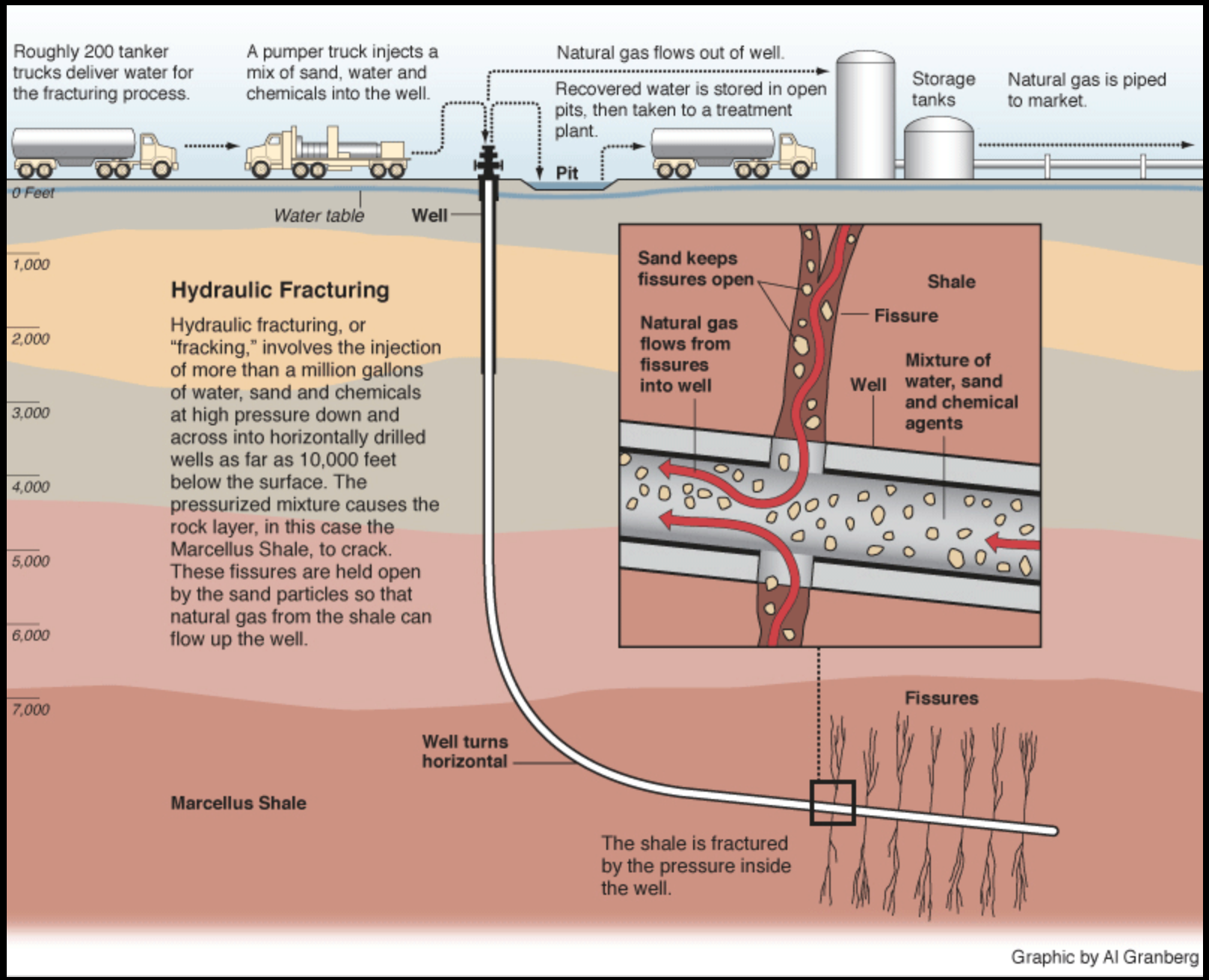
TALISMAN

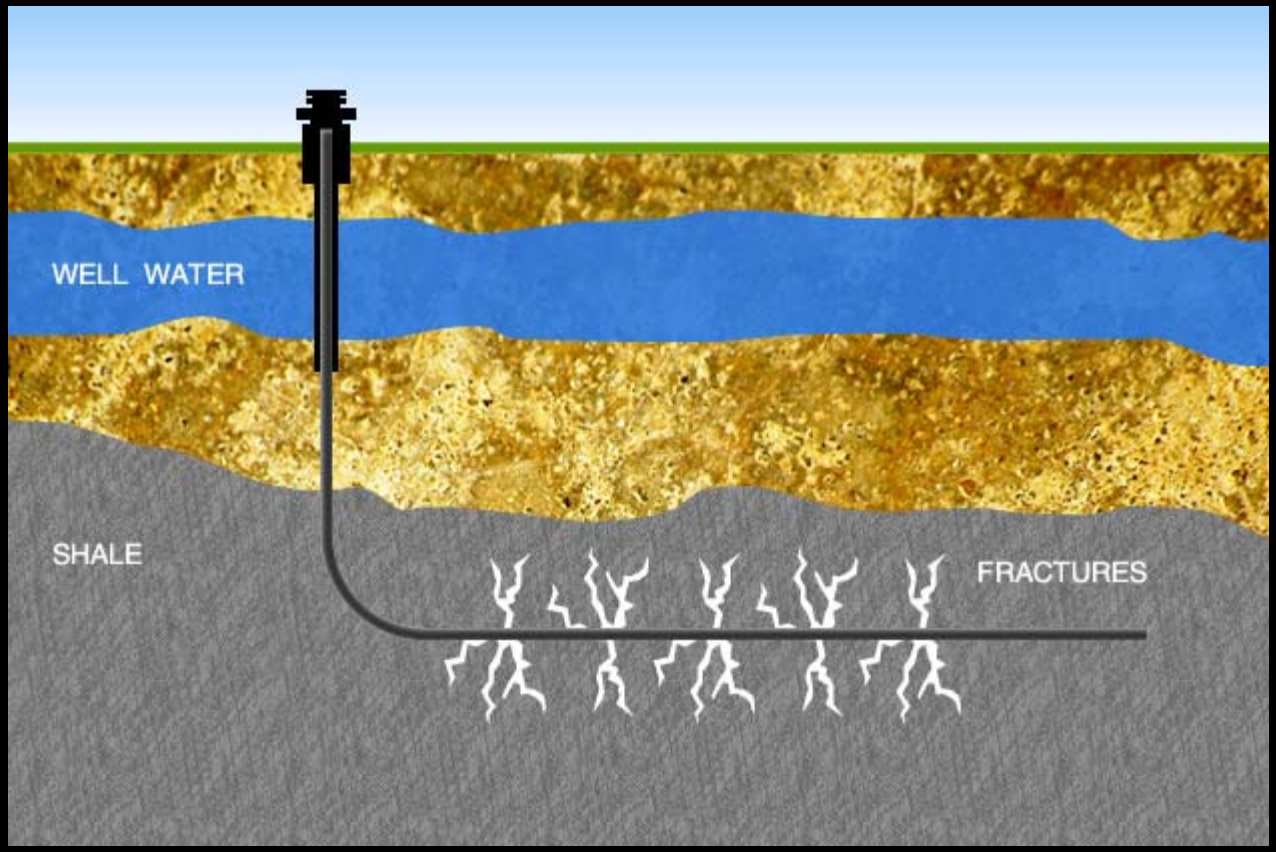
ENERGY

Good Neighbor Program


Hello, my name is
Talisman Terry, your
friendly Fracosaurus.
I am here to teach you
about a clean energy source
called Natural Gas, found
right here in the Twin Tiers!
TALISMAN
ENERGY
Good Neighbor Program
© copyright 2010 Talisman Energy USA Inc.

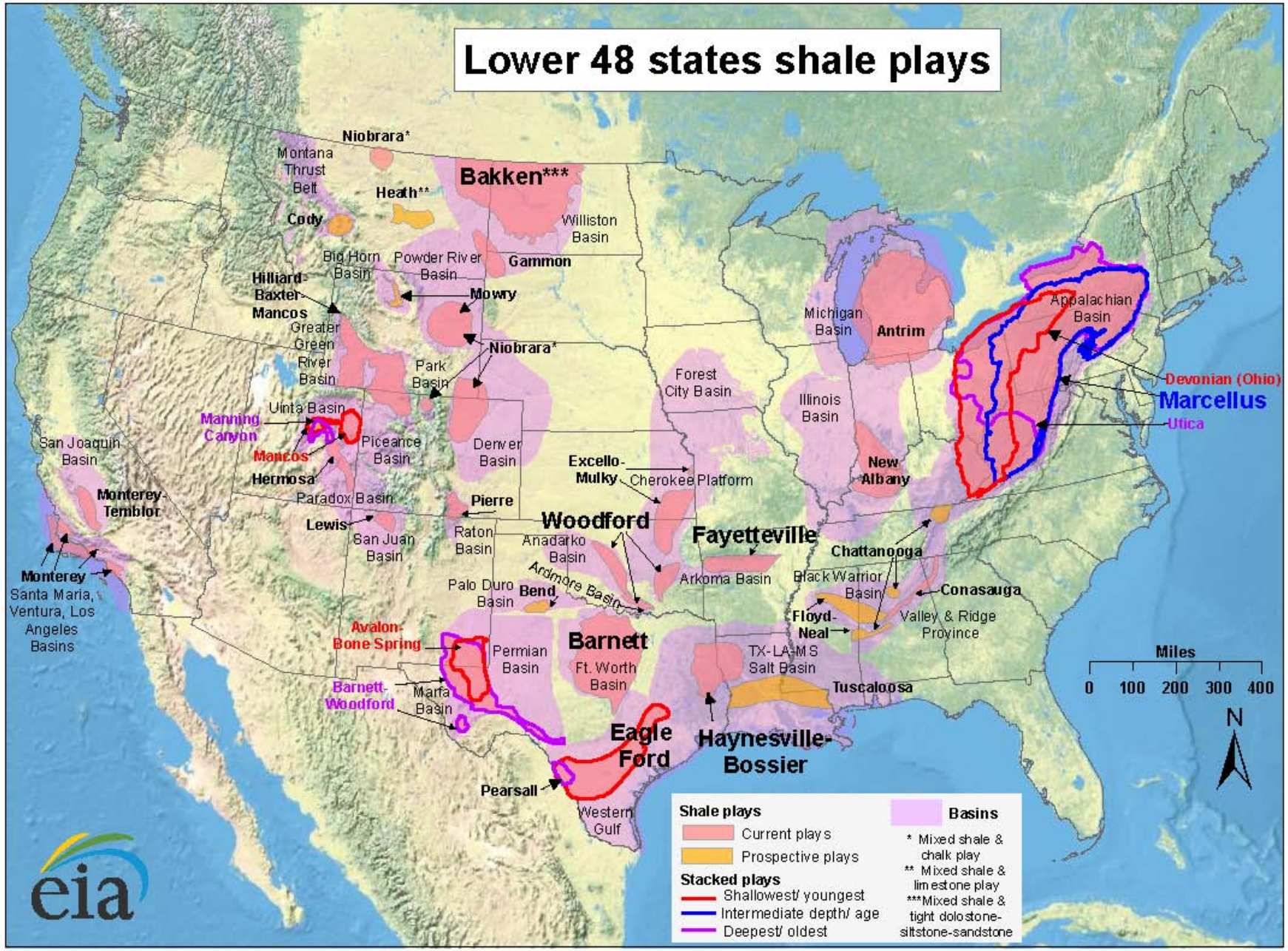

Land surface
Conventional non-associated gas
Coalbed methane
Conventional associated gas
Seal
Oil
Sandstone
Tight sand gas
Gas-rich shale
Source: U.S. Energy Information Administration and U.S. Geological Survey


Roughly 200 tanker trucks deliver water for the fracturing process.
A pumper truck injects a mix of sand, water and chemicals into the well.
Natural gas flows out of well.
Recovered water is stored in open pits, then taken to a treatment plant.
Storage tanks
Natural gas is piped to market.
Pit
0 Feet
Water table
Well
1,000
2,000
3,000
4,000
5,000
6,000
7,000
Hydraulic Fracturing
Hydraulic fracturing, or "fracking," involves the injection of more than a million gallons of water, sand and chemicals at high pressure down and across into horizontally drilled wells as far as 10,000 feet below the surface. The pressurized mixture causes the rock layer, in this case the Marcellus Shale, to crack. These fissures are held open by the sand particles so that natural gas from the shale can flow up the well.
Sand keeps fissures open
Shale
Fissure
Natural gas flows from fissures into well
Well
Mixture of water, sand and chemical agents
Fissures
Well turns horizontal
Marcellus Shale
The shale is fractured by the pressure inside the well.
Graphic by Al Granberg

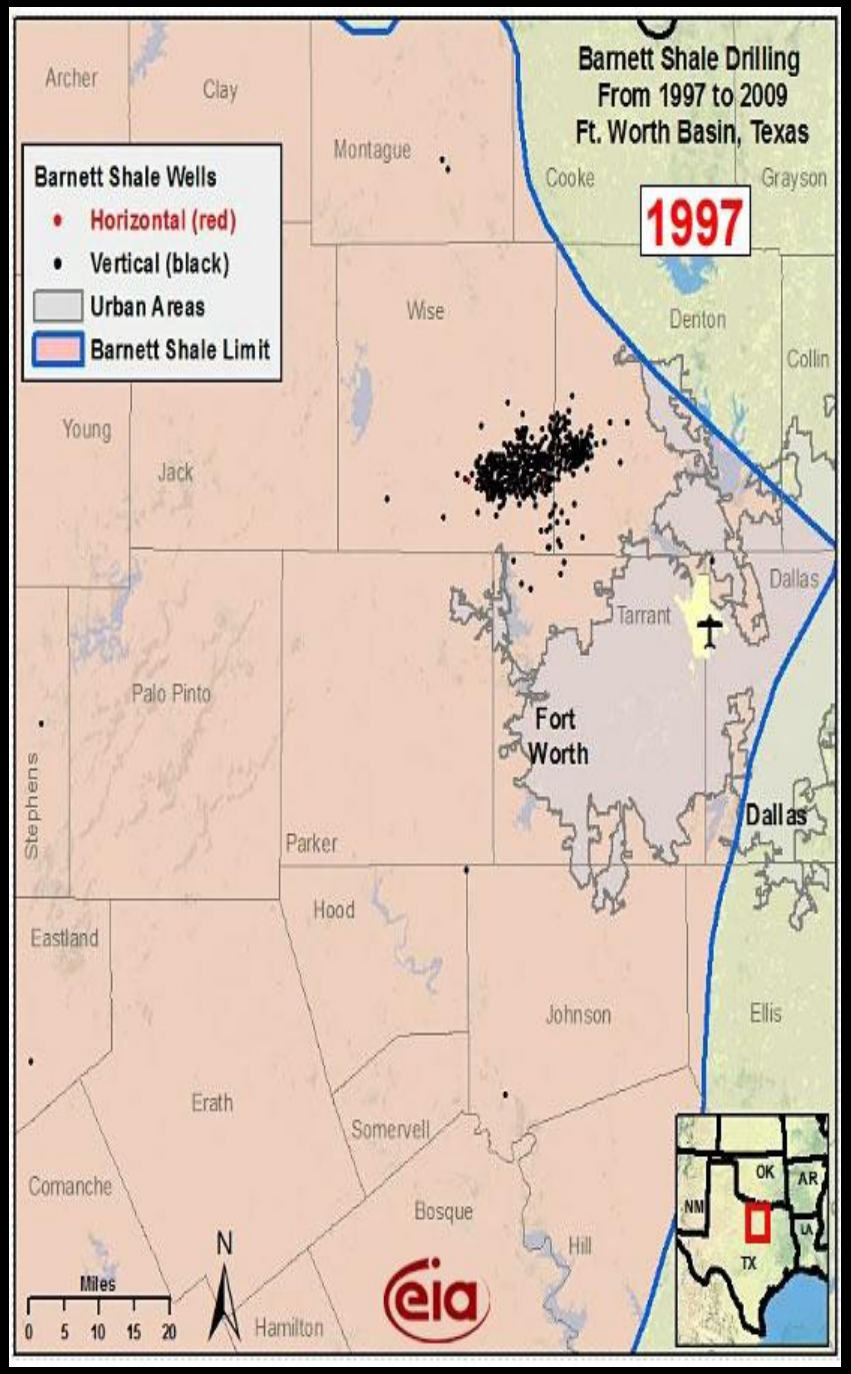

WELL WATER
SHALE
FRACTURES

Fracking Technology Milestones

Early 1900s	Natural gas extracted from shale wells. Vertical wells fractured with foam
1983	First gas well drilled in Barnett Shale in Texas
1980s-1990s	Cross-linked gel fracturing fluids developed and used in vertical wells
1991	First horizontal well drilled in Barnett Shale
1991	Orientation of induced fractures identified
1996	Slickwater fracturing fluids introduced
1996	Microseismic post-fracturing mapping developed
1998	Slickwater refracturing of originally gel-fractured wells
2002	Multi-stage slickwater fracturing of horizontal wells
2003	First hydraulic fracturing of Marcellus Shale
2005	Increased emphasis on improving the recovery factor
2007	Use of multi-well pads and cluster drilling



Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011


Barnett Shale Drilling
From 1997 to 2009
Ft. Worth Basin, Texas
1997
Barnett Shale Wells
Horizontal (red)
Vertical (black)
Urban Areas
Barnett Shale Limit
Archer
Clay
Montague
Cooke
Grayson
Wise
Denton
Collin
Young
Jack
Tarrant
Dallas
Palo Pinto
Fort Worth
Dallas
Stephens
Parker
Hood
Eastland
Johnson
Ellis
Erath
Somervell
Comanche
Bosque
Hill
Hamilton
Miles
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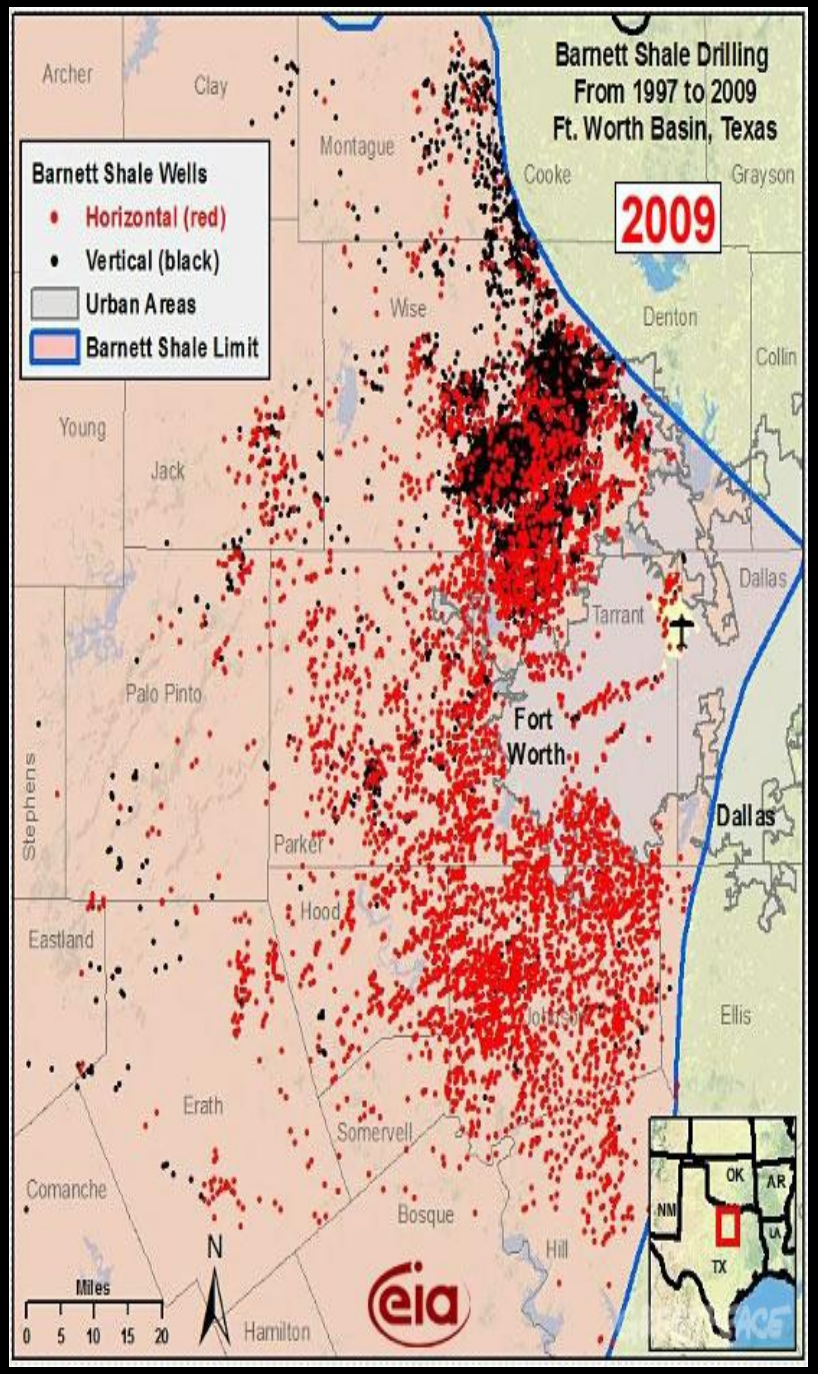
NM
LA
TX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Horizontal (red)
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Archer
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Dallas
Stephens
Parker
Hood
Eastland
Johnson
Ellis
Erath
Somervell
Comanche
Bosque
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Hamilton
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0 5 10 15 20
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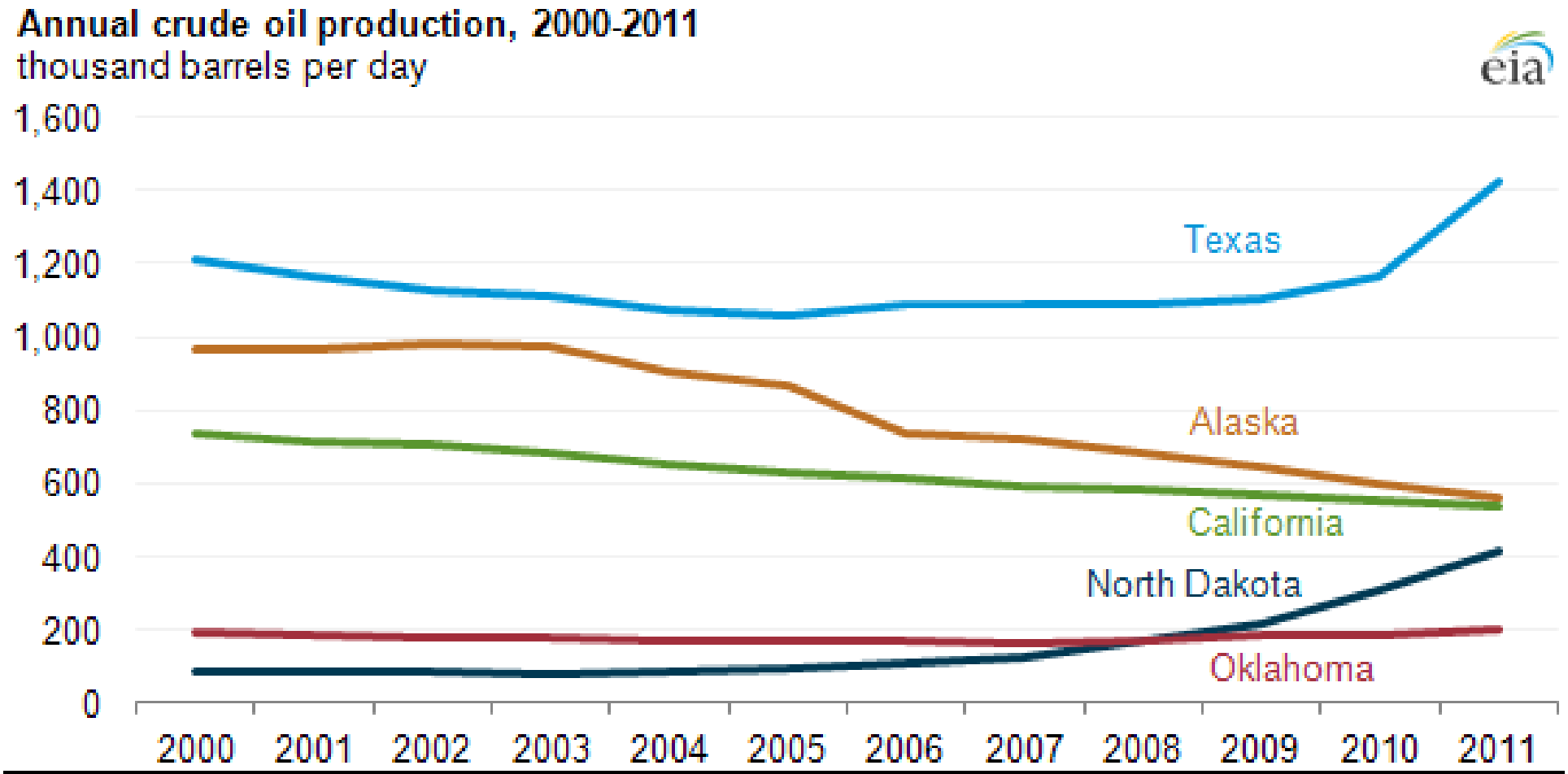
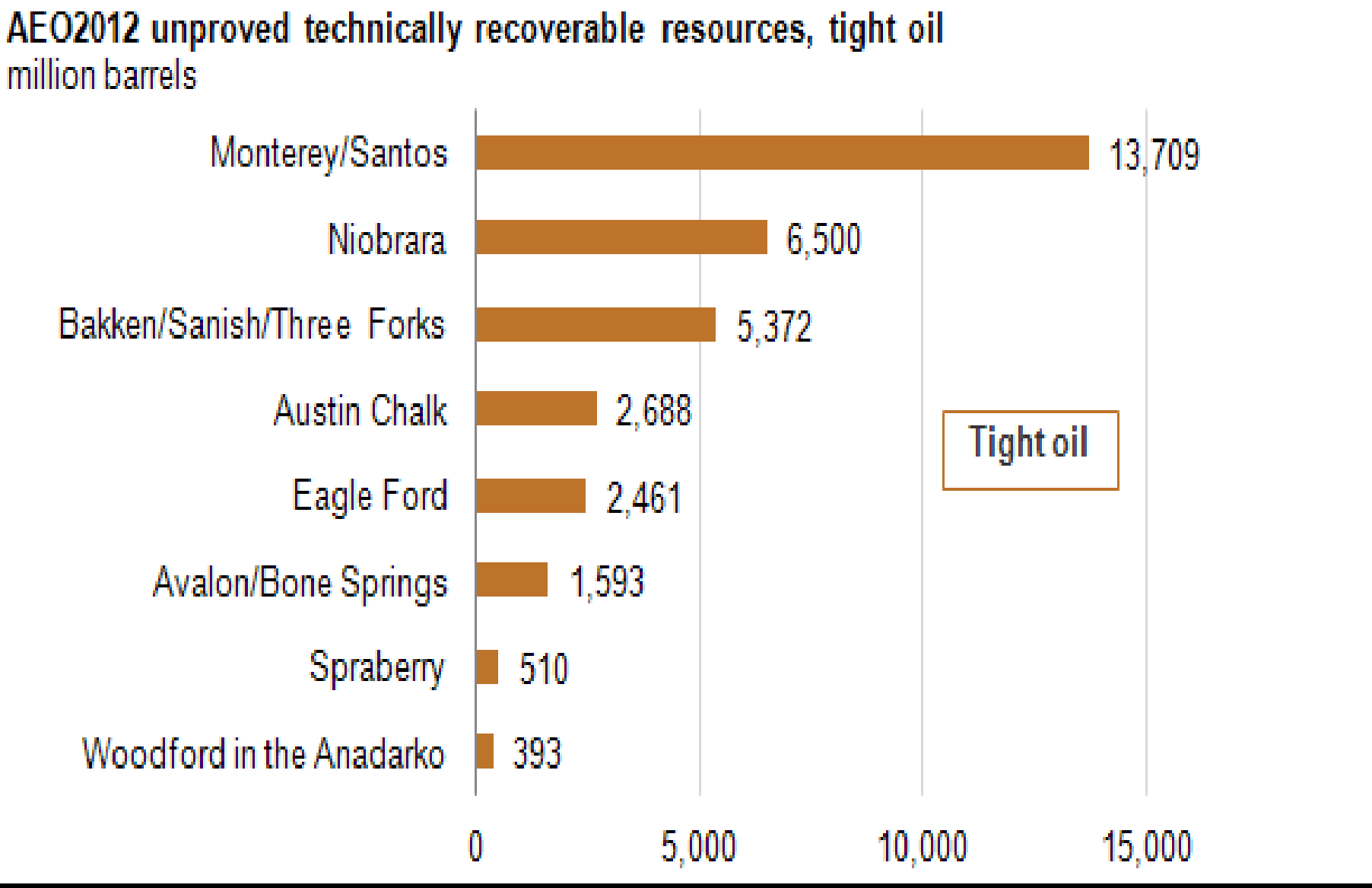
eia
OK
AR
NM
LA
TX

Annual Crude Oil Production, 2000-2011



Source: U.S. Energy Information Administration



Source: EIA 2012


San Joaquin
Basin
Monterey-
Temblor
Monterey
Santa Maria,
Ventura, Los
Angeles
Basins

United States Energy Information Administration, *Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays* at 75-77 (Jul. 2011)

Resource Estimate

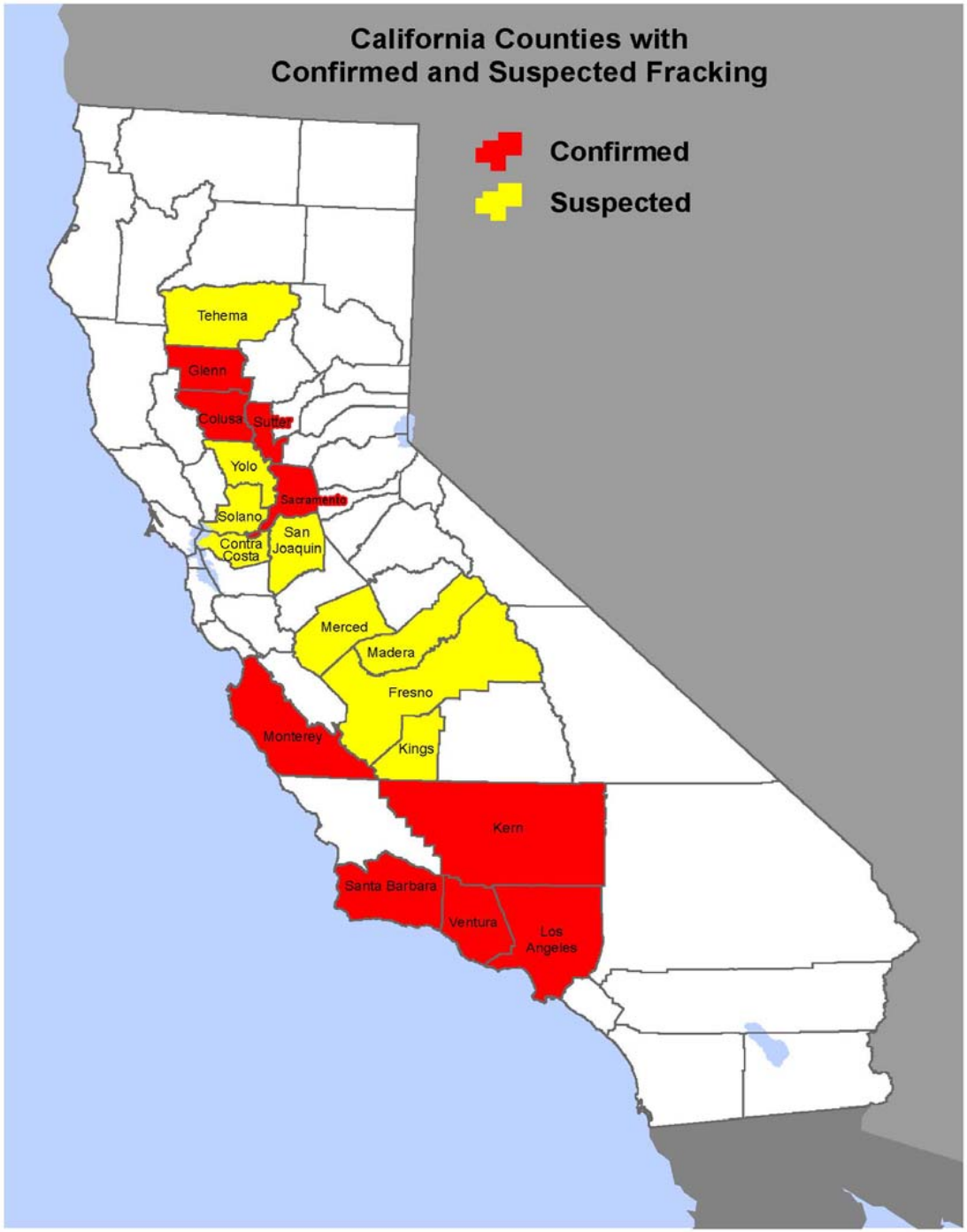
The active area for the Monterey/Santos shale play is approximately 1,752 square miles in the San Joaquin and Los Angeles Basin. The depth of the shale ranges from 8,000 to 14,000 feet deep and is between 1,000 and 3,000 feet thick. The shale oil play has an average EUR of 550 MBO per well and approximately 15.42 Bbbl of technically recoverable oil. These average values are provided in Table 57.

Table 57 Monterey/Santos Average EUR and Area

	Active
Area (sq. miles)	1,752
EUR (MBO/ well)	550
Well Spacing (wells/ sq. mile)	16
TRR (BBO)	15.42

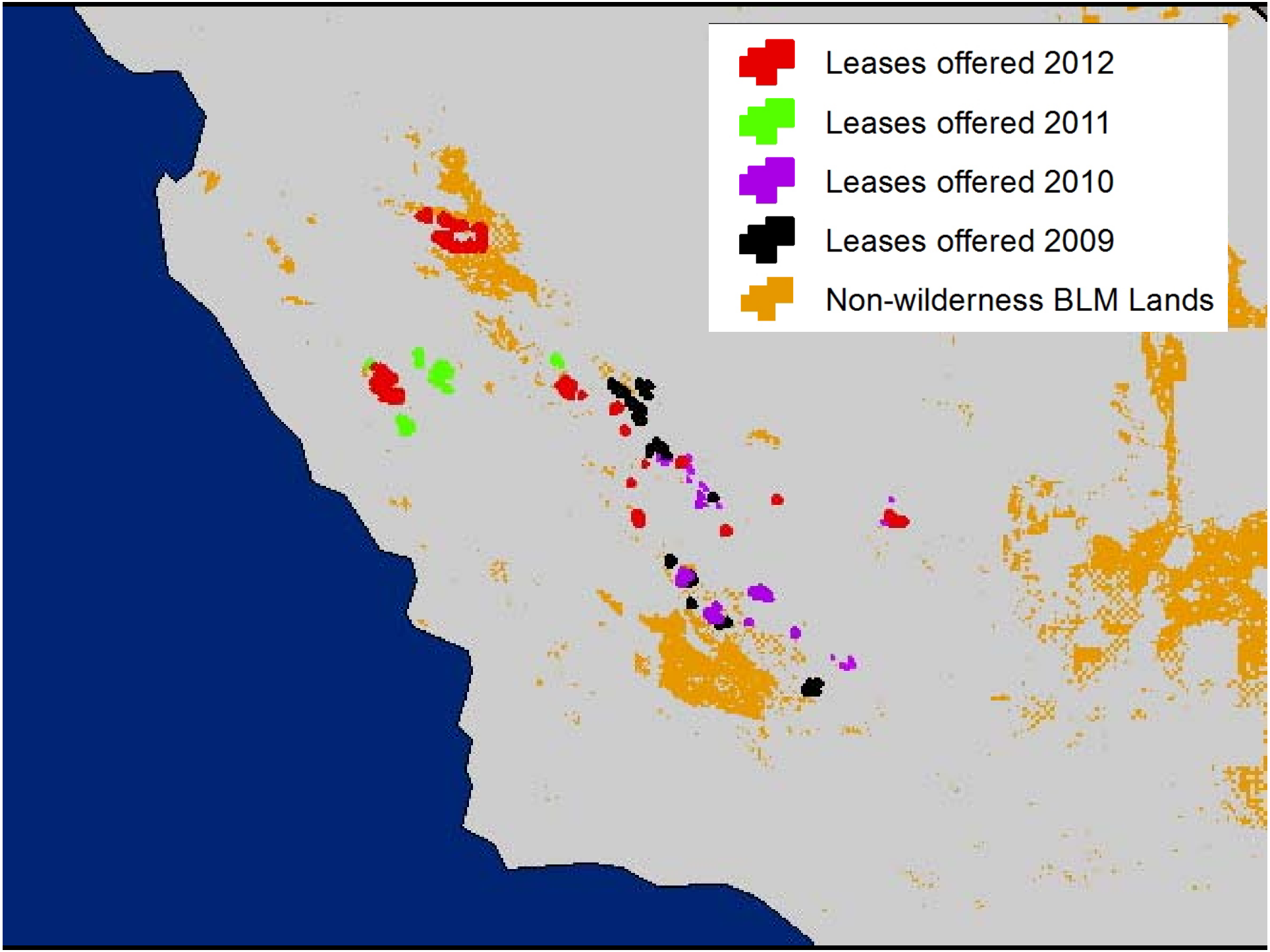
- “The Division is unable to identify where and how often hydraulic fracturing occurs in the state….The limited data we have is unreliable as there are neither reporting requirements nor regulatory parameters of when, how, and what needs to be reported when applying for permits.”

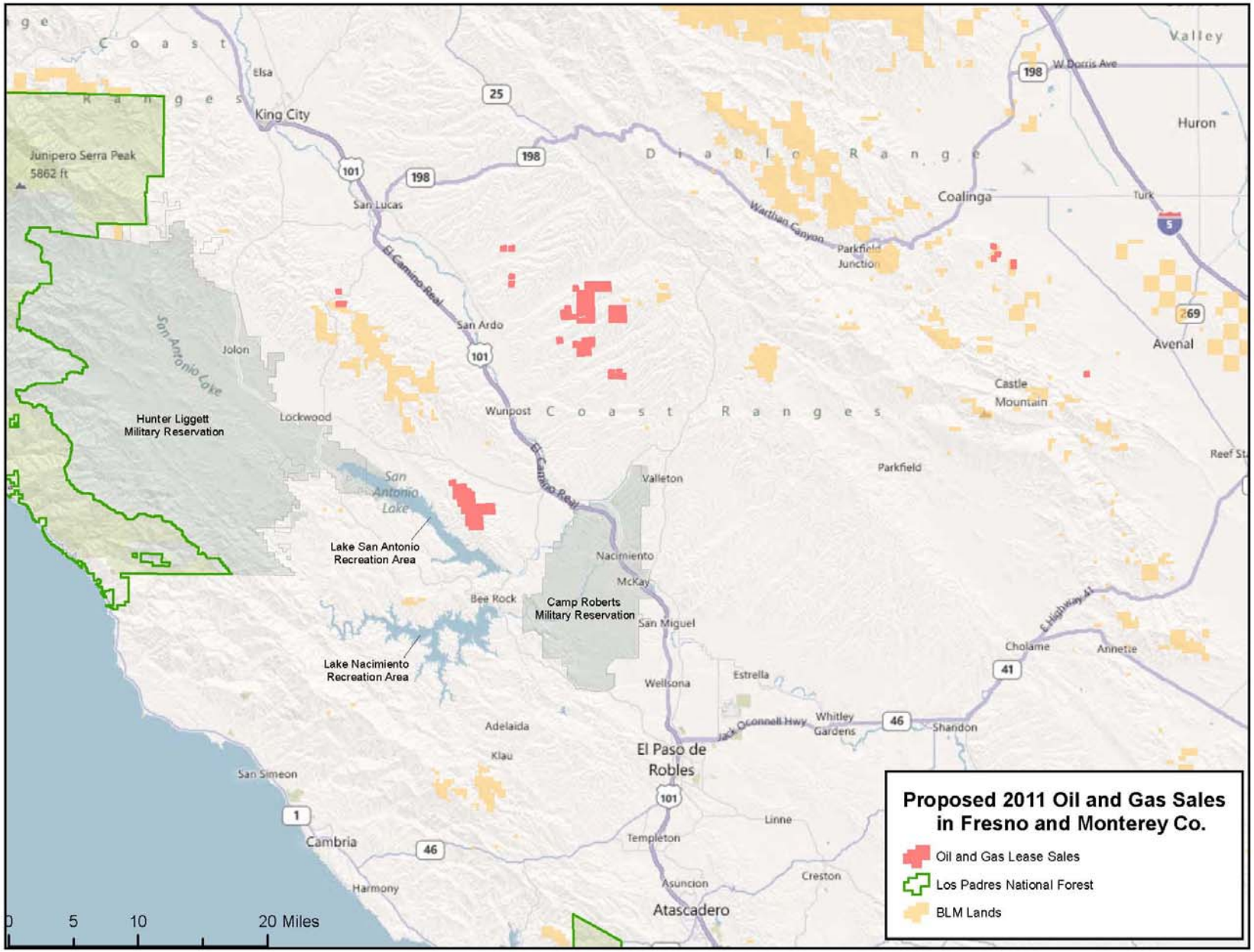
  - Elena Miller, 2011, State Oil and Gas Supervisor


California Counties with
Confirmed and Suspected Fracking
Confirmed
Suspected
Tehema
Glenn
Colusa
Sutter
Yolo
Sacramento
Solano
San
Joaquin
Contra
Costa
Merced
Madera
Fresno
Monterey
Kings
Kern
Santa Barbara
Ventura
Los
Angeles

How many wells in California are Fracked?

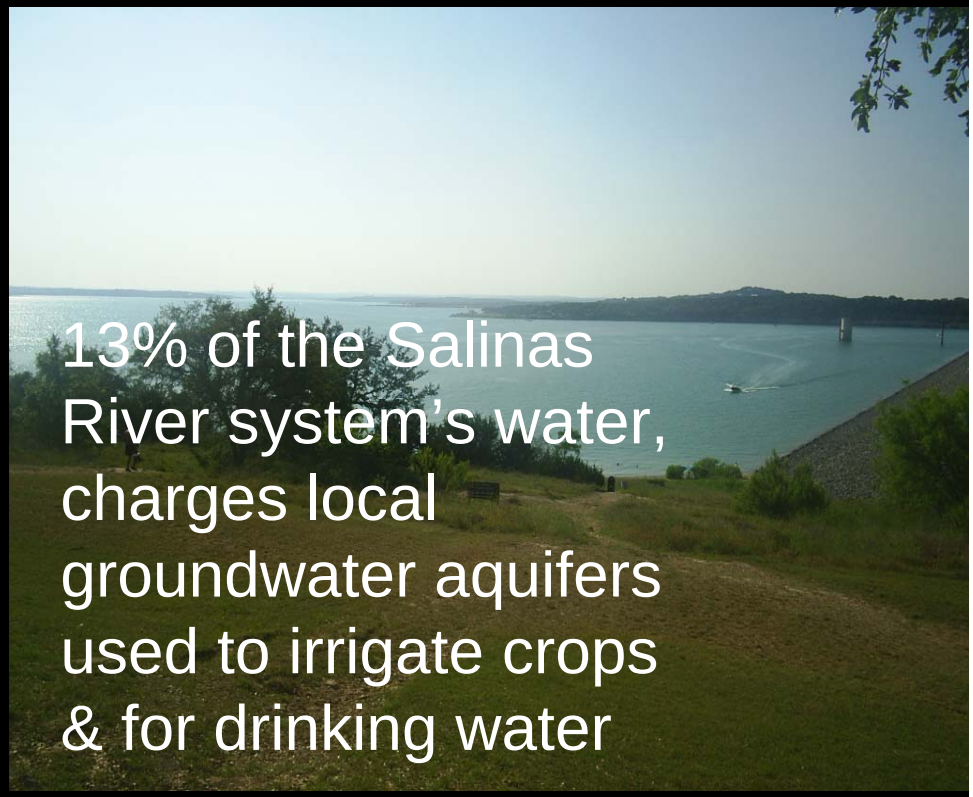
- DOGGR:
  - 2,294 new wells drilled in 2011
  - 3,376 notices filed for the reworking of existing wells
- FracFocus: 477 wells fracked since 1/1/11
- WSPA: 628 wells fracked by members in 2011
- Halliburton: 50-60% of new wells in Kern Co. fracked in 2011
- BLM:
  - 5% of wells reported fracked in CA in 2010
  - 17% of wells reported fracked in CA between 2000-10
  - 90% of wells on Federal and Indian land have been fracked nationwide as of May 2012.


Leases offered 2012
Leases offered 2011
Leases offered 2010
Leases offered 2009
Non-wilderness BLM Lands


Proposed 2011 Oil and Gas Sales in Fresno and Monterey Co.
Oil and Gas Lease Sales
Los Padres National Forest
BLM Lands
Junipero Serra Peak
5862 ft
Hunter Liggett
Military Reservation
Lake San Antonio
Recreation Area
Lake Nacimiento
Recreation Area
Camp Roberts
Military Reservation
King City
San Lucas
San Ardo
Wunpost
Jolon
Lockwood
Bradley
Valleton
Nacimiento
McKay
Bee Rock
San Miguel
Wellsona
Estrella
Adelaida
Klau
El Paso de Robles
Templeton
Linne
Asuncion
Creston
Atascadero
San Simeon
Cambria
Harmony
Coalinga
Parkfield Junction
Wartham Canyon
Huron
W Dorris Ave
Turk
Avenal
Castle Mountain
Parkfield
Reef St
Cholame
Annette
Shandon
Whitley Gardens
O'connell Hwy
E Highway 41
El Camino Real
Elsa
0 5 10 20 Miles

Lake San Antonio & The Salinas Valley


To King City
& US 101
LOCKWOOD
San
Antonio R.
Jolon
Bradley
To Salinas
& San Francisco
101
To
Bradley
&
Paso
Robles
Road
Fort Hunter Ligget
Cemetary
Cove
Lake San Antonio
New Pleyto Road
Interlake
Pleyto
San Antonio
Marina
Nacimiento
Road
Park
Hdqtrs
Chalk
Cliffs
Harris
Cr.
Three
Fingers
Road
Best
For
Stripers
Half Moon
Bay
Bee Rock
Cove
San
Antonio R.
To
US101
&
Paso
Robles
Good Bass
Fishing
Good Crappie
Fishing
Good Striper
Fishing
Lake
San Antonio
by
Dewayne Hight


13% of the Salinas River system's water, charges local groundwater aquifers used to irrigate crops & for drinking water


U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
Williams Hill
RECREATION AREA

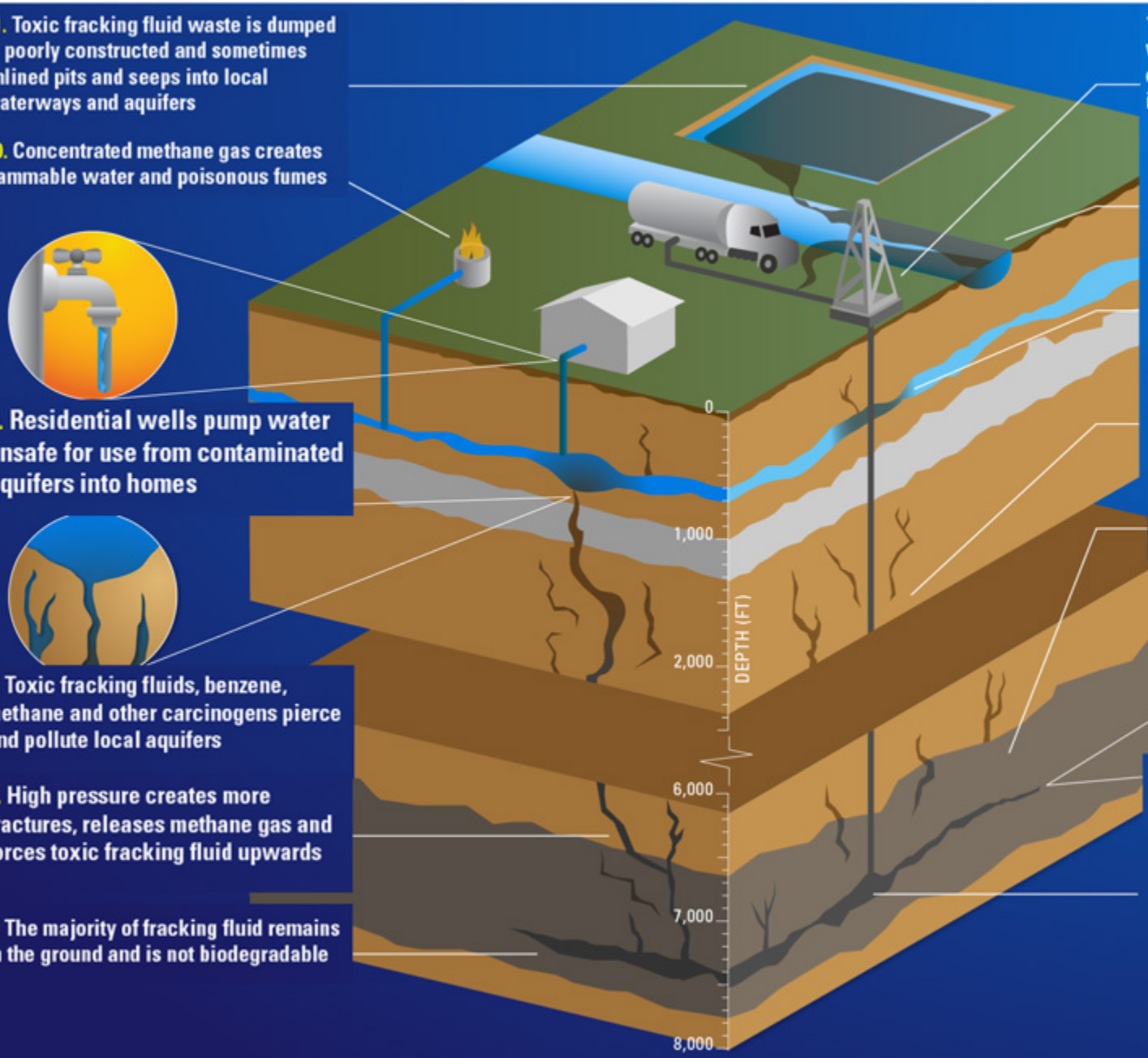

Organic Farm
Zona Organica
Only
Materials of
Natural Origin
are Permitted
Solamente
Materiales de Origen
Naturales
son Permitidos
All Visitors
Must
Check-In with a
Supervisor
Visitantes Deben
Registrarse con
el Supervisor

Fracking Threatens Our…

Fracking Threatens our Water


JOHN COLE
©THETIMES-TRIBUNE
SCRANTON, PA
CAGLECARTOONS.COM
LOOK AT IT THIS WAY: THE GLASS IS HALF-CLEAN...
NATURAL GAS DRILLERS
MARCELLUS SHALE DRINKING WATER
the OPTIMIST...

HOW NATURAL GAS DRILLING CONTAMINATES DRINKING WATER SOURCES



11. Toxic fracking fluid waste is dumped in poorly constructed and sometimes unlined pits and seeps into local waterways and aquifers

10. Concentrated methane gas creates flammable water and poisonous fumes

9. Residential wells pump water unsafe for use from contaminated aquifers into homes

8. Toxic fracking fluids, benzene, methane and other carcinogens pierce and pollute local aquifers

7. High pressure creates more fractures, releases methane gas and forces toxic fracking fluid upwards

6. The majority of fracking fluid remains in the ground and is not biodegradable

1. A mixture of millions of gallons of water, chemically treated sand and toxic chemicals is injected under high pressur into drilling well

2. Toxic fracking fluid spills from pipes, open valves and transporting vehicles and contaminates local waterways

3. Fracking fluid leaks though fissures and contaminates aquifer

4. Fracking fluid is pumped 7000 ft o more down and a similar distance horizontally to release natural gas

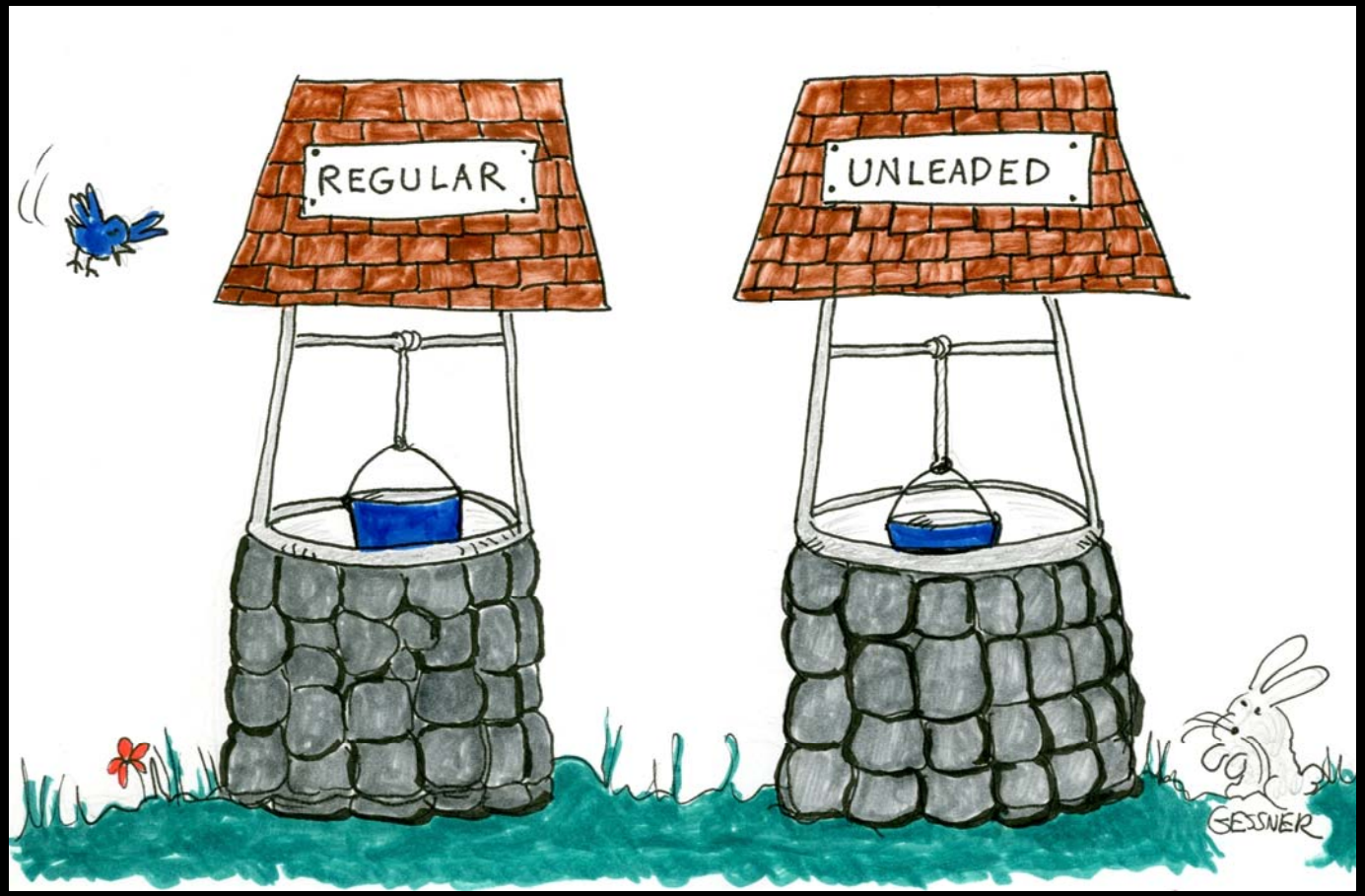
Gas producing rock formation

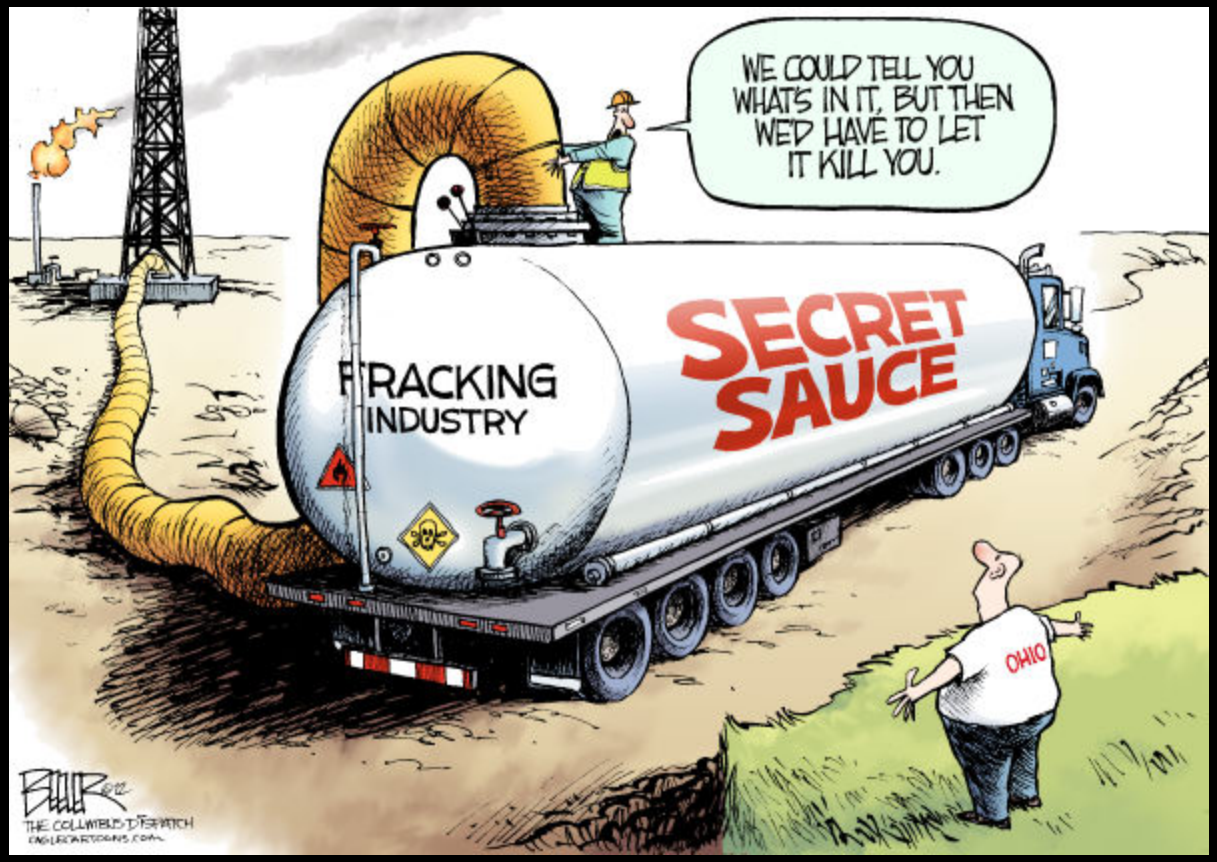
Proppants like chemically treated sand and ceramic keep fractures ope

5. Fracking fluid injected at high pressure creates fractures and release natural gas

DIAGRAM NOT TO SCALE

checksandbalancesproject.org


REGULAR
UNLEADED
GESSNER


WE COULD TELL YOU WHAT'S IN IT, BUT THEN WE'D HAVE TO LET IT KILL YOU.
FRACKING INDUSTRY
SECRET SAUCE
OHIO
THE COLUMBUS DISPATCH

Chemical Impacts

- 75% could affect the skin, eyes, respiratory and gastrointestinal systems
- 40-50% could affect the brain/nervous system, immune and cardiovascular systems, and kidneys
- 37% could affect the endocrine system
- 25% could cause cancer and mutations
- 37% can become airborne

Fracking Threatens Our Air

Study of Air Toxics and Carcinogens Near an Oil Field in Garfield County, Colorado

Table 3
Chronic and subchronic reference concentrations, critical effects, and major effects for hydrocarbons in quantitative risk assessment.

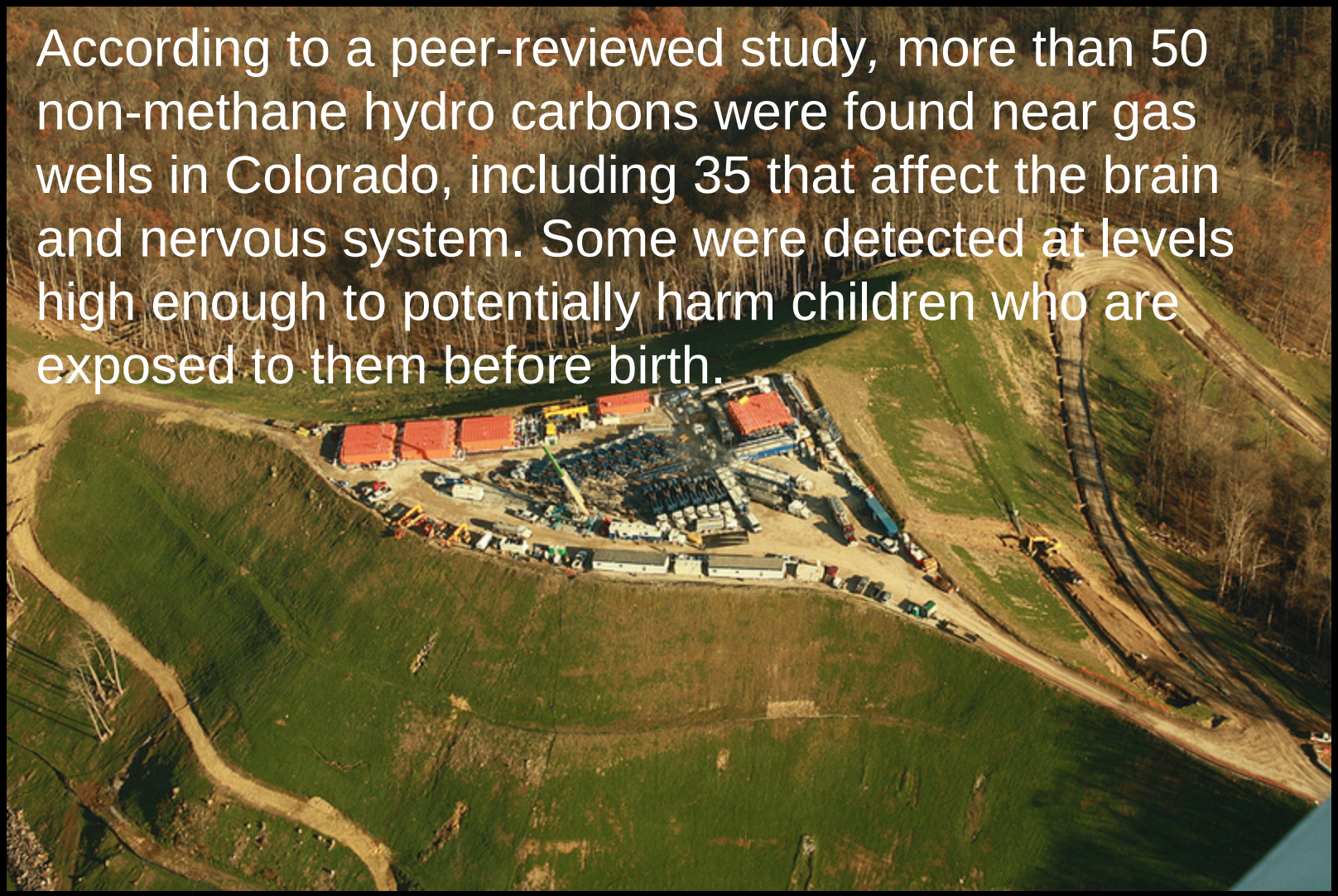
Hydrocarbon	Chronic		Subchronic		Critical effect/ target organ	Other effects
	RfC (µg/m^3)	Source	RfC (µg/m^3)	Source		
1,2,3-Trimethylbenzene	5.00E+00	PPTRV	5.00E+01	PPTRV	Neurological	Respiratory, hematological
1,3,5-Trimethylbenzene	6.00E+00	PPTRV	1.00E+01	PPTRV	Neurological	Hematological
Isopropylbenzene	4.00E+02	IRIS	9.00E+01	HEAST	Renal	Neurological, respiratory
n-Hexane	7.00E+02	IRIS	2.00E+03	PPTRV	Neurological	–
n-Nonane	2.00E+02	PPTRV	2.00E+03	PPTRV	Neurological	Respiratory
n-Pentane	1.00E+03	PPTRV	1.00E+04	PPTRV	Neurological	–
Styrene	1.00E+03	IRIS	3.00E+03	HEAST	Neurological	–
Toluene	5.00E+03	IRIS	5.00E+03	PPTRV	Neurological	Developmental, respiratory
Xylenes, total	1.00E+02	IRIS	4.00E+02	PPTRV	Neurological	Developmental, respiratory
n-propylbenzene	1.00E+03	PPTRV	1.00E+03	Chronic RfC PPTRV	Developmental	Neurological
1,2,4-Trimethylbenzene	7.00E+00	PPTRV	7.00E+01	PPTRV	Decrease in blood clotting time	Neurological, respiratory
1,3-Butadiene	2.00E+00	IRIS	2.00E+00	Chronic RfC IRIS	Reproductive	Neurological, respiratory
Propylene	3.00E+03	CalEPA	1.00E+03	Chronic RfC CalEPA	Respiratory	–
Benzene	3.00E+01	ATSDR	8.00E+01	PPTRV	Decreased lymphocyte count	Neurological, developmental, reproductive
Ethylbenzene	1.00E+03	ATSDR	9.00E+03	PPTRV	Auditory	Neurological, respiratory, renal
Cyclohexane	6.00E+03	IRIS	1.80E+04	PPTRV	Developmental	Neurological
Methylcyclohexane	3.00E+03	HEAST	3.00E+03	HEAST	Renal	–
Aliphatic hydrocarbons C_5–C_8[a]	6E+02	PPTRV	2.7E+04	PPTRV	Neurological	–
Aliphatic hydrocarbons C_9–C_{18}	1E+02	PPTRV	1E+02	PPTRV	Respiratory	–
Aromatic hydrocarbons C_9–C_{18}[b]	1E+02	PPTRV	1E+03	PPRTV	Decreased maternal body weight	Respiratory

Abbreviations: 95%UCL, 95% upper confidence limit; CalEPA, California Environmental Protection Agency; HEAST, EPA Health Effects Assessment Summary Tables 1997; HQ, hazard quotient; IRIS, Integrated Risk Information System; Max, maximum; PPTRV, EPA Provisional Peer-Reviewed Toxicity Value; RfC, reference concentration; µg/m^3, micrograms per cubic meter. Data from CalEPA 2011; IRIS (US EPA, 2011); ORNL 2011.

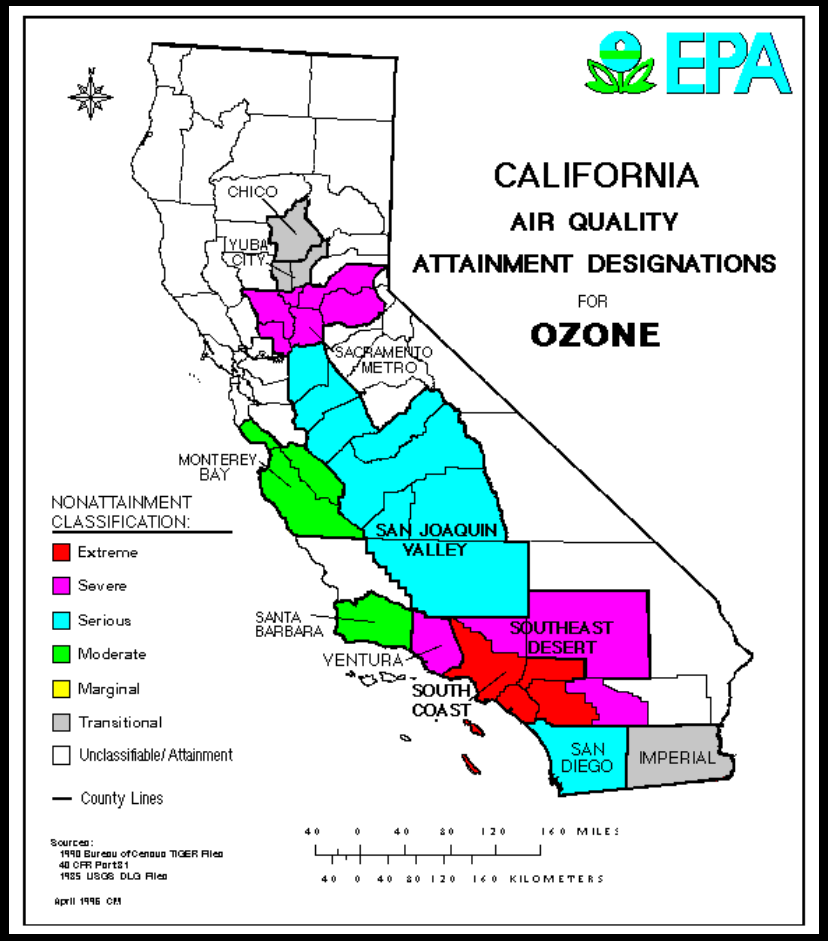
[a] Based on PPTRV for commercial hexane.

[b] Based on PPTRV for high flash naphtha.

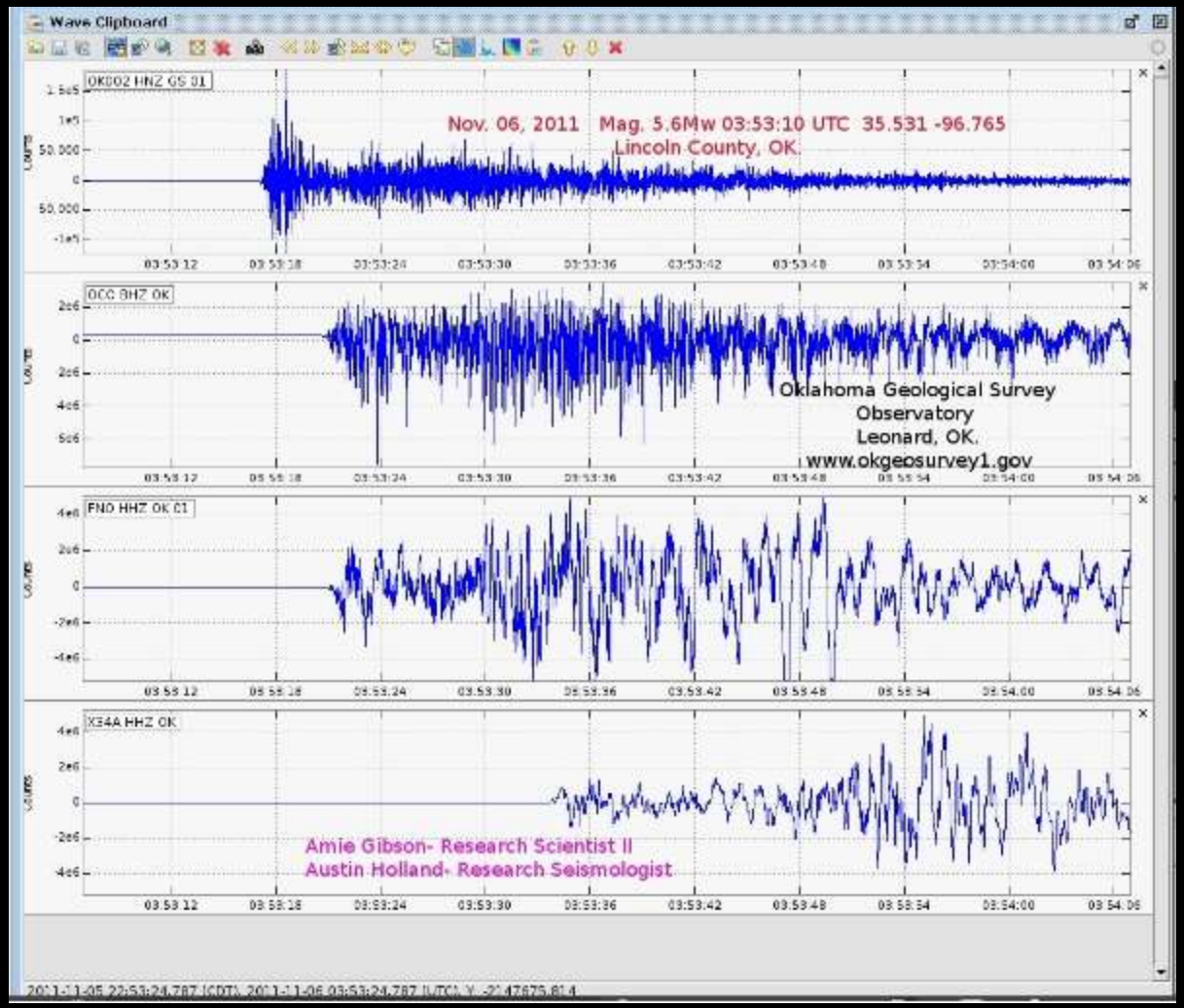
Source: McKenzie et al. 2012


According to a peer-reviewed study, more than 50 non-methane hydro carbons were found near gas wells in Colorado, including 35 that affect the brain and nervous system. Some were detected at levels high enough to potentially harm children who are exposed to them before birth.

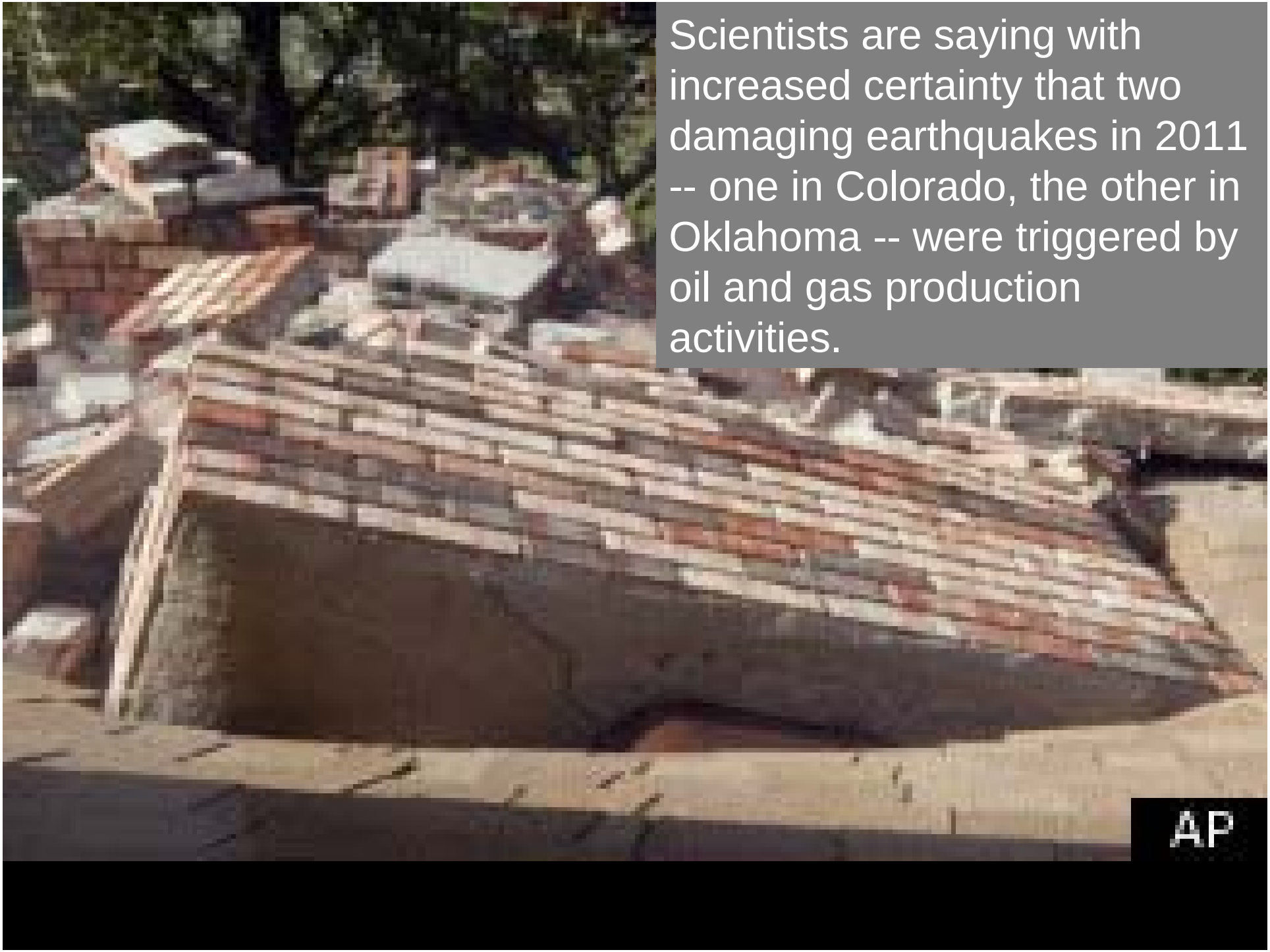
SkyTruth

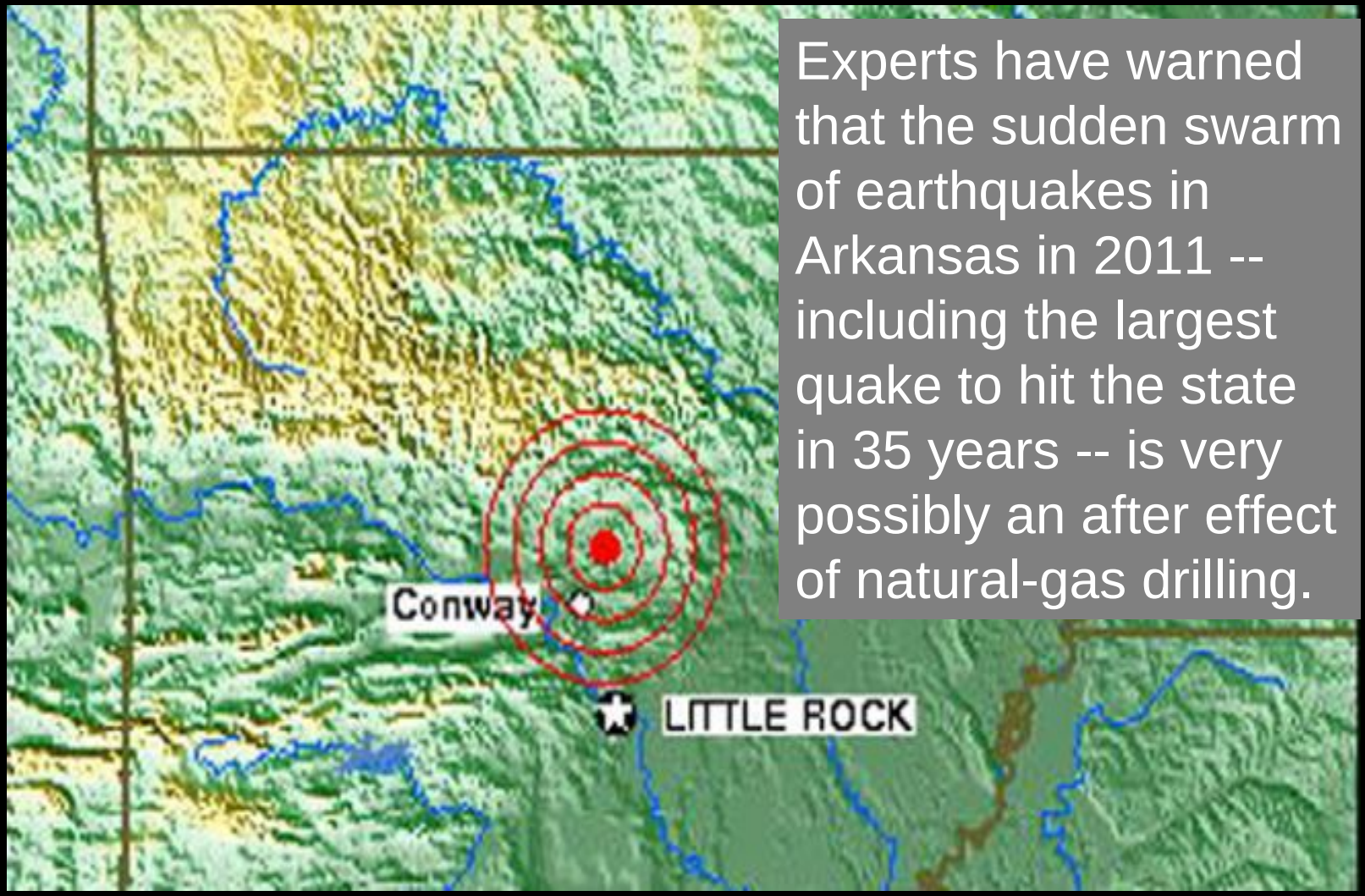

EPA
CALIFORNIA
AIR QUALITY
ATTAINMENT DESIGNATIONS
FOR
OZONE
CHICO
YUBA CITY
SACRAMENTO METRO
MONTEREY BAY
SAN JOAQUIN VALLEY
SANTA BARBARA
VENTURA
SOUTHEAST DESERT
SOUTH COAST
SAN DIEGO
IMPERIAL
NONATTAINMENT CLASSIFICATION:
Extreme
Severe
Serious
Moderate
Marginal
Transitional
Unclassifiable/Attainment
County Lines
40 0 40 80 120 160 MILES
40 0 40 80 120 160 KILOMETERS
Sources:
1990 Bureau of Census TIGER Files
40 CFR Part 81
1985 USGS DLG Files
April 1995 CM

Earthquakes



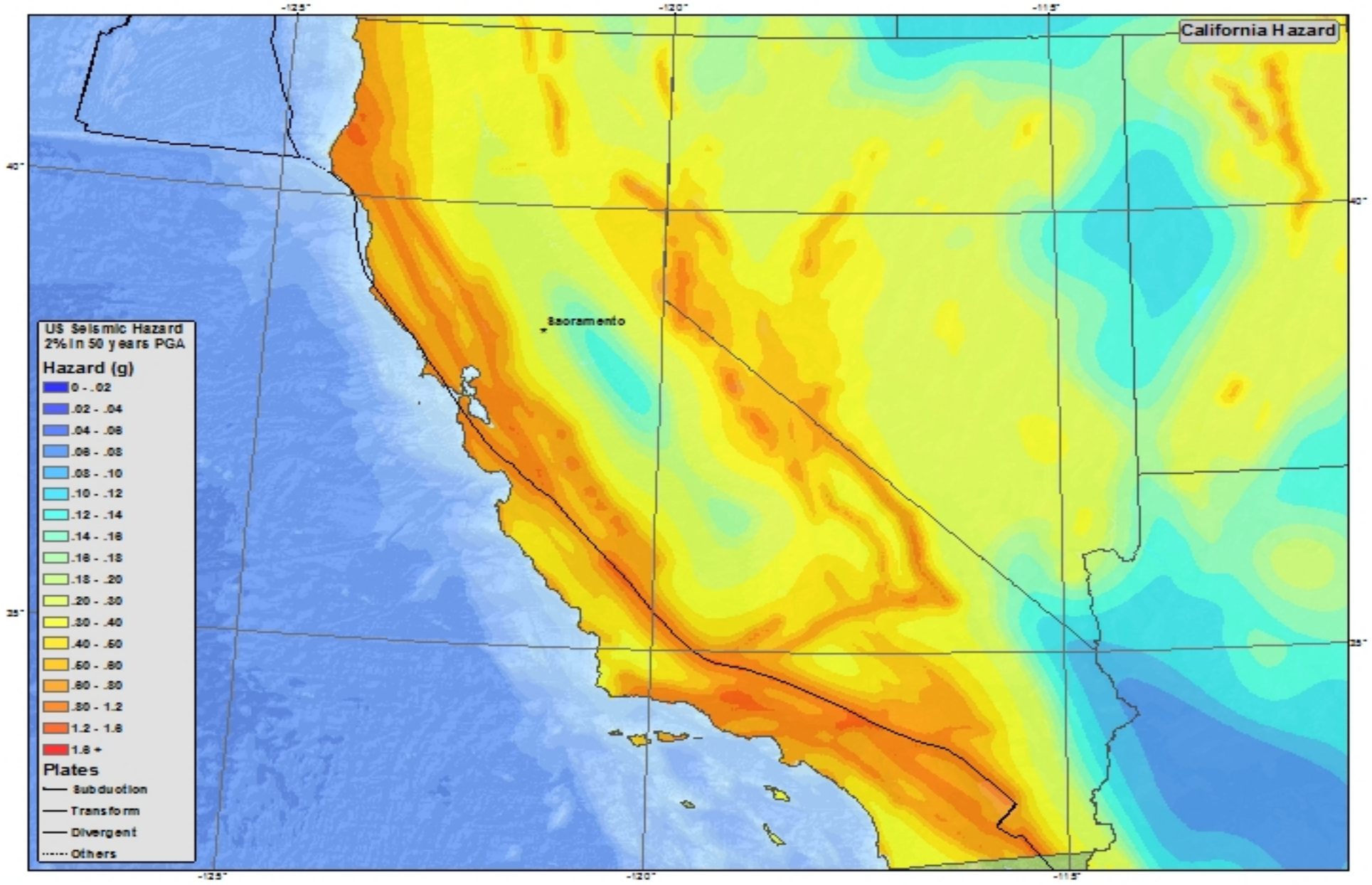
Oklahoma Geological Survey


Scientists are saying with increased certainty that two damaging earthquakes in 2011 -- one in Colorado, the other in Oklahoma -- were triggered by oil and gas production activities.
AP



Experts have warned that the sudden swarm of earthquakes in Arkansas in 2011 -- including the largest quake to hit the state in 35 years -- is very possibly an after effect of natural-gas drilling.

USGS



USGS, Seismic Hazard Map


FRACKING THREATENS
CALIFORNIA'S WILDLIFE
www.BiologicalDiversity.org


© Gary Nafis

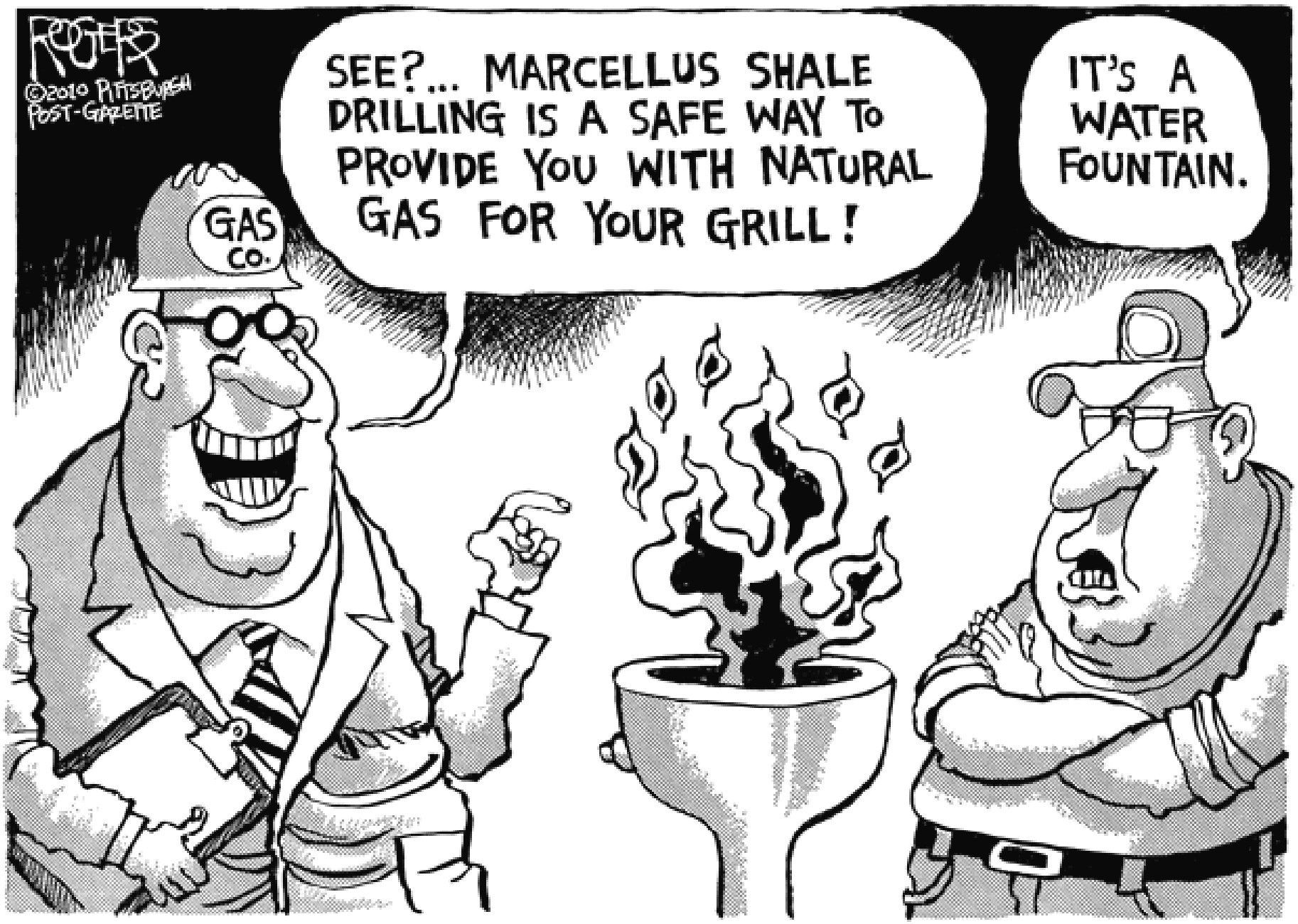

DIAZ

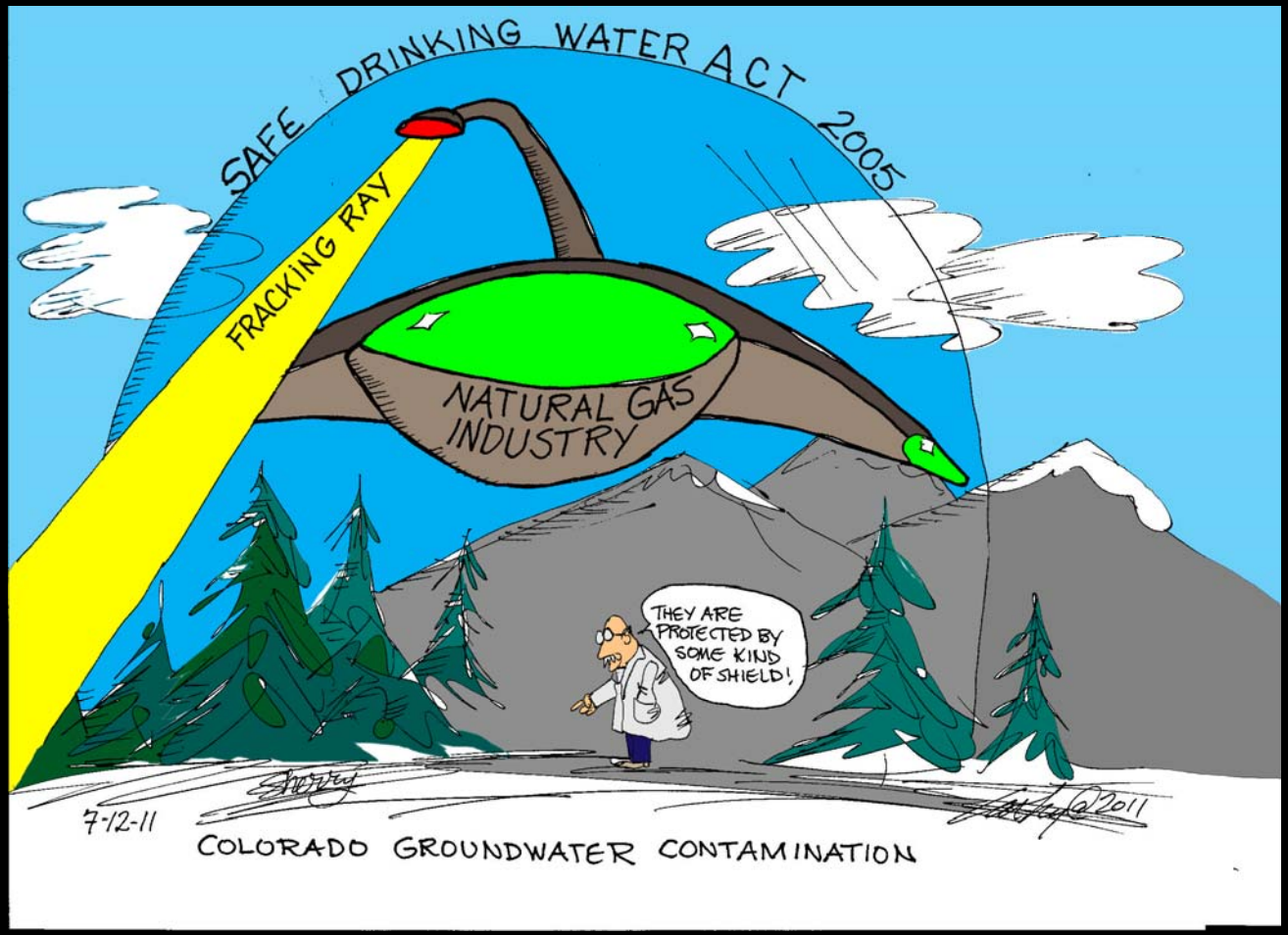

CENTRAL CALIFORNIA COAST
STEELHEAD TROUT


Fracking threatens our climate
•July 6, 2012
Reagan National Airport,
Washington, D.C.
© 2012 Phillip Dugaw

Methane

- About 126 billion cubic feet of gas are unnecessarily vented and flared from federal oil and gas leases each year.
- Enough to heat 1.7 million homes for one year.


ROGERS
©2010 PITTSBURGH POST-GAZETTE
GAS CO.
SEE?... MARCELLUS SHALE DRILLING IS A SAFE WAY TO PROVIDE YOU WITH NATURAL GAS FOR YOUR GRILL!
IT'S A WATER FOUNTAIN.


SAFE DRINKING WATER ACT 2005
FRACKING RAY
NATURAL GAS INDUSTRY
THEY ARE PROTECTED BY SOME KIND OF SHIELD!
7-12-11
COLORADO GROUNDWATER CONTAMINATION


BAN
FRACKING IN
CALIFORNIA!
The Bee

Litigation

- Center for Biological Diversity and Sierra Club sue BLM over 2011 lease sale in Monterey and Fresno counties.
- Notice to sue under Endangered Species Act.
- Litigation for failure to comply with CA Environmental Quality Act.
- Litigation for failure to comply with CA's Underground Injection Program

Contact:

Rose Braz, climate campaign director

Center for Biological Diversity

rbraz@biologicaldiversity.org

415.632.5319

Thank You!