Fracking in Colorado

What are the Hidden Impacts?

Source(s) of data

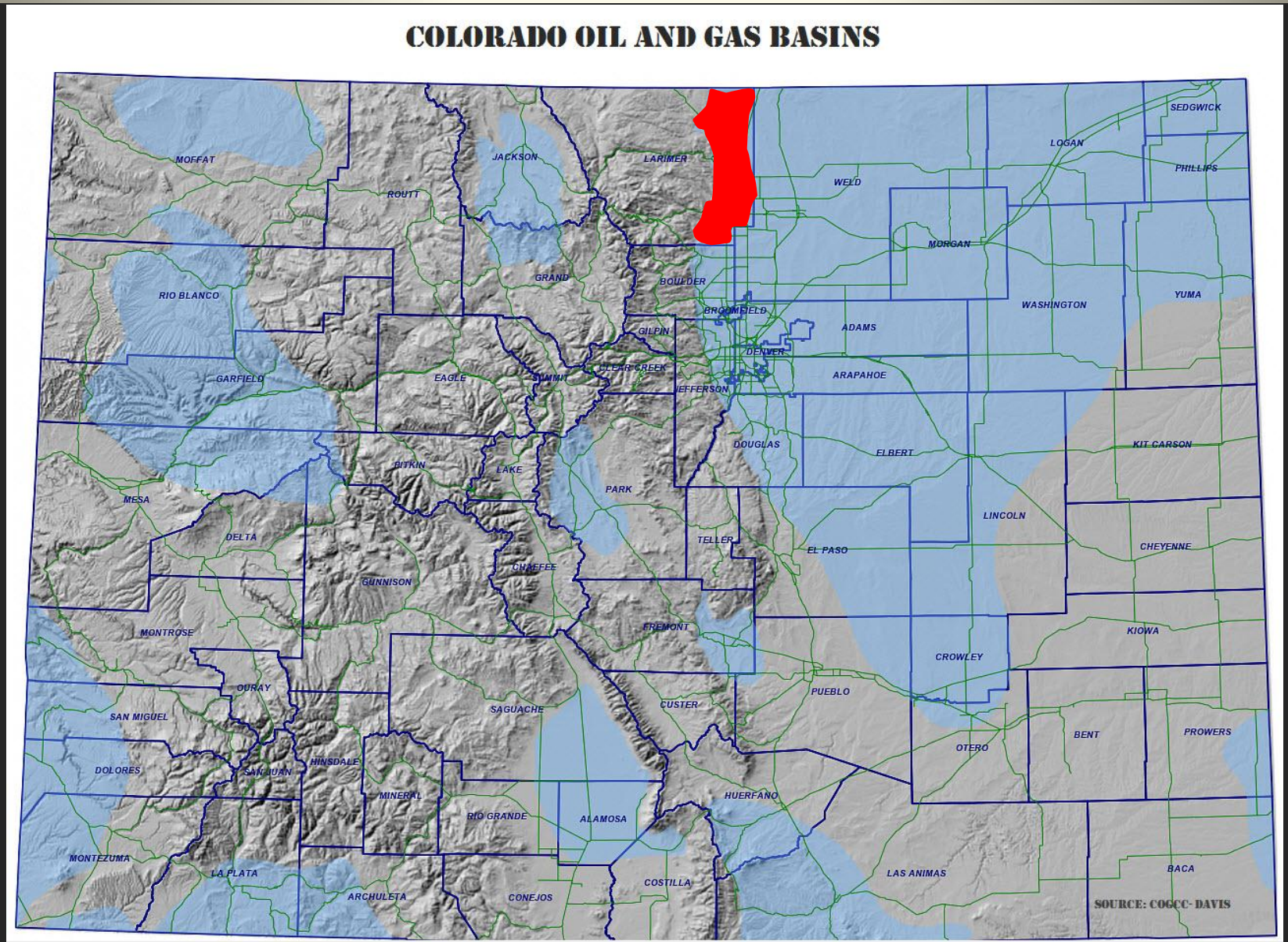
- The source of all Colorado oil and gas related information was derived from the COGCC's website and subsequent documentations per specific well API.
- All COGCC data is un-redacted and not interpreted, thus remaining true in its original form and can be found on the COGCC's website. Unless otherwise noted
- Data compilation was conducted from 2011-present.

Types of observed & recorded oil and gas development impacts in Colorado

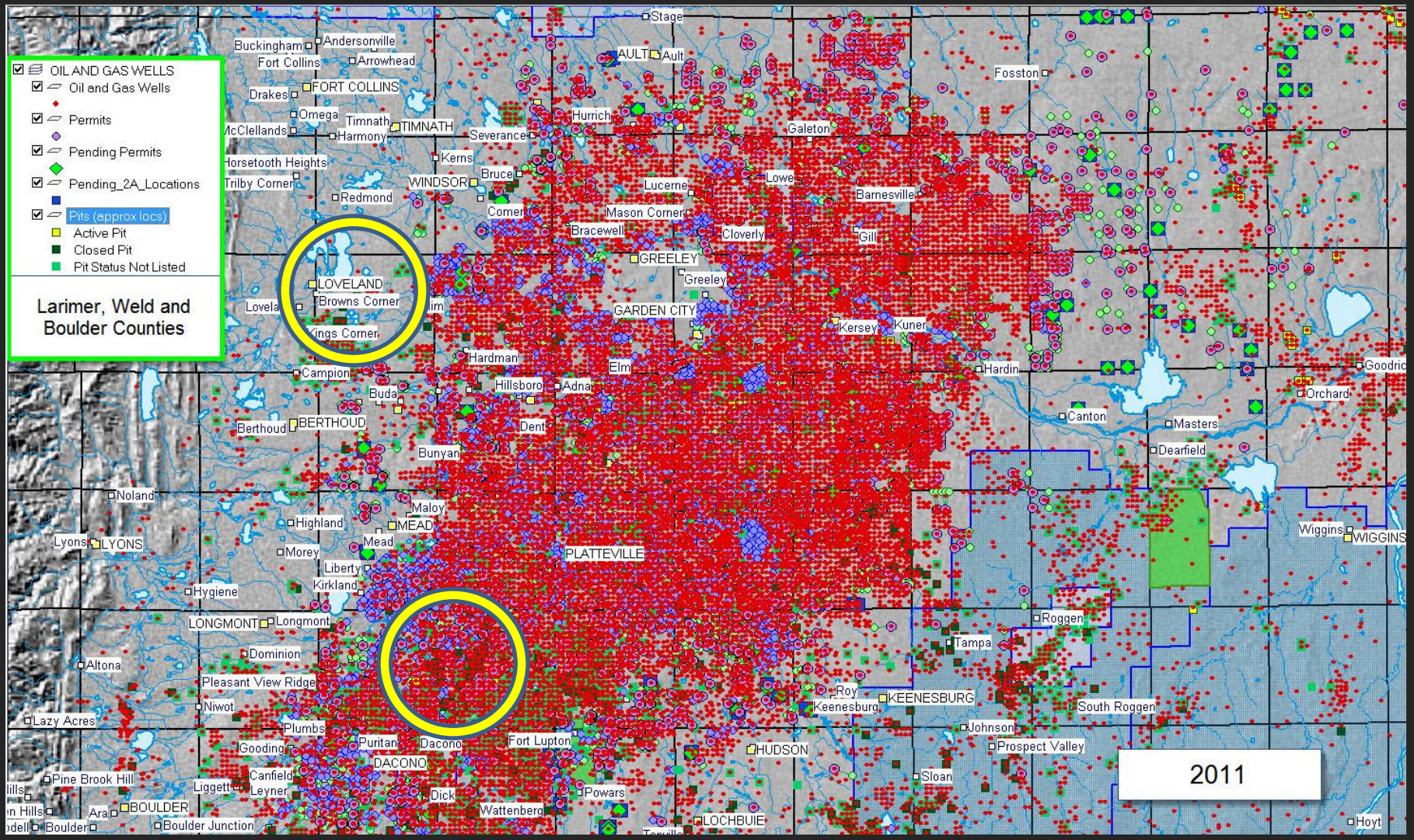
- ✓ Soil Contamination, ground and surface water contamination/impacts
- ✓ Drinking Water impacts
  - ✓ Aquifer impacts
  - ✓ Well – water impacts

- ✓ Vegetation impacts
- ✓ Wildlife & habitat impacts
- ✓ Agricultural impacts
- ✓ Air quality degradation
- ✓ Human impacts
- ✓ Mechanical failures
- ✓ COGCC failures
- ✓ Industry failures and myths

What does this mean to the people of Colorado?



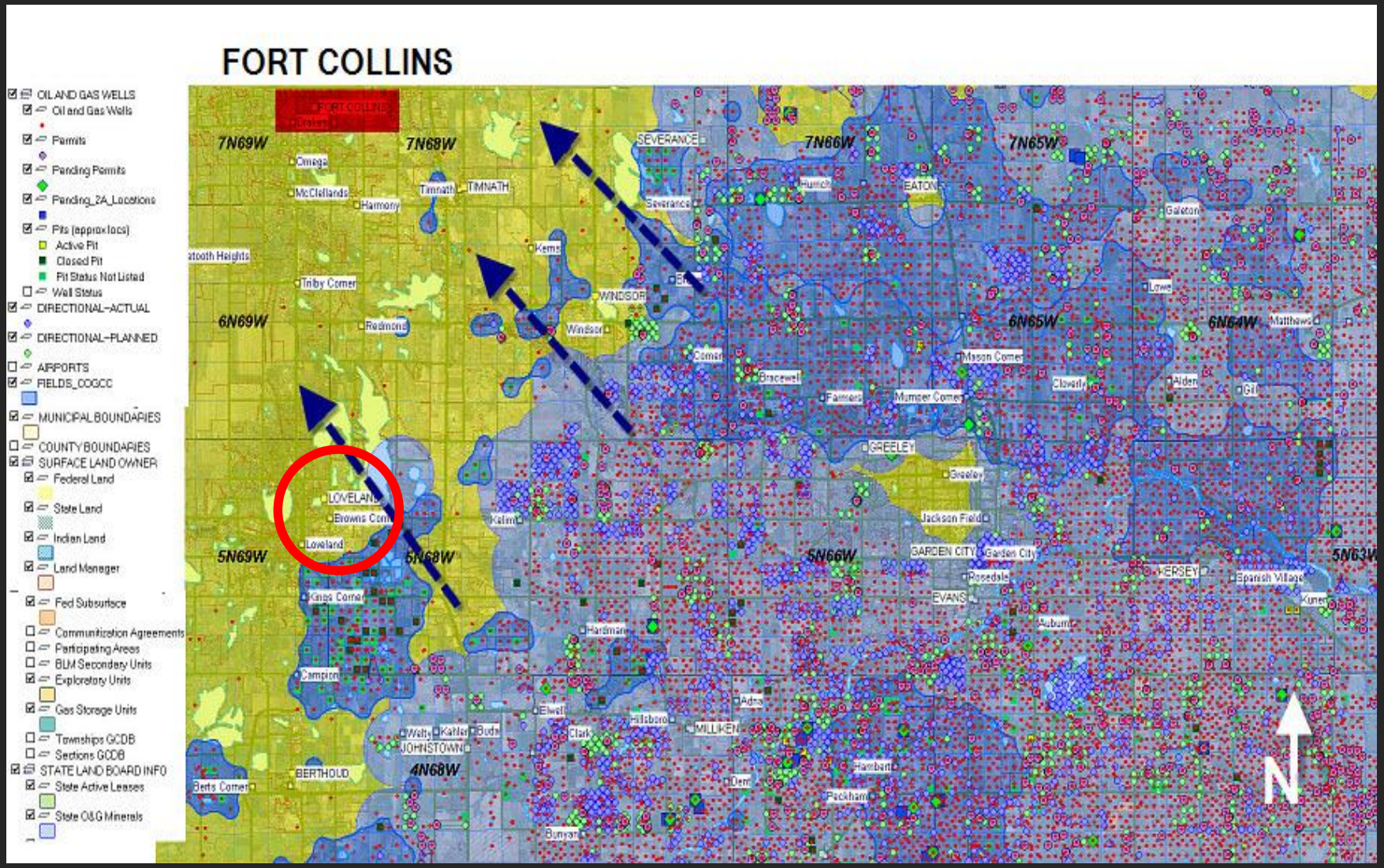
Active Well Density Map
Larimer & Weld Counties



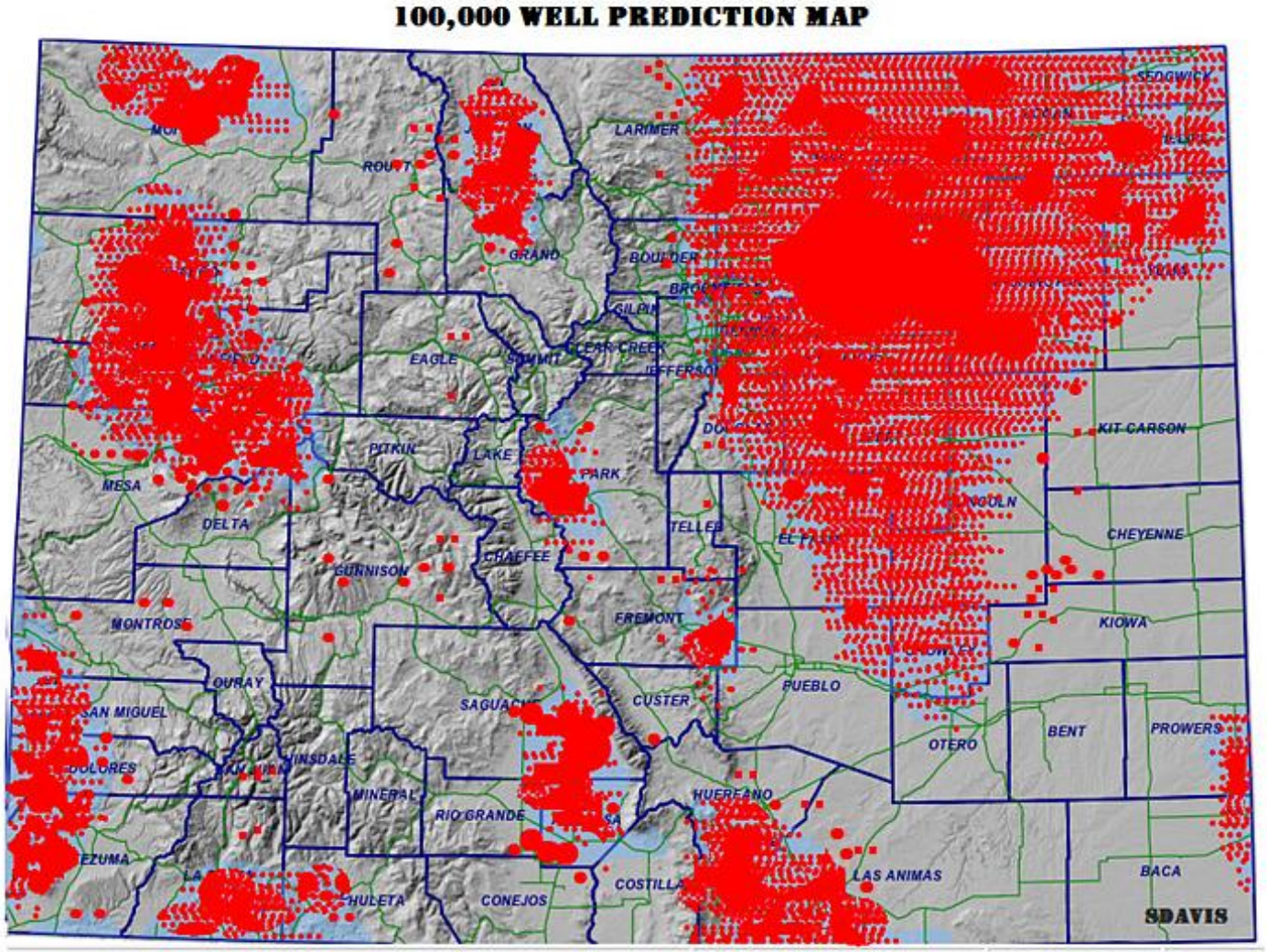
<18,000 active wells!

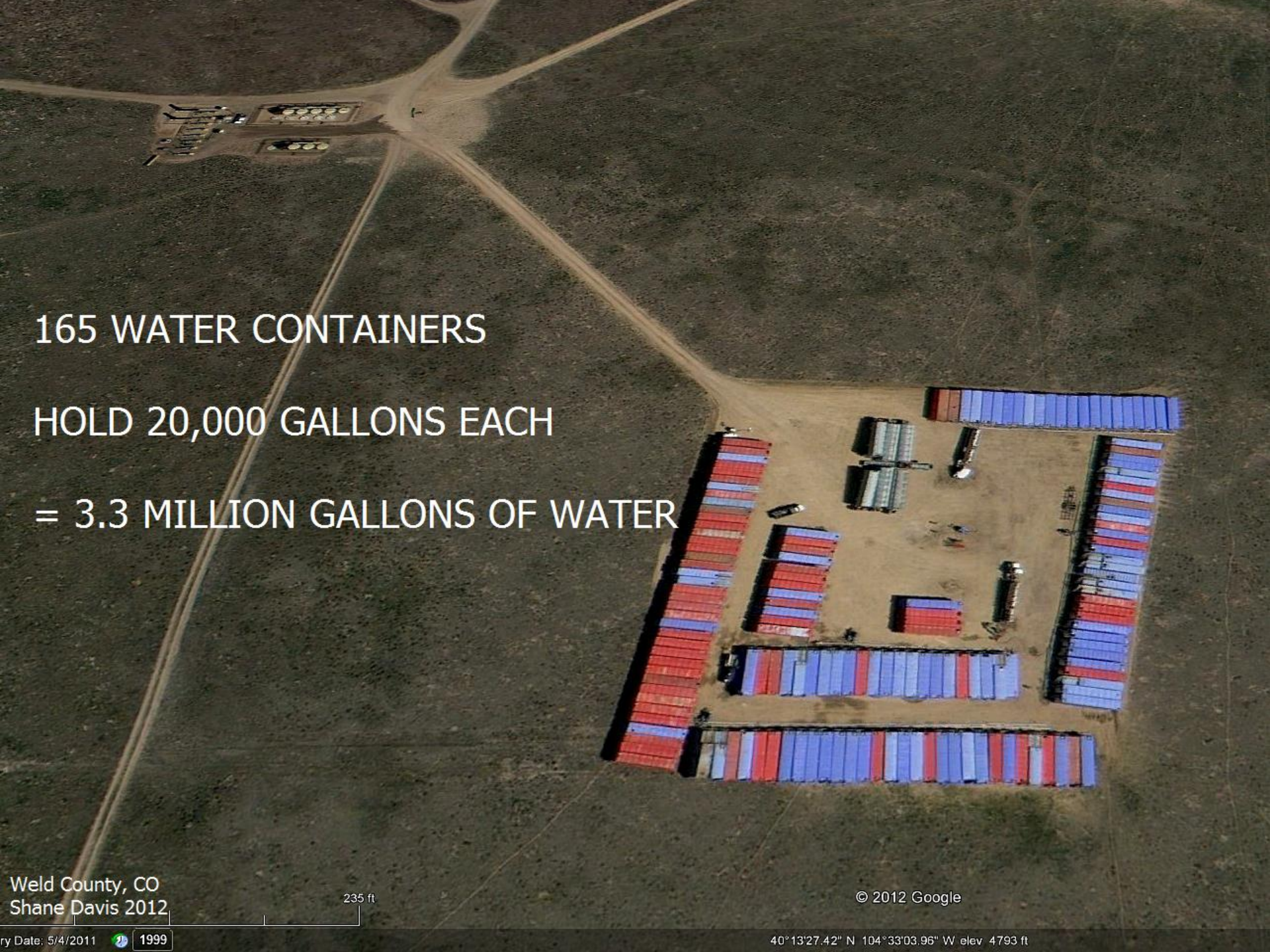
Active Well Density Map
Larimer & Weld Counties II

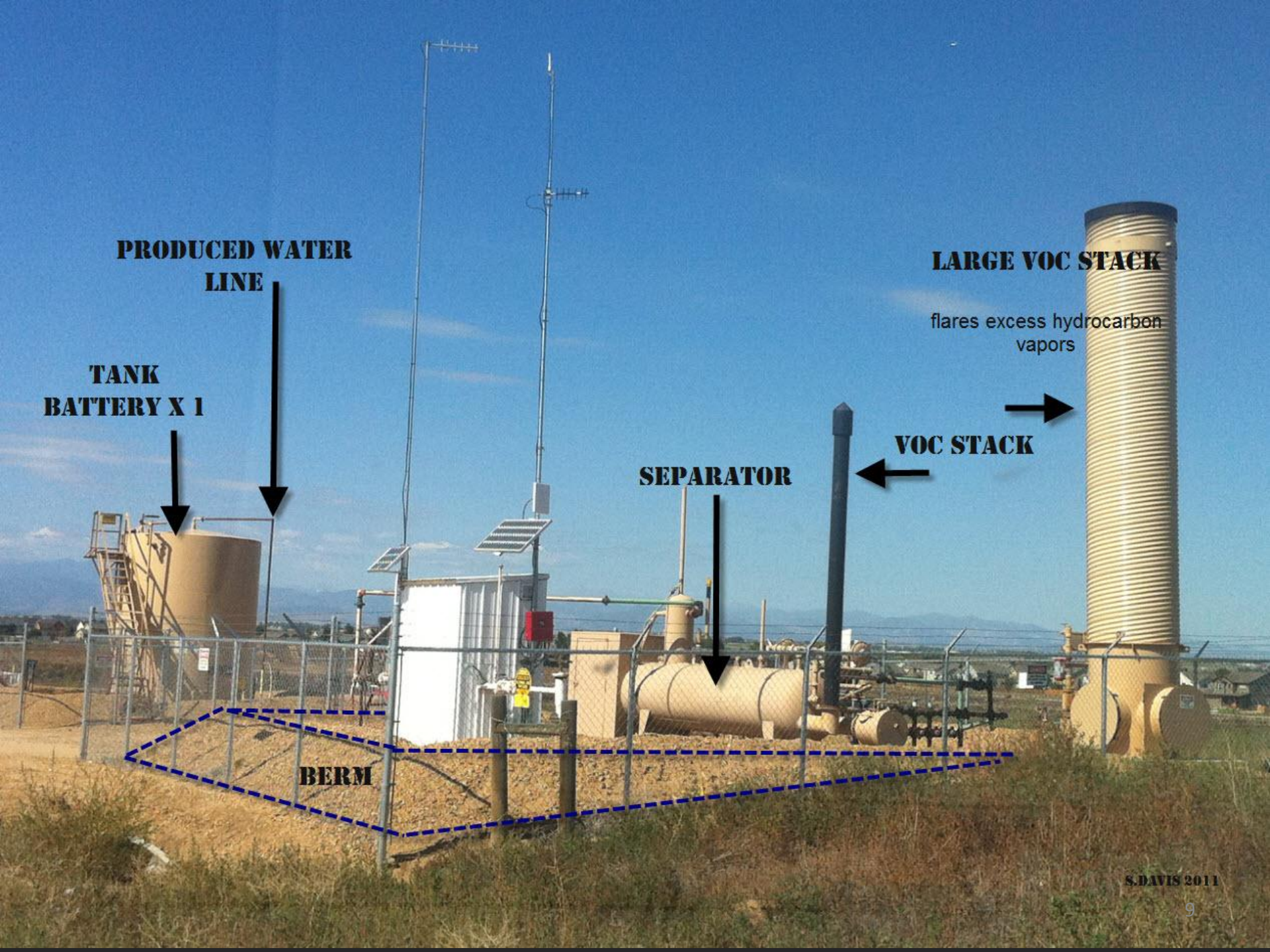
Yellow Areas are designated as oil & gas 'Exploratory Units'



What Would 100,000 Wells Look Like?




165 WATER CONTAINERS
HOLD 20,000 GALLONS EACH
= 3.3 MILLION GALLONS OF WATER
Weld County, CO
Shane Davis 2012
235 ft
© 2012 Google
ry Date: 5/4/2011
1999
40°13'27.42" N 104°33'03.96" W elev 4793 ft


PRODUCED WATER LINE
TANK BATTERY X 1
LARGE VOC STACK
flares excess hydrocarbon vapors
VOC STACK
SEPARATOR
BERM
S.DAVIS 2011


TANK BATTERY
PRODUCED WATER LINE
Firestone, CO
Condensate tank
~ 118’ from nearest home
DANGER
HIGH PRESSURE
EXPLOSIVE VAPORS
NO SMOKING
DANGER
OPEN PIT
NO TRESPASSING
SDAVIS 2011

Completed Well Count – Larimer County

Total completed wells: 674
Producing Wells: 153
Approved Wells: 30
Other statuses – Abandoned etc: 491

NOAV: 98
Complaints: 15
Spill/Release: 41
Pits: 161 mostly all abandoned

Weld County Statistics

WELL & SITE INSPECTIONS >1,000+

ALLEGED VIOLATIONS – 878

PUBLIC COMPLAINTS – 634

TOXIC SPILLS/RELEASES – 1,691

~total statewide sill/releases >4,000

100% contaminate soil and ~43% contaminated groundwater

Source: COGCC

Toxic Contaminates Reported cont.

COGA: In reality, our industry has to focus on two areas to prevent impacting underground sources of drinking water:

(1) preventing surface spills, and
(2) ensuring casing protection. Both of these areas are currently regulated in Colorado.

Source: COGA

Water Contaminations - 1,000 COGCC spill/release reports studied

- **42.7%** appear to result in groundwater contamination – COGCC
- 3.1% appear to result in surface water contamination – COGCC
- 57.1% appear to have a berm failure – COGCC

1000 REPORTED SPILL INCIDENT REPORTS
WELD COUNTY, COLORADO
SHANE DAVIS
SOURCE: COGCC WEBSITE http://cogcc.state.co.us/

Company Name	Ground Water	Surface Water	Berm Contained
TOTAL 1000 SPILL INCIDENT REPORTS	427 YES	31 YES	429 YES
40 OPERATORS	563 NO	969 NO	571 NO

TOTAL PERCENTAGE FROM 1000 SPILL REPORTS	GW CONTAM	42.7%	YES
	GW CONTAM	56.3%	NO
	SURFACE H2O CONTAM	3.1%	YES
	SURFACE H2O CONTAM	96.9%	NO
	BERM CONTAINED	42.9%	YES
	BERM CONTAINED	57.1%	NO

Source: COGCC, Jan 2012

STATE OF COLORADO
OIL & GAS
CONSERVATION COMMISSION

DEPARTMENT OF NATURAL RESOURCES
John W. Hickenlooper, Governor
1120 Lincoln St. Suite 801
Denver, CO 80203
Phone: (303) 894-2100
FAX: (303) 894-2109
www.colorado.gov/cogcc

October 13, 2011

To address such effects, the COGCC has an extensive regulatory program, which we comprehensively updated in 2008. Our updated regulations impose a variety of requirements to protect state waters and land from spills and releases of waste products.

After the 2008 COGCC rule changes went into effect in Jan 2009

- ✓ Groundwater contamination reports increased by 4% to a total of 47% of all spill/releases.
- ✓ Berm failure rates also increased by 3.5% to 63.5% failure rate.

Groundwater contaminations cont…

A large percent of groundwater contaminations are directly linked to the continued use of historic equipment that subsequently fails. "Mechanical Failure"

COGA reports: "The spills occur from replacing the old equipment with new equipment." That assertion is empirically inaccurate. The industry is forced to replace the old equipment when they eventually learn months after it has failed to prevent fluid loss and subsequently contaminates soil, groundwater and surface water.

Concerns with toxic frac fluids

99.5% water and sand - 0.5% are 'toxic' chemicals

COGA states that these chemicals pose serious risk at full strength.

We must understand that this purported 'safety of dilution' is a false assumption.

Many of the highly toxic chemicals used in mining can contaminate an entire Olympic sized swimming pool with just a few drops.

Source: COGCC

Industry's Household Chemicals – aka: toxic chemicals

"Many of the chemicals used in fracking are the same kind that are found in your home under your kitchen sink. These household chemicals are being used every day. You use them, and so does the oil and gas industry."

COGA – Tisha Schuller

Industry's Household Chemicals – aka: toxic chemicals

- ✓ 3 million poisonings every year in America are caused from common household cleaners.
- ✓ Household cleaners are the #1 cause of poisoning of children.
- ✓ There are basically three ways toxic chemicals can enter your body: by swallowing (ingestion), by breathing (inhalation), or by contact with your skin or eyes (absorption).

Industry's Household Chemicals – aka: toxic chemicals

- ✓ Toxic chemicals in household cleaners are three times more likely to cause cancer than air pollution. (EPA)
- ✓ COGA's household toxins don't just affect us, they create toxic waste in their manufacture and use which gets disposed of in the environment in the form of air and water pollution and solid toxic waste.
- ✓ These chemicals also pose systemic adverse effects on the environment and the wildlife

Federal Exemptions: RCRA

The most substantial exemption, in my view, is the EPA's determination in 1988 that oil and gas exploration and production or "E&P" wastes should not be regulated under Subtitle C of the Resource Conservation and Recovery Act.

More generally, the EPA found that between ten and seventy percent of the oil and gas wastes sampled (the percentages varied by type of waste) "could potentially exhibit RCRA hazardous waste characteristics." The EPA concluded, though, that imposing corrective action requirements, including on-site management of the wastes under RCRA, would result in "significant costs to the industry."

See pp 20,21 of RCRA: Subtitle C, Sec 3001 (b)(2)(A) & (B)
21 SOLID WASTE DISPOSAL ACT Sec. 3001

Federal Exemptions: SDWA

Safe Drinking Water Act: Public protections were removed in three ways

1.) SEC 322. Hydraulic fracturing – excluded underground injection of natgas, underground injections of fluids and or propping agents.

2.) The energy policy Act of 2005 asked for a 'voluntary discontinuance' of diesel fuel use in fracking operations.

3.) Underground injection in oil and gas operations was defined so as to alleviate the EPA from regulating threats to drinking water from fracking fluids.

Federal Exemptions: cont…

A second important oil and gas exemption in federal environmental law is the exemption of uncontaminated sediments from oil and gas construction sites from National Pollutant Discharge Elimination System storm water permitting requirements.

Third, oil and gas operators do not need to prepare annual toxic chemical release forms under the Emergency Planning and Community Right-to-Know Act.

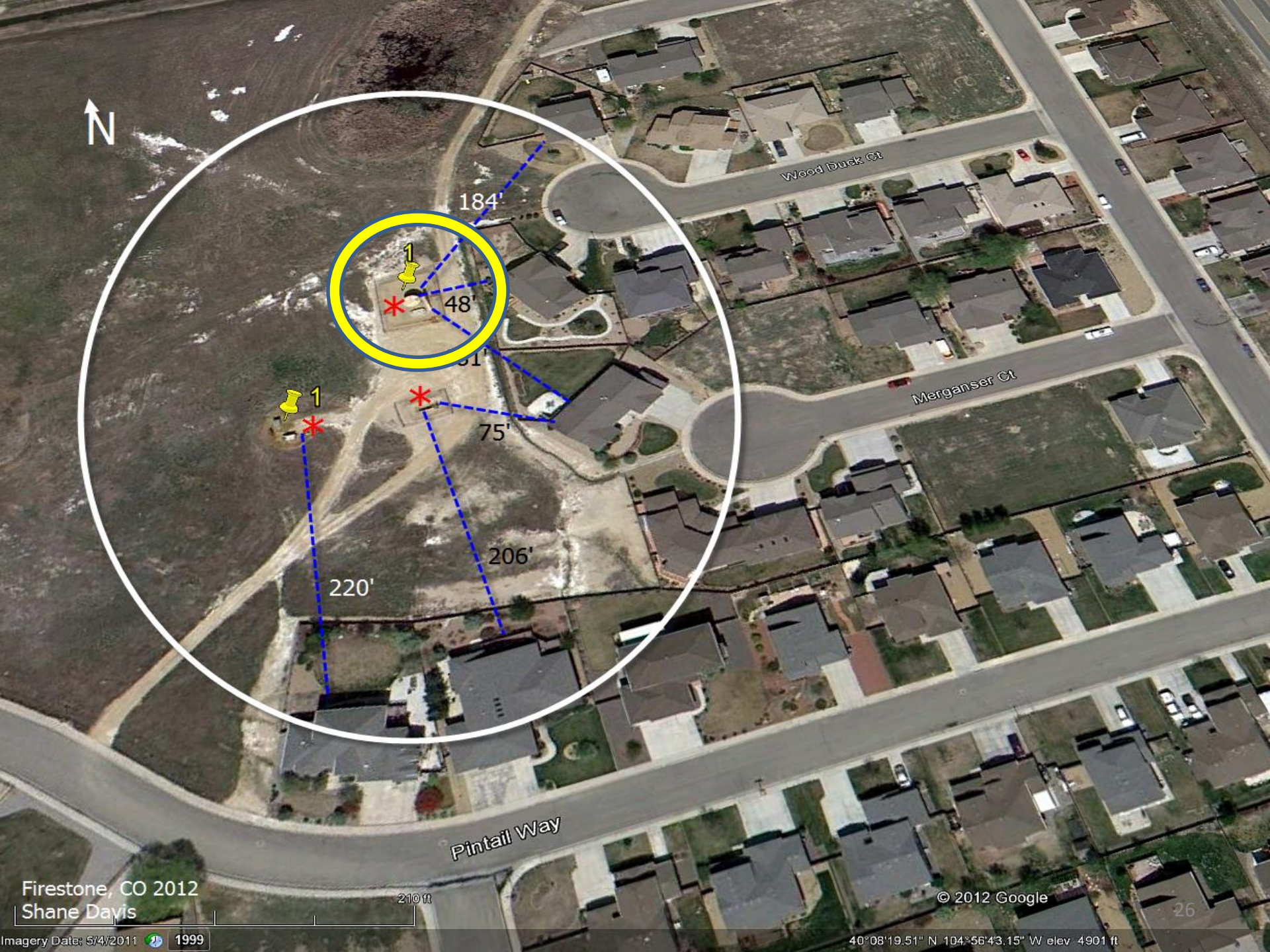
Statewide Setbacks

8% or ~ 4,000 active oil and gas wells are closer than the 350’ setback requirement. There is a waiver for a waiver in the industry to its ultimate advantage.

The setback requirement is merely a suggestion and does NOT apply to an existing completed well. This is ‘bad business’ and collides with the COGCC’s mission statement; to prevent adverse environmental and human health impacts.

Source: COGCC May Report 2012

Zoning and Hazards

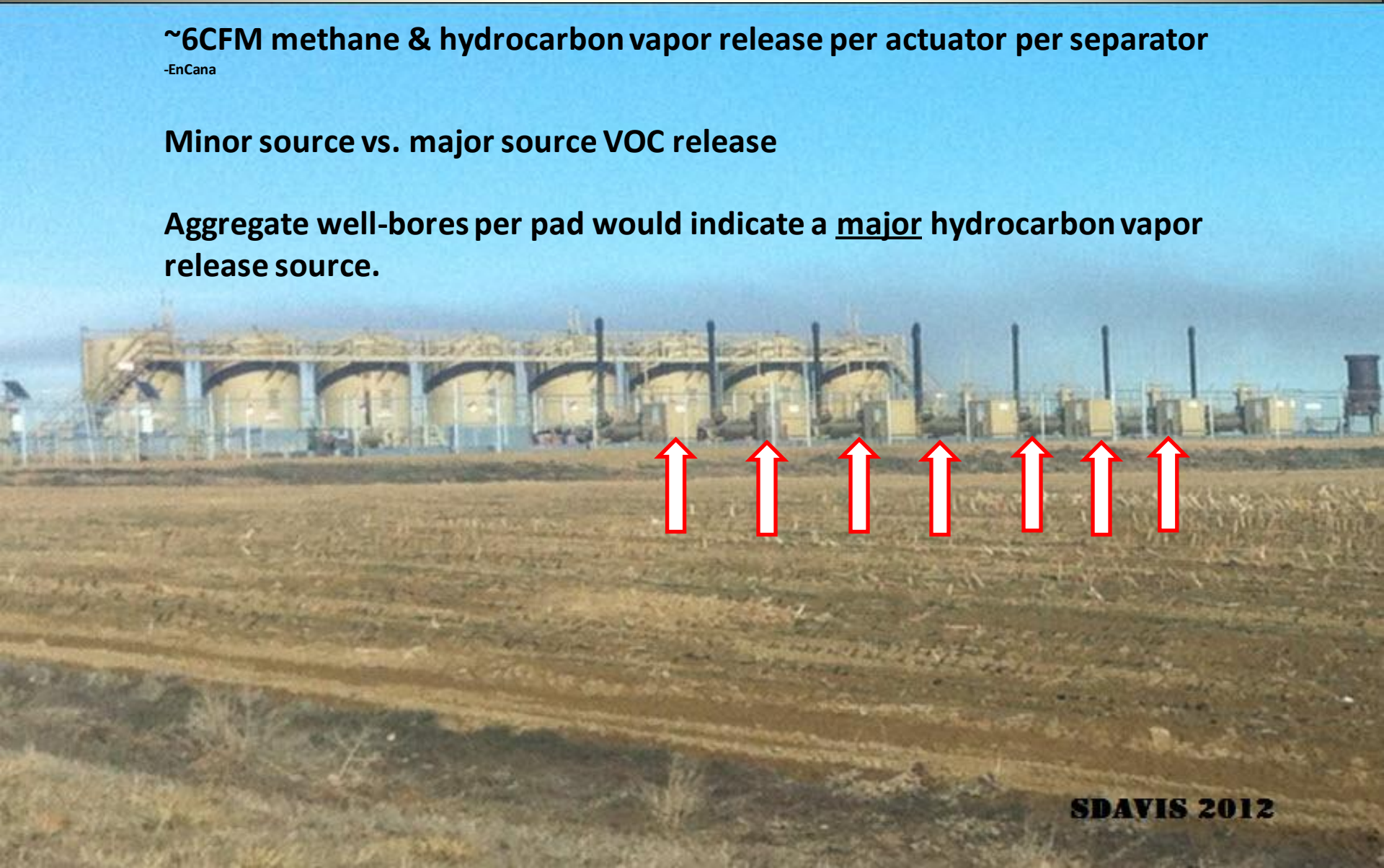

N
184'
48'
75'
206'
220'
1
1
Wood Duck Ct
Merganser Ct
Pintail Way
Firestone, CO 2012
Shane Davis
210 ft
© 2012 Google
Imagery Date: 5/4/2011
1999
40°08'19.51" N 104°56'43.15" W elev 4901 ft

Aggregate Toxic Emissions

~6CFM methane & hydrocarbon vapor release per actuator per separator
-EnCana

Minor source vs. major source VOC release

Aggregate well-bores per pad would indicate a major hydrocarbon vapor release source.



Aggregate Toxic Emissions: CAA

Regardless of the number of active onsite wells, Oil and Gas well pads are classified as a 'minor non-point source' of pollution thus 'exempt' from the Clean Air Act.

This exemption needs to be overturned immediately. The State of Colorado needs to immediately recognize that aggregated well pads must be listed as 'major point sources of pollution.'

CAA -42 USC SS 7401 et seq


Standard
video


Infrared
video

CSPH Preliminary Emission Results

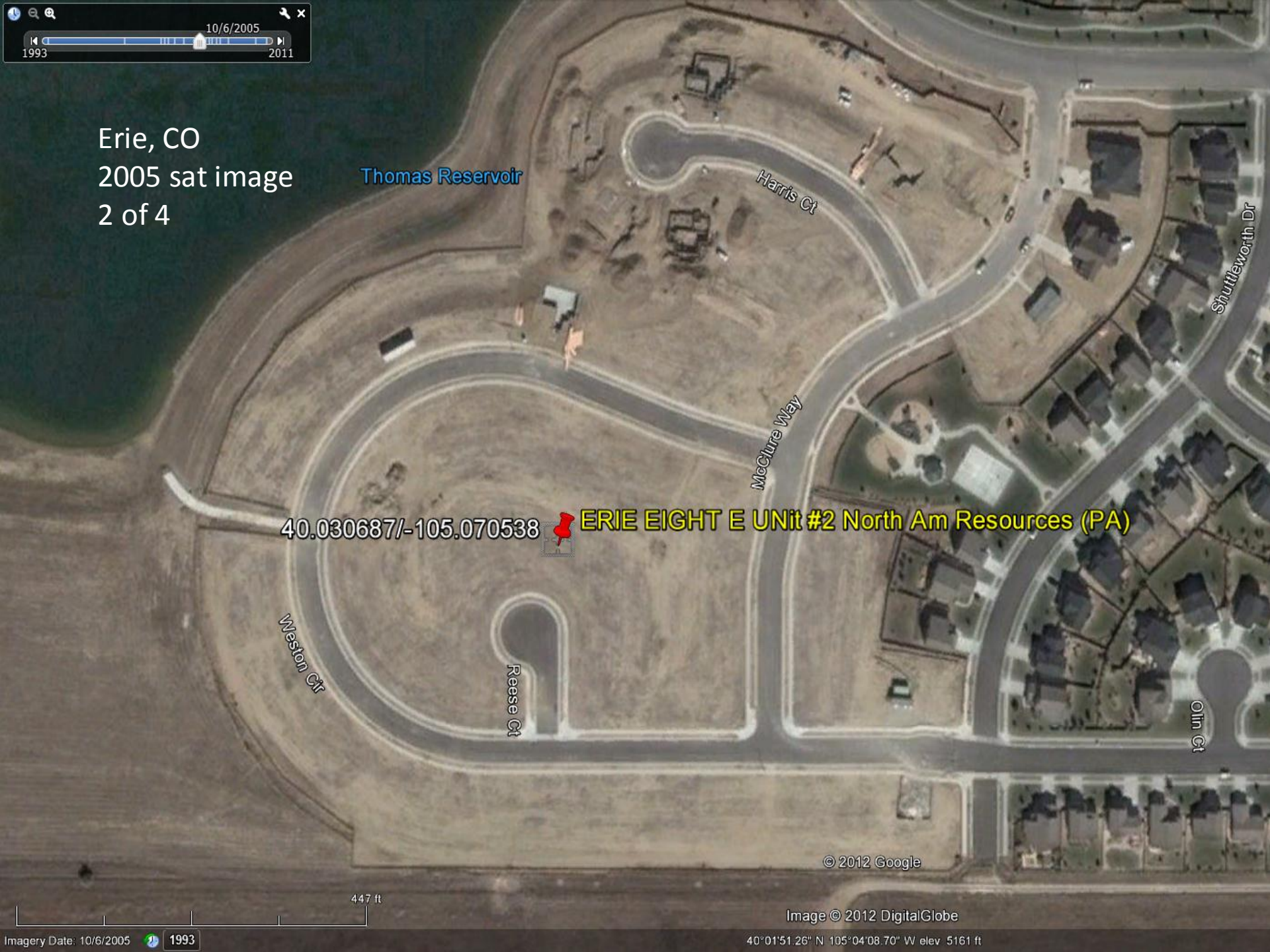
"Results indicate that health effects resulting from air emissions during development of unconventional natural gas resources are most likely to occur in residents living nearest to the well pads and warrant further study."

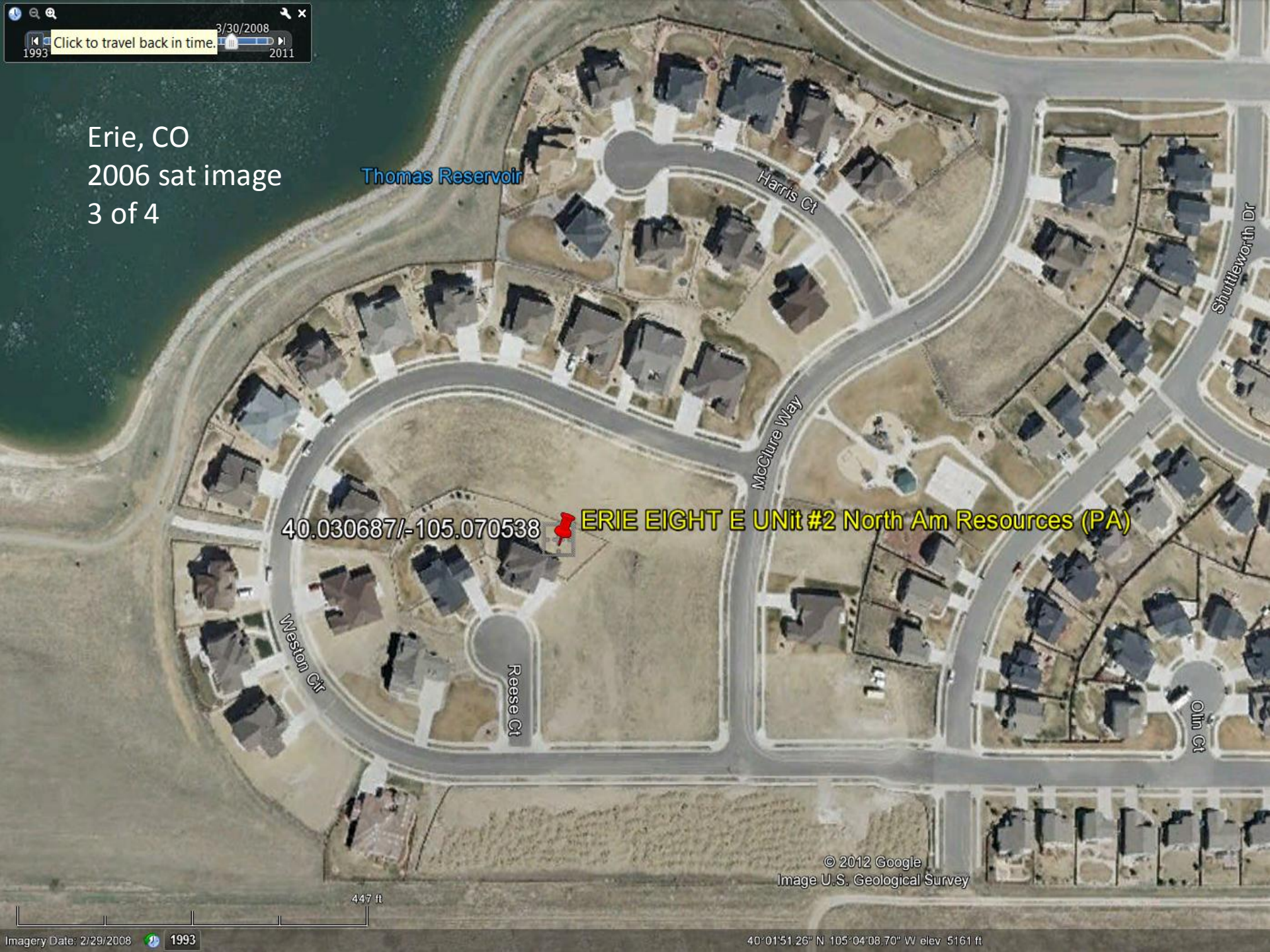
66% increase in cancer from living within ½ mile of an active oil and gas well from dozens of airborne toxins

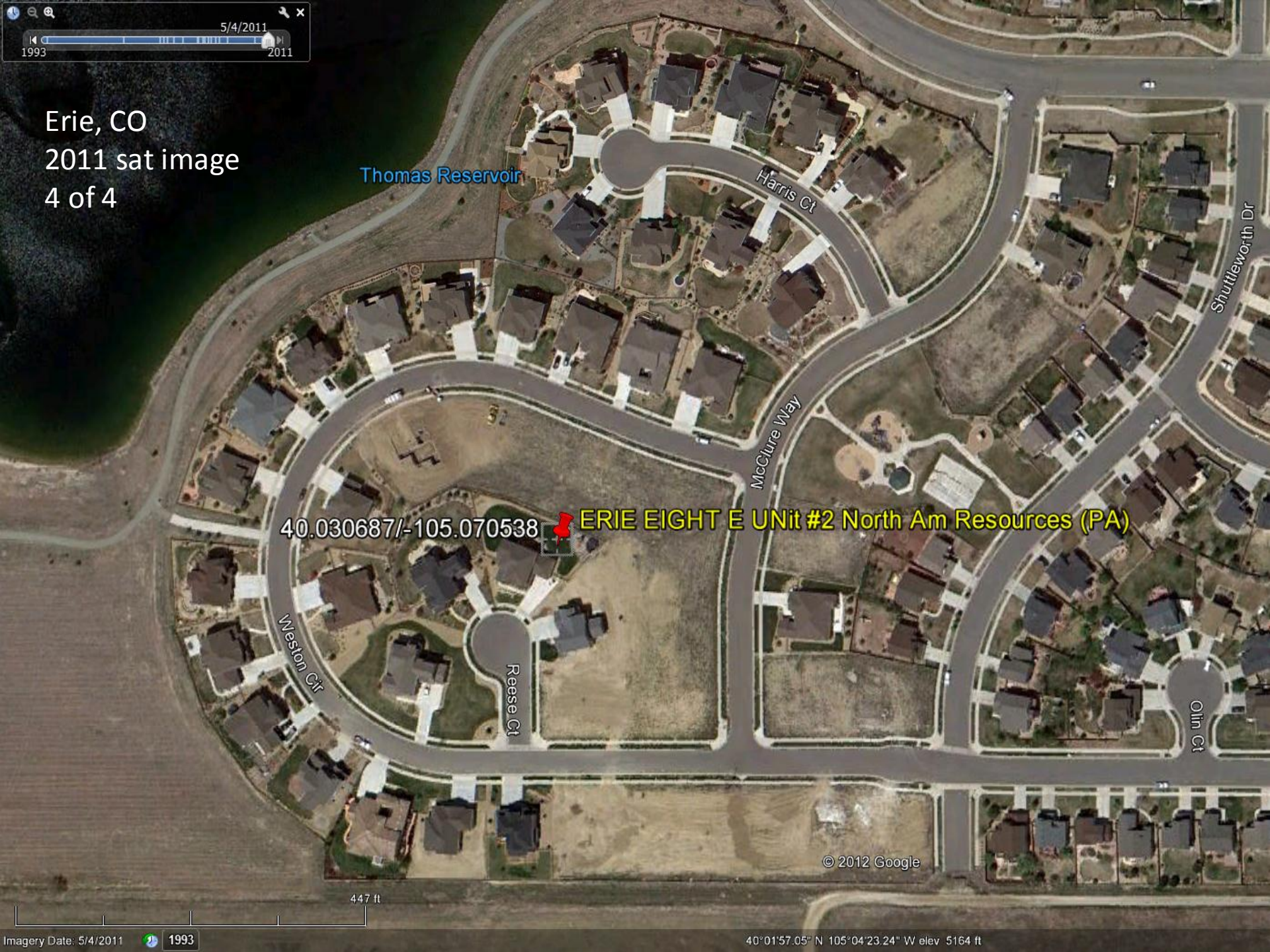
Colorado School of Public Health


180’ from residential area

Erie, CO
1999 sat image
Image 1 0f 4


10/6/2005
1993
2011
Erie, CO
2005 sat image
2 of 4
Thomas Reservoir
Harris Ct
Shuttleworth Dr
McClure Way
40.030687/-105.070538
ERIE EIGHT E UNit #2 North Am Resources (PA)
Weston Cir
Reese Ct
Olin Ct
© 2012 Google
447 ft
Image © 2012 DigitalGlobe
Imagery Date: 10/6/2005
1993
40°01'51.26" N 105°04'08.70" W elev 5161 ft


Click to travel back in time.
3/30/2008
1993
2011
Erie, CO
2006 sat image
3 of 4
Thomas Reservoir
Harris Ct
Shuttleworth Dr
McClure Way
40.030687/-105.070538
ERIE EIGHT E UNit #2 North Am Resources (PA)
Weston Cir
Reese Ct
Olin Ct
© 2012 Google
Image U.S. Geological Survey
447 ft
Imagery Date: 2/29/2008
1993
40°01'51.26" N 105°04'08.70" W elev 5161 ft


5/4/2011
1993
2011
Erie, CO
2011 sat image
4 of 4
Thomas Reservoir
Harris Ct
Shuttleworth Dr
McClure Way
40.030687/-105.070538
ERIE EIGHT E UNit #2 North Am Resources (PA)
Weston Cir
Reese Ct
Olin Ct
© 2012 Google
447 ft
Imagery Date: 5/4/2011
1993
40°01'57.05" N 105°04'23.24" W elev 5164 ft

Jan 13, 2011 -COGCC requested emergency funding for explosive levels of methane seeping into occupied residential homes from plugged and abandoned oil and gas wells .

ORDER NO. 1E-10

Produced Water – Industrial Waste Spill

2005

FOLLOW UP TO NOAV INSPECTION--BERM SEPARATIONS IN PIT HAVE BEEN REMOVED CREATING A SINGLE PRODUCED WATER PIT----

PRODUCER MAINTAINS THAT NO SKIM PIT EVER EXISTED---COGCC HAS NO RECORD PERMITTING TWO PITS / ALL OIL CONTAMINATION AS REPRESENTED IN THE NOAV HAS BEEN REMOVED FROM PRODUCED WATER PIT / JUNK AT WELLSITE HAS BEEN REMOVED


7/7/2004
1993
2011
State Land
API 05-005-06522
Arapahoe County, CO
Shane Davis 2012
159 ft
Image © 2012 DigitalGlobe
© 2012 Google
Imagery Date: 7/7/2004
1993
39°39'18.08" N 103°49'50.48" W elev 4998 ft

Are historic cement well-bores safe for re-entry?

Weld County

The Case of Mr. Anderson's water well and the Laramie-Fox Hills Aquifer

Weld County – August 1st 2009 Mr. Anderson Filed a complaint with the State alleging an impact to his water well was possibly caused from mining.

State tested Mr. Anderson's water well and found it had been impacted from the mining operation with thermogenic methane and toluene.

On November 17, 2009, COGCC Staff issued NOAV #200222149 to Eddy Oil for impacting the Anderson WW with gas from the Codell Formation from a production casing leak at the Well.

State determines that the oil and gas operator caused contamination of the Laramie-Fox Hills Aquifer and Mr. Anderson's water well from the hole thus contaminating groundwater.

State issued fines of $66,000 – later reduced to $46,200

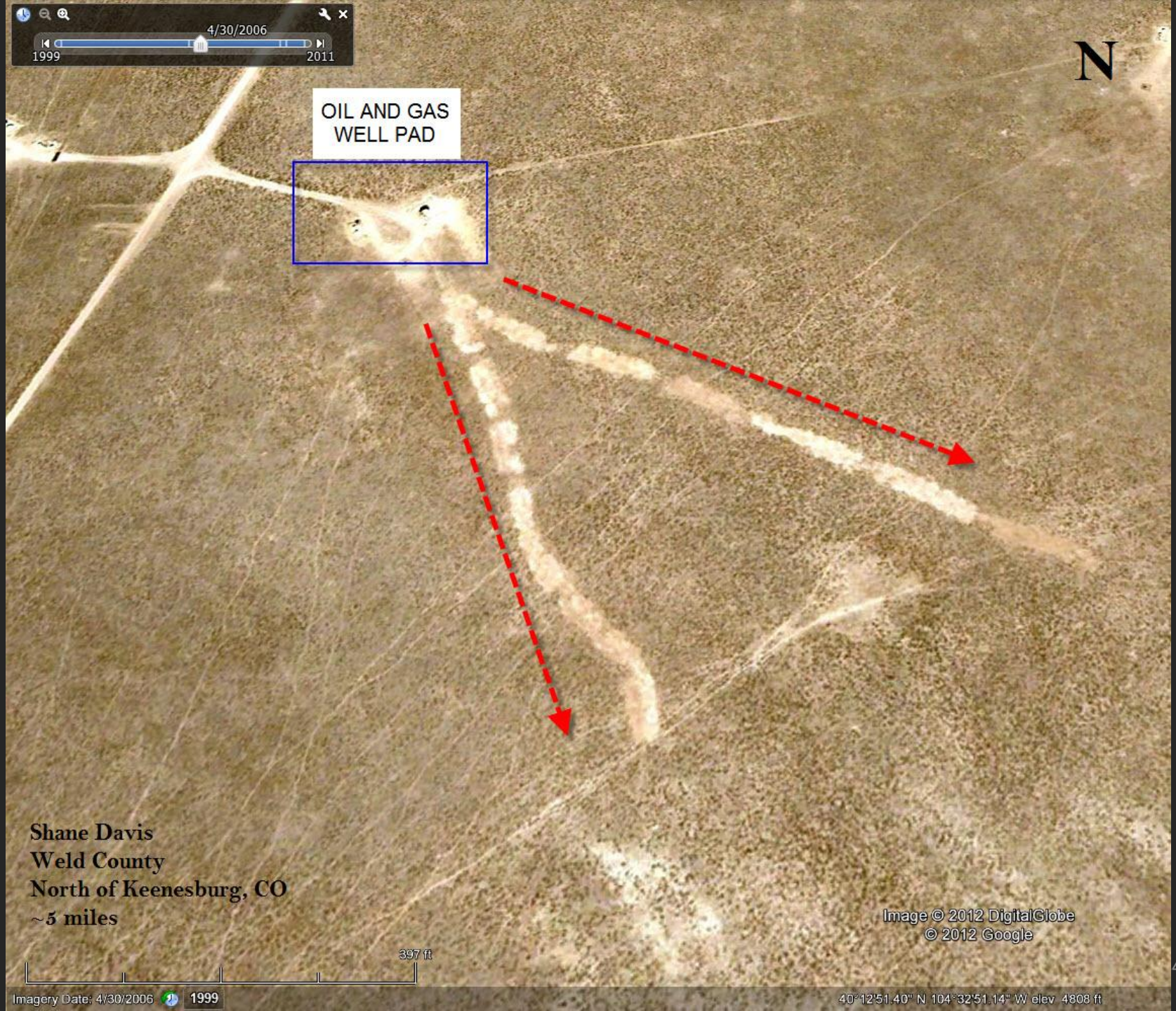
Oil and Gas well was then plugged and abandoned by the oil and gas operator.


3/11/2010
1999
2011
Co Rd 45
API 05-123-11818 LFox Hills AQUIFER & Water Well Contamination
40.28881/-104.63763
Shane Davis
Weld County, CO 2012
318 ft
© 2012 Google
Image © 2012 DigitalGlobe
Imagery Date: 3/11/2010
1999
40°17'32.32" N 104°38'29.95" W elev 4728 ft

Where does all of the potentially 'toxic produced' water go?

- Class II Injection Wells
  - Large open formations underground that the oil and gas industry pumps produced water/industrial fracking waste water down into where it is to remain forever.
  - A waste injection site has been found that holds up to 1.26 trillion gallons of industrial fracking waste water.

- Pumping into streams and rivers, lakes and open bodies of water.
- Agriculture – crops, livestock
- Spraying on dirt roads or out in the field?


4/30/2006
1999
2011
OIL AND GAS
WELL PAD
N
Shane Davis
Weld County
North of Keenesburg, CO
~5 miles
Image © 2012 DigitalGlobe
© 2012 Google
397 ft
Imagery Date: 4/30/2006
1999
40°12'51.40" N 104°32'51.14" W elev 4808 ft

COGCC HAS 17 INSPECTORS FOR COLORADO

~47,000 ACTIVE OIL & GAS WELLS

~82,000 INACTIVE WELLS

129,073 wells in Colorado – all statuses

EQUALS 2,764 WELL INSPECTIONS PER YEAR, PER INSPECTOR

82,000 ABANDONED WELLS MUST BE VISITED ONCE PER YEAR ALSO…

EQUALS 4,823 ABANDONED WELL INSPECTIONS PER YEAR, PER INSPECTOR

TOTAL ANNUAL INSPECTIONS PER INSPECTOR = 7,587

THIS IS A FAILURE!

Failures

Setbacks: City, County State and industry zoning failure
Historic equipment: Aged equipment is clearly not adequate to abide by COGCC mission statement to prevent adverse impacts.

Exporting minerals to China
Failed economic business model
Water Contamination(s)
Soil Contamination
Air Contamination
Habitat Fragmentation
Berm Failures
Lack of Adequate # of Inspectors

NATURAL GAS:

BRIDGE FUEL TO

NOWHERE

"Fossil fuels have no part in America's energy future – coal, oil, and natural gas are literally poisoning us. The emergence of natural gas as a significant part of our energy mix is particularly frightening because it dangerously postpones investment in clean energy at a time when we should be doubling down on wind, solar and energy efficiency."

-Robin Mann, Sierra Club President

For more information regarding natural gas drilling, please visit:

sierraclub.org/naturalgas

SIERRA CLUB
FOUNDED 1892

BEYOND NATURAL GAS

SCAN this code for more information.

General Citations

- All data sourced by COGCC unless otherwise noted.
- All images and research by Shane Davis unless otherwise noted
- All GIS maps courtesy of COGCC (except predictive map S. Davis)
- Dirty Secrets - txsharon blog
- Mr. Anderson's well map WTFrack.org
- Air quality testing - NOAA
- Do not distribute without permission(s)

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