Implications of a 3,200' Setback in California

Overview

FracTracker Alliance has completed a geospatial analysis assessing the projected impact of a 3,200' public health setback from oil and gas extraction operations, as defined by the CalGEM draft rule. The most significant results of this analysis are outlined in the overview, followed by a more thorough discussion with maps, tables, and methods.

Well Counts

- Of the 103,890 wells listed as unplugged/operational (active/idle/new) in the CalGEM "AllWells" dataset, 28,367 (27.3%) are located within 3,200 feet of a sensitive receptor. The status of the wells include:
  - 15,092 active oil and gas wells
  - 12,491 idle oil and gas wells
  - 784 new oil and gas wells

Permit Counts

- For the time period of January 1, 2021 – December 4, 2021:
  - Of the 2,540 new drilling permits issued by CalGEM, 682 (26.9%) were located within the 3,200' setback zone.
  - Of the 3,082 rework permits issued by CalGEM, 1,567 (50.8%) were located within the 3,200' setback zone. This figure includes permits for deepening and sidetrack operations

Production

- According to CalGEM monthly production data reported for 2019 and 2020, wells from within the 3,200' setback zone produced:
  - In 2019, 37,468,471 bbls of oil/condensate; 23.97% of the total 156,402,018 bbls
  - In 2020, 34,370,690 bbls of oil/condensate; 24.27% of the total 141,638,219 bbls.

Demographics

- According to U.S. Census Bureau 5 year (2014-2019) American Community Survey Census Block level data:
  - There are 2,763,383 Californians living within 3,200' of an operational oil and gas well.
  - Non-white (including His panic or Latino) Californians account for 69.0% of total.
  - Children under 5 years of age account for 5.9% of total
  - Children under 18 years of age account for 21.4% of total

Kyle Ferrar • Ferrar@FracTracker.org • (O) 415-890-3722 • www.FracTracker.org

Introduction

California is the only major oil production state without a public health setback to protect communities and individuals from exposure to harmful emissions and other forms of environmental degradation originating from extraction operations. The proposed 3,200' setback regulation is a vital public health intervention that begins to address the environmental health disparities experienced by frontline communities. Separating communities from the industrial oil and gas extraction operations will necessarily reduce frontline community exposures to the localized air pollution, including toxic and carcinogenic volatile organic compounds (VOCs) such as BTEX chemicals and other polycyclic aromatic hydrocarbons (PAHs).

While the set of rules proposed by Governor Newsom and the California department of Geological Energy Management (CalGEM) do not address existing extraction sites, it is important to understand how much oil production is currently derived from the areas within the setback zone, as well as the population counts and demographical profiles of the communities living within this setback zone. Insight into the reduction of future production is inferred by determining the proportions of new drilling permits issued within the setback zone. Using the locations of both existing extraction sites and new drilling permits, this assessment also reviews the implications of loopholes included in the proposed rule, in § 1765. Setback Exclusion Area. Section B.

Well Counts, Permits and Production

A breakdown by county of operational well counts, permits and production numbers are listed below in Table 1. This provides a basic overview of the regions with the most wells, closest to communities and population density. Statewide well counts, production figures, and permit count totals are listed above in the overview section.

Counties with the highest counts of operational wells within the 3,200' setback were also consistently the same counties with the largest volumes of production of oil/condensates from within the setback zone. These include Kern, Los Angeles, Ventura, Orange, and Santa Barbara counties, in that order. The top five overall producing counties are Kern, Los Angeles, Monterey, Ventura, and Fresno, in that order. This shows that Orange and Santa Barbara counties have unequal amounts of production from within the 3,200' setback zone.

Kern is also the county with the most new drilling and rework permits issued within the setback zone. While Kern was issued nearly as many new drilling permits as rework permits in total, rework permits in the setback zone outnumbered new drilling permits by 31%. Los Angeles, Ventura, Orange, and Santa Barbara counties similarly issued a larger majority of rework permits in the setback zone. This speaks to operators keeping aging wells in communities operating at minimum capacities to avoid the closure costs of plugging and remediation.

Table 1. County summaries of well and permit counts and production volumes for areas of each county located within 3,200' of an operational oil and gas well in California.

County	Operational Well Count		2019 Oil/Condensate (Bbls)		2020 Oil/Condensate (Bbls)		New Drilling Permits (2020-2021)		Rework Permits (2020-2021)	
Kern	(17.0%)	13,124	(14.4%)	15,971,862	(15.5%)	15,393,965	(25.2%)	589	(40.4%)	851
Los Angeles	(93.7%)	6,615	(90.9%)	10,655,679	(88.9%)	9,282,322	(97.4%)	38	(92.4%)	159
Ventura	(49.4%)	1,999	(44.2%)	2,809,868	(41.6%)	2,523,420		0	(73.0%)	89
Orange	(93.2%)	1,712	(98.5%)	2,517,858	(99.1%)	2,308,839	(100%)	5	(93.2%)	41
Santa Barbara	(93.5%)	1,442	(59.2%)	1,729,593	(51.6%)	1,329,020		0	(92.6%)	213
Los Angeles (OS)	(36.3%)	509	(37.9%)	2,226,649	(36.7%)	2,211,905	(100%)	4	(26.4%)	24
Monterey	(26.6%)	405	(10.9%)	911,167	(9.4%)	695,969	(57.1%)	16	(64.4%)	38
Fresno	(7.1%)	345	(2.2%)	133,040	(2.2%)	123,596	(8.5%)	9	(25.0%)	18
San Luis Obispo	(59.0%)	297	(70.0%)	361,449	(73.4%)	371,057	(100%)	14	(76.5%)	13
Sutter	(66.4%)	271		0		0		0	(83.9%)	26
Glenn	(80.6%)	245		0		0	(66.7%)	4	(100%)	2
San Joaquin	(93.8%)	227		0		0		0		0
Colusa	(59.9%)	212		0		0	(100%)	3	(86.4%)	19
Sacramento	(74.8%)	154	(91.0%)	7,961		7,345		0	(63.6%)	7
Solano	(59.7%)	129	(49.5%)	866	(56.3%)	801		0	(45.5%)	5
Tehama	(71.7%)	109		0		0		0		0
Tulare	(98.0%)	98	(100%)	35,380	(100%)	29,179		0		0
San Bernardino	(89.3%)	67	(100%)	8,791	(100%)	7,067		0		0
Kings	(13.4%)	53	(25.9%)	31,343	(24.1%)	28,952		0		0
Ventura (OS)	(82.8%)	48	(96.0%)	1,013	(79.7%)	451		0		0
Contra Costa	(90.0%)	45	(100%)	58,078	(100%)	52,445		0	(42.9%)	3
Humboldt	(65.5%)	36		0		0		0		0
San Mateo	(100%)	36	(99.5%)	46	(99.3%)	43		0		0
Madera	(76.9%)	30		0		0		0	(100%)	4
San Diego	(93.5%)	29		0		0		0		0
Butte	(96.3%)	26		0		0		0	(100%)	8
Yolo	(35.7%)	25		0		0		0	(100%)	1
Riverside	(82.1%)	23		0		0		0		0
Alameda	(100%)	10	(100%)	7,038	(100%)	3,388		0		0
San Benito	(18.9%)	10	(5.4%)	788	(8.9%)	927		0		0
Santa Clara	(35.7%)	10		0		0		0		0
Imperial	(53.8%)	7		0		0		0		0
Santa Barbara (OS)	(8.8%)	5		0		0		0		0
Napa	(66.7%)	4		0		0		0		0
Stanislaus	(57.1%)	4		0		0		0		0
Merced	(100%)	3		0		0		0		0
Lake	(100%)	1		0		0		0		0
Lassen	(100%)	1		0		0		0		0
Siskiyou	(100%)	1		0		0		0		0

Demographics

U.S. Census Bureau 5-year (2014-2019) American Community Survey data was summarized at the census block group level to estimate the total population living within 3,200' of a well located in the setback zone. Statewide totals can be found at the top of this report in the overview.

Table 2. California population counts and demographics for areas within 3,200' of an operational oil and gas well located within the 3,200' setback zone.

County	Total Population Count	Non-white population incl. Hispanic or Latino		Population under 5 years of age		Population under 18 years of age	
		Pop. Count	(%)	Pop. Count	(%)	Pop. Count	(%)
Los Angeles	1,893,442	1,446,649	76.4%	111,522	5.9%	397,272	21.0%
Orange	425,753	197,904	46.5%	22,963	5.4%	85,761	20.1%
Kern	123,922	71,709	57.9%	9,479	7.6%	35,922	29.0%
San Diego	114,470	66,759	58.3%	6,344	5.5%	23,274	20.3%
Ventura	60,896	32,942	54.1%	3,618	5.9%	13,240	21.7%
Riverside	38,563	25,593	66.4%	2,932	7.6%	9,686	25.1%
San Bernardino	31,419	22,446	71.4%	1,977	6.3%	7,734	24.6%
Santa Barbara	31,323	18,725	59.8%	2,357	7.5%	7,370	23.5%
San Joaquin	9,738	7,532	77.3%	534	5.5%	2,458	25.2%
Contra Costa	8,829	5,180	58.7%	625	7.1%	2,369	26.8%
Fresno	5,248	2,970	56.6%	384	7.3%	1,348	25.7%
Solano	4,035	1,314	32.6%	112	2.8%	660	16.3%
Stanislaus	2,082	977	46.9%	246	11.8%	732	35.2%
Colusa	2,035	1,475	72.5%	162	8.0%	590	29.0%
Alameda	1,591	614	38.6%	50	3.2%	354	22.2%
Glenn	1,222	330	27.0%	71	5.9%	294	24.0%
Tulare	1,154	805	69.7%	67	5.8%	307	26.6%
Yolo	1,049	479	45.6%	76	7.3%	292	27.8%
Sutter	954	280	29.3%	47	4.9%	240	25.2%
Kings	924	880	95.2%	94	10.2%	361	39.0%
Tehama	885	316	35.7%	23	2.6%	177	20.0%
San Benito	753	644	85.5%	64	8.4%	173	23.0%
Sacramento	608	235	38.6%	17	2.9%	92	15.2%
Lake	463	216	46.7%	50	10.8%	185	39.9%
Santa Clara	462	66	14.3%	16	3.4%	107	23.2%
San Mateo	420	246	58.6%	19	4.6%	103	24.5%
San Luis Obispo	329	42	12.8%	12	3.6%	64	19.4%
Humboldt	279	22	8.0%	7	2.6%	43	15.5%
Merced	209	123	59.0%	14	6.9%	60	28.6%
Madera	125	67	53.6%	8	6.4%	30	24.1%
Napa	54	9	15.9%	2	4.3%	10	18.4%
Imperial	46	37	80.4%	4	8.7%	8	18.3%
Monterey	41	16	39.3%	3	7.2%	10	25.6%
Butte	34	10	30.5%	2	4.6%	5	13.9%
Santa Cruz	15	3	21.0%	0	1.6%	2	15.9%
Siskiyou	9	2	19.0%	0	3.6%	1	14.6%
Lassen	2	0	17.0%	0	7.4%	0	15.2%

FracTracker Alliance's previous People and Production report more accurately describes the economic and ethnographic disparities associated with living near oil and gas drilling, and geographically characterizes the frontline communities without the limitations of defined setback distances. The results of that report do not suffer from edge effects or the pitfalls of assuming uniform population distributions. Regardless of these known limitations, this report uses U.S. Census Bureau 5-year (2014-2019) American Community Survey census block group data to summarize population counts and ethnicities of the populations living within the 3,200' setback.

Loopholes

Of particular concern is a potential caveat in section (a) of the draft rule under subheading **§ 1765. Setback Exclusion Area**, which states "(a) After [EFFECTIVE DATE], CalGEM will not approve any Notice of Intention to drill *a new well with a new surface location* within the setback exclusion area, except a well, such as an intercept well or a pressure relief well, that must be drilled to alleviate an immediate threat to public health and safety or the environment." The draft rule then defines a new well as "a new boring that involves installation of surface casing where none existed previously." This language allows for well re-drills, such as permits to "deepen" and "sidetrack" well bores from below the surface casing. This would allow for major expansions of existing wells including increases of production volumes and uncontrolled emissions from within the setback zone, under the guise of "rework" permits. These activities do not require new API identifiers or new surface casings, but would allow for directional or horizontal drilling, potentially with high counts of laterals similar to what is being practiced in the Marcellus and other shale plays. This leaves the door open for major industrial activity and drilling expansion from within the setback zone. Preventing this type of activity may involve expanding the rule to prevent certain types of permits for existing sites.

Methods

This analysis conducted by FracTracker Alliance used CalGEM datasets of oil and gas well locations to determine the potential impact of the proposed public health rule, and specifically focused on the adoption of a 3,200' setback, as defined in the draft rule. Wells located within the setback zone were identified using geospatial analysis tools available in ESRI ArcGIS Pro Ver. 2.7.0, with data projected in NAD83 California Teale Albers. Wells were identified by their proximity to sensitive receptors, as defined in the draft rule. CalGEM permits issued within the setback zone were identified in the same way. Crude oil and condensate production volumes were summed for wells within the setback zone. Population counts and demographics for the areas within 3,200' of wells within the setback zones were also summarized.

The identification of wells located within the setback zone was completed by first creating 3,200' buffers around operational oil and gas wells, and identifying sensitive receptors within these buffer zones. This assessment used CalGEM's AllWells dataset (updated 11/05/21) to map the locations of operational oil and gas wells and permits. The AllWells dataset was limited to 103,979 entries with unique API identifiers. The dataset was filtered by 'Well Status' to include only active, idle (including abeyance), and new wells.

The datasets of sensitive receptors included in the analysis were downloaded from various California state agencies, or amended from larger national GIS datasets. Locations of healthcare facilities were downloaded from the California Department of Health and Human Services, including the locations of residential elderly care facilities, nursing homes, and licensed childcare services (downloaded 9/5/21). Property lines for California schools were downloaded from the California school campus database (downloaded 9/5/21). The dataset of prison property boundaries for California detention centers was downloaded from California Office of Emergency Services (downloaded 9/5/21). Point locations for playgrounds in cities and outlines of publicly accessible state parks were downloaded from the California Department of Parks and Recreation (downloaded 9/5/21).

The outlines of occupied dwellings and commercial businesses open to the public were generated by screening Microsoft's OpenStreetMap building footprint dataset. Building footprints located within the 3,200 buffer of operational wells were manually screened for identifiers of habitation. Shapefiles of county and city level zoning boundaries were overlaid on the working maps to assist with the tedious process. Building footprints in industrial zoned parcels were screened for commercial businesses using Google business profiles. In cases where the nature of a building was inconclusive, the building footprint was conserved. **This analysis therefore provides an upper bound estimate for the projected impact of the proposed setback rule.**

The analyses of oil production data utilized CalGEM's annual production and injection summary reports for 2019 and 2020, reporting barrels of oil/condensate. Reported production volumes were summed for the wells identified as located within the 3,200' setback zone.

A dataset of permits issued by CalGEM from January 1, 2020 – December 4, 2021 was compiled from the agency's weekly summary reports of well permits issued. The dataset was filtered to remove well plugging permits. Counts of sidetrack and well deepening permits were combined with counts of well rework permits to simplify the analysis. Permit counts for areas within the 3,200' setback zone were summed using GIS.

Block group level U.S. Census data from the 5-year American Community Survey (2014-2019) was used to estimate counts of Californians living within 3,200' of operational oil and gas wells. The category "Non-white including Hispanic or Latino" was calculated by subtracting [B03002_003 – Not Hispanic or Latino: White Alone] from [B03002_001 – Total Population].

Census block groups were clipped using the buffered datasets of operational oil and gas wells identified as located within the 3,200' setback zone. Census demographics and total population counts were adjusted by the proportion of the block group located within 3,200' of the operational well (Areal adjustment percentage = Area of block group within 3.200' of an operational well / Total area of block group). A uniform population distribution within the census blocks was assumed in order to determine the population counts of the area of each block group within 3,200' of an operational well.