

The Scientific Evidence Does NOT Support a 3,200-Foot Setback

The debate around the distance of oil wells from sensitive areas like schools and homes is intense, with Senate Bill 1137 proposing a 3,200-foot setback for new and existing oil wells in California. A closer look at the scientific evidence used by the “Scientific Advisory Panel” (SAP) to justify these setbacks reveals significant gaps and biases that challenge the establishment of such a distance.



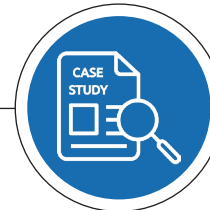
The SAP Uses Studies That Do Not Relate To California

Many of the studies used by the SAP evaluate fracking, a process that it is currently not allowed in California. Of the 69 studies cited by the SAP to justify the 3,200-foot setbacks, 45 are from other states, and 19 don't even focus on oil and gas production at all.



The SAP Used the Highly Controversial Bradford-Hill Methodology to Draw Conclusions

The Bradford-Hill methodology is used to assess the causality of an observed association between a factor and an outcome. While the criteria are valuable for assessing causality, they are not a formal statistical test and can be subject to interpretation bias. Additionally, meeting all the criteria does not guarantee causality, as some may be met by chance or confounding factors.



The SAP Ignored Studies That Contradicted Their Conclusion

There are several studies that measure actual operations in California and do not support the establishment of a 3,200-foot setback. These studies were ignored by the SAP. The studies affirmed that oil and gas operations can be done safely under California's strict environmental regulations.

Studies from Outside California

Study Name	Summary	Could Potentially Support a 3,200 Foot Setback	Relates to California's Environmental Regulations	Production Technique Currently Used in CA	Establishes Causation between oil production & measured health impacts	Evaluates actual air emissions
Allshouse et al. 2019 - "Community Noise and Air Pollution Exposure During the Development of Multi-Well Oil and Gas Pad"	Focuses on truck traffic during fracking rather than direct emissions from wells. Additionally, it lacks a health risk assessment and doesn't compare data to a control site.	✗	✗	✗	✗	✓
Apergis et al. 2019 - "Fracking and Infant Mortality: Fresh Evidence from Oklahoma"	This study doesn't actually evaluate impacts on infant mortality, but rather looks for a correlation between well location and infant weight. Limitations as noted by the authors of the study include lack of control over factors such as maternal health habits and social conditions confounding the results.	✗	✗	✓	✗	✗
Burgos et al. 2017 - "Watershed-Scale Impacts from Surface Water Disposal of Oil and Gas Wastewater in Western Pennsylvania"	This study evaluates watershed-scale impacts from wastewater disposal in Pennsylvania but might lack broader relevance to other regions or specific aspects of oil and gas development.	✗	✗	✓	✗	✗
Busby et al. 2017 - "There's a World Going on Underground: Infant Mortality and Fracking in Pennsylvania"	The study relies on data that primarily implicates the combustion of crude petroleum and natural gas, and environmental violations related to produced water disposal rather than drilling or exploration activities.	✗	✗	✗	✗	✗
Caron-Beaudoin et al. 2021 - "Density and proximity to hydraulic fracturing wells and birth outcomes in Northeastern British Columbia, Canada"	This study's results regarding birth outcomes and proximity to fracking wells are inconsistent, which may raise questions about the reliability of the findings. This study also does not focus on California.	✗	✗	✗	✗	✗
Casey et al. 2016 - "Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA"	This study primarily focuses on the density of wells rather than distance, which might not fully capture the potential effects of proximity to fracking activities. This study does not focus on California.	✗	✗	✗	✗	✗
Casey et al. 2019 - "Unconventional Natural Gas Development and Adverse Birth Outcomes in Pennsylvania: The Potential Mediating Role of Antenatal Anxiety and Depression"	The study does not find evidence of maternal mental health acting as a mediator in the association between fracking and adverse birth outcome. This study does not focus on California.	✗	✗	✗	✗	✗
Currie et al. 2017 - "Hydraulic Fracturing and Infant Health: New Evidence from Pennsylvania"	The study is limited to a small sample size of potentially exposed children and focuses on potential rather than actual exposure. This study does not focus on California.	✗	✗	✗	✗	✗

Studies from Outside California

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Cushing et al. 2020 - "Flaring from Unconventional Oil and Gas Development and Birth Outcomes in the Eagle Ford Shale in South Texas"	The study's focus on a specific demographic group (Hispanic women) and rural areas might limit the generalizability of the findings. This study does not focus on California.	✗	✗	✗	✗	✗
Deziel et al. 2020 - "Unconventional oil and gas development and health outcomes: A scoping review of the epidemiological research"	This is a literature review of other studies regarding hydraulic fracturing. The study lacks granularity in its presentation of results, making it challenging for reviewers to draw their own conclusions.	✗	✗	✗	✗	✗
Helmig 2020 - "Air quality impacts from oil and natural gas development in Colorado"	While the study discusses air quality impacts from oil and natural gas development, it was funded in part by an organization with a mission to protect communities and the environment from the adverse impacts of mineral and energy development, which may introduce bias.	✗	✗	✗	✗	✓
Hill 2018 - "Shale Gas Development and Infant Health: Evidence from Pennsylvania"	The study explores the adverse effects of shale gas development on infant health in Pennsylvania, specifically looking at proximity to fracking sites during pregnancy. The findings are not focused on California.	✗	✗	✗	✗	✗
Hill et al. 2019 - "Temporal and Spatial Trends of Conventional and Unconventional Oil and Gas Waste Management in Pennsylvania, 1991-2017"	This study acknowledges the need for additional data to evaluate risks and impacts to human health and environmental quality, which may limit its applicability to specific health outcomes. This study does not focus on California.	✗	✗	✓	✗	✗
Holder et al. 2019 - "Evaluating Potential Human Health Risks from Modeled Inhalation Exposures to Volatile Organic Compounds Emitted from Oil and Gas Operations"	This study evaluates oil and gas operations in Colorado's Northern Front Range and Garfield County and found that observed effects were below thresholds at 500 ft from the well, and does not focus on California.	✗	✗	✗	✗	✗
Jackson et al., 2014 - "The Environmental Costs and Benefits of Fracking"	Emphasizes the lack of comprehensive research on the potential effects of unconventional energy extraction on human health.	✗	✗	✗	✗	✗
Janitz et al., 2019 - "The Association Between Natural Gas Well Activity and Specific Congenital Anomalies in Oklahoma, 1997-2009"	This study evaluated the number of infants born with congenital anomalies based on mother's zip code at time of birth within 2, 5, and 10 miles of a well in Oklahoma and does not account for mothers' location during pregnancy, or account for any other potential sources of exposure or other correlations. The study does not focus on California.	✗	✗	✗	✗	✗

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Koehler et al. 2018 - "Exposure Assessment using Secondary Data Sources in Unconventional Natural Gas Development and Health Studies"	The study emphasizes the need for further research on health outcomes associated with oil and gas development.	✗	✗	✗	✗	✓
Lauer et al. 2018 - "Sources of Radium Accumulation in Stream Sediments near Disposal Sites in Pennsylvania: Implications for Disposal of Conventional Oil and Gas Wastewater"	The study discusses water quality effects of produced water in Pennsylvania which does not have the same regulatory standards and oversight as California.	✗	✗	✗	✗	✗
Li et al., 2020 - "Unconventional oil and gas development and ambient particle radioactivity"	This is a general study modeling potential transport of radioactive particles from hydraulic fracturing and is not based on any actual measured data. The study acknowledges limitations in simplifying the particle transport process.	✗	✗	✗	✗	✗
Ma, 2016 - "Time Series Evaluation of Birth Defects in Areas with and without Unconventional Natural Gas Development"	The study examines the relationship between unconventional natural gas development (UNGD) and birth defects in Pennsylvania and found that there was no association with the prevalence of birth defects or and UNGD. It does not focus on California.	✗	✗	✗	✗	✗
McKenzie et al. 2014 - "Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado"	This study investigates the relationship between birth defects and proximity to natural gas development in rural Colorado examining distances ranging from 10 miles to 125 miles to a well. This study does not focus on California.	✗	✗	✓	✗	✗
McKenzie et al. 2019 - "Congenital Heart Defects and Intensity of Oil and Gas Well Site Activities in Early Pregnancy"	The study explores the correlation between congenital heart defects (CHDs) and the intensity of oil and gas well site activities during early pregnancy in Colorado. The study only found an association in rural areas and not urban ones and suggested that the lack of association in urban areas could be due to other non oil and gas sources of pollution. This study does not focus on California.	✗	✗	✓	✗	✗
McKenzie et al. 2018 - "Ambient Nonmethane Hydrocarbon Levels Along Colorado's Northern Front Range: Acute and Chronic Health Risks"	This study assesses the potential health risks associated with exposure to nonmethane hydrocarbons from oil and gas activities in Colorado's Northern Front Range. This study does not focus on California.	✗	✗	✗	✗	✗

Studies from Outside California

Study Name	Summary	Could Potentially Support a 3,200 Foot Setback	Relates to California's Environmental Regulations	Production Technique Currently Used in CA	Establishes Causation between oil production & measured health impacts	Evaluates actual air emissions
Michanowicz et al. 2021 - "Methane and Health-Damaging Air Pollutants From the Oil and Gas Sector: Bridging 10 Years of Scientific Understanding"	The paper discusses the impact of oil and gas activities on air quality and health, emphasizing the co-occurrence of methane and health-damaging air pollutants. It underscores the importance of regulations and measures to mitigate air pollution from the oil and gas sector.	✗	✗	✓	✗	✗
Moore et al. 2014 - "Air Impacts of Increased Natural Gas Acquisition, Processing, and Use: A Critical Review"	This review evaluates the air impacts associated with increased natural gas acquisition, processing, and use.	✗	✗	✗	✗	✓
Peng et al., 2016 - "The Health Implications of Unconventional Natural Gas Development in Pennsylvania"	This report discusses the association between unconventional natural gas development (OGD) in Pennsylvania's Marcellus Shale region and various health factors. It does not focus on California.	✗	✗	✗	✗	✓
Rabinowitz et al., 2015 - "Proximity to Natural Gas Wells and Reported Health Status: Results of a Household Survey in Washington County, Pennsylvania"	The study explores the association between proximity to natural gas wells and self-reported health symptoms in Washington County, Pennsylvania. It does not focus on California.	✗	✗	✗	✗	✗
Rasmussen et al., 2016 - "Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations"	This study investigates the association between unconventional natural gas development in Pennsylvania's Marcellus Shale region and asthma exacerbations without specifying a specific distance. It does not focus on California.	✗	✗	✗	✗	✗
Shapiro et al., 2013 - "Psychosocial stress in pregnancy and preterm birth: Associations and mechanisms"	The study explores the association between various stressors, including pollutants and oil and gas development stressors, and adverse birth outcomes such as preterm birth. It suggests a complex relationship between stressors and birth outcomes that requires further investigation.	✗	✗	✗	✗	✗
Stacy et al., 2015 - "Perinatal Outcomes and Unconventional Natural Gas Operations in Southwest Pennsylvania"	This study investigates the association between unconventional natural gas operations in Southwest Pennsylvania with potential for pre-term births and low birth weight examining a radii of 10 miles. This study does not focus on California.	✗	✗	✓	✗	✗
Whitworth et al. (2017) - "Maternal residential proximity to unconventional gas development and perinatal outcomes among a diverse urban population in Texas"	This study notes that its findings suggest a correlation between maternal residential proximity to unconventional gas development and pre-term birth, but not low birthweight. The study does not focus on California.	✗	✗	✗	✗	✗

Studies from Outside California

Study Name	Summary	Could Potentially Support a 3,200 Foot Setback	Relates to California's Environmental Regulations	Production Technique Currently Used in CA	Establishes Causation between oil production & measured health impacts	Evaluates actual air emissions
Willis et al. (2018) - "Unconventional Natural Gas Development and Pediatric Asthma Hospitalizations in Pennsylvania"	The study evaluated associations between unconventional natural gas wells and asthma in rural populations. This study does not fully account for other environmental factors impacting asthma outcomes. This study also does not focus on California.	✗	✗	✗	✗	✗
Willis et al. (2020) - "Natural Gas Development, Flaring Practices and Pediatric Asthma Hospitalizations in Texas"	The study evaluated associations between unconventional natural gas wells, flaring activity and asthma in Texas. This study does not fully account for other environmental factors impacting asthma outcomes. This study also does not focus on California.	✗	✗	✓	✗	✗
Willis 2021 - "Associations between Residential Proximity to Oil and Gas Drilling and Term Birth Weight and Small-for-Gestational-Age Infants in Texas: A Difference-in-Differences Analysis"	This study from Texas examines perinatal outcomes and strongest body of evidence linking OGD exposure with adverse health effects. It found that there was no statistically significant increase in occurrence of small-for-gestational age infants.	✗	✗	✗	✗	✗

California-Based Studies

Study Name	Summary	Could Potentially Support a 3,200-Foot Setback	Relates to California's Environmental Regulations	Production Technique Currently Used in CA	Establishes Causation Between Oil Production & Measured Health Impacts	Evaluates Actual Air Emissions
Brandt et al. 2015 - "Air Quality Impacts from Well Stimulations"	The study found that statewide oil and gas operations contribute 4% to greenhouse gas emissions and less than 1% of all air pollution emissions in the South Coast Air Basin.	✗	✓	✗	✗	✓
DiGiulio et al. 2021 - "Vulnerability of Groundwater Resources Underlying Unlined Produced Water Ponds in the Tulare Basin of the San Joaquin Valley, California"	The study examines the potential groundwater contamination associated with unlined produced water ponds in California, based on limited monitoring data.	✗	✓	✓	✗	✗
Gonzalez et al. 2020* - "Oil and gas production and spontaneous preterm birth in the San Joaquin Valley, CA"	While study explored the association between oil and gas production and preterm birth in California, results indicate associations to rural location, lower attainment of educational levels rather than distance to oil wells.	✗	✗	✗	✗	✗

California-Based Studies

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Gonzalez et al. 2021 - "Upstream oil and gas production and ambient air pollution in California"	Although the study investigates the impact of upstream oil and gas production on ambient air pollution in California, it may have methodological limitations (i.e. does not account for wind direction or transportation corridors near monitoring devices).	✗	✗	✗	✗	✓
Johnston et al., 2021 - "Respiratory health, pulmonary function and local engagement in urban communities near oil development"	This analyzes self-reported symptoms indicated that people living within 200 meters of an active oil well. The study did not include reference sites for similar urban populations outside of South Los Angeles and did not include quantitative air quality data measures.	✗	✗	✓	✗	✗
Long et al., 2015 - "An Independent Scientific Assessment of Well Stimulation in California"	The study was conducted as part of the CCST analyses supporting the development of SB 4 to regulate hydraulic fracturing in California, and therefore reviews data from prior to the implementation of the current California regulations overseeing oil and gas development in the State.	✗	✓	✗	✗	✓
Onyije, F.M. (2021)* - "Cancer Incidence and Mortality among Petroleum Industry Workers and Residents Living in Oil Producing Communities: A Systematic Review and Meta-Analysis"	This study concludes that many of the associations appear to be due to factors other than those directly emerging from petroleum production. It further states that inclusion criteria of individual studies and their possibilities to adjust for confounders may have had a significant impact on the study results. The overall evidence remains weak, particularly for the residential studies.	✗	✗	✓	✗	✗
Shamasunder et al., 2018* - "Community-Based Health and Exposure Study around Urban Oil Developments in South Los Angeles"	The study evaluated associations between self-reported respiratory symptoms (e.g., wheezing) and asthma with the location of two wells. Limitations of the study include inability to distinguish from other exposures (e.g. freeway traffic). This study concluded that additional research is needed.	✗	✓	✓	✗	✗
Shonkoff et al., 2015 - "Potential Impacts of Well Stimulation on Human Health in California"	This study examines the potential human health impacts of well stimulation, including fracking, in California. It acknowledges data gaps and the challenge of characterizing health risks.	✗	✓	✗	✗	✗

California-Based Studies

Study Name	Summary	Could Potentially Support a 3,200-Foot Setback	Relates to California's Environmental Regulations	Production Technique Currently Used in CA	Establishes Causation Between Oil Production & Measured Health Impacts	Evaluates Actual Air Emissions
Stringfellow et al. (2017) - "Comparison of Chemical Use Between Hydraulic Fracking, Acidizing, and Routine Oil and Gas Development"	The study compares chemical usage in hydraulic fracking, acidizing, and routine oil and gas development (OGD). It highlights the overlap between chemicals used in conventional OGD and hydraulic fracking operations, emphasizing the importance of comprehensive disclosure requirements for protecting health.	✗	✗	✗	✗	✗
Tran et al. (2020)* - Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective Cohort Study of 2006-2015 Births"	The study found increased adverse birth outcomes was associated with proximity to oil and gas production in rural areas, but not the urban population and noted that maternal occupation, housing quality, indoor air quality, dependence on groundwater sources for drinking water, and underlying population sensitivity to oil and gas related pollutants were not measured in the study and may have affected the results. The study looked at dataset as far as 10 miles from the subject wells.	✗	✗	✓	✓	✗
Wong/Stand-LA (2017)* - "Existing Scientific Literature on Setback Distances from Oil and Gas Development Sites."	This literature review provides a very brief overview of 14 studies but did not include an analysis of the scientific robustness of the studies.	✗	✗	✓	✗	✗

*These studies were not used by the SAP when evaluating SB 1137 but have been cited by elected officials when discussing setbacks in California.

Not Related to Oil and Gas Production at All

Study Name	Summary	Could Potentially Support a 3,200 Foot Setback	Relates to California's Environmental Regulations	Production Technique Currently Used in CA	Establishes Causation between oil production & measured health impacts	Evaluates actual air emissions
Avol et al. 2021 - "Respiratory Effects of Relocating to Areas of Differing Air Pollution Levels"	Focuses on truck traffic during fracking rather than direct emissions from wells. Additionally, it lacks a health risk assessment and doesn't compare data to a control site.	✗	✓	✗	✗	✗
Baer et al. 2016 - "Population-based risks of mortality and pre-term morbidity by gestational age and birth weight"	This study doesn't focus on oil development. Instead, it is a general study of adverse perinatal outcomes in California.	✗	✗	✗	✗	✗
Barker 1995 - "Fetal Origins of Coronary Heart Disease"	The study is not related to oil development and focuses on fetal undernutrition in Great Britain.	✗	✗	✗	✗	✗

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Study Name	Summary	Could Potentially Support a 3,200 Foot Setback	Relates to California's Environmental Regulations	Production Technique Currently Used in CA	Establishes Causation between oil production & measured health impacts	Evaluates actual air emissions
Binkowski and Roselle 2003 - "Models-3 Community Multi-scale air quality model aerosol component"	This study doesn't relate to oil development but rather discusses modeling methods for estimating air quality impacts, specifically focusing on PM2.5 movement in the eastern United States.	✗	✗	✗	✗	✗
Bolden et al. 2015 - "New Look at BTEX: Are Ambient Levels a Problem?"	The study examines the health effects of exposure to BTEX compounds, through a review of existing literature, not specifically focused on the source of exposure.	✗	✗	✗	✗	✗
Dadvand et al. 2013 - "Maternal Exposure to Particulate Air Pollution and Term Birth Weight: A Multi-Country Evaluation of Effect and Heterogeneity"	The study examines the relationship between air pollution and low birthweight and is not directly related to oil and gas development.	✗	✗	✗	✗	✓
Dzhambov et al. 2019 - "Road Traffic Noise Exposure and Birth Outcomes: An Updated Systematic Review and Meta-Analysis"	The study investigates the association between road traffic noise and adverse birth outcomes and is not directly related to oil development.	✗	✗	✗	✗	✗
Eisner 2002 - "Environmental Tobacco Smoke Exposure and Pulmonary Function Among Adults in NHANES III: Impact on the General Population and Adults with Asthma"	The study explores the impact of secondhand smoke exposure on pulmonary function and is not directly related to oil development.	✗	✗	✗	✗	✗
Ferrero et al. 2014 - "Benzene Exposure and Respiratory Health in Children: A Systematic Review of Epidemiologic Evidences"	The study reviews epidemiologic evidence on benzene exposure and respiratory health in children and is not specifically focused on oil development.	✗	✗	✗	✗	✗
Friedman et al., 2001 - "Impact of Changes in Transportation and Commuting Behaviors During the 1996 Summer Olympic Games in Atlanta on Air Quality and Childhood Asthma"	The study demonstrates the impact of changes in transportation on air quality and childhood asthma and is not directly related to oil development.	✗	✗	✗	✗	✗
Guarnieri and Balmes, 2014 - "Outdoor Air Pollution and Asthma"	The study discusses the association between outdoor air pollution and asthma and is not directly related to oil development.	✗	✗	✗	✗	✓
Ha et al., 2014 - "The Effects of Air Pollution on Adverse Birth Outcomes"	The study examines the effects of air pollution on adverse birth outcomes and is not specifically focused on oil development.	✗	✗	✗	✗	✓

Not Related to Oil and Gas Production at All

Study Name	Summary	Could Potentially Support a 3,200 Foot Setback	Relates to California's Environmental Regulations	Production Technique Currently Used in CA	Establishes Causation between oil production & measured health impacts	Evaluates actual air emissions
Kan et al., 2007 - "Traffic Exposure and Lung Function in Adults: The Atherosclerosis Risk in Communities study"	This study examines the impact of traffic exposure on lung function in adults, finding reductions in lung function associated with proximity to busy roadways and is not directly related to oil development.	✗	✗	✗	✗	✓
Liu et al., 2012 - "Global, Regional, and National Causes of Child Mortality: an Updated Systematic Analysis for 2021 with Time Trends Since 2000"	This study is not directly related to oil development and instead focus on child mortality following perinatal issues.	✗	✗	✗	✗	✗
Nieuwenhuijsen et al., 2017 - "WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Adverse Birth Outcomes"	The study reviews the association between environmental noise exposure and adverse birth outcomes and is not related to oil production.	✗	✗	✗	✗	✗
Seixas and Checkoway 1995 - "Exposure Assessment in Industry Specific Retrospective Occupational Epidemiology Studies"	This study is not related to oil development and instead focuses on generic issues of exposure.	✗	✗	✗	✗	✗
Schraufnagel et al., 2019 - "Health Benefits of Air Pollution Reduction"	This study is not related to oil development and instead focuses on generic issues of exposure.	✗	✗	✗	✗	✗
Swinburn et al. (2015) - "Valuing Quiet: An Economic Assessment of U.S. Environmental Noise as a Cardiovascular Health Hazard"	This study assesses the economic impact of environmental noise on cardiovascular health in the United States. It does not focus on oil and gas production.	✗	✗	✗	✗	✗
Vogel et al. (2018) - "The Global Epidemiology of Preterm Birth"	This paper lacks direct relevance to oil development.	✗	✗	✗	✗	✗



California-Specific Studies that were Omitted

Study Name	Could Potentially Support a 3,200-Foot Setback	Relates to California's Environmental Regulations	Production Technique Currently Used in CA	Establishes Causation Between Oil Production & Measured Health Impacts	Evaluates Actual Air Emissions
MRS. 2020. Inglewood Oil Field Health Risk Assessment Report. Prepared for Los Angeles County.	✗	✓	✓	✗	✓
Environmental Compliance Solutions. 2015. Health Risk Assessment, Kern County DEIR, Proposed Drilling and Oil and Gas Operations.	✗	✓	✓	✗	✓
City of Los Angeles Department of Public Works Office of Petroleum and Natural Gas Administration and Safety Oil and Gas Health Report. A Report on Council File 17-0447. July 25, 2019.	✗	✓	✓	✗	✓

The scientific evidence presented does not convincingly support the establishment of a 3,200-foot setback for oil wells, as proposed by Senate Bill 1137. The studies cited in developing the bill reveal significant gaps, biases, and reliance on out-of-state data that challenge the validity of such a specific distance. California already has stringent regulations in place, making the need for an additional, uniform setback distance questionable.

Moreover, the selective use of literature by the Scientific Advisory Panel (SAP) and the omission of studies contradicting their findings further undermine the credibility of the proposed setback. The debate surrounding the setback distance should take into account the regional variations and limitations identified in relevant studies, emphasizing the necessity for a tailored and California-specific approach to address the complexities of oil and gas production in the region.