

MARCH 9, 2018

Californians for Energy Independence

c/o California Independent Petroleum Association

Subject: Evaluation of the Effects of Buffer Zone Setbacks on City of Los Angeles Oil and Gas Production

On behalf of the California Independent Petroleum Association (CIPA), Catalyst Environmental Solutions presents the findings of our analysis evaluating the potential effects of setback requirements on oil and gas production in the City of Los Angeles. In April 2017, the Los Angeles City Council President, Herb Wesson introduced a motion calling for a study analyzing the feasibility of a buffer zone or setback for wells located next to “sensitive land uses”, loosely defined in the motion as “homes, schools, hospitals, parks and public places”. Community activists have suggested a 2,500-foot buffer around all production wells in the city. In response to these concerns, the Los Angeles County Department of Public Health published an evaluation of public health and safety risks associated with oil and gas production in the county in February 2018. In this study, the County reviewed setback ordinances adopted by other jurisdiction and found that these jurisdictions defined sensitive land use as

“housing, schools, faith institutions and hospitals.” Based on this definition, we evaluated the potential effects of four specific setback scenarios on the production of oil in the City of Los Angeles. The four scenarios evaluated are: 1) 2,500 foot buffer, 2) 1,500 foot buffer, 3) 1,000 foot buffer, and 4) 500 foot buffer from “sensitive land uses”. Based on the results of our analysis, described in detail below, implementation of a 2,500-foot setback would result in a shutdown of 87% of all oil and gas production wells in the City of Los Angeles. While the other three scenarios would reduce the number of affected wells slightly, even a 500-foot setback would result in the shutdown of 64% of the city’s oil and gas production wells.

ACTIVE PRODUCTION WELLS

Catalyst obtained the locations for all wells documented within the City from GIS shapefiles developed and maintained by the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR). This total list includes wells classified as either active, buried, idle, new, or plugged. Of these, active wells (totaling 846) were isolated and filtered down to exclusively oil and gas production wells for the remainder of this analysis. Based on this filtering method, Catalyst determined that there are a total of 632 active oil and gas production wells located within the city limits (Figure 1). See Table 1 for additional information.

Table 1. City of Los Angeles’ active well classifications and quantities.

Active Well Classification	Number of Wells in City of Los Angeles
Oil and Gas Production	632
Water Flood	161
Gas Storage	24
Observation	21
Water Disposal	5
Dry Gas	1
Oil and Gas / Cyclic Steam	2
Total	846

SELECTING SENSITIVE LAND USES

Catalyst used City of Los Angeles Land Use data to identify sensitive land uses as described in the City Council motion. As displayed in Table 2, we included in our analysis all land use categories that correspond to residential uses and educational services. Hospital facilities are not specifically distinguished in City of Los Angeles’ Land Use data; therefore, these locations were acquired from the U.S. Geological Survey’s National Map, which provided coordinate points for major hospital facilities. These locations were overlaid on the GIS layer for zoning designations obtained from the City. The City also does not have a specific designation for religious institutions; these facilities are included within a number of different land use designations, including multiple dwelling, limited commercial, commercial which also includes other unrelated facilities. Catalyst was unable to obtain a GIS layer that specifically provided the locations of religious facilities, although those facilities that are situated within the limited commercial or residential zones are captured within this analysis.

Table 2. City of Los Angeles’ land use classifications.

Included in Sensitive Land Use	Excluded from Sensitive Land Uses
Highway oriented commercial – high med residential	Airport Airside
Community commercial – mixed high residential	Airport Landside
Low I residential	Airport northside
Low II residential	Commercial fishing
Low medium residential	Commercial manufacturing
Low residential	Community commercial
Medium residential	General commercial
Minimum residential	Hazard industrial and commercial
Very high residential	Heavy industrial
Very low I residential	Heavy manufacturing
Very low II residential	Highway oriented and limited commercial
Very low residential	Highway oriented commercial
High medium residential	Limited industrial
High residential	Limited manufacturing
Limited commercial – mixed medium residential	Hybrid industrial
Hospitals	Intermodal container
Educational Facilities	Light industrial
	Light manufacturing
	Limited commercial
	Neighborhood commercial
	Neighborhood office commercial
	Non-hazard industrial and commercial
	Open space
	Other public open space
	Parking buffer
	Public facilities
	Public I open space
	Public/quasi-public open space
	Recreation and commercial
	Regional center commercial
	Regional commercial
	Regional mixed commercial

DETERMINING AFFECTED WELLS

Using GIS software, we overlaid the active oil and gas production wells with the sensitive land uses from the City land use and planning data and applied the four setback scenarios to identify which wells would be affected under each scenario. Figures 2 through 5 graphically present the results of this analysis. As shown in these figures and in Table 3 below, under the 2,500-foot setback scenario, 548 production wells in the City of Los Angeles would be affected. However, even reducing the potential setback to 500 feet would affect 403 wells, leaving over half of the City's production wells affected. Therefore, reducing the size of the potential setback scenario would not avoid adverse effects to production in the city.

Table 3. Results of each setback scenario analysis.

Setback from Sensitive Land Use (Feet)	Number of Potentially Affected Wells (Shutdown)	Percentage of All Active Oil & Gas Wells in City of LA
500	403	64%
1,000	470	74%
1,500	535	84%
2,500	548	87%

IMPACTS TO PRODUCTION

The API number of each well in the City was obtained from the GIS shapefile data gathered from DOGGR. Catalyst's analysis of impacts to production is based on the 2016 production values (in barrels/year for oil and MCF/year for gas) as reported in the DOGGR 2016 Microsoft Access database (published April 3, 2017) which compiles all monthly production reports by well that are submitted by operators to DOGGR.¹ We calculated the potential production loss that could occur under each of the four scenarios (Table 4). Total oil production in the City of Los Angeles in 2016 was 2,735,105 barrels. As shown in the table, in 2016, 87% of oil production would be lost under the 2,500-foot setback scenario and more than half of the oil production in the City would be lost under the 500-foot setback scenario resulting in a loss of 2.38 million barrels of oil and 3.1 million MCF of Gas and 1.7 million barrels of oil and 1.1 million MCF of Gas, respectively.

Table 4. City of Los Angeles oil and gas production loss under each setback scenario analyzed.

Setback (Feet)	Total Production Loss from Setbacks	
	Oil (bbl)	Gas (MCF)
500	1,726,409	1,118,081
1,000	2,136,245	1,468,486
1,500	2,344,374	1,669,230
2,500	2,383,435	3,190,458

¹Note that in February 2018 DOGGR published a 2016 Production by County summary and 2016 Production Annual Report, both of which provide slightly increased production numbers from the 2016 MS Access Database, because they include condensate production from dry gas and gas storage wells. For the purposes of this analysis, Catalyst only considered production from active oil and gas production wells.

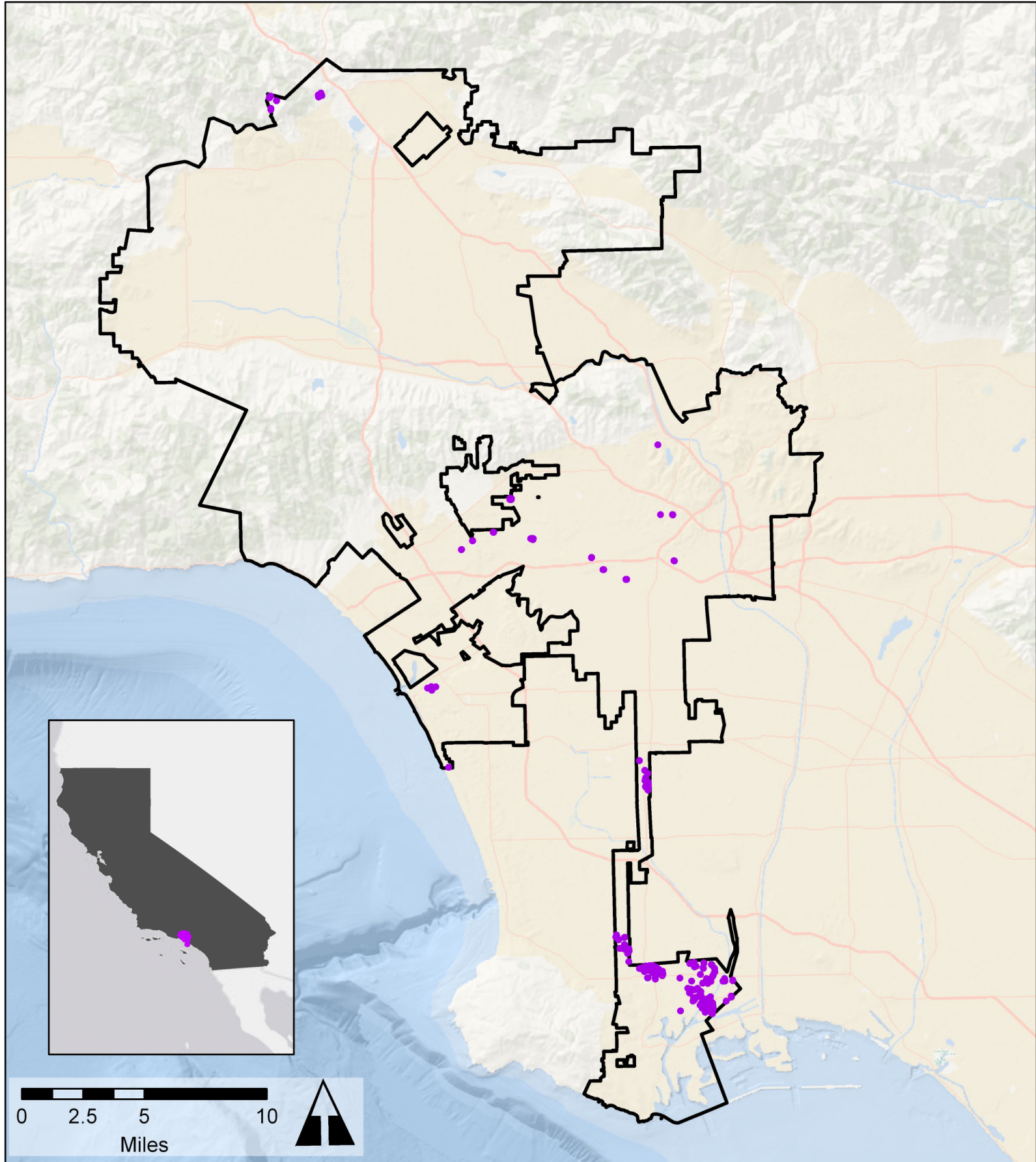
Catalyst appreciates the opportunity to assist Californians for Energy Independence and CIPA with this analysis. If you have any questions, or require any additional information, please feel free to contact me at mschwartz@ce.solutions or 818-387-5875.

Sincerely,

A handwritten signature in black ink, appearing to read 'ms', is positioned below the 'Sincerely,' text.

Megan Schwartz

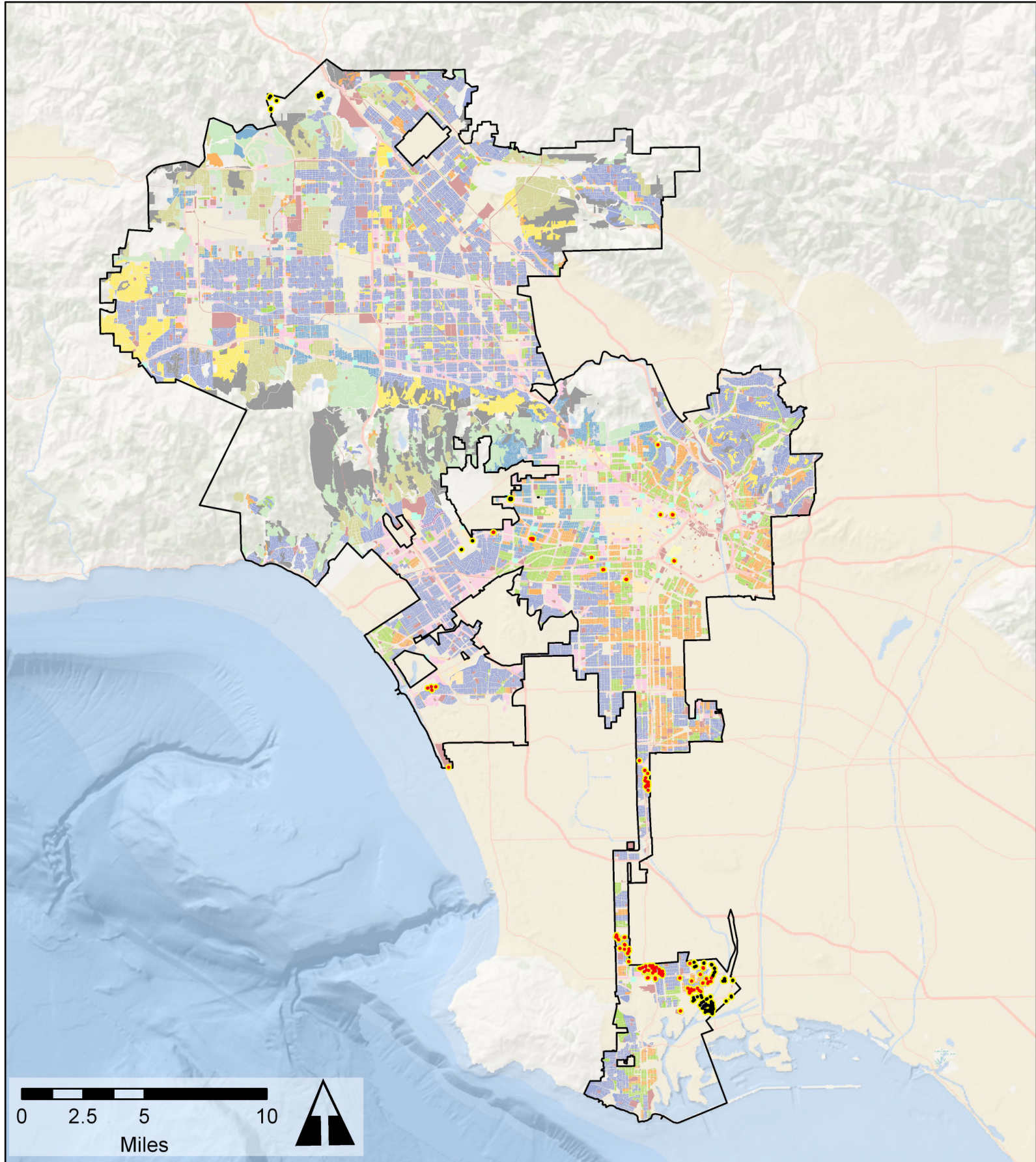
DIRECTOR OF REGULATORY COMPLIANCE AND PERMITTING
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- Legend**
- City of Los Angeles Production Wells
 - ▭ City of Los Angeles Boundary

CITY OF LOS ANGELES PRODUCTION WELLS

Figure 1
California Independent Petroleum Association
Oil & Gas Production Well Setback Analysis
Date: March 2018

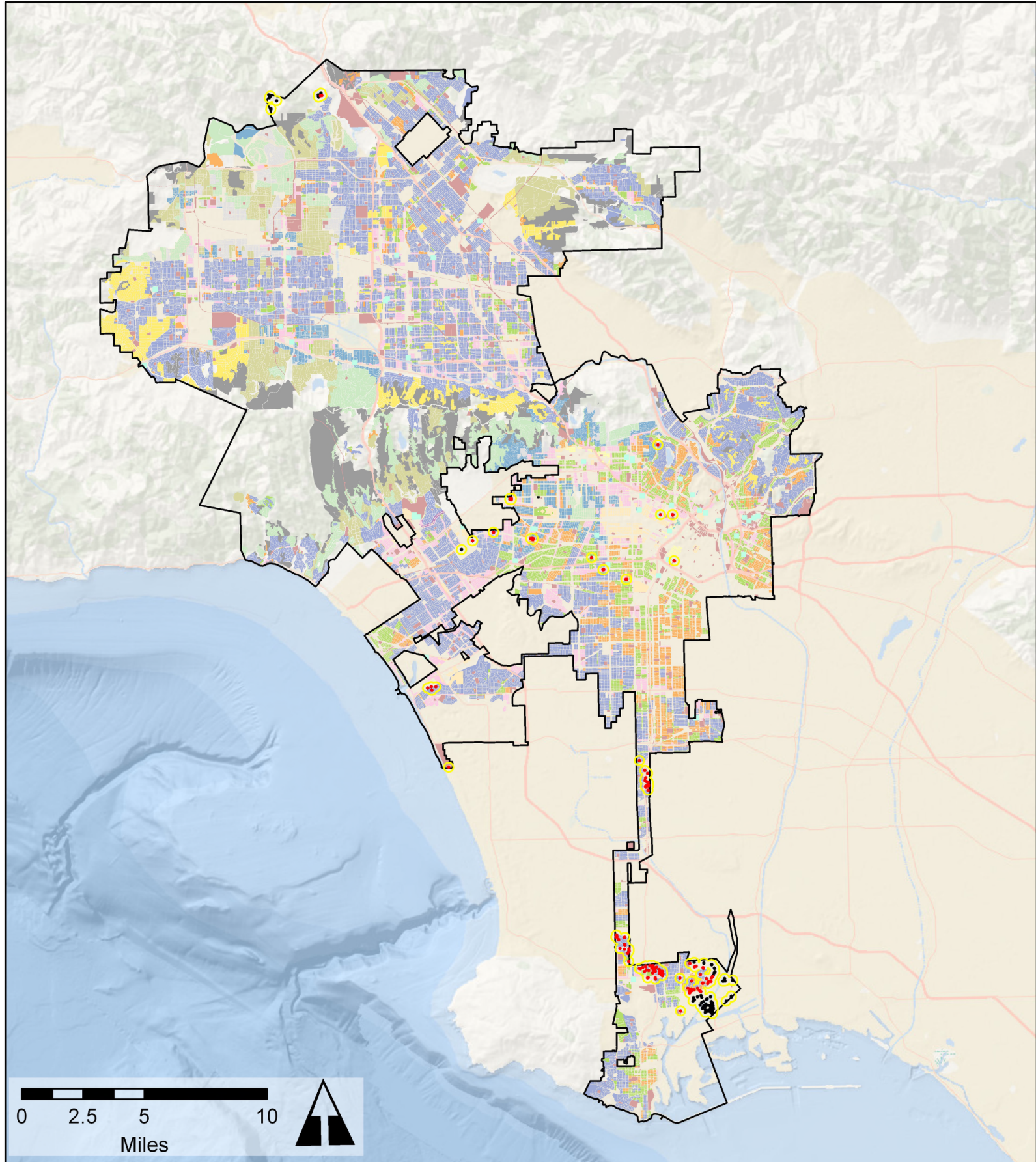


- Legend**
- Active Oil & Gas Production Wells**
- Production wells affected by setback
 - Production wells unaffected by setback
 - 500 Ft. Setback
- Sensitive Land Use Categories**
- City Hospitals
 - Educational Facilities
 - Community Commercial - Mixed High Residential
 - High Medium Residential
 - High Residential
 - Highway Oriented Commercial - High Med Residential
 - Limited Commercial - Mixed Medium Residential
 - Low I Residential
 - Low II Residential
 - Low Medium I Residential
 - Low Medium II Residential
 - Low Residential
 - Medium Residential
 - Minimum Residential
 - Very High Residential
 - Very Low I Residential
 - Very Low II Residential
 - Very Low Residential
 - City of Los Angeles Boundary

500 FT. SETBACK

Figure 2
California Independent Petroleum Association
Oil & Gas Production Well Setback Analysis
Date: March 2018

Catalyst
ENVIRONMENTAL SOLUTIONS

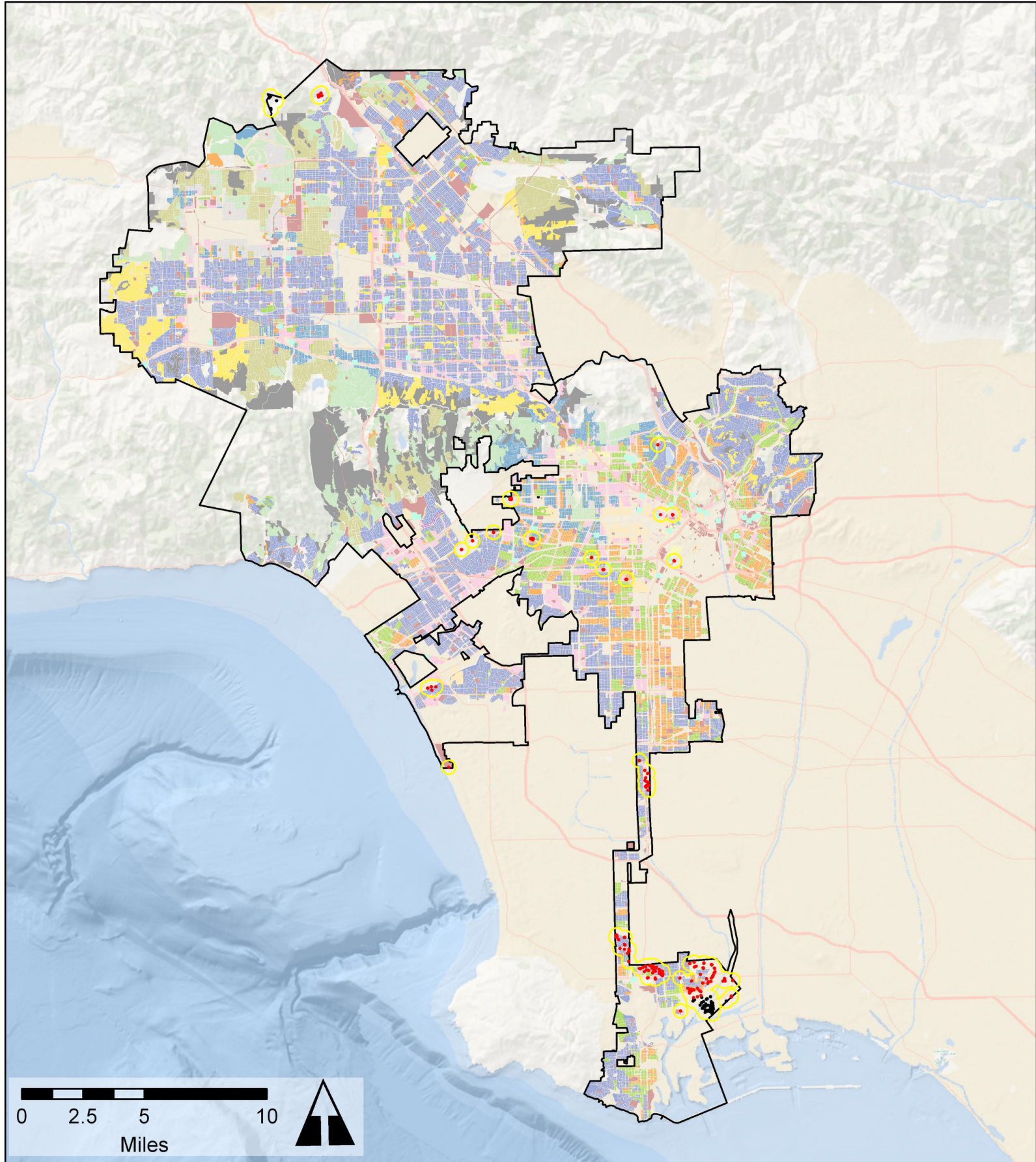


- Legend**
- Active Oil & Gas Production Wells**
- Production wells affected by setback
 - Production wells unaffected by setback
 - 1,000 Ft. Setback
- Sensitive Land Use Categories**
- CityHospitals
 - Educational Facilities
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 - High Medium Residential
 - High Residential
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1,000 FT. SETBACK

Figure 3
 California Independent Petroleum Association
 Oil & Gas Production Well Setback Analysis
 Date: March 2018

Catalyst
 ENVIRONMENTAL SOLUTIONS

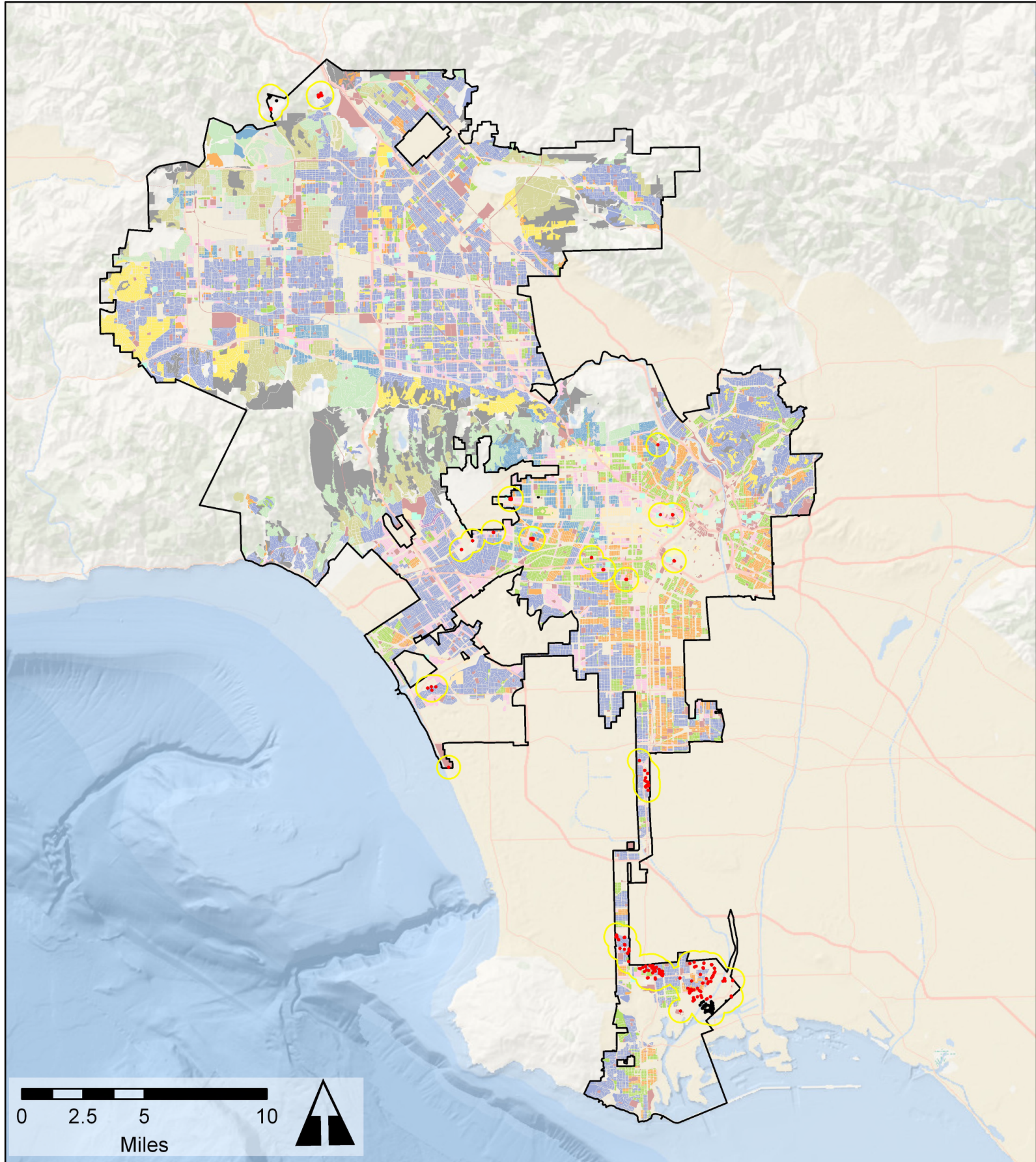


- Legend**
- Active Oil & Gas Production Wells**
- Production wells affected by setback
 - Production wells unaffected by setback
 - 1,500 Ft. Setback
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- CityHospitals
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1,500 FT. SETBACK

Figure 4
California Independent Petroleum Association
Oil & Gas Production Well Setback Analysis
Date: March 2018

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ENVIRONMENTAL SOLUTIONS



- Legend**
- Active Oil & Gas Production Wells**
- Production wells affected by setback
 - Production wells unaffected by setback
 - 2,500 Ft. Setback
- Sensitive Land Use Categories**
- CityHospitals
 - Educational Facilities
 - Community Commercial - Mixed High Residential
 - High Medium Residential
 - High Residential
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2,500 FT. SETBACK

Figure 5
California Independent Petroleum Association
Oil & Gas Production Well Setback Analysis
Date: March 2018