SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

Alberto Ayala, Ph.D., M.S.E.
EXECUTIVE DIRECTOR/AIR POLLUTION CONTROL OFFICER

July 31, 2018

Mr. Richard Corey, Executive Officer
c/o Laura Zaremba-Schmidt, Air Resources Engineer
California Air Resources Board
9480 Telstar Avenue #4
El Monte, California 91731

Subject: Submittal of the Sacramento Region's Final Assessment of Proposed Monitoring Locations for AB 617 Community Protection Action

Dear Mr. Corey:

The Sacramento Metropolitan Air Quality Management District (District) is pleased to submit to the California Air Resources Board (CARB) our *Final Assessment of Proposed Monitoring Locations for AB 617 Community Air Protection Action* (Report). The Report identifies ten communities in Sacramento that meet the criteria for new air quality monitoring and potential emission reduction efforts set forth by Assembly Bill 617 (AB 617). Two of these ten communities, the ones with the highest identified air pollution burden according to the District's analysis, are recommended for immediate action in year one. Our expectation is that, with CARB support and state funding assistance, we can add two communities for new AB 617 efforts each subsequent year. We agree with the legislative intent to improve air quality in the communities in our region that still suffer from disproportionate impacts of localized air pollution and we welcome the opportunity to work with CARB to deliver the promise of AB 617 to our most marginalized and vulnerable residents.

The District's primary responsibility is to achieve and maintain clean air for all who live and work in the capital region. Our agency is also a regional leader for coordinated climate action. We believe that the focused efforts mandated by AB 617 are essential to address remaining risks to public health due to highly localized air quality burdens.

To start these efforts, the District has conducted a robust analysis of our region – its communities at large, sensitive receptors, toxic and greenhouse gas emission sources, and unique local conditions - as described in the attached Report to support the recommendations for the state's Community Air Protection Program. The initial monitoring efforts will provide the District, CARB and the public with the necessary neighborhood-specific information about existing environmental

burdens and the evidence to develop and implement new strategies for emission reductions. We share the ultimate AB 617 goal of improving the quality of life for all people in California and the District is prepared to do its part in the capital region.

Our final technical assessment clearly shows there are several communities in Sacramento that suffer from excess burden due to exposure to various air toxics and criteria pollutants. Those identified in this analysis are either low-income or disadvantaged communities and display clear evidence of health disparities. They are largely located near or along major highways or roadway intersections where toxic combustion emissions from mobile sources can lead to elevated cancer risks, in some cases well above the statewide average.

Recognizing that mobile source emissions are a significant driver of air pollution and health impacts in our region, the District has been at the forefront of innovative incentive policies and programs for clean air projects for over two decades. The District has disbursed in excess of $250 million in public funds for cleaner mobility and technology. These investments have resulted in emission reductions equivalent to taking approximately one million cars off the road and removing 200,000 wood-burning fireplaces. Although the region has made significant progress, we have not yet reached attainment of all health-based ambient air quality standards and will not do so for many more years.

With a backlog of additional shovel-ready clean air projects in the region amounting to approximately $350 million, opportunities abound for more AB 617-directed investments of Cap and Trade funds for community air protection and further toxic and criteria emission reductions from locomotives, trucks, buses, farm tractors, and passenger cars. For this reason, the District and our regional partners have been vigorously advocating for incentive funding on the order of $35 million annually for ten years, meeting with legislators and key legislative staff not only about the needs for implementation of the new AB 617 mandates for monitoring, but also for investments and a growing portfolio of incentive projects. We believe incentive funding is the best and most expeditious way to realize the goals of AB 617 and bring emission reductions and health benefits to the prioritized communities. These investments will also yield broad regional benefits, since the reduction in mobile sources emissions will benefit all Sacramento communities.

Adequate funding for local air districts to implement AB 617 is critical or the legislation will become an empty promise. Thus, the District applauds the California State Legislature and Governor’s 2018-2019 budget, which includes a two-year appropriation of $50 million each year to local air districts to implement AB 617 programs. The District has expressly advocated for funding on the order of up to $1.5 million annually per community in order to fulfill the air monitoring expectations of the state in the Sacramento region.

AB 617 is the most significant piece of California air quality legislation in the last 30 years. Implementation of AB 617 monitoring and associated emissions reduction programs can be critical steps forward for bringing the full benefits of California's leading clean air and climate policies to the most impacted communities in the state. Collection of new air monitoring data to better understand localized pollution impacts and inform the development of subsequent emissions reduction programs, including new Cap and Trade incentives for clean air projects, can be a game-changing approach to public health protection. The District is prepared to work with the public and CARB on this most impactful new policy. If you have any questions regarding our assessment, please do not hesitate to contact me at 916-874-4802, AAyala@airquality.org or Mr. Mark Loutzenhiser at 916-874-4872, MLoutzenhiser@airquality.org.

Sincerely,

Alberto Ayala, Ph.D., M.S.E.
Executive Director/Air Pollution Control Officer

Attachments:

Sacramento Region's Final Assessment of Proposed Monitoring Locations for AB 617 Community Protection Action

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SACRAMENTO METROPOLITAN

AIR QUALITY
MANAGEMENT DISTRICT

Final Assessment of Proposed Monitoring Locations for AB 617 Community Air Protection Action

July 31, 2018

Submitted to the:
Office of Community Air Protection Program
California Air Resources Board

EXECUTIVE SUMMARY

Assembly Bill (AB) 617[1] prioritizes new efforts to address cumulative air quality impacts in California communities. AB 617 requires that the California Air Resources Board (CARB) identify communities that have the highest cumulative exposure burden to air pollution and select a list of communities by October 1, 2018, for deployment of community air monitoring systems and/or to prepare community emissions reduction programs. The legislation directs CARB to work with air districts and communities for the identification of potential monitoring locations. On April 30, 2018, the Sacramento Metropolitan Air Quality Management District (Sac Metro Air District or District) submitted an initial list of four general areas in Sacramento County for further analysis and refinement of community boundaries. This report provides the technical analysis that builds upon the initial assessment to determine the District's final recommendations of proposed communities for consideration in the state's Community Air Protection Program.

The technical analysis for the final assessment was designed to focus on the identification of priority communities with the highest air pollution risk and related health impacts and a high proportion of disadvantaged and low-income residents, including particular consideration of the region's most sensitive receptors. For the final submittal, the District enhanced its initial analysis with a robust suitability analysis and also used results from the most updated toxic emissions modeling prepared by CARB to identify the most vulnerable communities in the Sacramento region. The factors used for the suitability analysis were determined in part by the feedback received directly from local communities who identified their air quality priorities and shared them through the District's extensive community outreach and engagement process. Engaging with the communities provided the District with specific understanding of community issues and needs as they relate to highly localized air pollution sources and perceived impacts. Community outreach and feedback consisted of launching a new dedicated AB 617 District webpage, hosting and participating in numerous public meetings, talking to community residents and community organizations, and developing a survey for community input and incorporating the survey results into the final assessment of communities.

The District identified ten priority communities, shown in Figure 1, in the Sacramento region for consideration for a new AB 617 local community air monitoring program to be phased in over time. These ten communities represent about 11% of the population in Sacramento County. For year one, the District is recommending two communities for new local community air monitoring, Community A or B, and Community C. Communities A and B are ranked first and second in the District's analysis, but due to their physical proximity and the similarity in air pollution sources and impacts, the District is recommending to add Community C in place of either Community A or B. All three have been identified by CalEnviroScreen 3.0 (CES3) as having areas in disadvantaged communities (DAC). The recommendation of Community C, which is also ranked high in the analysis, will offer important geographic diversity and provide the District with a greater understanding of the regional air quality disparities in Sacramento's north and

[1] AB 617, Garcia, C., Chapter 136, Statutes of 2017.

south areas. In addition, CARB modelling is complementary in that it shows that Communities A, B, and C have cancer risks that are excessively higher than the statewide average ambient cancer risk. Unsurprisingly, mobile sources are a significant portion of the emissions inventory and one of the main drivers of cancer risk in these communities since the communities are located next to and along some of Sacramento's busiest freeways. Therefore, the District recommends these communities for enhanced local air quality monitoring of criteria pollutants and toxic air contaminants (TAC), including diesel particulate matter (DPM), specifically from mobile sources in year one of the program. Community monitoring will allow the District to better characterize and understand localized emissions impacts from mobile and other sources. This understanding is the first step to developing plans for reducing the emissions responsible for the identified excess cancer risks in these vulnerable communities.

Although the District has identified and prioritized communities for CARB's consideration for year one, the District recognizes that many other communities in Sacramento are impacted by air pollution. The District will continue to work with CARB and community leaders and members to reduce the cumulative air pollution exposure burden to all impacted and burdened communities in Sacramento as soon as possible and as these new AB 617 efforts get implemented in the capital region.

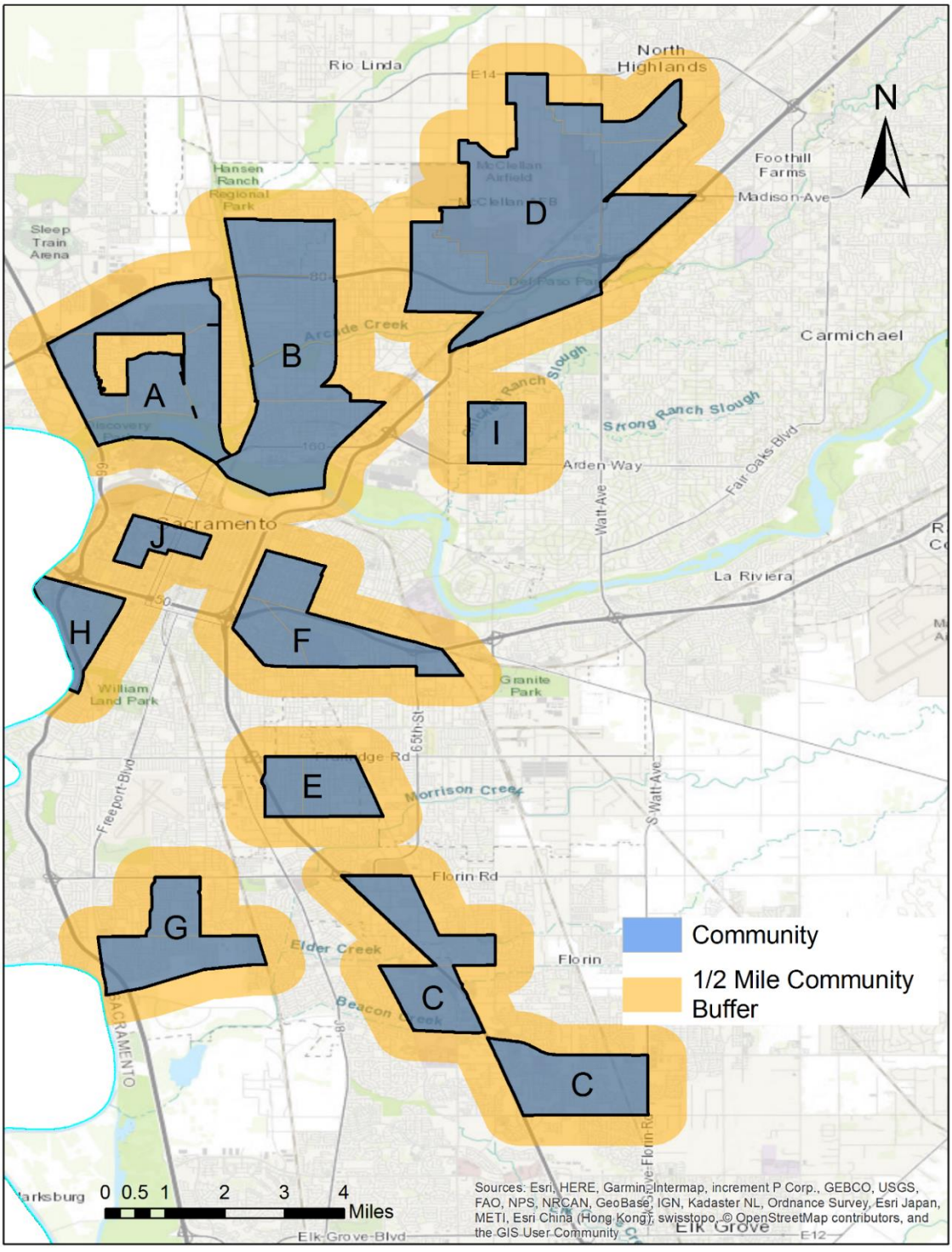

Figure 1. Community Recommendations

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I. INTRODUCTION

AB 617 mandates a localized focus and renewed urgency to reduce harmful exposure in California communities most impacted by air pollution. The first step in this new mandate is to identify potential locations throughout California with existing disproportionately high cumulative exposure burdens due to toxic air contaminants (TACs) and conventional air pollutants. While tremendous progress has been made in California over the last few decades for improving regional air quality thanks to local and state efforts, urban air pollution remains stubbornly high in many population centers and near-source, and highly localized impacts have been shown throughout the state, including in the state capital region. AB 617 requires CARB, by October 1, 2018, to identify and prioritize communities with the highest air pollution exposure burden and select communities to deploy new ambient air monitoring efforts and, in some cases, develop community emissions reduction programs. The promise of AB 617 is then to invest some of the funding generated by the state's greenhouse gas Cap-and-Trade Program in emission reduction projects from stationary and mobile sources to directly protect these communities. Initial community identification recommendations from air districts were expected to be submitted to CARB by April 30, 2018, with final community recommendations due to CARB by July 31, 2018. For the final submittal, CARB encouraged air districts to further evaluate the initial recommendations and provide additional detailed local assessments of air pollution impacts and burdens to the communities under consideration. The legislative intent is that selected communities for monitoring represent the pollution source and regional diversity of the state and that air districts engage meaningfully with local members in these initial communities through a robust public process of inclusion to help inform and frame an air district's recommendations. Final submittal expectations are outlined in CARB's *Draft Community Air Protection Blueprint, Appendix B – Identification, Assessment, and Selection of Communities* (CARB, 2018b).

This report provides the final and detailed technical analysis conducted by the Sac Metro Air District for the identification of communities most impacted by air pollution in the capital region and a prioritization scheme of communities for new AB 617 air monitoring for the state's Community Air Protection Program. The District also offers costs estimates for implementation of the state's new air monitoring mandate. This report also includes evidence of the District's readiness and necessity to implement new localized community monitoring in order to be able to meet the public expectations raised by AB 617. The technical assessment used to identify, refine, and prioritize communities based on air pollution exposure burden, socioeconomic factors, health impacts indicators, and sensitive receptors are described herein.

Health Impacts

Air pollution adversely impacts human health and continues to be an important public concern worldwide. The United State Environmental Protection Agency (EPA) and CARB have established health-based ambient air quality standards for criteria pollutants based on the latest scientific evidence of safe levels for the public. Additionally, EPA and CARB have formally identified 187 and approximately 200 pollutants, respectively, as ambient

air toxic substances. Most air toxics have no known safe levels and may cause serious acute and chronic effects on humans, even at low levels of exposures (CARB, 2018c). Health impacts from air toxics and criteria pollutants include cancer, cardiovascular and reproductive effects, birth defects, damage to the immune system, as well as neurological, reproductive (e.g., reduced fertility), developmental, respiratory and other health problems, or adverse environmental effects (EPA, 2018c).

The Sacramento region is, unfortunately, still in nonattainment for the state and federal ozone standards and nonattainment for the state particulate matter (PM) standard. Sources of regional air pollution in our region include mobile, stationary and area-wide sources and urban air pollution remains a serious and leading concern. Low-income neighborhoods, and communities of color that live in urban areas may be disproportionately exposed to air pollution, which is a barrier to economic opportunity and security (EPA, 2018d). People who live, work or attend school near major roads appear to have an increased incidence and severity of health problems associated with air pollution exposures related to roadway traffic. Children, older adults, people with preexisting cardiopulmonary disease, and people of low socioeconomic status are among those at higher risk for health impacts from air pollution near roadways (EPA, 2018d). Many of the communities identified in this report are located next to major roadways and suffer from historical land use development patterns that have led to social and economic marginalization. These communities are the most impacted and burden communities in the region. And for that reason, they are the ideal local candidates for new AB 617 protections.

Experience in Community Air Monitoring

CARB's *Draft Community Air Protection Blueprint* states that the implementation of AB 617 requirements in the first year should focus on communities with the greatest readiness to deploy air monitoring systems or emissions reduction programs to ensure that the program will provide near-term success. The District has extensive experience in the implementation of community monitoring and can readily leverage its existing knowledge of the region to implement a new community-scale monitoring program. The District operates its own ambient air monitoring station network and has an active dialogue with EPA and CARB on many air monitoring related topics. In addition, a recent study, to be published soon in the peer-review literature, provides a very relevant and timely underpinning for the anticipated work. In 2015, the District was awarded an EPA grant to investigate air toxics from wood burning smoke in Sacramento communities. Fortuitously and with striking similarity, this study consisted of many of the design elements and goals of AB 617 for community-scale monitoring, including the selection process of communities, community engagement, identification and monitoring of targeted air pollutants, and design monitoring strategies to ensure actionable data is collected. As part of this study, the District engaged extensively with community members and stakeholders on community air quality monitoring priorities. This recent community engagement process provided the District with a solid understanding of effective and meaningful community engagement and inclusion to build upon for efforts in AB 617. This

study also offered some practical and current cost information for the deployment of community-level monitoring.

The Wintertime Air Toxics from Wood Smoke in Sacramento study (Wood Smoke Study) was designed to measure hazardous air pollutants (HAPs), wood smoke, and particulate matter (PM) in environmental justice (EJ)[2] communities and non-EJ communities from the beginning of December 2016 to end of January 2017 (District, 2018). The study hypothesis was that there are measurable differences in the pollution levels due to wintertime wood burning smoke in EJ versus non-EJ communities in the Sacramento region. The three EJ communities were in the Arden, South Natomas and South Sacramento neighborhoods and three non-EJ communities in the Del Paso Manor, T Street, and Tahoe Park-Colonial Heights neighborhoods. Each EJ community was paired with a non-EJ community for comparison. Significant portions of these communities are included in the communities identified as part of this final AB 617 assessment.

Results from the study indicated that EJ areas in Sacramento showed elevated concentrations of six HAPs (benzene, toluene, ethylbenzene and xylene, iso-octane, and acrolein) compared to non EJ areas. These HAPs are typically associated with mobile sources and "present [a] tangible hazard, based on scientific studies of exposure to humans" (EPA, 2018c). The study concluded that "[e]ven though wood smoke emissions can contribute to HAPs, results consistently showed that wood burning has little influence on the ambient levels of HAPs in the region, and that fossil fuel combustion in vehicles is the main source of HAPs" (District, 2018). There is no other monitoring information available to determine the severity of the problem given seasonal variability or the temporal and spatial gradients of ambient concentrations within these communities. Thus, more information, like that potential afforded by new AB 617 monitoring, needs to be collected to determine the net potential public health impacts from air toxics and other air pollution in these areas. Recommendations derived from the study results indicated that there is a need to perform "additional community monitoring to better understand within-community variability" and to "[p]erform mobile monitoring of [particulate matter] and [black carbon] in communities to identify whether there may be 'hot spots'" (District, 2018).

Many stakeholders and project participants have expressed a strong interest for the District to expand and leverage the study results for other efforts and in order to inform air pollution risk reduction efforts in those communities. AB 617 monitoring can be a timely and relevant continuation of these previous, but highly relevant efforts. For more information about the Wood Smoke Study, the final report is available for download on the District's website: http://www.airquality.org/Air-Quality-Health/Air-Monitoring.

[2] EPA defines environmental justice (EJ) as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies", https://www.epa.gov/environmentaljustice/learn-about-environmental-justice.

II. SUBMITTAL REQUIREMENTS

CARB's *Draft Community Air Protection Blueprint, Appendix B – Identification, Assessment, and Selection of Communities* discusses the submittal requirements for the final list of proposed communities. Table 1 identifies the section in this report that addresses each of the required elements for the final submittal.

Table 1: Submittal Requirements

Submittal Requirement	Addressed in:
Hold at least one public workshop.	Community Outreach and Engagement
Hold community level meetings in areas such that community members can easily participate.	Community Outreach and Engagement
List of all communities recommended for action that year, including community descriptions, identifying characteristics, geographic boundaries, and applicable census tracts.	Community Recommendations
Description of the process used to refine the list of communities.	Technical Assessment for Final Recommendations
If the communities are recommended for monitoring, a description of the known monitoring needs.	Community Recommendations
If the communities are recommended for community emissions reduction programs, provide additional information regarding the air quality challenges, emissions sources, air monitoring information, and available resources.	Emissions reductions program decisions will be informed by and made after the outcome of the new community monitoring.

Requirements are from *Draft Community Air Protection Blueprint, Appendix B – Identification, Assessment, and Selection of Communities (pg. B-8 and B-9)*

III. INITIAL SUBMITTAL – PRELIMINARY TECHNICAL ASSESSMENT

For its initial Board-approved submittal to CARB, the District conducted a preliminary technical assessment to identify potential general community areas in the Sacramento region for further evaluation. As a starting point, the District considered the Senate Bill (SB) 535 Disadvantaged Communities (DAC) – CalEnviroScreen 3.0 (CES3) and Assembly Bill 1550 low income communities (AB 1550) tools as these are the preferred state methods for identification of impacted communities in California. Recognizing that these tools provide an incomplete view of disadvantaged communities in the Sacramento region as several District Board members have publically noted, and in the case of CalEnviroScreen 3.0, included other non-air environmental factors, the District expanded and improved analysis of the region by including additional factors relevant to the goals of AB 617. The District used additional Sacramento-specific indicators that included the

communities with the greatest health disparities identified in the Sacramento County Community Health Needs Assessment (CHNA), locations of sources of toxics and greenhouse gas (GHG) emissions that impact nearby communities, and locations of potentially-impacted sensitive receptors.

With this information, the District used geographic information system (GIS) software[3] to create individual layers for each of the burden indicators, which were then combined into a composite representation of the region shown as a heat map illustrated in Figure 2. From this analysis, the District identified four general areas where the cumulative value of these indicators was highest, indicating the largest impacts. These are highlighted in red on the heat map and the areas were: A) Downtown Sacramento, B) South Sacramento, C) North Highlands, and D) Del Paso/Arcade. The initial recommendations and the preliminary technical assessment are described in the report, *Initial Assessment of Potential Locations for AB 617 Community Protection Action*, that was submitted to CARB on April 30, 2018.

[3] Maps throughout this assessment were created using ArcGIS® software by Esri. ArcGIS® and ArcMap™ are the intellectual property of Esri and are used herein under license. Copyright © Esri. All rights reserved. For more information about Esri® software, please visit www.esri.com. Base map sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, and the GIS User Community.

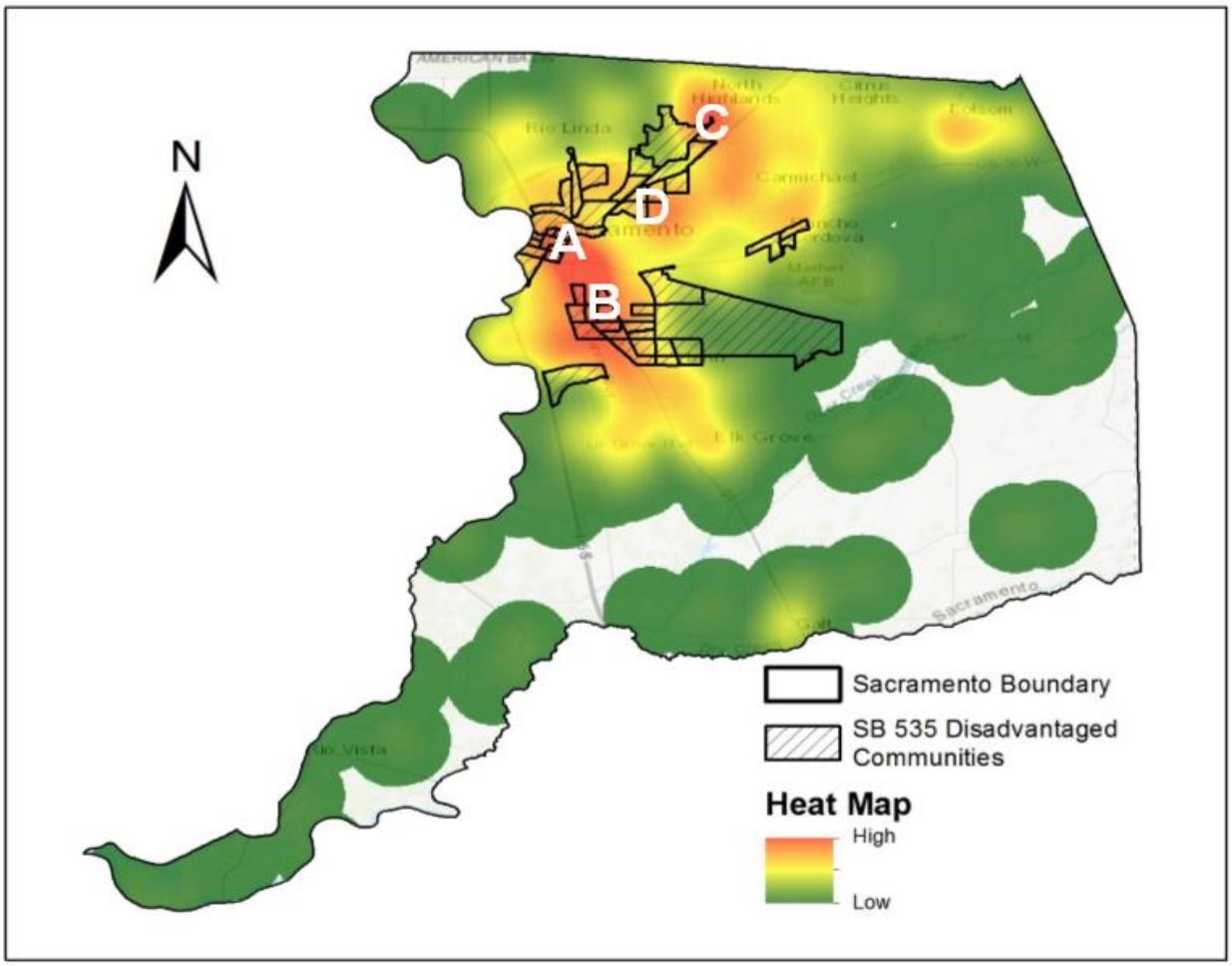

Figure 2. Four Potential Community Areas from the Initial Assessment

IV. COMMUNITY OUTREACH AND ENGAGEMENT

The District embraced the call for community engagement and inclusion that is central to AB 617. As a simple initial step, the District developed a webpage (http://www.airquality.org/air-quality-health/community-air-protection) to help create an accessible and transparent process on the District's effort on AB 617. This webpage provides all the expected and basic information (e.g., reports, presentations, media statements, advocacy letters) in one place. It contains an overview of AB 617, how the requirements affect the District, and updates on the District's AB617 implementation efforts. The District will continue to use the webpage as the principal tool to disseminate AB 617 information to the public.

For public outreach, the District started conversations with stakeholders beginning in early 2018 to discuss the AB 617 requirements and implementation and the community

selection process related to AB 617, DAC, and/or AB 134[4]. These meetings included representatives from community groups, public, stakeholder groups, District Board Directors, elected officials, and staff representatives from cities and counties. The outreach to key stakeholders and community leaders and representatives has allowed the District to receive important feedback about community priorities and concerns with respect to the implementation of AB 617, including community selection areas. These meetings helped guide the District in developing the preliminary technical assessment to identify potential community areas. Up until the submittal of the initial list of community areas, the District participated in 39 events where information was shared on the District's efforts on AB 617. The events are identified in the District's *Initial Assessment of Potential Locations for AB 617 Community Protection Action*.

After the initial list of community areas was submitted to CARB, the District continued to discuss AB 617 requirements and implementation with interested key stakeholders. In addition, the District focused more of its efforts on community outreach and engagement, especially in the areas identified in the preliminary assessment. The District recognized that engaging with the community members who live or work in these areas will lead to a better understanding of specific air quality priorities and concerns in those communities. The success of AB 617 will depend on how the various actors come together to resolve remaining air quality concerns. Knowing that, the District continues to work to build strong relationships with the community. These relationships will assist with the AB 617 implementation to quickly deploy community air monitoring and, if appropriate, implement community emissions reduction programs. These community engagements also helped the District identify areas positioned to take immediate and early actions, if needed, to reduce community-level impacts.

The District has been heavily involved in many outreach and engagement opportunities. A general community meeting at the District's office was held on June 5, 2018. The District invited directors and members of community organizations from the areas identified in the initial list of recommendation, elected officials and their staffs, and other representatives from cities, counties, and state. This meeting provided an overview of the District's efforts on AB 617 and other related programs, including the initial submittal, and solicited community feedback on additional factors to include in the final analysis. Additionally, the District decided to continue to reach out to different community groups and organizations in specific areas identified in the initial assessment to ensure a comprehensive effort was made to solicit more feedback from specific communities. Doing so provides the District with information about the specific needs of each community. Other outreach and engagement included consulting with elected officials, participating in various community meetings, and discussing the District's AB 617 efforts with community leaders individually. The following table shows the date of community outreach and engagement event where the District solicited community feedback, the community outreach action, and what community area identified in the initial assessment is represented by a particular community group. The table does not reflect outreach efforts conducted prior to May as part of the initial assessment.

[4] AB 134, Committee on Budget, Chapter 14, Statutes of 2017. AB134 was adopted to fund community air quality projects.

Table 2: Highlights of Community Outreach and Engagement since April 30, 2018.

Event Date	Community Outreach/Engagement Action	Community Area*
May 2, 2018	Cap-and-Trade Funding Meeting with Valley Vision	Areas A, B,C,D
May 3, 2018	City of Sacramento Mayor's office	Areas A, B,C,D
June 5, 2018	Sac Metro Air District Community Workshop	Areas A, B,C,D
June 14, 2018	Presentation at the Stockton Boulevard Partnership	Area B
June 7, 2018	Meeting with Lisa Nava and Kerri Aiello, Sacramento County Supervisor Serna's office	Area B
June 7, 2018	Meeting with City Council Member's Carr Outreach Coordinator	Area B
June 14, 2018	Presentation at the Stockton Boulevard Partnership	Area B
June 20, 2018	Presentation at the Meadowview Neighborhood Association	Area B
June 21, 2018	Presentation at the South Oak Park Communication Association	Areas A and B
June 29, 2018	Meeting with Susan Peters Office, District 3	Area C
June 29, 2018	Participation in Clean Air Partnership Luncheon Panel discussion advising groups on AB 617 community outreach efforts, and provided community selection survey link	General
July 9, 2018	Correspondence with St. Michael's Episcopal Church	Area D
July 10, 2018	Fulton Avenue Association	Area D
July 10, 2018	Correspondence with President of Old Foothill Farms Neighborhood Association	Area D
July 26, 2018	Sac Metro Air District's Board Meeting	Areas A,B,C,D
September, 2018	New Foothill Farms Neighborhood Association meeting	Area C**
September, 2018	Old Foothill Farms Neighborhood Association Meeting	Area C**

* A – Downtown Sacramento Area, B – South Sacramento Area, C – North Highlands Area, D – Del Paso/Arden Area

** Anticipated meetings scheduled due to the next available membership meeting

The community outreach and engagement is an on-going process and will continue after the final community recommendations are submitted to CARB on July 31, 2018. The District has already coordinated with community leaders and groups for future community engagement opportunities. The community feedback received at future coordination will be incorporated in specific community area monitoring plans and next year's update to the AB 617 community recommendations.

V. COMMUNITY FEEDBACK

Community feedback was a critical element used to identify and prioritize communities for new AB 617 monitoring. In addition to the many discussions had, the District also solicited feedback through a formal survey conducted during community engagement opportunities. The survey is also available on our website, and provided electronically to all interested parties. The survey asked community representatives and members to identify specific issues like emission sources of concerns and the importance of several factors including air pollution sources, health risks, socioeconomic factors, location of sensitive receptors, and any additional information or factors to consider in identifying communities.

The findings from the survey results received by the District indicated the following:

- Mobile sources and their pollution are the greatest concern. Specifically, the majority of the survey responses identified the emissions emitted from cars and trucks and traffic and congestion on freeways as the primary source of emissions the community would like to see reduced.
- Other feedback to consider from the survey can be categorized into socioeconomic factors, health impacts, high emission sources, and sensitive receptors. These factors were all included in the preliminary assessments and was part of the final assessment in identifying communities.
- A score was applied to the survey to objectively prioritize public input. The factors outlined in the survey were broadly categorized as air pollution sources, health impacts, socioeconomic factors, and locations of sensitive receptors. All of the factors ranked very closely, with health impacts being ranked the highest followed by air pollution sources, socioeconomic factors, and location of sensitive receptors.

The survey responses corroborated the District's preliminary assessment and they did not suggest any new information or factors for consideration in the final assessment. This outcome is reassuring. It suggests the long-standing and consistent nature of the air quality problems in the communities and the desire for resolution. The responses point to mobile sources are the emission sources of most concern, which is consistent with District's emission inventories that shows the majority of emissions are from mobile sources. In addition, this feedback is also consistent with CARB toxic modeling where it shows higher cancer risks (Figure 5) in areas that are located in close proximity to the busiest freeway intersections in the region known to have heavy traffic and congestion. Based on community feedback, the factors for the final technical assessment are weighted equally. The results of the survey are incorporated into the final assessment.

VI. TECHNICAL ASSESSMENT FOR FINAL RECOMMENDATIONS

The technical assessment builds upon the methodology used in the preliminary technical analysis, and it follows the key criteria specified by AB 617, which are the following:

- Locations of disadvantaged communities as defined in Section 39711 of the California Health and Safety Code (CHSC);
- Communities with high exposure burdens for TACs and criteria air pollutants;
- Locations of sensitive receptors, such as licensed healthcare facilities, schools, daycare centers, and other locations determined by the District or CARB; and
- Community feedback.

The technical assessment also takes into consideration that the use of CalEnviroScreen 3.0 and AB 1550 tools by themselves are inadequate in providing a complete picture in identifying communities most impacted by air pollution in the Sacramento region based on local knowledge. CES3 data indicators relevant to the goal of AB 617 and AB 1550 data was supplemented with information from other data sources shown in the analysis below to accurately identify the cumulative localized air pollution impacts to Sacramento communities. The District used the technical assessment to identify specific community boundaries and prioritize communities with the highest air pollution burden.

Community Evaluation Assessment Factors

According to CARB's *Draft Community Air Protection Blueprint, Appendix B,* CARB expects a "strong science-based foundation to identify and prioritize communities that experience high cumulative exposure burdens" (pg. B-2). Thus, CARB required the assessments to evaluate the following six factors to characterize the cumulative exposure impacts within each community and help inform recommendations. In the final submittal, CARB expects air districts to provide a detailed local assessment of these six factors for each community under consideration in their region to complement the statewide assessment.

- Exposure to air pollution
    1. Concentrations of ozone, particulate matter, and toxic air pollutants from measurements, air quality modeling quantifying air pollution exposure burden
    2. Density of air pollution sources and the magnitude of emissions within the community from mobile and stationary sources of pollution
    3. Cancer risk estimates based on existing or new air quality modeling that characterizes the burden faced by the community
- Sensitive populations
    4. Sensitive populations including children and the elderly at schools, hospitals and day care centers
- Other measures of vulnerability to air pollution
    5. Public health indicators that are representative of the incidence of the worsening of disease related to air quality
    6. Socio-economic factors, such as poverty levels and unemployment rates

This technical assessment incorporated all of these factors through the use of two approaches: the District's suitability analysis, which included all factors previously discussed with the exception of cancer risk and CARB's toxic emissions modeling for the

Sacramento region. The combined results were used to determine community boundaries and prioritize communities for air monitoring. A depiction of this community identification and prioritization process using the suitability analysis and CARB's toxic emissions modeling is shown in Figure 3. These approaches are described below.

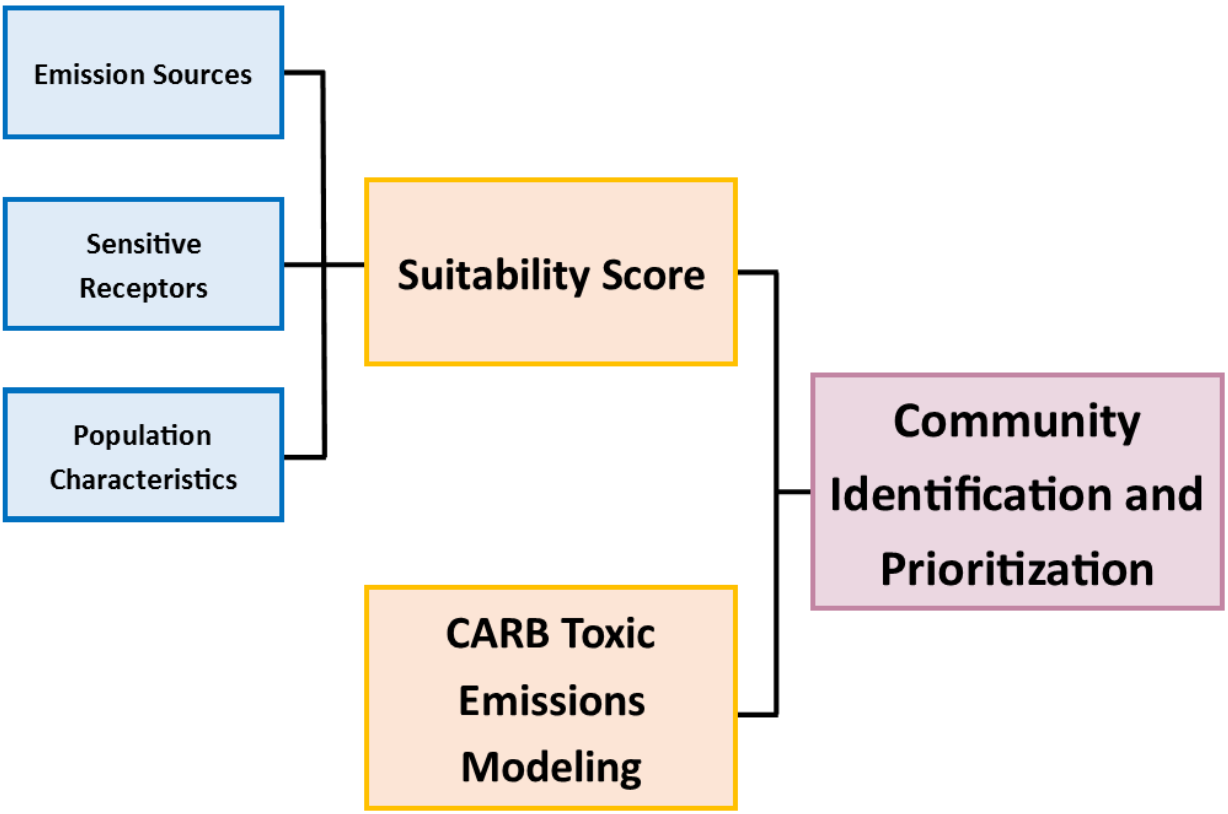

Figure 3. Community Identification and Prioritization Process

Suitability Analysis

A suitability analysis is broadly defined as a method of determining the appropriateness of a given area within a system of a particular use. The appropriateness of a given area is based on several factors to meet specific criteria in order to determine whether the area meets the need of the user. In this assessment, the suitability analysis, described in detail in Appendix A, was used to determine communities in Sacramento County that have the highest estimated cumulative air pollution exposure burden based on the different indicators used to meet the key criteria set by AB 617. These indicators provided information on a census tract level, which was used to determine the suitability of the census tracts for community identification.

Three categories of census tract resolution data were used: 1) Exposure to Air Pollution (Emissions), 2) Sensitive Receptors, and 3) Health and Socioeconomic Factors. To determine the indicators for each category, the District started first by evaluating indicators used in the CES3 and AB 1550 state-preferred tools. CES3 uses 20 indicators to calculate its overall score; some indicators, such as drinking water contaminants,

cleanup sites, groundwater threats, and impaired water bodies, are not relevant to air quality or AB 617 and were not included as data indicators in the suitability analysis. Twelve of the 20 indicators used in CES3 were used in the suitability analysis.

One indicator, ozone concentration, in CES3 is relevant to air quality, but for Sacramento County, this data source is an air pollution indicator that is more of a regional concern rather than a community-level concern, therefore this information would not change the results if it were incorporated into the community-level analysis.

To supplement the information provided by CES3 and AB 1550 tools, the District used additional Sacramento-specific data indicators. Inclusion of indicators such as permitted stationary sources and locations of sensitive receptors is an improvement in the local assessment that goes beyond what is included in the state tool and helps build a more accurate picture of the air pollution burden to nearby communities in the Sacramento region. All data indicators, including the source and date, for the three categories used in the suitability analysis are described below.

Exposure to Air Pollution

The exposure to air pollution includes the emissions from mobile sources (i.e. cars, trucks, and locomotives), stationary sources (i.e. power plants, industrial facilities, and manufacturing facilities), and area-wide sources (i.e. gas stations, diesel engines, and woodstoves/fireplaces). Eight indicators are used to address the exposure to air pollution at the census tract level, and each are described below.

1. *Traffic density* (CES3, 2013) – Sum of traffic volumes adjusted by road segment length (vehicle-kilometers per hour) divided by total road length (kilometers) within 150 meters of the census tract boundary.
2. *Diesel emissions* (CES3, 2012) - Spatial distribution of gridded diesel particulate matter (DPM) emissions from on-road and non-road sources for a 2012 summer day in July (kg/day).
3. *$PM_{2.5}$* (CES3, 2012 to 2014*)* - Annual mean concentration of $PM_{2.5}$ (average of quarterly means, $\mu g/m^3$), over three years (2012 to 2014). $PM_{2.5}$ emissions come from many sources, including cars and trucks, industrial processes, wood burning, or other activities involving combustion.
4. *Toxic Releases from Facilities* (CES3, averaged over 2011 to 2013) - Toxicity-weighted concentrations of modeled chemical releases to the ambient air from facility emissions and off-site incineration.
5. *Retail Gasoline Dispensing Facilities (GDFs)* (District, 2013 to 2016) – Total throughput in terms of gallons of gasoline per year from permitted GDFs in the county[5]. Total throughput is used as a surrogate for the emissions from gas stations because gasoline volume can be used to calculate the different pollutants from GDFs.

[5] http://www.airquality.org/businesses/permits-registration-programs/permit-applications-recordkeeping-advisories/gasoline-dispensing-facility

6. *Emergency Engines* (District, 2016) – Emissions of PM in pounds per day released from permitted emergency diesel engines in the county.
7. *AB 2588 Air Toxics "Hot Spots" Program Core Facilities* (District, 2005 to 2011): The AB 2588[6] program requires applicable emissions sources to monitor and report toxic emissions, perform detailed health risk assessments (HRAs) for some facilities, and, where toxic risks are high, take actions to mitigate those emissions. Therefore, these facilities are included in this analysis based on HRA cancer risk.
8. *Greenhouse Gas Emissions from Large Stationary Sources* (District, 2016)*:* Operations subject to CARB's GHG Mandatory Reporting Requirement Program[7]. Most of these facilities are those that have GHG emissions greater than 10,000 metric tons per year, which is the reporting threshold for most GHG stationary sources. These facilities are included in this analysis based on annual GHG emissions in units of metric tons of carbon dioxide equivalent (CO2e).

Sensitive Receptors

Four indicators were used to evaluate sensitive receptors. Sensitive receptors are defined as receptors that are disproportionately susceptible to air pollution if these are located in areas that suffer from high cumulative exposure burdens of air pollution. Sensitive receptors in each of the indicators were identified as follows:

1. *Parks* (Sacramento County, 2018): The total number of park centroids that lie within each census tract.
2. *Schools* (City of Sacramento, 2018): The school data set is a point locator of K-12 public, charter and private schools along with major colleges and universities within the City of Sacramento's Policy Area. It is maintained through individual research and contact with school districts. The total number of schools that lie within each census tract.
3. *Licensed Healthcare Facilities* (California Health and Human Services, 2017): A list of California healthcare facilities licensed by California Department of Public Health, Licensing and Certification was used. The total number of licensed healthcare facilities that lie within each census tract.
4. *Child Care Centers* (California Department of Social Services, 2018): This layer contains information regarding child care facilities licensed by the Community Care Licensing Division of the Department of Social Services. The total number of licensed child care facilities that lie within each census tract.

Health and Socioeconomic Factors (Population Characteristics)

Health and socioeconomic factors (population characteristics) scores for each census tract were used from CES3, and are derived from the average percentiles for three health indicators (asthma, cardiovascular disease, and low birth weight) and five socioeconomic indicators (educational attainment, housing burdened low income households, linguistic

[6] AB 2588, Information and Assessment Act of 1987, Connelly
[7] CHSC Section 38530 and Title 17, California Code of Regulations, Sections 95100 - 95158

isolation, poverty, and unemployment). To ensure all socioeconomic factors were considered in this analysis, AB 1550 low-income communities were also included.

1. *Cardiovascular Disease* (CES3; averaged over 2011-2013) - Spatially modeled, age-adjusted rate of emergency department visits for acute myocardial infarction per 10,000.
2. *Low Birth-Weight Births* (CES3; averaged over 2006-2012) – Percent of low birth weight infants.
3. *Asthma Emergency Department Visits* (CES3; averaged over 2011-2013) - Age-adjusted rate of emergency department visits for asthma per 10,000.
4. *Educational Attainment* (CES3; averaged over 2011-2015) - Percent of the population over age 25 with less than a high school education
5. *Linguistic Isolation* (CES3; averaged over 2011-2015) - Percentage of households in which no one age 14 and over speaks English "very well" or speaks English only
6. *Housing Burdened Low Income Households* (CES3; averaged over 2009-2013) - Percent of households in a census tract that are both low income (making less than 80% of the Housing and Urban Development Area Median Family Income) and severely burdened by housing costs (paying greater than 50% of their income to housing costs).
7. *Poverty* (CES3; averaged over 2011-2015) - Percent of the population living below two times the federal poverty level.
8. *Unemployment* (CES3; averaged over 2011-2015) - Percent of the population over the age of 16 that is unemployed and eligible for the labor force. Excludes retirees, students, homemakers, institutionalized persons except prisoners, those not looking for work, and military personnel on active duty.
9. *AB 1550 Low Income Communities* (CARB, 2017) - AB 1550 defines low income communities as the census tracts with median household incomes at or below 80 percent of the statewide median income or with median household incomes at or below the threshold designated as low income by the Department of Housing and Community Development's State Income Limits adopted pursuant to CHSC Section 50093. Based on this definition, CARB developed a map for California that identifies low income communities in relation to DAC[8].

A simplified depiction of the suitability analysis methodology is shown in Figure 4. Appendix A provides a detailed explanation of the suitability analysis methodology. The individual indicators within each of the three categories were summed to provide a score from zero to one. The three categories were then summed to determine the suitability score for each census tract. This method provided an evenly weighted, objective score for each census tract in Sacramento County based on all of the indicators described above.

[8] https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/communityinvestments.htm

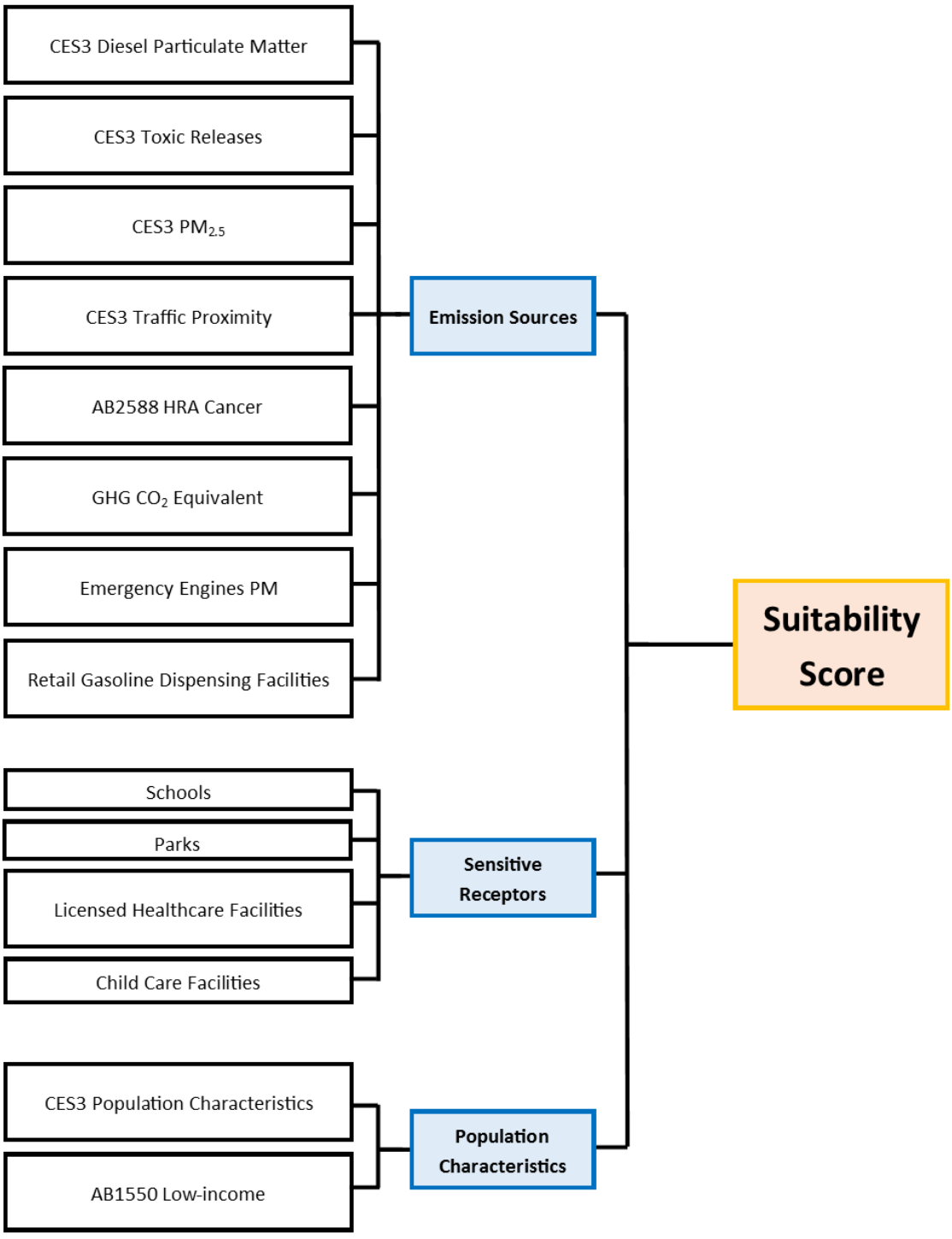

Figure 4. Simplified depiction of the suitability analysis methodology.

The suitability score of all census tracts in Sacramento County are colored by percentile and mapped in Figure 5. The higher suitability score indicates that the census tract is most suitable in meeting the criteria and factors for community identification under the AB 617 process.

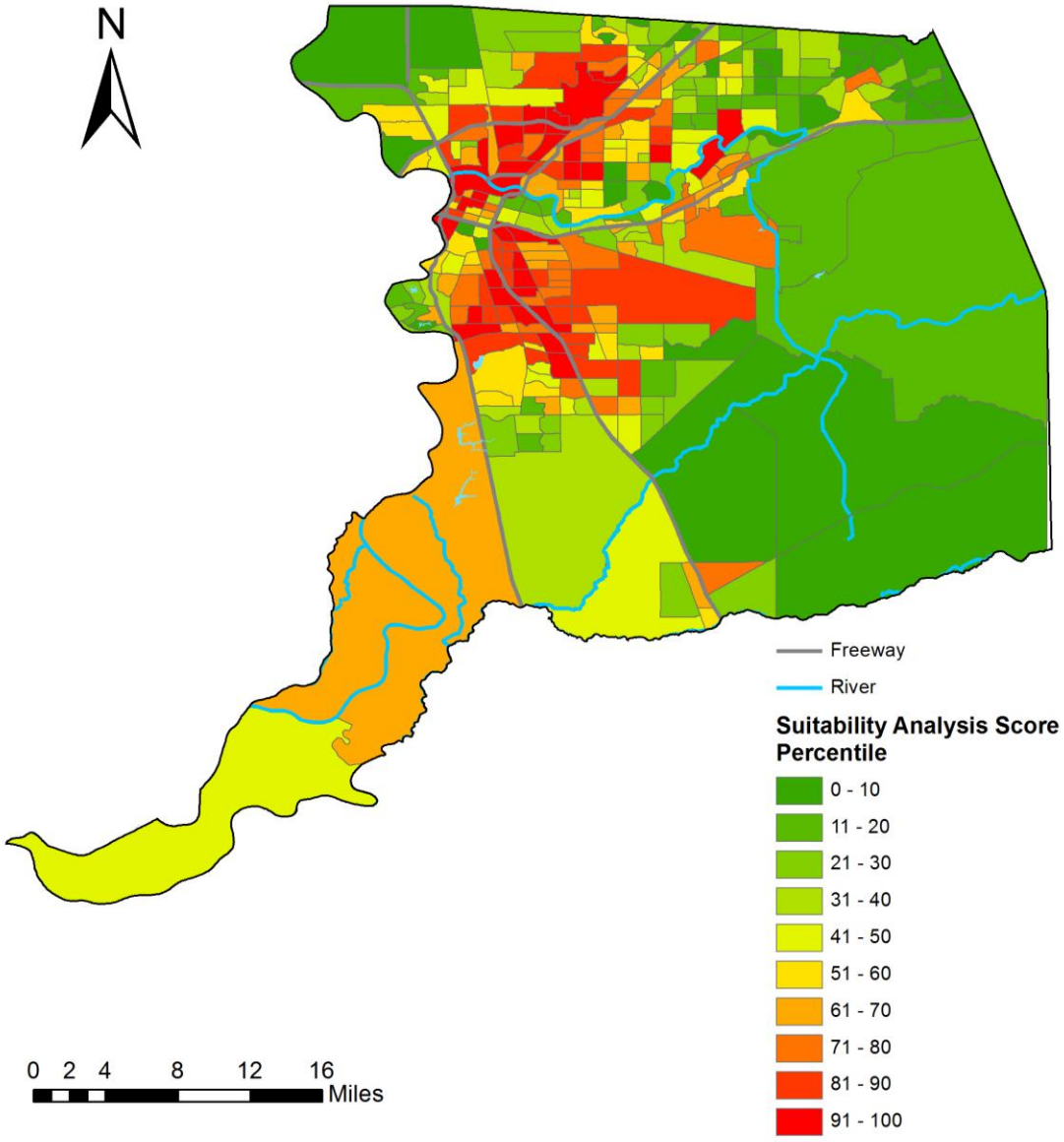

Figure 5. Suitability score, colored by percentile.

CARB's Toxic Emissions Modeling

CARB staff conducted air quality modeling for TACs and criteria air pollutants for six domain areas in California, including the Sacramento Valley. CARB's approach utilizes two air quality models: Community Multi-Scale Air Quality (CMAQ), a grid-based photochemical model, is used to model chemically reactive toxic VOCs, and CALPUFF,

a dispersion model, is used to model inert species such as diesel particulate matter (DPM) and heavy metals (CARB, 2018e)

CARB's toxic emissions modeling calculated the cancer risks from multiple air pollution sources, such as on-road mobile sources (i.e. cars and trucks), area-wide sources (i.e. residential wood burning devices and gas dispensing facilities), and stationary sources (i.e. Title V facilities and AB 2588 facilities) and summed the total cancer risks and burdens from all sources. The results from the modeling also included annual average $PM_{2.5}$ concentrations from residential wood combustion (RWC) and all primary and secondary pollutants. Detailed information regarding CARB's toxic emissions modeling is documented in Sacramento Valley Air Toxics Modeling (CARB, 2018e) and Toxic Emissions Inventory Modeling (CARB, 2018d). CARB provided two figures for each of the following modeled result – one figure is for the Sacramento Valley and the other is for the Sacramento urban area. The figures displayed the modeling results for each census tract.

- Cancer risk from all TACs/sources
- Cancer risk score (percentile) from all TACs/sources
- Cancer burden from all TACs/sources.
- Cancer burden score (percentile) from all TACs/sources
- Cancer risk caused by DPM from on-road mobile sources
- Cancer risk caused by DPM from area sources
- Cancer risk caused by DPM from point sources
- Cancer risk caused by DPM from all emission sources
- Cancer risk caused by all volatile organic compounds (VOCs)
- Cancer risk caused by all heavy metals
- RWC emission rate and annual average $PM_{2.5}$ concentrations (primary emissions only).
- Annual average $PM_{2.5}$ concentrations from all criteria pollutants (primary + secondary).
- Annual average $PM_{2.5}$ concentration ranking/score (percentile) from all criteria pollutants (primary + secondary).

In this assessment, the District used the modeling results of the cancer risk and burden from all TACs/sources to identify and prioritize communities because this approach identifies the total cumulative air pollution impacts to communities, which is consistent with AB 617. Conversely, after a community has been identified, other modeling results have been used to help identify the emission sources and pollutants of concern. Figure 6 shows the cancer risk, in occurrences in a population of one million, from all TACs/sources in Sacramento.

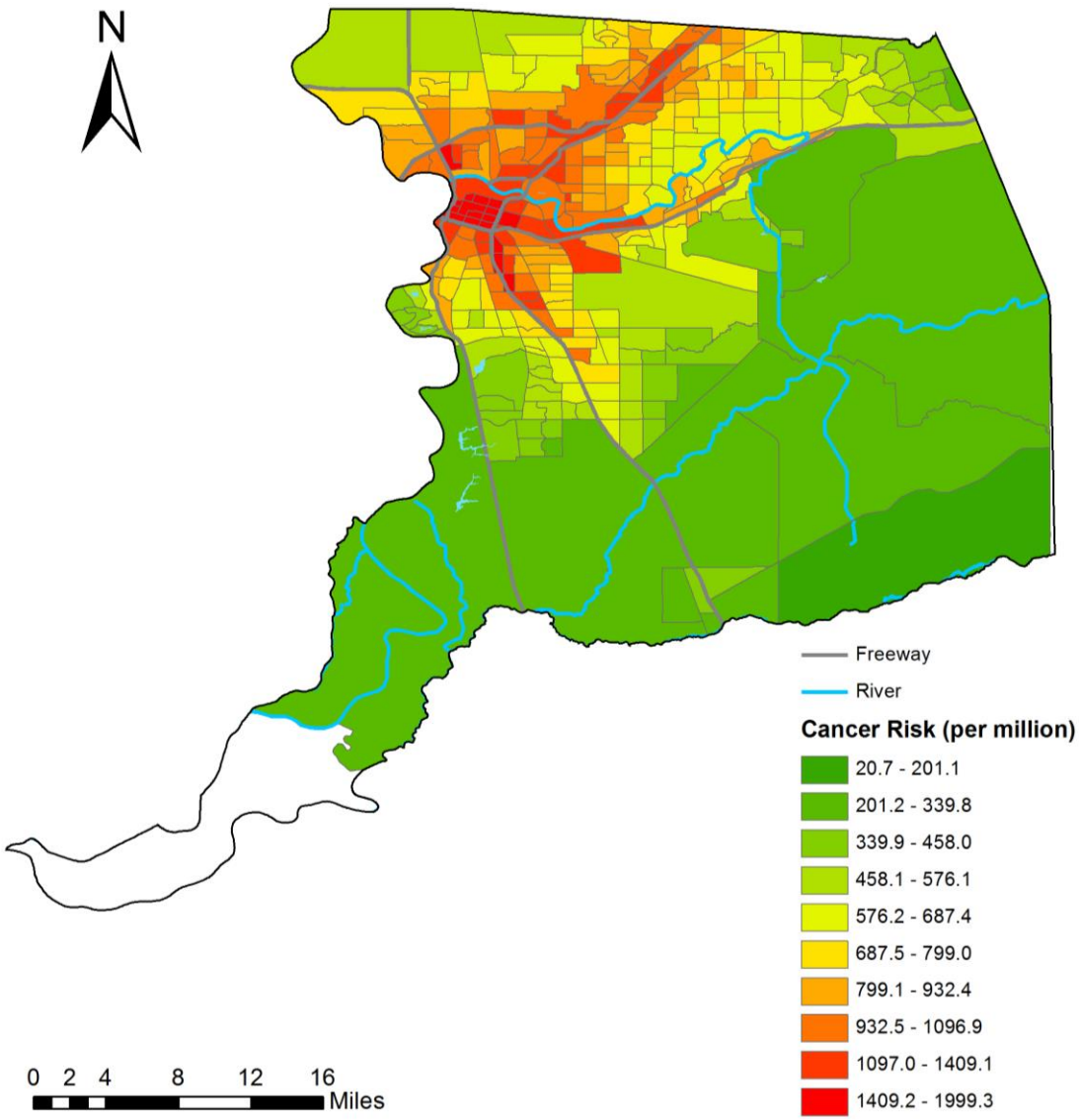

Figure 6. Cancer risk per million from all TACs/source

According to CARB and California Air Pollution Control Officers Association's *Risk Management Guidance for Stationary Sources of Air Toxics*, the estimated statewide average ambient potential inhalation cancer risk is approximately 830 per million for the top ten monitored air toxics and DPM (CARB/CAPCOA, 2015). Although the statewide cancer risk has declined substantially since 1990, there are still some areas that are experiencing higher than average cancer risks. This is clearly the case in Sacramento where the modeling results show that there is a large number of census tracts that are significantly above the state average ambient cancer risk. In fact, the highest cancer risk in Sacramento is almost 2,000 chances in one million, which is more than twice the state average ambient cancer risk. These areas with higher than average cancer risk signify the importance of and need for effective AB 617 outcomes in order to promptly reduce the emissions at the community level, and in the process begin to abate the documented exposure risks in those communities.

While cancer risk is an important indicator of air pollution impacts, the District must also consider the cancer burden, which is the estimated number of potential cancer cases for a given population who is exposed to those responsible emissions for a lifetime (70 years). Highly-populated areas with high cancer risk will have the highest cancer burden. To reduce the cancer burden in an area, air agencies in general can only focus on reducing cancer risk since decisions about population densities and locations are beyond AB 617. Figure 7 shows the cancer burden from all TACs/sources in Sacramento.

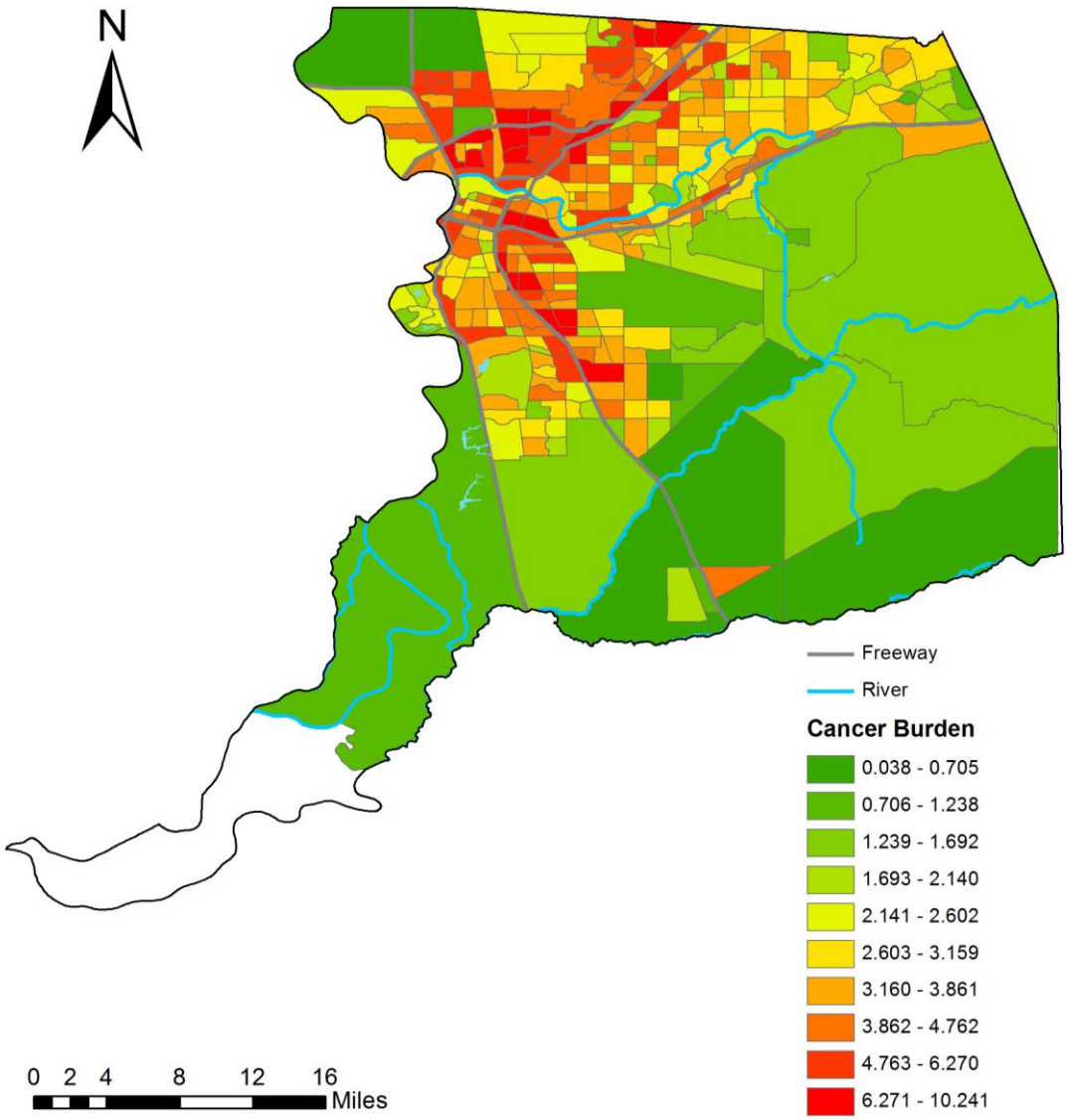

Figure 7. CARB modeled cancer burden.

Community Identification and Prioritization

Community identification and prioritization were determined by the suitability analysis scores and CARB's modeled cancer burden scores as shown in Figure 3. By undergoing this process to identify and prioritize communities, this technical assessment clearly shows several communities that have excessively high exposure burden to TAC and criteria air pollutants. Sacramento has areas that are flanked by major freeway intersections where the air toxic emissions from mobile sources significantly drive up the air pollution risks in nearby communities. In addition, these communities tend to have typically low socioeconomic status, including low-income households, where the residents in the communities do not have the necessary access to information or resources to improve their condition. As such, implementation of the AB 617 program and, most importantly, the subsequent allocation of the necessary Cap-and-Trade resources for emission reduction incentive funds are critical and essential to protecting the public health from localized exposure of air pollution. Although the District analysis has led to the identification of many communities in the Sacramento area that are disproportionately impacted by air pollution to varying degrees and mitigation of impacts in every community should be a priority for state public policy, the implementation of AB 617 has real practical limitations. This assessment only focuses on the communities with the highest air pollution exposure burden and prioritizes those communities for monitoring and other actions. This is representative of the group that are most impacted by air pollution in the region and most susceptible to adverse health impacts.

As previously described, the methodology for the final assessment was designed to focus on the identification of communities with the highest air pollution risk and air pollution related health impacts in disadvantaged and low-income communities, including impacts to the region's most sensitive receptors. The final assessment refined the methodology from the initial evaluation by developing a suitability analysis to score census tracts for identifying and prioritizing communities for AB 617. To ensure the highest burden communities are identified, the suitability analysis was used in conjunction with CARB's modelling of cancer burdens in the capital region. The following describes the District's approach.

A. Community Identification

A community can be defined as a group of people living in the same place, or having a particular characteristic in common, defined by physical and administrative boundaries, local groups and organizations, local activities, or various community participation roles. Based on this definition, the District identified communities based on existing boundaries indicated by census tracts that have high suitability scores or cancer burden scores. The following steps were taken to identify the communities:

1. The census tracts in the top 2 percentile of the CARB modeled cancer burden scores or the top 5 percentile of the suitability scores were identified as shown in the Figure 8.

- In order to identify the most impacted areas in Sacramento County, the top 2 percentile of the modeled cancer burden score was identified. EPA has used the 98th percentile in establishing federal air quality standards because this threshold limits the occurrence of peak concentrations and provides stability to the air quality data. Statistically, the 98th percentile roughly corresponds to values outside 2 standard deviations of the mean for normally distributed data. For this assessment, the District is interested in the peak values (most impacted census tracts) and thus has selected census tracts in the 98th percentile or greater range.

- Similar to the modeled cancer burden, the highest suitability scores were selected to identify the most impacted areas of Sacramento County. The District selected the top 5 percentile to ensure inclusion of the most impacted people in the region, while retaining community-scale areas as outlined in AB 617. This represented the census tracts most impacted by health impacts, socioeconomic factors and emission sources, which may not include those reflected in the top 2 percentile of the cancer burden score.

2. Census tracts that are adjacent to each other were grouped together.
3. A half mile buffer was placed around a census tract or multiple census tracts if they were grouped together to form the boundaries of a community. The half mile buffer was included to acknowledge that air pollution impacts do not stop at a census tract.

Following the steps above, ten communities were identified and shown in Figure 9. Each of the communities are discussed in detail in Table 5.

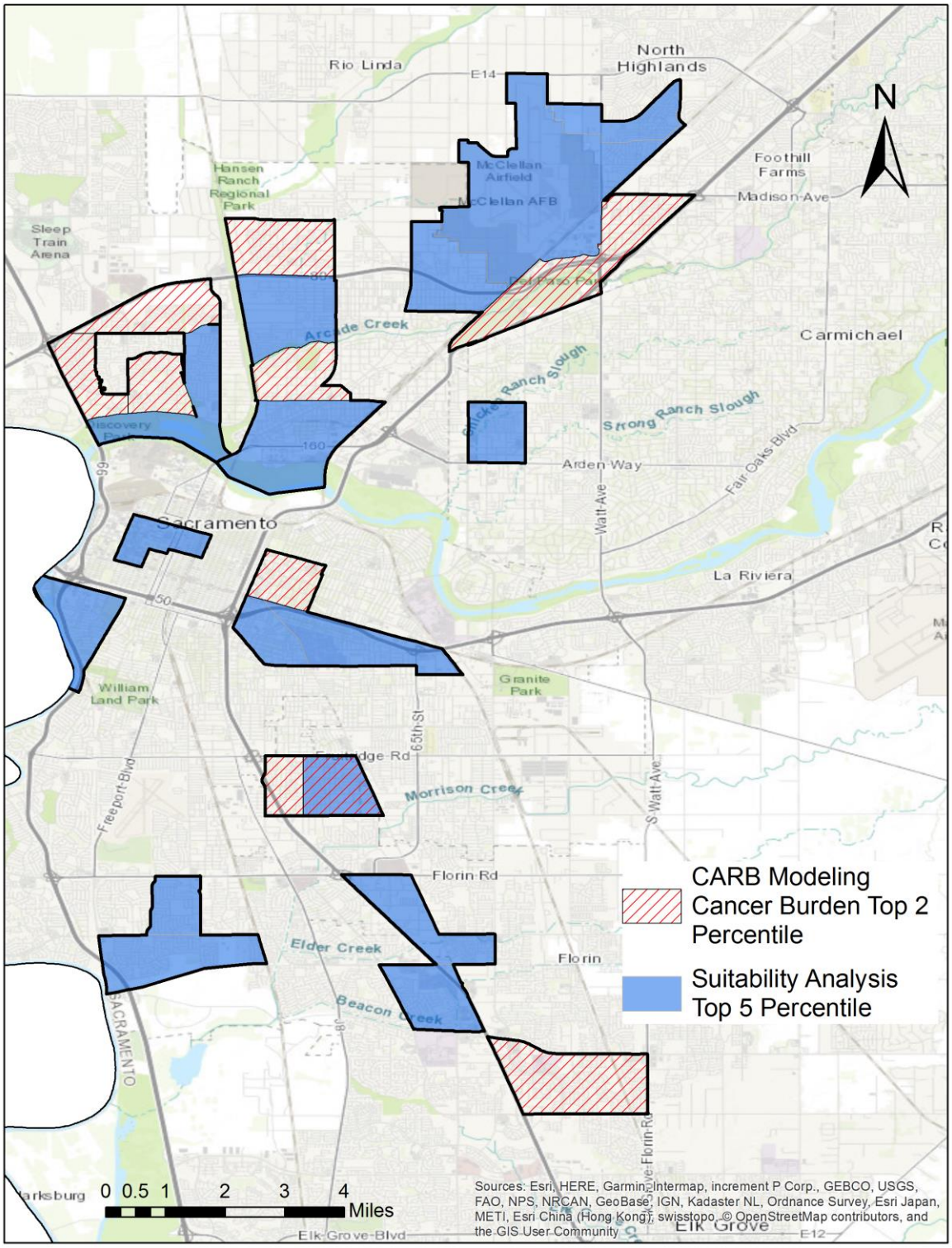

Figure 8. Census tracts in the top 5 percentile of the suitability score or the top 2 percentile of the cancer burden score.

B. Community Prioritization

The District conducted a thorough analysis to ensure that communities with the highest exposure burden from air pollution within Sacramento County were identified. As discussed above, this identification process was done using the suitability analysis and CARB's toxic emissions modeling. The next step was to prioritize the ten communities according to the highest suitability score and CARB's cancer burden score identified in each community. These ten communities represent about 11% of the population of Sacramento County. Many of the residents in these communities live, work or attend school near major roads and would be more susceptible to health problems associated with air pollution exposures. The District recognizes that the highest scores may come from different census tracts within a community; however, the District considered each community as a whole and not by census tracts, and the highest scores are from within that community. This conservative approach ensures that communities with the highest exposure air pollution burden are the first communities prioritize for air monitoring. The following outlines the steps to prioritize communities:

1. For each community, all census tracts that were identified by the community identification process were grouped according to the associated suitability scores and CARB's modeled cancer burden score.
2. For all communities, the suitability scores from all identified census tracts were normalized. Normalizing the scores retains the relative spread in the distribution of score values but ensures that the total score is not overly influenced by extreme or outlier values.
3. For all communities, the cancer burden scores from all identified census tracts were normalized.
4. The maximum normalized suitability score and maximum normalized cancer burden score from the census tract(s) identified for each community[9] were summed to calculate a prioritization score. A theoretical maximum of two points were possible for each census tract: one point for the normalized suitability score and one point for the CARB modeled cancer burden score.
5. The highest prioritization score resulted in the highest priority community, which was ranked first. Similarly, the lowest prioritization score resulted in the lowest priority, which was ranked tenth on the District's list.

[9] Scores of census tracts within the ½ mile buffer of each community were not used because they were not completely within the boundaries of the community and not used to initially identify the community. These boundaries will still be included in the community monitoring area.

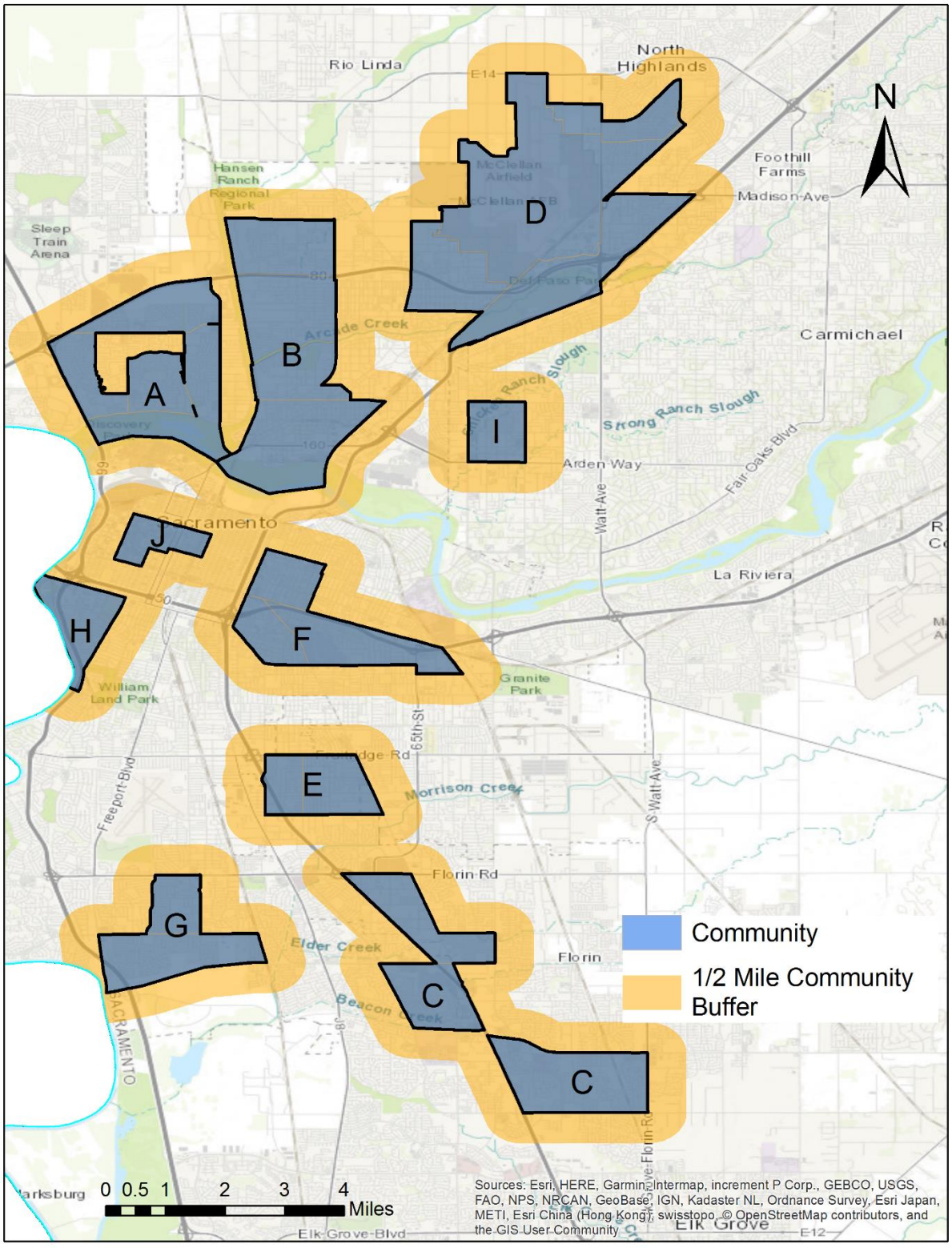

Figure 9. Ten Identified Communities

Table 4 shows the AB 617 community prioritization results. A detailed table that shows all census tracts and their associated (actual and normalized) scores is shown in Appendix B.

Table 4: Community Ranking and Prioritization Scores

Identified Community	Ranking	Prioritization Score
Community A	1	1.920
Community B	2	1.887
Community C	3	1.831
Community D	4	1.528
Community E	5	1.519
Community F	6	1.411
Community G	7	1.253
Community H	8	1.094
Community I	9	1.015
Community J	10	0.944

C. Air Quality Monitoring Recommendations

Ten communities have been identified as areas with the highest exposure burden to air pollution and prioritized for community air monitoring in the Sacramento region. Table 5 shows the air monitoring needs for each community. Specifically, these include the type of emissions to monitor in order to determine the source for development of a community emissions reduction program. As discussed previously, the air monitoring identification was based on the technical assessment from both the suitability analysis and CARB's toxic emissions modeling, on other studies such as the District's Wood Smoke Study, and the District's emission inventories for mobile, stationary, and area-wide sources. This information, along with the unique characteristics of each community, helped determine the type of monitoring to conduct in each community.

The District is considering to conduct the initial phase of new community air monitoring during year one using a combination of conventional, regulatory grade monitoring equipment housed in a mobile laboratory and a new network of low-cost air sensors. A mobile air monitoring laboratory can offer the same capability and measurement rigor as a fixed air monitoring station, but with the added flexibility to be readily moved and setup in any location of interest. The mobile laboratory is anticipated to provide the full range of air monitoring information as it can be equipped with real-time measurement instruments and equipment for sample collection and subsequent analysis. For instance, the District is considering sample collection for speciation of toxic gaseous and particle compounds, which can assist in source attribution at the community level. Analytical methods use this type of data for emission inventory reconciliation, source apportionment, and comparative analyses of emissions data with surface air quality data. Receptor models, such as positive matrix factorization or chemical mass balance analytical data, can also help to identify likely emission sources that can be targeted in a new program for community emissions reductions. This process often identifies weaknesses or omissions in emission

inventories, which can then be iteratively resolved until inventories and ambient data are reconciled. Examples of this well-known method can be found in Haste et al. (1998), Korc et al. (1995), and Fujita et al. (1992). The goal for the mobile laboratory is to realize sufficient measurement capability to be able to determine the mix of stationary, mobile, and area wide emission sources that may contribute to the elevated levels of risk and burden determined for a specific community. Knowledge of local sources and conditions will inform the specific measurements to be conducted in a community.

A network of low-cost air sensors can complement the mobile laboratory measurements. Sensor technology has progressed to a degree where they can provide a powerful new way for the rapid and broad assessment of pollution at a level of temporal and spatial resolution not offered by the existing fixed station networks. Low-cost sensors can be used for saturation monitoring of a community as they can be readily located on school grounds, commercial buildings, and even private residences. The technical literature today includes many examples of successful monitoring campaigns conducted with low-cost sensors (e.g. Williams et al., 2018). EPA, CARB, air districts, and many other air quality practitioners have growing experience with this emerging technology and how it could really aid and revolutionize localized air monitoring (e.g. CARB Community Air Monitoring Toolbox (CARB, 2018a), EPA Air Sensor Toolbox (EPA, 2018a), and South Coast Air Quality Management District Air Quality Sensor Performance Evaluation Center – AQ-SPEC (SCAQMD, 2018)). Presently, the District is investigating a number of sensor technologies on the market in anticipation of the new monitoring efforts. If selected, the District will develop a detailed year one community air monitoring plan for public consideration. In it, ample discussion of the measurement approach in the mobile laboratory and the sensor network will be offered for public comment.

The new information gathered will also allow for the evaluation and improvement of local emission inventories and assist directly with the development of community-specific strategies to reduce the identified environmental risks and burdens. Knowledge of the emission profile specific to communities are essential for the development of emission reduction programs. The new information can also be used in the event that new District rules or refocused incentive programs enabled by Cap-and-Trade state funding are warranted to achieve the objectives of AB 617.

The District's goal is to establish air monitoring in the recommended communities as soon as possible; however, the development and implementation of a community monitoring program are time consuming and resource intensive. It includes the purchase of monitoring equipment, finding appropriate monitoring locations, procuring contractors and developing contracts with laboratories, establishing a database for maintaining and validating the air monitoring data, and developing a data quality assurance plan and standard operating procedures. In recognition of the ambitious timeframes in AB 617, the District is well underway preparing for deployment of the new air monitoring strategies, but collection of the necessary actionable data to base some potential new policies for community emissions reductions will take time. For example, if regulations and reduction programs are to be developed, there will be a need to study and understand seasonal meteorological variations and their influence on localized pollution. Therefore, initial

monitoring in a community and the development of an emissions reduction program may take up to a year or longer.

Most critically, to be able to conduct the expected community air monitoring, the District needs on-going financial support from the state. The estimated Year 1 costs for monitoring in one community is approximately $1.5 million, with an on-going $1 million operational costs in subsequent years. The initial Year 1 costs include all the expected expenditures that CARB is very familiar with such as the upfront capital outlay for new equipment, staffing, contractual work for site development, siting appropriate locations, consumables and maintenance, convening a community steering committee, data analysis, database set up, development of quality assurance plans and standard operating procedures, maintaining the monitoring equipment, and validating air monitoring data. These costs of implementation for AB 617 have been well documented and extensively discussed in the dialogue the District and its advocates have had with various legislators and legislative staff. At the same time, the District will need additional support to implement the additional elements in AB 617, including the development of the emissions reduction programs, the new emission reporting and clearinghouse work, rule development, Best Available Retrofit Control Technology (BARCT) analysis, and the rest of AB 617 not addressed in this final community recommendation report.

Table 5. Community Air Quality Monitoring Recommendations

Community	Priority	Overview of the Issues	Monitoring Recommendation
Community A	1	Community A includes the South Natomas area, which is located southeast of the Interstate 80 and 5 intersection. This area is distinctly different than the newer North Natomas community, which has not been identified as priority community for the Community Air Protection program. The South Natomas community was identified with four census tracts. One census tract was identified in the top 5 percentile of the suitability analysis and three census tracts in the top 2 percentile for cancer burden. Part of this community is located in the DAC. CARB's toxic emissions modeling shows that this community has the highest cancer burden score in the region and a cancer risk between 924 and 1,769 chances in a million, which at the maximum, is double the statewide average ambient cancer risk of 830 chances in one million. Based on CARB's toxic emissions modeling, cancer risks from on-road mobile sources emissions (Appendix C) are between 66% and 78% of the total cancer risk. This community was identified as one of the EJ communities in the District's wintertime air toxics from wood smoke in Sacramento study. The monitor in this community had the highest or second highest recorded concentrations in the study for traffic-related air toxic emissions such as benzene and toluene. The study determined that this community is more impacted by mobile source emissions than residential wood combustion in the wintertime when compared to a non-EJ community.	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.

Community	Priority	Overview of the Issues	Monitoring Recommendation
Community B	2	Community B includes the Norwood/Old North Sacramento areas, and is located adjacent to Community A. This community was identified with four census tracts. Two census tract were identified in the top 5 percentile of the suitability analysis and two census tracts in the top 2 percentile for cancer burden. Part of this community is located in the DAC. The area includes numerous railroad lines and emissions from mobile sources, including a section of Interstate 80 and Highway 160. CARB's toxic emissions modeling shows that this community has a cancer risk between 913 and 1,203 chances in a million, which is significantly above the statewide average ambient cancer risk of 830 chances in a million. Based on CARB's toxic emissions modeling, the cancer risks from on-road mobile sources emissions are between 63% and 66% of the total cancer risks. This community was identified as one of the communities in the District's wintertime air toxics from wood smoke in Sacramento study (EJ community), which determined that this community is more impacted by mobile sources emissions than residential wood combustion in the wintertime when compared to a non-EJ community.	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.
Community C	3	Community C includes the Florin area. This community includes three census tracts, which bracket (located on the east or west side) of Highway 99. Two census tract were identified in the top 5 percentile of the suitability analysis and one census tract in the top 2 percentile for cancer burden. Part of this community is located in the DAC. CARB's toxic emissions modeling shows that this community has a cancer risk as high as 1,040 chances in a million. Based on CARB's toxic emissions modeling, cancer risks from on-road mobile sources emission are between 65% and 75% of the total cancer risks. Parts of this community were included in the District's wintertime air toxics from wood smoke in Sacramento	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.

Community	Priority	Overview of the Issues	Monitoring Recommendation
		Study (EJ community), which determined that this community is more impacted by mobile sources emissions than residential wood combustion in the wintertime when compared to a non-EJ community.	
Community D	4	Community D includes the McClellan Park area. This community was identified with four census tracts. McClellan AFB consists of two different areas - southwest and northeast of McClellan AFB. Three census tracts were identified in the top 5 percentile of the suitability analysis and one census tract in the top 2 percentile for cancer burden. Emissions from mobile sources include Interstate 80, which runs through the center of this area and major railroad lines that parallel Interstate 80. CARB's toxic emissions modeling shows that this community has a cancer risk between 878 and 1,264 chances in a million, which is above the statewide average ambient cancer risk of 830 chances in a million. Based on CARB's toxic emissions modeling, cancer risks from on-road mobile sources are between 66% and 76% of the total cancer risks. Public issues that were identified are lack of adequate public transportation and older vehicles; and income, hospitals and health facilities, emission centers. CARB's toxic emissions modeling identified the area west of McClellan AFB as higher in cancer risk. No measurements were taken in this area during the District's wintertime air toxics from wood smoke study, therefore the impact of wood smoke on HAP and $PM_{2.5}$ concentrations is unknown and would require investigation.	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.

Community	Priority	Overview of the Issues	Monitoring Recommendation
Community E	5	Community E includes areas near Fruitridge Road and California State Route 99. This community was identified with two census tracts. Both census tracts were identified as being in the top 5 percentile of the suitability analysis and one census tract in the top 2 percentile for cancer burden. This community is located in the DAC. CARB's toxic emissions modeling shows that this community has a cancer risk between 958 and 1,438 chances in a million, which is above the statewide average ambient cancer risk of 830 chances in a million. Based on CARB's toxic emissions modeling, cancer risks from mobile sources are between 68% and 74% of the total cancer risks. Highway 99 runs through part of this community. It was included in the wood smoke study as an EJ sample community. The study determined that this community is more impacted by mobile source emissions than residential wood combustion in the wintertime when compared to a non-EJ community.	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.
Community F	6	Community F includes the North Oak Park and Medical Center areas. This community was identified with three census tracts. Two census tracts were identified in the top 5 percentile of the suitability analysis and one census tract in the top 2 percentile for cancer burden. The community is located just east of the intersection of Highway 99 and 50. CARB's toxic emissions modeling shows that this community has a cancer risk between 1,014 and 1,625 chances in a million, which is above the statewide average ambient cancer risk of 830 chances in a million. Based on CARB's toxic emissions modeling, cancer risk from on-road mobile sources emissions are between 68% and 71% of the total cancer risks. This community was included in the District's wintertime air toxics from wood smoke in Sacramento study (non EJ community).	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.

Community	Priority	Overview of the Issues	Monitoring Recommendation
Community G	7	Community G includes the Meadowview area. This community includes two census tracts, which were both identified in the top 5 percentile of the suitability analysis score. A portion of one of the census tracts goes through I-5. Health and socioeconomic factors were expressed as a concern by community members in the survey. This community was included in the District's wintertime air toxics from wood smoke in Sacramento study (EJ community).	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.
Community H	8	Community H includes the Upper Land Park area and is located along Interstate 5 and immediately south of the intersection of Interstate 80 and Interstate 5. There is a high density of railroad tracks in this community. This community was identified with one census tract, which is within the DAC. CARB's toxic emissions modeling shows that this community has a cancer risk of 1,220 chances in a million, which is above the statewide average ambient cancer risk of 830 chances in a million. Based on CARB's toxic emissions modeling, cancer risk from on-road mobile sources emissions was approximately 75% of the total cancer risk. No measurements were taken in this area during the District's wintertime air toxics from wood smoke in Sacramento study, therefore the impact of wood smoke on HAP and $PM_{2.5}$ concentrations is unknown and would require investigation.	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.
Community I	9	Community I includes the Arden area. This community was identified with one census tract. CARB's toxic emissions modeling shows that this community has a cancer risk of 967 chances in a million, which is above the statewide average ambient cancer risk of 830 chances in a million. Based on CARB's toxic emissions modeling, cancer risk from on-road mobile sources emissions was approximately 70% of the total cancer risk. This community was	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.

Community	Priority	Overview of the Issues	Monitoring Recommendation
		included in the District's wintertime air toxics from wood smoke in Sacramento study (EJ community).	
Community J	10	Community J includes the downtown Sacramento area. This community was identified with one census tract. It is located in the general downtown Sacramento area, and the census tract is a DAC. CARB's toxic emissions modeling shows that this community has a cancer risk of 1,540 chances in a million, which is above the statewide average ambient cancer risk. The cancer risk of several of the communities within the ½ mile buffer is twice that of the statewide average of 830 chances in a million. Based on CARB's toxic emissions modeling, cancer risk from on-road mobile sources emission was approximately 70% of the total cancer risk. The census tracts along Business Route 80, which are within the identified half mile buffer, have cancer risks from mobile sources emission that ranges from 75% to 77% of the total cancer risks. Downtown Sacramento represents the employment center for the county and has a dense road network and a high density of railroad tracks, which contribute to diesel particulate matter concentrations in the area. This community was included in the District's wintertime air toxics from wood smoke in Sacramento study (non EJ community).	Speciated compounds and multiple wavelength black carbon in order to determine mobile sources emissions.

VII. COMMUNITY RECOMMENDATIONS

The community identification process resulted in ten communities that were prioritized for air monitoring. Each community was prioritized in either Year 1, Years 2 – 5, or Years 6 and beyond based on their community prioritization score (Table 6). In Year 1, the District is recommending two communities: Community A or B and Community C. Staff recognizes that Communities A and B are ranked first and second based on the prioritization score, but due to their close proximity and the similarity in potential air pollution impacts, the District recommends Community C in place of either Community A or B. The recommendation of Community C will provide a greater understanding of the regional air quality disparities in Sacramento. Whichever community is not selected for Year 1 will be the first priority in Year 2.

The District understands that funding in future years for communities is contingent upon state appropriations. Thus, the District will adjust the number of communities recommended for monitoring in Year 1 or subsequent years depending on the availability of state funding.

Table 6. Community Recommendations

	Community Selection*
Year 1	Community A (1) or B (2) and Community C (3)
Years 2 – 5	Community A (1), B (2) or C (3) (not selected in Year 1) and Communities D (4), E (5), F (6), G (7), and H (8)
Years 6 and beyond	Communities I (9) and J (10)

*The prioritization of each community is shown from highest (1) to lowest (10).

Selection of Communities A or B, and C will allow a better understanding of mobile source emissions and potential impacts in different localized areas of Sacramento. From CARB's toxic emissions modeling, the cancer risks for the recommended communities are mainly driven by the mobile sources emissions where these can be responsible for as much as 75% of the total. These communities also include census tracts that are identified as DACs. The two Year 1 communities are ideal for CARB for monitoring due to the pollution source mixes, which are consistent with those listed in Appendix B of the *Draft Community Air Protection Blueprint* that include urban mixes of traffic, commercial, and residential sources of air pollution.

The results from monitoring these recommended communities would be transferrable to other communities within Sacramento and throughout the state facing similar air pollution problems. In addition, these communities were included in the Wintertime Air Toxics from Wood Smoke in Sacramento study (District, 2018). As part of that study, the District conducted wintertime air monitoring in these areas. The District has established a good working relationship with residents and community groups in these areas. Selected communities for AB 617 would be able to utilize these working relationships that the

District has with community leaders and members. These recommended communities are also next freeways known to have heavy traffic and congestion where the Sacramento Area Council of Governments (SACOG) has identified several capacity improvement projects[10]. Monitoring in these communities would provide useful information to show the effectiveness of these improvement projects.

CARB will select the first set of communities for monitoring and the funding to go along by October 1, 2018. Each subsequent year, CARB will add communities for focused action for either community air monitoring, community emissions reduction programs, or both.[11] The Sac Metro Air District looks forward to partnering with the state on these future efforts.

VIII. CONCLUSION

The final assessment performed by the District is based fully on the criteria set forth in AB 617 and goes beyond the application of only CES3 by incorporating other more relevant local factors of air quality concerns in the Sacramento region. The communities were selected based on a quantifiable scientific technical approach using the results of a robust suitability analysis, which includes emissions sources, sensitive receptors, and health and socioeconomic factors, and CARB's toxic emissions modeling for cancer burden. Community input was strictly factored in with respect to concerns expressed during the public meetings and in surveys.

This assessment shows that there are number of communities in the Sacramento region that have excessive cancer risks higher than the statewide average ambient cancer risk. The elevated cancer risks are due to the fact that Sacramento has areas that are in close proximity to busy freeways and transportation corridors, where air toxic emissions from mobile sources disproportionately impact the nearby environment. In addition, most of the communities that experience adverse air pollution impacts are considered disadvantage and low-income. Consequently, residents in these communities typically lack the financial means or resources to improve air quality and their quality of life. The air pollution impacts in these communities represent an ideal opportunity for improvement by the letter of the AB 617 law.

Although many more communities are adversely impacted by air pollution in the region, the District recognizes the practical limitations in AB 617 implementation. Only ten communities with the highest exposure burden to air pollution are identified in this year one effort. These ten communities were prioritized and recommended for community air monitoring to be considered by CARB in the State's Community Air Protection Program. For Year 1, the District recommends two communities for air monitoring. Monitoring in these areas is essential in establishing the baseline air pollution concentrations, including air toxics, in order to develop as appropriate a subsequent community emissions reduction program in fulfillment of the AB 617 mandate for the Sacramento region.

[10] These projects can be viewed on SACOG's interactive map (hyperlinked).
[11] Identified as Step 3 in CARB's three step process of identifying, assessing and selecting communities for funding (CARB Draft Community Air Protection Blueprint, pg. B-1).

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Appendix A – Suitability Analysis

A suitability analysis is broadly defined as a method of determining the appropriateness of a given area within a system for a particular use. In this assessment, suitability analysis was used to determine areas within Sacramento County with the estimated highest cumulative exposure burden to air pollution based on available data.

As described in Section VI, three categories of data at census tract resolution were used to determine the suitability of specific communities: Exposure to Air Pollution (Emission Sources), Sensitive Populations (Sensitive Receptors), and Health and Socioeconomic Factors (Population Characteristics). Table A.1 describes the source and resolution of each data source. References to sources are located in the References section of this document.

Table A.1 – Description of data used in suitability analysis.

Category	Factor	Date	Source	
Emission Sources	Traffic Density	2013	CES3	
	Diesel Emissions	2012	CES3	
	$PM_{2.5}$	2012 – 2014, average of quarterly means over three years	CES3	
	Toxic Releases from Facilities	2011 – 2013, averaged	CES3	
	Retail Gasoline Dispensing Facilities	2013 – 2016	District	
	Emergency Engines	2016	District	
	AB 2588 Air Toxics "Hot Spots" Program Core Facilities	2012 – 2016	District	
	Greenhouse Gas (GHG) Emissions from Large Stationary Sources	2016	District	
Sensitive Receptors	Parks	2018	Sacramento County	
	Schools	2018	City of Sacramento	
	Licensed Healthcare Facilities	2017	CHHS	
	Child Care Centers	2018	CDSS	
Population Characteristics	Cardiovascular Disease	2011 – 2013, averaged	CES3	Population Characteristics Layer CES3
	Low Birth-Weight	2006 – 2012, averaged	CES3	
	Asthma Emergency Department Visits	2011 – 2013, averaged	CES3	
	Educational Attainment	2011 – 2015, averaged	CES3	
	Linguistic Isolation	2011 – 2015, averaged	CES3	
	Housing Burdened Low Income Households	2009 – 2013, 5-year estimate	CES3	
	Poverty	2011 – 2015, 5-year estimate	CES3	
	Unemployment	2011 – 2015, 5-year estimate	CES3	
	AB 1550 Low Income Communities	2017	CARB	

Legend:

CES3	CalEnviroScreen 3.0
OSHPD	Office of Statewide Health Planning and Development
CDSS	California Department of Social Services
CARB	California Air Resources Board

The District considered the multiple indicators of impacts described in Table A.1 to determine the areas for consideration for the initial list of candidate communities subject to air monitoring and/or community emissions reduction program. A modified suitability analysis technique was used to determine these areas based on census tracts. Figure B-1 outlines the technique used to calculate the suitability of each census tract for consideration.

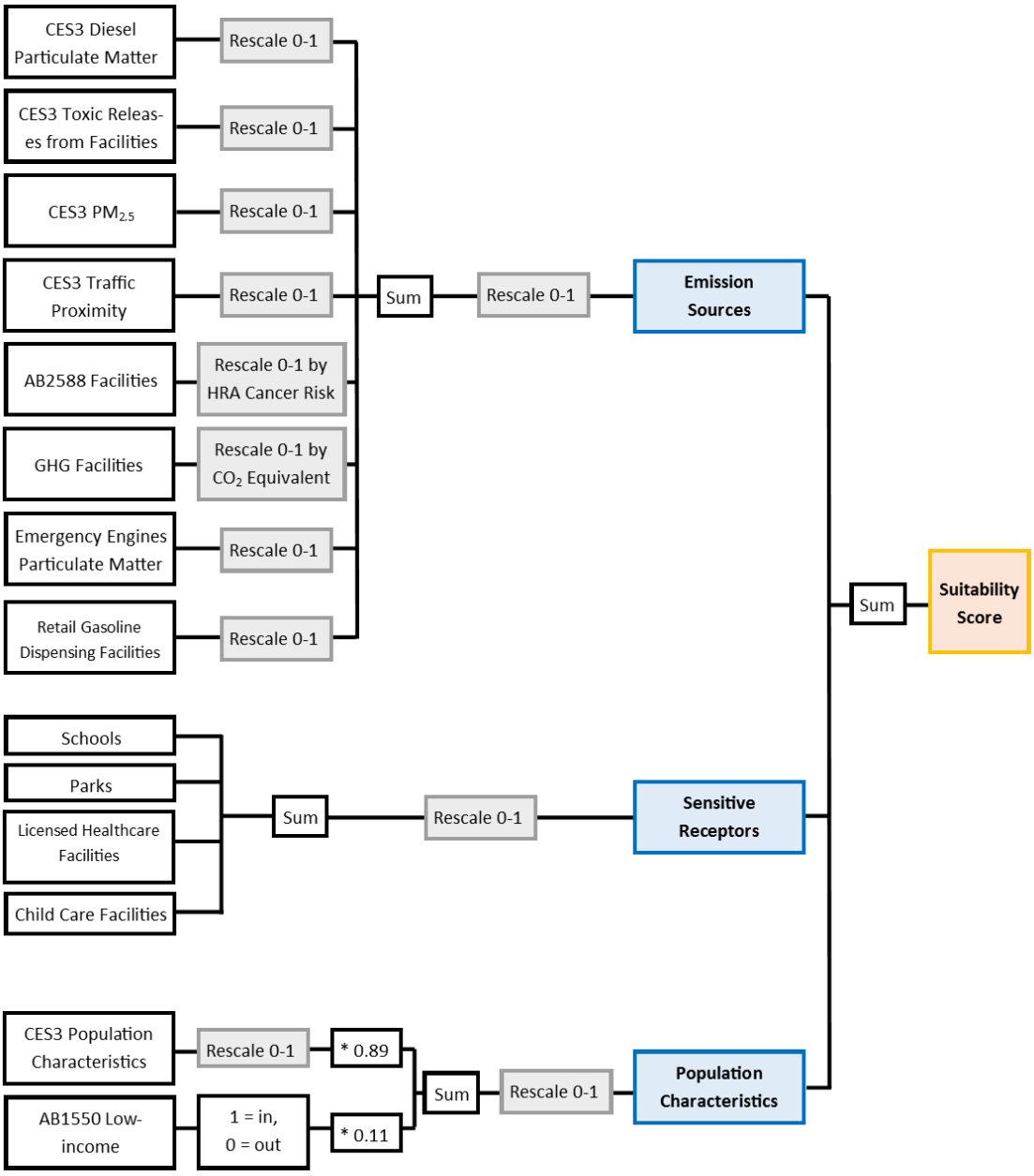

Figure A-1. Suitability analysis methodology flowchart.

Each data source was projected to census tract resolution. Some data sources such as CES3 and AB 1550 low-income are provided by census tract. Other data sources such as parks, or AB 2588 facilities are determined as point sources. The goal of the suitability analysis was to provide a score for each census tract. Therefore, for point sources, the total number of sources from each particular data source within each census tract was summed (i.e. if there are 3 parks within a census tract, the parks score would be 3). Once all the data sources were projected to census tract resolution, a score for each of the three categories could be determined.

Emission Sources

For Emission Sources, there are a total of 7 data sources which are combined to provide a value for each census tract. The first step of the analysis was to perform a unity-based normalization (rescale) on each of the 7 data sources to output a value from 0 – 1. Equation 1 describes how this rescaling was calculated.

$$z_i = \frac{x_i - \min(x)}{\max(x) - \min(x)} \quad (1)$$

Where z_i is i^{th} normalized value, and x is an original value from $x = (x_1, \ldots, x_n)$. This rescaling method assigned a value of 0 to the lowest value in the data set, and a 1 to the highest value, all while retaining the initial distribution information within the data set. Table A.2 is an example of the unity-based rescaling method applied to some sample values.

Table A.2 – Example of unity-based normalization (rescaling).

Initial Value	Rescaled Value
2	0.0
5	0.3
8	0.6
10	0.8
11	0.9
12	1.0

The AB 2588 sources were rescaled by health risk assessment (HRA) cancer risk, and the GHG facilities were rescaled by CO_2 equivalent emissions. Once each of the 7 data sources were rescaled, then for each census tract, the 7 rescaled values were summed. This provided a value for each census tract between 0 and 7 containing the information from all 7 data sources. Lastly, these summed values were then rescaled once again to provide an Emission Source value from 0 – 1 for each census tract.

Sensitive Receptors

There are a total of 4 data sets incorporated into the Sensitive Receptors value. For each census tract, the total number of sensitive receptors from the 4 data sets was determined by summing the 4 values. For example, if there were 3 parks, 1 school, 2 licensed healthcare facilities, and 4 daycare facilities within a census tract, the value for that census tract would be 10 (i.e. 3 + 1 + 2 + 4 = 10). The total number of sensitive receptors for each census tract based on the 4 data sets was then rescaled to provide a value for Sensitive Receptors from 0 – 1 for each census tract.

Population Characteristics

There are a two data sets which make up the Population Characteristics value, the CES3 Population Characteristics (PC) score and the AB 1550 Low-Income (AB1550) determination. The first step to determining the overall value for Population Characteristics was to rescale the PC score from 0 – 1 for each census tract. For the AB1550 data set, if a census tract was within the determined boundaries of the AB 1550 determination, then the census tract was assigned a value of 1. If it was outside the boundaries, it was assigned a value of 0. The PC and AB1550 data were then combined to determine the Population Characteristics value. However, the CES3 Population Characteristics data set itself is a combination of 8 different factors. Therefore, a factor of 0.89 (8/9) was applied to the PC values and 0.11 (1/9) to the AB1550 values in order to maintain equal weighting of all layers. The weighted PC and AB1550 values were then summed and rescaled to provide a value ranging from 0 – 1 for Population Characteristics.

Suitability Score

The final suitability score was calculated as the sum of the Emission Sources, Sensitive Receptors, and Population Characteristics values. The final scores had a theoretical range of 0 – 3. This score enabled the District to best identify census tracts within Sacramento County with the estimated highest cumulative exposure burden to air pollution based on available emission, sensitive receptor, and socioeconomic data.

Appendix B – Community Prioritization Scores

Table B.1 shows the detailed prioritization score for each of the communities outlined in Section VI. The table outlines each census tract within each community and their associated (actual and normalized) value. Figure B-1 shows a map of the communities with labeled census tracts.

Table B.1: Community Prioritization Scores

				Normalized 0-1 *		
Identified Community	Census Tract	Suitability Score	CARB Cancer Burden	Suitability Score	CARB Cancer Burden	Prioritization Score
A	6067007004	1.324	7.510	0.424	0.617	1.920
	6067007007	1.747	4.935	**0.920**	0.253	
	6067007011	1.411	10.222	0.526	**1.000**	
	6067007014	1.113	7.642	0.177	0.635	
B	6067006701	1.412	9.422	0.527	**0.887**	1.887
	6067006702	1.815	6.883	**1.000**	0.528	
	6067006800	1.481	7.431	0.608	0.606	
	6067006900	1.776	5.717	0.954	0.363	
C	6067005002	1.769	6.504	**0.946**	0.475	1.831
	6067009322	1.416	9.402	0.532	**0.884**	
	6067009606	1.689	4.869	0.852	0.244	
D	6067006400	1.641	6.023	0.796	0.407	1.528
	6067007301	1.708	4.361	0.874	0.172	
	6067007403	1.742	3.977	**0.914**	0.118	
	6067007413	1.280	7.486	0.372	**0.613**	
E	6067004601	1.761	7.262	**0.937**	0.582	1.519
	6067004602	1.400	7.269	0.513	**0.583**	
F	6067001500	0.962	7.020	0.000	**0.548**	1.411
	6067001700	1.698	4.844	**0.863**	0.240	
	6067001800	1.694	6.252	0.858	0.439	
G	6067004202	1.712	3.156	0.879	0.002	1.253
	6067004300	1.747	5.505	**0.920**	**0.333**	
H	6067002200	1.687	4.874	0.849	0.244	1.094
I	6067005505	1.678	4.386	0.840	0.175	1.015
J	6067001101	1.768	3.145	0.944	0.000	0.944

* Maximum values are **bold**.

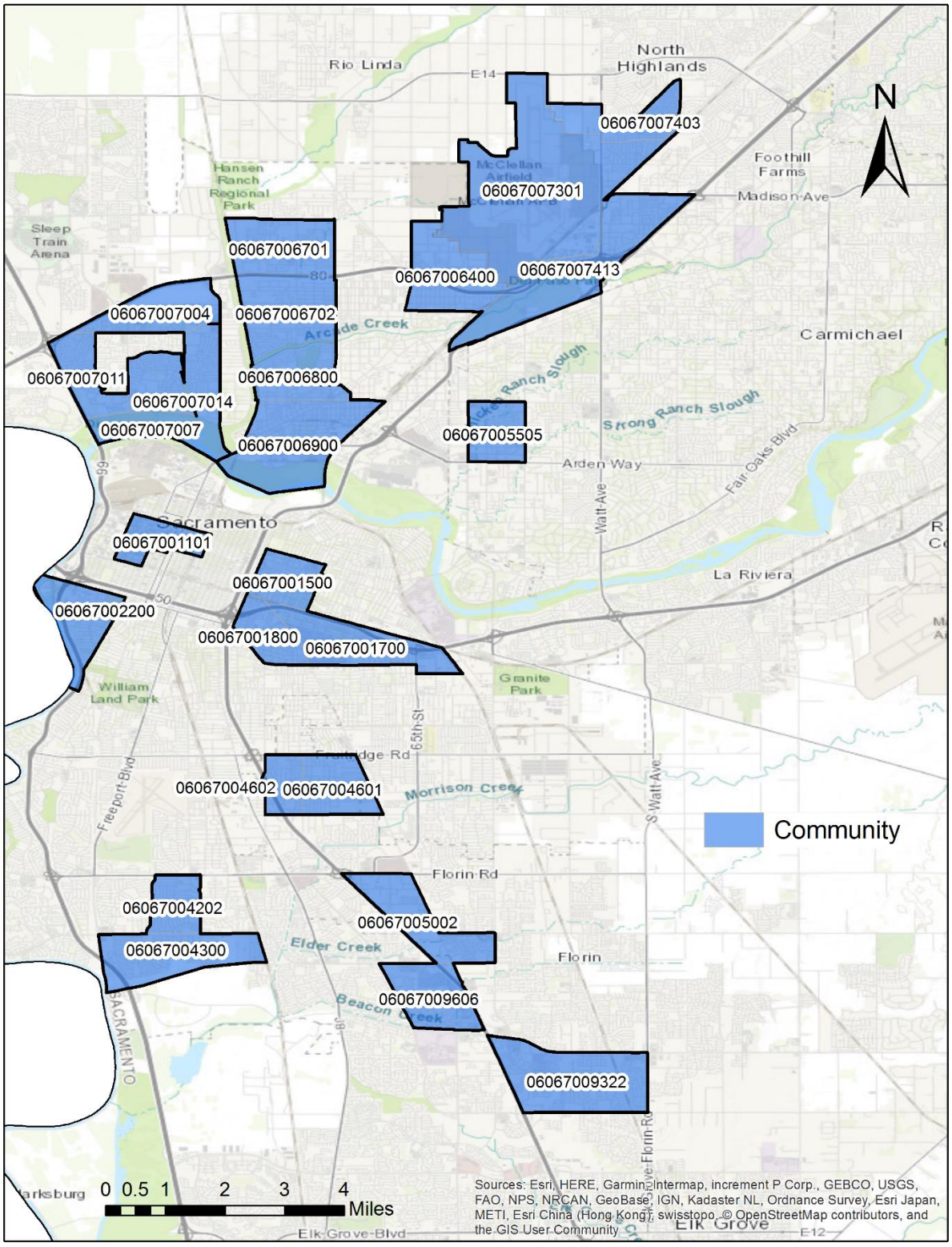

Figure B-1. Communities labeled by census tract.

Appendix C – CARB's Toxic Emissions Modeling for On-road Mobile Sources

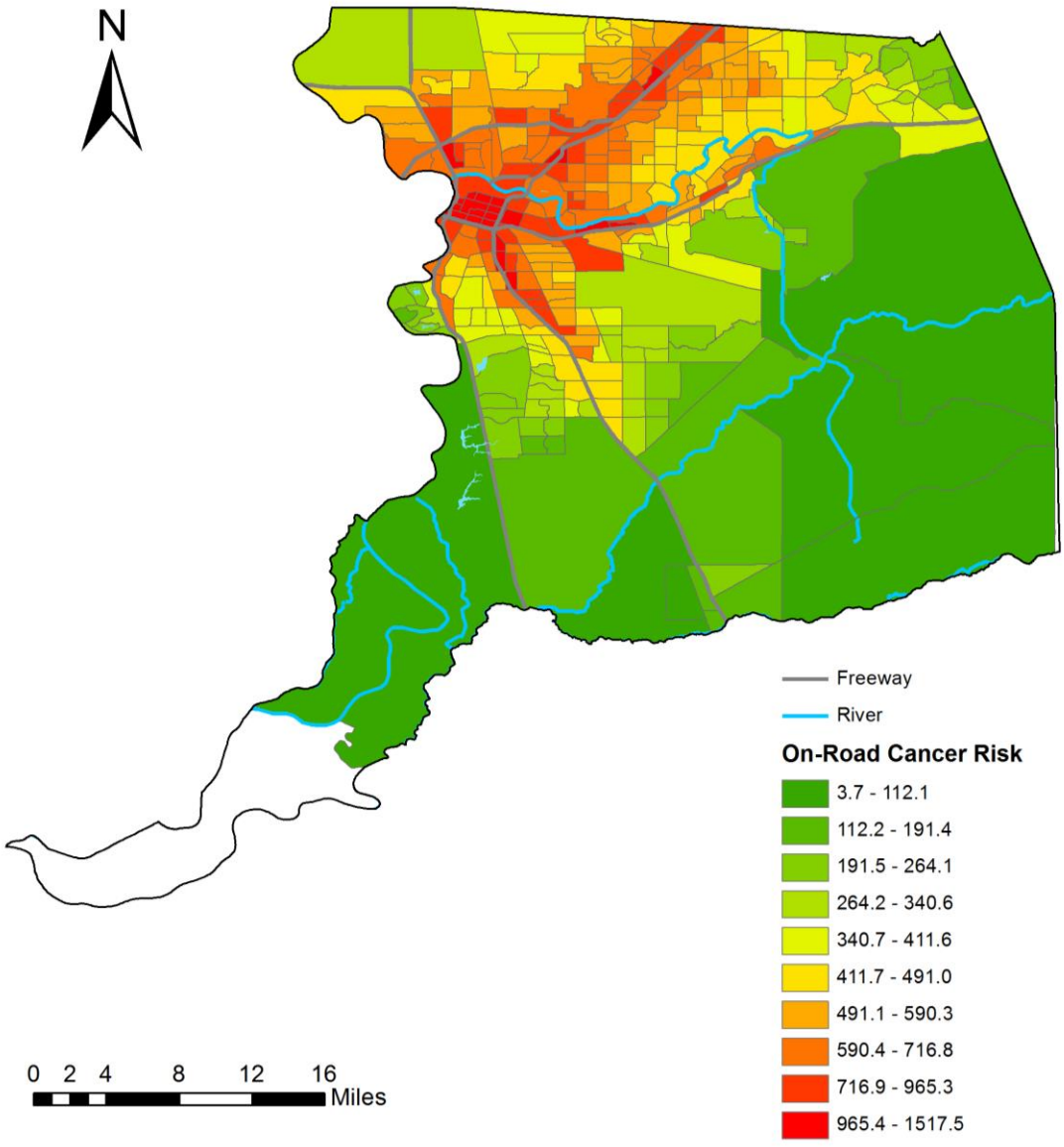

Figure C-1. CARB modeled on-road cancer risk