State of Alaska

Volkswagen Environmental Mitigation Trust
Beneficiary Mitigation Plan

Prepared by

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This report prepared by:

Alaska Energy Authority

813 West Northern Lights Blvd

Anchorage, AK 99503

907-771-3000

www.akenergyauthority.org

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Abbreviation	Definition
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AEA	Alaska Energy Authority
CAA	Clean Air Act
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DERA	Diesel Emission Reduction Act
DEQ	Diesel Emissions Quantifier
DMV	Department of Motor Vehicle
EMA	Eligible Mitigation Action
EMT	Environmental Mitigation Trust
EPA	United States Environmental Protection Agency
EVSE	Electric vehicle supply equipment
FNSB	Fairbanks North Star Borough
GHG	Greenhouse gases
HFC	Hydrofluorocarbons
IARC	International Agency for Research on Cancer
µg/m3	micrograms per cubic meter of air
MMT	Million metric tons
MOA	Municipality of Anchorage
MOVES	Motor Vehicle Emission Simulator
MPa	Megapascals

Abbreviation	Definition
MVEB	Motor Vehicle Emissions Budget
MWh	Mega Watt hour
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
O_3	Ozone
Pb	Lead
PFC	Perfluorocarbons
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 micrometers or less
PM_{10}	Particulate matter with an aerodynamic diameter of 10 micrometers or less
PM	Particulate matter
ppb	Parts per billion
ppm	Parts per million
RFA	Request for Applications
RPSU	Rural Power System Upgrade
SF_6	Sulfur hexafluoride
SIP	State Implementation Plan
SO_2	Sulfur dioxide
TED	Trust Effective Date
VMT	Vehicle miles travelled
VW	Volkswagen Group of America
ZEV	Zero emission vehicle

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1. INTRODUCTION

The Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (EPA) to set air quality standards (40 CFR Part 50) to protect the health and the welfare of the public and the environment. The law requires EPA to periodically review and update the standards to ensure that health and environmental protection are adequate based on scientific justifications. Accordingly, EPA has set National Ambient Air Quality Standards (NAAQS) for six principal criteria pollutants, including nitrogen dioxide (NO_2) and particulate matter (PM), both of which are produced by diesel engines.

Volkswagen Group of America (VW) installed software in its 2.0 and 3.0 liter diesel engines of several Volkswagen, Audi and Porsche model vehicles beginning with model year 2009 to alter emission test results. The "defeat devices" masked the actual levels of nitrogen oxides (NO_x) emitted from these vehicles, which were significantly in excess of the NAAQS for NO_2, violating the Clean Air Act. The devices turned on the emission controls only when a vehicle was being tested and then disabled emission controls under normal use of the vehicle. These devices resulted in better driving performance and real world fuel mileage, but allowed the release of NO_x emissions in excess of nearly 40 times the federal NO_x limit, depending on driving conditions. The devices were installed in approximately 11 million vehicles globally, of which about 580,000 were sold within the U.S., resulting in thousands of tons of excess NO_x emissions.

Once discovered, the EPA, the Federal Trade Commission, and the California Air Resources Board (CARB) sued VW. The parties settled in 2016. The settlement consists of three components that require VW to (1) implement a Buyback, Lease Termination, Vehicle Modification and Emissions Compliant Recall Program for the affected vehicles; (2) invest $2 billion into the development, construction and maintenance of zero-emission vehicle (ZEV) related infrastructure and education to increase usage of ZEV technology nationwide; and (3) invest $2.925 billion into an Environmental Mitigation Trust (EMT) to fund specific projects that reduce diesel emissions.

The EMT is explicitly intended for funding ten categories of Eligible Mitigation Actions (EMAs), as defined in Appendix D-2 of the 2.0 liter Consent Decree (Appendix C of this document), to fully mitigate the total, lifetime excess NO_x emissions from the 2.0 liter and 3.0 liter affected vehicles. Under the final terms, two EMTs were established, one for federally-recognized tribes nationwide ($54.5 million) and a second for states and territories. The states and territories were allocated funds based on the distribution of the registered affected vehicles. There are approximately 1,450 affected vehicles registered in Alaska. Alaska was allocated $8.125 million to fund EMAs over a three- to ten-year period.

The final terms of the settlement regarding the EMT were filed with the court October 2, 2017, establishing the Trust Effective Date (TED). Alaska filed to become a Beneficiary of the EMT within the required 60 days of the TED, designating the Alaska Energy Authority (AEA) as the lead agency to administer the EMT funds. Alaska's status as a designated Beneficiary of the EMT was filed with the court by the EMT Trustee, Wilmington Trust, on January 29, 2018.

The Volkswagen settlement provides an opportunity to fund mitigation projects that reduce pollution, particularly nitrogen oxides, by upgrading and/or replacing older diesel engines that

meet certain criteria. The settlement requires each Beneficiary to develop a Beneficiary Mitigation Plan (Plan) through a public process that summarizes the Beneficiary's high-level vision for use of the mitigation funds. Specifically, Alaska's Plan must include:

- Alaska's overall goal for the use of the funds;
- Categories of EMAs we anticipate will be appropriate to achieve the stated goals and the preliminary assessment of the percentages of funds anticipated to be used for each type of EMA;
- Description of how the potential beneficial impact of the selected EMAs on air quality in areas that bear a disproportionate share of the air pollution burden will be considered;
- General description of the expected ranges of emission benefits we estimate would be realized by implementation of the EMAs identified in the Plan; and
- Explanation of the process for seeking and considering public input on the Plan.

As described in Section 6, AEA conducted public outreach on the settlement and developed a proposed draft Plan in May 2018 and solicited public input to ensure that stakeholders' interests were considered in the development of the final Plan. This document represents Alaska's final Plan for allocating the EMT funds.

2. GOALS

Alaska's goals for implementing the settlement are as follows:

1. Reduce NO_x emissions in the most cost-effective manner
2. Improve air quality and protect human health in disproportionately affected areas
3. Consider environmental justice and at-risk populations
4. Leverage additional funds to increase benefits to Alaskans

Alaska will offer several solicitations to fund certain EMAs, listed in Appendix C. The proposed allocation of funds for the various EMAs described in Section 4 and summarized in Table 1 and the criteria for evaluating projects (Table 2) were developed to achieve these goals with consideration of the sources and distribution of emissions described in Section 3 and the demographics and distribution of Alaska's population.

2.1. Cost Effectiveness

The primary purpose of the mitigation fund is to reduce NO_x emissions to fully mitigate for the lifetime excess emissions of the vehicles installed with defeat devices. As of March 2017, there were approximately 1,450 affected vehicles registered in Alaska (ADEC 2017 unpublished data). The total lifetime NO_x emissions produced by these vehicles is approximately 10.54 tons. Alaska has been allocated $8.125 million which will mitigate for these vehicles, but will not be adequate to replace aging diesel engines in the state. Projects that reduce the most lifetime short tons of NO_x and PM emissions for the least cost will be given a higher priority.

2.2. Improve Air Quality and Protect Human Health in Disproprtionately Affected Areas

The settlement requires Alaska to consider how the plan will impact areas that bear a disproportionate air pollution burden. Air quality is highly variable across the state, from densely populated areas along the Railbelt to remote isolated villages. Diesel engines are widely used throughout the state, with the highest transportation use along the Railbelt, Southeast Alaska and southern coastal areas with significant economic activity, and the highest electric generation use in rural villages. Alaska will prioritize projects proposed in the most highly impacted air quality areas of the state to benefit the health of most Alaskans, such as *Nonattainment* or *Maintenance* areas of federal air quality standards and areas with the highest amount of on-road NOx emissions or diesel particulate matter (see Appendix A).

***Nonattainment Area* and *Maintenance Area*s**

A *Nonattainment Area* is an area designated by the EPA that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the EPA's ambient air quality standard for one of the specified six criteria pollutants. Violations of air quality standards require the state government and impacted communities to conduct an emissions inventory and develop an attainment plan describing control measures and programs to reduce the pollutant to bring *Nonattainment Area*s into attainment within a given number of years.

A *Maintenance Area* is an area formerly classified as a *Nonattainment Area* that has since consistently met the NAAQS for the specified pollutant through implementation of the control measures. Maintenance Plans (MPs) are developed for these areas that demonstrate the NAAQS have consistently been met, establish an emissions budget for the area, and include measures to ensure the NAAQS will continue to be maintained for a 10-year period after redesignation.

If an area has consistently demonstrated EPA-established threshold emission concentrations well below the pollutant-specific NAAQS, a state may develop a less rigorous maintenance plan, or Limited Maintenance Plan (LMP). LMPs may also be developed for areas submitting a second 10-year maintenance plan. LMPs do not require emission budgets or forecasted emissions to demonstrate compliance because these areas have such low ambient concentrations that it is unreasonable to expect emissions growth during the maintenance period to result in violation of the NAAQS. LMPs must demonstrate maintenance of NAAQS by implementing the control measures established in the attainment or maintenance plan, provide for continued monitoring, and include contingency measures that would be implemented if exceedances occurred in the area. *Maintenance Area*s with EPA-approved LMPs are redesignated by the EPA from nonattainment to attainment with a maintenance plan. These areas may be referred to as Limited *Maintenance Area*s.

In addition to protecting human health and the environment, it is important to achieve attainment in these areas because a *Nonattainment Area* status can potentially limit existing industry, the siting of new industry, and impact receipt of federal highway dollars. Alaska does not have any areas that do not meet federal air quality standards for NO_x. However, there is a *Nonattainment Area* for PM and *Maintenance Area*s for PM and carbon monoxide (CO).

Other Air Quality Priority Areas

The amount of on-road NOx and PM emissions from diesel engines varies across the state. For school bus and transit bus projects, priority will be given to census areas with the highest on-road NOx emissions and census tracts with the greatest amount of diesel PM (see Appendix A).

2.3. Environmental Justice and At-risk Populations

In addition to considering the areas bearing a disproportionate amount of air pollution as described above, Alaska will consider population demographics to ensure that the burdens of pollution do not fall disproportionately on low-income, low-education, minority, and Alaska Native communities as well as age groups at higher health impact risk (e.g., children five years old or younger and adults 65 years or older.

EPA Environmental Justice Screening

The EPA has developed an environmental justice screening and mapping tool (EPA 2017b) based on National Air Toxics Assessment (NATA) data that considers the characteristics of populations (e.g., income, education, age, minority status) affected by diesel PM emissions and traffic proximity and volume. These environmental justice indices have been grouped into percentile rank (see maps in Appendix B) and priority will be given to projects that benefit at-risk populations through the proposed scoring criteria presented in Table 2. The indices (EPA 2015b) represent a snapshot in time based on the 2011 NEI. The most current assessment available will be used at the time of solicitation.

Rural Alaska

The most at-risk populations occur in rural Alaska and in small localized areas within the most populated areas of the state. Rural Alaska has majority Alaska Native populations, along with very high costs of living and low incomes. However, EMAs 1-9 are transportation related, allowing for the replacement or upgrade of diesel engines in medium and heavy duty local freight trucks, port drayage trucks, school buses, shuttle buses, freight switchers, marine vessels, airport ground support equipment, or cargo handling equipment; installation of shore-power for ocean going vessels; or installation of zero-emission vehicle infrastructure. The opportunity for these types of eligible projects occur throughout the most populated areas of the state, along the Railbelt, Southeast and southern coastal areas with significant economic activity. Such opportunities are not available or the projects are of little use in rural Alaska, where road systems are limited and there are few vehicles eligible for engine replacement or upgrade. Moreover, the cost of generating electricity in rural Alaska, much of which is generated by burning diesel, is not conducive to the use of electric vehicles.

EMA 10, The Diesel Emission Reduction Act (DERA) Option, allows EMT funds to be used as voluntary match to DERA-eligible projects. The DERA is an EPA-administered program that provides federal funding for projects that reduce emissions from existing diesel engines. While there is significant overlap between EMAs 1-9 and DERA-eligible projects, replacement of stationary diesel engines with at least 500 hours of use per year and marine engines with at least 1,000 hours of use per year are only allowed under EMA 10.

Alaska is one of the few states that uses diesel engines to generate prime power. Alaska produces more NO_x emissions to generate electricity than any other state. More than 200 rural Alaska communities rely on diesel engines for power. In terms of reducing NO_x emissions, rural Alaska communities would see greater benefit by replacing or upgrading a diesel engine that generates power 24 hours a day, 365 days a year, than by upgrading eligible vehicles. Moreover, some of these communities experience wintertime inversions, exposing residents to longer duration and higher concentrations of NO_x and PM from diesel powerhouses, which are typically centrally located within the community.

To ensure that rural Alaska communities benefit from the EMT, we will allocate EMT funds to match the funds the state receives from the EPA through the State DERA program one to one on an annual basis for five years. EMT funds may only be used as voluntary match. As described in Section 4, matching the State DERA funds one to one will leverage additional funding from the EPA.

2.4. Voluntary Funding Match

To maximize the potential to achieve the goals with limited funds, priority will be given to projects that provide voluntary matching funds.

3. AIR QUALITY IN ALASKA

The EPA has set NAAQS for six principal criteria pollutants considered harmful to public health and the environment: NO_2, PM, CO, ozone (O_3), lead (Pb), and sulfur dioxide (SO_2). Nitrogen dioxide is the oxide used by the EPA as the indicator for all NO_x.

The two EPA criteria pollutants impacted in Alaska are CO and PM. Anchorage and Fairbanks have designated *Maintenance Area*s for CO. Portions of Fairbanks are also designated as *Nonattainment Area*s for $PM_{2.5}$, while Juneau and Eagle River are classified as *Maintenance Area*s for PM_{10}. Other communities that regularly exceed or are near violating the EPA standards for PM include Butte ($PM_{2.5}$) and rural Alaska communities for both PM_{10} (dust) and $PM_{2.5}$ (woodsmoke).

Diesel exhaust contributes to all six of the EPA's principal criteria pollutants. The primary diesel engine emissions of concern are NO_x, PM, and greenhouse gases. The sections below summarize the emission sources of these pollutants statewide and by the census areas/boroughs of Alaska based on the 2014 National Emission Inventory (EPA 2015b). Alaska has 19 organized boroughs and one unorganized borough. The unorganized borough is divided into 10 census areas that generally align with election districts (Figure 1). For purposes of discussion, both the census areas and organized boroughs are referred to as boroughs below.

3.1. Diesel Pollution

Diesel exhaust is harmful to both human health and the environment. Acute exposure can cause eye, throat, and respiratory irritation, lightheadedness, and nausea, while chronic exposure may lead to inflammation and changes in the lung, asthma, and heart and lung diseases. Diesel exhaust

is considered a Group 1 carcinogen by the International Agency for Research on Cancer (IARC) that causes lung cancer and an increased risk of bladder cancer (IARC 2012).

NO_x reacts with volatile organic compounds and carbon monoxide in sunlight to produce ground-level ozone, the major component of smog. Ozone can make it difficult to breathe, cause coughing, inflammation and damage of the airways, aggravate lung diseases, make lungs more susceptible to infection and cause chronic obstructive pulmonary disease (COPD) and premature death. Children are at greatest risk from exposure to ozone because their lungs are not fully developed and they are more likely to be active outside when ozone levels are high. People with asthma, elderly people and people who are active outdoors are also at higher risk from exposure.

Particulate matter is a complex mixture of solid and liquid particles of inorganic and organic chemicals, including carbon, sulfates, nitrates, metals, acids and volatile compounds (ADEC 2016). Particulate matter varies in size and health risk. Coarse particles have a diameter from 10 to 2.5 micrometers, and fine particles have diameters of 2.5 micrometer or less ($PM_{2.5}$). Coarse particulates can be inhaled and cause respiratory problems, while $PM_{2.5}$ particles can lodge deeply into lungs and enter the bloodstream causing serious respiratory and cardiovascular problems. Health studies have shown a significant association between exposure to fine particles and premature mortality. As with NO_x, children, older adults, and people with heart and lung disease are particularly sensitive to fine particle exposure.

NO_x and PM also negatively impact the environment by contributing to the development of acid rain, damaging waterways, ecosystems, agricultural crops, and infrastructure. NO_x emissions also result in the deposition of excess nutrients in waterbodies leading to excess plant and algal growth and depletion of dissolved oxygen necessary to support aquatic fish and wildlife.

3.2. Nitrogen Oxides

A total of 154,373 tons of NO_x were emitted statewide from point, non-point, event and mobile sources combined in 2014 (EPA 2015b). Figure 2 displays the statewide sources of NO_x emissions by sector. Point sources from Alaska's major industries include oil and gas exploration, extraction, refinement and transportation; precious metals and coal mining; seafood processing; electricity and heat generation; military base operations and municipal operations including waste management (ADEC 2015).

Major non-transportation sources of NO_x emissions consist of industrial and commercial sources combined (35 percent), electric generation (12 percent), and wildfire (12 percent). Residential fuel combustion, waste management, prescribed fire and other sources each contributed less than one percent of the NO_x emissions statewide. The transportation sector (onroad mobile, nonroad mobile, locomotives, commercial marine vessels, and aircraft) accounts for 40 percent of the statewide NO_x emissions, primarily from commercial marine vessels (25 percent) and onroad mobile sources (10 percent).

As the distribution of Alaska's population, infrastructure and local economies vary widely across the state, both the total amount of NO_x emissions and sources of NO_x are highly variable from borough to borough. Nearly a quarter of Alaska's statewide NO_x emissions are generated at the North Slope, primarily from the oil and gas industry (89 percent) and electric generation (10

percent). The next highest NO_x emissions are from the Kenai Peninsula (15 percent), followed by Anchorage (7 percent), Southeast Fairbanks (7 percent), Valdez-Cordova (6 percent), and Fairbanks North Star (5 percent). The Aleutians, Kodiak Island, Juneau, Hoonah-Angoon, Petersburg, and Ketchikan Gateway, each contribute 2 - 4 percent of the statewide NO_x emissions, primarily from commercial marine vessels. The Northwest Arctic borough and Matanuska-Susitna each contribute less than 3 percent, primarily from electric generation (90 percent) and onroad sources (70 percent), respectively. The remaining 15 boroughs combined emit 9 percent of the statewide NO_x emissions, with each contributing less than one percent.

Industry and industrial processes are the dominant sources of NO_x emissions in the Aleutians, Bristol Bay, Dillingham, Fairbanks, Kodiak, Kusilvak (formerly Wade Hampton), and Yukon-Koyukuk areas. Wildfires are a significant source of NO_x in Southeast Fairbanks (84 percent), Kenai Peninsula (36 percent), and Yukon-Koyukuk (17 percent), accounting for 5 percent of the NO_x emissions from Nome and Kusilvak.

The EMT may only be used to fund eligible projects within the transportation and electric generation sectors, discussed in more detail below.

3.2.1. Transportation

In 2014, transportation emissions from burning fuel produced 62,286 tons of NO_x, accounting for 40 percent of Alaska's total NO_x emissions (EPA 2015b). The NO_x emissions by mode of transportation were predominantly produced by commercial marine vessels (25 percent), followed by onroad vehicles (10 percent), aircraft (2.3 percent), nonroad mobile sources (snow machines, ATVs, construction equipment, airport ground support equipment, port cargo handling equipment, and other mobile equipment combined; 2 percent) and rail (0.6 percent) (Figure 2).

Commercial marine vessel emissions are based on fuel sales within Alaska and do not necessarily represent emissions occurring within Alaskan airspace or within the borough where refueling occurred. As to be expected, nearly all of the 38,614 tons of NO_x emissions from commercial marine vessels were attributed to the 15 coastal boroughs of the Aleutians, Kodiak, Southcentral and Southeast with significant commercial fishing industries, oil tankers, cruise ship destination ports, or served by the Alaska Marine Highway ferry system (Figure 3). Seventy percent of the commercial marine vessel NO_x emissions were attributed to fuel sales in Valdez-Cordova (20 percent), Petersburg (14 percent), Ketchikan Gateway (14 percent), Kenai Peninsula (12 percent) and the Aleutians (11 percent). Eligible marine vessel engines may be upgraded or repowered with EMT funds (EMA 4 and EMA 10). In addition, EMA 5 includes the shore-side cost of installing shore power to ocean-going vessels from the existing utility grid (Appendix C). While not directly related to commercial marine vessel emissions, NO_x emissions at ports could potentially be reduced through EMA 8 which includes the repower or replacement of port cargo handling equipment with all electric engines (Appendix C).

Onroad motor vehicles produced 16,121 tons of NO_x emissions in 2014, approximately half of which was produced by diesel engines (8,197 tons) (Figure 2). Given our limited road system, Alaskans typically drive less miles per year than drivers in the Lower 48. Between 1990 and 2015, the annual average vehicle miles traveled per person has ranged from 6,500 to 7,600 miles (ADEC 2015). Approximately 80 percent of Alaska's onroad NO_x emissions from diesel vehicles occur in

the most populated urban areas of Southcentral and portions of the Interior that are connected by road, Anchorage (30 percent), Matanuska-Susitna (20 percent), Kenai Peninsula (13 percent), Southeast Fairbanks (8 percent) and Fairbanks North Star (7 percent) (Figure 3). Heavy duty vehicles disproportionately contribute to these emissions. Juneau and Sitka combined account for 10 percent of the statewide onroad diesel NO_x emissions, producing approximately 423 tons and 393 tons of NO_x emissions in 2014, respectively. Kodiak Island, Ketchikan Gateway, Valdez-Cordova, and Yukon-Koyukuk each produced between 100 and 175 tons of NO_x from onroad diesel vehicles. The remaining boroughs produced anywhere from none (Aleutians West) up to approximately 64 tons (Prince of Wales-Hyder) of NO_x emissions from onroad diesel vehicles. Diesel heavy duty (Class 8) local freight trucks and port drayage trucks, medium duty (Class 4-7) local freight trucks, and Class 4-8 school buses, shuttle buses and transit buses are eligible for repower or replacement with EMT funds (EMAs 1, 6, and 2 respectively; Appendix C). EMA 10 expands the range of eligible engines (Appendix D).

In 2014, 1,818 tons of NO_x emissions were produced by diesel nonroad mobile sources statewide (Figure 2). Nonroad mobile sources include snow machines, ATVs, construction equipment, airport ground support equipment, and port cargo handling equipment. Nearly half of the diesel nonroad mobile NO_x emissions were in Anchorage (45 percent), followed by Fairbanks North Star (11 percent), Prince of Wales-Hyder (5 percent), and Kenai Peninsula (4 percent) (Figure 3). Both airport ground support equipment (EMA 7) and port cargo handling equipment (EMA 8) are eligible for repower or replacement with all electric engines with EMT funds.

The Alaska Railroad runs for approximately 506 miles between Seward in the south to Fairbanks and Eielson Air Force Base in the north carrying both passengers and freight (ADEC 2015). There is also a small, summertime passenger rail that runs between Skagway, Alaska and Canada's Yukon Territory. Locomotives were the source of 915 tons of NO_x emissions in 2014, or 0.6 percent of the statewide total, limited in distribution to the boroughs along the rail and with rail yards: Valdez-Cordova (Whittier), Kenai Peninsula (Seward), Anchorage, Matanuska-Susitna, Fairbanks North Star, Yukon-Koyukuk and Skagway. Under EMA 3, eligible diesel freight switcher locomotives may be repowered or replaced (Appendix C). The DERA option (EMA 10) expands eligible locomotives to include line haul locomotives carrying passengers or freight (Appendix D).

Approximately 2 percent (3,616 tons) of the statewide NO_x emissions were attributed to aircraft (Figure 2). Nearly three-quarters of the aircraft NO_x emissions were from Anchorage (58 percent) and Fairbanks North Star (15 percent). As with commercial marine vessels, NO_x emissions are attributed to the location of the fuel sales. While aircraft are not included in any of the EMAs defined in the trust agreement, airport ground support equipment is eligible to be repowered or replaced with all electric engines (EMA 8, Appendix C).

3.2.2. Electric Generation

Electric generation emissions are calculated from the amount of fuel (coal, natural gas, diesel) burned to produce electricity that is delivered to an electric grid serving customers. This sector does not include electric generation associated with the industrial sector, such as North Slope oil and gas. In 2014, electric generation accounted for approximately 12 percent of the statewide NO_x

emissions (18,823 tons), of which 10,257 tons were from diesel fuel sources, exceeding NO_x emissions produced by onroad diesel vehicles in the same year by 25 percent (Figure 2).

Alaska produces 3.4 pounds of NO_x emissions per megawatt hour (MWh) of electricity generated, more than any other state and three and a half times the national average (NASEO 2017). Rural communities in Alaska rely primarily on diesel electric generators for power, and Alaska ranks second only to Hawaii in the share of its electricity generated from petroleum. Nearly half of the NO_x emissions from diesel electric generators were from rural communities in Northwest Arctic and Aleutians West boroughs (Figure 3). The Bethel, Bristol Bay, Dillingham, Fairbanks North Star, Nome, North Slope and Valdez-Cordova boroughs each contributed another 3 to 7 percent of the statewide NO_x emissions. For some of these boroughs, NO_x emissions from diesel electric power generation was the primary source of NO_x emissions, ranging from 90 percent of the total NO_x emissions within Northwest Arctic Borough to approximately 40 percent of the emissions within Bethel, Bristol Bay, Dillingham and Nome, to 26 percent emissions within Aleutians West.

Diesel engines for prime power operate 24 hours a day, 365 days a year. Powerhouses are typically centrally located within a community. Many of these communities experience wintertime inversions, exacerbating health impacts from prolonged exposure to elevated levels of NO_x and PM. Under the DERA option (EMA 10), EMT funds may be used as voluntary match to repower or replace eligible stationary diesel engines used for power production.

3.2.3. NO_x *Nonattainment Area* and *Maintenance Area*s

The EPA established NAAQSs for NO_2 are as follows:

- Primary 1-hour: 100 parts per billion (ppb) 98th percentile of 1-hour daily maximum concentrations, averaged over three years;
- Primary and secondary annual: 53 ppb annual mean (EPA 2017d).

Alaska does not have any areas designated as *Nonattainment Area* of the NO_2 NAAQSs. However, NO_x contributes to the formation of particulate matter and there is a 24-hour $PM_{2.5}$ *Nonattainment Area* in the Fairbanks North Star Borough (FNSB). FNSB's and ADEC's plan (ADEC 2016) to reach attainment in the FNSB 24-hour $PM_{2.5}$ *Nonattainment Area* identifies voluntary programs that contribute some reductions to $PM_{2.5}$ and its precursor NO_x. As a required element of the plan, ADEC established a Motor Vehicle Emissions Budget (MVEB) for the FSNB *Nonattainment Area* of 0.33 tons of $PM_{2.5}$ per day and 2.13 tons of NO_x per day (See Section 3.3.1.3 below).

3.3. Particulate Matter

Emissions from both fine particulate matter ($PM_{2.5}$) and coarse particulate matter are regulated by the EPA. PM_{10} is particulate matter with a diameter of 10 micrometers or less. It includes both coarse particulate matter and fine particulate matter ($PM_{2.5}$). Sources of coarse particles include crushing or grinding operations, and dust from paved or unpaved roads. Sources of fine particles include wildfire, all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes.

A total of 363,532 tons of PM_{10} were emitted statewide from point, non-point, event and mobile sources combined in 2014 (EPA 2015b). Figure 4 displays the statewide sources of PM_{10} emissions

by sector. More than 96 percent of the PM_{10} in Alaska statewide is from wildfires (56 percent) and dust (41 percent). Wildfires are the primary source of PM_{10} in the Southeast Fairbanks (96 percent) and Kenai Peninsula (76 percent) boroughs. PM_{10} emissions in the Yukon-Koyukuk borough are almost equally caused by wildfires (45 percent) and dust (52 percent). With the exception of these three boroughs, and Anchorage (83 percent), North Slope (76 percent), Northwest Arctic (73 percent), and Denali (64 percent) boroughs, dust is the source of more than 85 percent of the PM_{10}, nearly all of which is generated from unpaved roads. Industrial, industrial processes and commercial sources combined contribute a little more than 1 percent of the statewide PM_{10}, but were a significant source within Denali (33 percent), North Slope (20 percent), and Northwest Arctic (16 percent) boroughs. Waste contributed 0.8 percent of the PM_{10} emissions statewide, but nearly 11 percent of the PM_{10} emissions within Anchorage. All sources of transportation combined produced 0.8 percent of PM_{10} emissions statewide, while electricity generation contributed 0.2 percent.

The sources of $PM_{2.5}$ emissions are nearly the same as PM_{10}, with the exception of wildfire and dust (Figure 4). While wildfire and dust combined both contribute more than 95 percent of all particulate matter, dust contributes more coarse particulate matter.

In 2014, commercial marine vessels produced 1,029 tons of PM_{10}, followed by diesel onroad mobile sources (570 tons), diesel nonroad mobile sources (136 tons), and locomotives (23 tons) (Figure 5). Electricity generated from burning oil contributed 408 tons of PM_{10} in 2014. $PM_{2.5}$ comprised more than 75 percent of the PM_{10} generated from diesel onroad mobile sources and more than 95 percent of the PM_{10} emissions from commercial marine vessels, diesel nonroad mobile sources, locomotives, and electric generation from oil.

The distribution of PM emissions across the state from eligible EMT sectors follows the same pattern as NO_x emissions previously described (Figures 5 and 6). $PM_{2.5}$ from onroad diesel emissions were highest in the populated boroughs connected by road, ranging from 30 to 130 tons per year in each borough, followed by Sitka (25 tons), Juneau (21 tons), and Ketchikan Gateway (11 tons) in Southeast (Figure 6). Two thirds of the statewide $PM_{2.5}$ emissions from diesel nonroad mobile sources occur within Anchorage, Fairbanks North Star, Matanuska-Susitna, and Kenai Peninsula boroughs; Prince of Wales-Hyder contributes over 4 percent, while Valdez-Cordova, Juneau, Aleutians West, Bethel, Nome, North Slope, Yukon-Koyukuk each contribute about 2 percent of the statewide $PM_{2.5}$ emissions. More than half of the 22 tons of $PM_{2.5}$ emissions from locomotives occur in the Anchorage and Matanuska-Susitna boroughs. In 2014, commercial marine vessels accounted for 987 tons of $PM_{2.5}$ emissions annually. The highest occurrence was in Valdez-Cordova (19 percent), followed by Petersburg (13 percent), Ketchikan Gateway (13 percent), Kenai Peninsula (11 percent), the Aleutians (11 percent), and Hoonah-Angoon (9 percent).

In 2014, 400 tons of $PM_{2.5}$ emissions were released from burning oil to generate electricity (Figure 6). Seventy-five percent of the emissions were generated in the Fairbanks North Star (21 percent), Northwest Arctic (19 percent), Valdez-Cordova (15 percent), the Aleutians (14 percent), and Bethel (5 percent); fifteen percent of the emissions were attributed to portable generators.

3.3.1. PM *Nonattainment Area* and *Maintenance Area*s

The current EPA NAAQSs for particulate matter are as follows:

- Primary annual $PM_{2.5}$: 12.0 micrograms per cubic meter of air ($\mu g/m^3$) annual mean averaged over three years;
- Secondary annual $PM_{2.5}$: 15.0 $\mu g/m^3$ annual mean averaged over three years;
- 24-hour $PM_{2.5}$: 35 $\mu g/m^3$ 98th percentile averaged over 3 years;
- 24-hour PM_{10}: 150 $\mu g/m^3$ not to be exceeded more than once per year on average over three years (EPA 2017d).

The primary standards provide health protection, including protecting the health of sensitive populations such as asthmatics, children, and the elderly, while secondary standards protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation and buildings (EPA 2017d). In 2012, the EPA reviewed and revised the primary annual $PM_{2.5}$ NAAQS, strengthening the annual standard from 15 to 12 μg/m3 (EPA 2016). ADEC subsequently evaluated the most recent air monitoring data within the state to determine compliance with the revised annual $PM_{2.5}$ NAAQS and recommended to EPA that all areas of the state be designated as in attainment. On December 18, 2014, the EPA designated the entire state of Alaska as "unclassifiable/attainment," consistent with the recommendation from the state of Alaska.

The 24-hour PM standards are designed to provide health protection against short-term particle exposures, especially in areas with high peak PM concentrations. PM_{10} (dust) is of concern in rural Alaska because of the existence of point sources, unpaved roads and wood smoke which are prevalent in many communities all around Alaska. Appendix A includes a map (Figure A-3) showing the rural Alaska communities reporting health problems from dust and identifies the villages that have initiated PM_{10} monitoring programs (ADEC 2011). Historically, Eagle River and Mendenhall Valley in Juneau have violated the air quality standards for PM_{10}, though both of the areas are now attaining the PM_{10} NAAQS and are in maintenance status.

In 2006, the EPA strengthened the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ (EPA 2016). To develop nonattainment area recommendations for the revised 24-hour $PM_{2.5}$ NAAQS, ADEC evaluated three years of air quality data for four areas of Alaska: Anchorage, Fairbanks, the Mendenhall Valley in Juneau, and the Butte area in the Matanuska-Susitna Borough. The three year calculated average (2006-2008) of 24-hour $PM_{2.5}$ for Fairbanks was 43 μg/m3 and the Mendenhall Valley in Juneau was exactly at 35 μg/m3. Anchorage (26 $\mu g/m^3$) and Butte (31 $\mu g/m^3$) both met the 24-hour $PM_{2.5}$ standard. Accordingly, ADEC recommended Fairbanks be designated as a *Nonattainment Area* and the other three as in Attainment. Because of the prevalence of wood-fueled heating and limited air quality monitoring data, ADEC recommended that other areas of Alaska be designated as unclassifiable for the 24-hour standard. (All of the communities showed attainment for the annual exposure limit which was 15μg/m3 at the time.) Multiple exceedances of the 24-hour $PM_{2.5}$ standard have since been measured at Butte monitoring sites on multiple occasions.

3.3.1.1. Eagle River, Anchorage 24-hour PM_{10} Maintenance Area

A 9-square mile area of Eagle River was designated a *Nonattainment Area* for 24-hour PM_{10} NAAQS in 1987 due to dust generated from 22 miles of unpaved roads in the area (Appendix A Figure A-4).

The State and Municipality of Anchorage (MOA) developed an ambitious road paving program to pave or surface one-third of the roads to reduce PM_{10} emissions. Nearly all the gravel roads were paved in the early 1990s, which resulted in Eagle River being reclassified from *Serious* to *Moderate*. By 2007, all roads in the area had been paved or surfaced with recycled asphalt. The MOA and ADEC subsequently prepared an LMP (ADEC 2010) demonstrating that the area was in attainment and that continued maintenance of the standard was expected through 2020. Excluding natural events (high winds, volcanic eruptions), the highest PM_{10} concentrations measured since 1988 have been approximately half the 24-hour standard (ADEC 2010). The LMP takes into account increases in PM_{10} emissions from all sources, including onroad mobile sources, through 2020 to help ensure that PM_{10} concentrations will remain below the NAAQS. Between 2007 and 2020, the vehicle miles traveled (VMT) was projected to grow by 36.3% to 226,221 (ADEC 2010). On January 7, 2013 the EPA approved the LMP and redesignated Eagle River as attaining the PM_{10} standard. This area of Eagle River is currently a PM_{10} *Moderate Maintenance Area*.

3.3.1.2. Mendenhall Valley, Juneau 24-hour PM_{10} Maintenance Area

The Mendenhall Valley area of Juneau was designated as a *Moderate Nonattainment Area* for the 24-hour PM_{10} standard in 1991 (Appendix A Figure A-5) based on violations that occurred throughout the 1980s and early 1990s (ADEC 2009). The Mendenhall Valley is the largest residential area within the City and Borough of Juneau. It is surrounded by mountains on the east, west, and north, contributing to winter time inversions which elevated PM_{10} concentrations generated from home heating wood smoke, vehicle exhaust, and fugitive dust from playgrounds and travel on roads. The ADEC developed a nonattainment plan that included a wood smoke control program incorporating public education, real-time monitoring, open burning prohibitions in winter, new stove certification, enforcement of a borough wood smoke ordinance, and paving unpaved roads. Through implementation of these control measures, there have been no measured violations of the standard since 1994. Juneau is currently designated as a *Moderate Maintenance Area* in attainment for PM_{10}. There is an EPA-approved LMP (ADEC 2009) in place for the area that provides for continued monitoring and implementation of control measures, and contingency plans if ambient PM_{10} issues occur in the future.

3.3.1.3. Fairbanks North Star Borough 24-hour $PM_{2.5}$ Nonattainment Area

In December 2009, the EPA designated a portion of the Fairbanks North Star Borough (FNSB), including the City of Fairbanks and the City of North Pole, as a 24-hour $PM_{2.5}$ *Nonattainment Area* (Appendix A Figure A-6) based on measurements collected at the State Office Building (ADEC 2016). During 2006 – 2008, the 98th percentile $PM_{2.5}$ design value for each of those years was 42.2 $\mu g/m^3$, 33.1 $\mu g/m^3$, and 46.7 $\mu g/m^3$, respectively (ADEC 2016). In 2014, the EPA published a rule that classified $PM_{2.5}$ *Nonattainment Area*s as *Moderate* areas requiring attainment to be reached within 6 years of the nonattainment designation. Because it did not attain the NAAQS within the required six years (i.e., December 2015), EPA reclassified the *Nonattainment Area* from *Moderate* to *Serious* effective June 9, 2017.[1] Accordingly, the State of Alaska and FNSB developed a State Implementation Plan (SIP) for the 24-hour $PM_{2.5}$ *Nonattainment Area* to meet the federal requirements to reach attainment by December 3, 2019.

[1] Federal Register, Vol. 82, No. 89, May 10, 2017

The SIP describes how the State of Alaska and FNSB will identify and implement air pollution control measures to achieve lower emissions of $PM_{2.5}$ as well as NO_x, sulfur oxides (SOx), volatile organic compounds (VOCs), and ammonia (NH3), which can contribute to the formation of $PM_{2.5}$ (EPA 2016). The nonattainment area consists of three air quality control zones, North Pole Control Zone, Fairbanks Control Zone and Goldstream Control Zone (Appendix A Figure A-6), with sub-area specific regulatory control measures established for under 18 AAC 50 to target area-specific problems (ADEC 2016).

Local emissions from wood stoves, burning distillate oil, industrial sources, and onroad mobile sources contribute to direct $PM_{2.5}$ emissions as well as NO_x, SO2, NH3 and VOC within and around the *Nonattainment Area*. $PM_{2.5}$ is primarily a health concern during the winter months (October through March) when extremely strong temperature inversions are frequent and human impacts on air pollution increase (ADEC 2016).

Fairbanks, located at 65 degrees latitude, experiences a subarctic continental climate. As a result, Fairbanks is frequently subjected to ground-based temperature inversions that are among the strongest surface-based inversions found anywhere in the United States (ADEC 2016). Temperature inversions are a semi-permanent feature of the winter atmosphere in Fairbanks, occurring about 80 percent of the time in December and January. Inversions are often accompanied by clear skies, low temperatures, and very poor air pollution dispersion. As a result of stable boundary layers, low wind speeds and low vertical mixing, the concentration levels of ground level pollutants in the atmosphere in Fairbanks can approach that of much larger metropolitan areas in the contiguous United States.

While nearly all of the exceedances of the 24-hour $PM_{2.5}$ NAAQS have occurred between mid-November and mid-February, Fairbanks also experiences high concentrations of $PM_{2.5}$ during the summer that are the result of wildfires and meteorology (wind speed, wind direction, etc.) (ADEC 2016). However, exceedances from wildfires are considered uncontrollable exceptional events because they are naturally occurring.

The SIP addresses motor vehicle emissions and their link to transportation planning efforts in the community. As part of the plan for controlling emissions and reducing ambient levels of $PM_{2.5}$ and NO_x, ADEC established a Motor Vehicle Emissions Budget (MVEB) for calendar year 2017 and beyond, which defines the total allowable emissions from onroad vehicles for $PM_{2.5}$ and its precursor, NO_x. The MVEB for the Fairbanks *Nonattainment Area* is 0.33 tons of $PM_{2.5}$ per day and 2.13 tons of NO_x per day, based on ADEC's analysis of the regional average winter day onroad vehicle emissions (ADEC 2016). While emissions from onroad sources comprise a relatively small portion of the $PM_{2.5}$ (9 percent) and NO_x (17 percent) emissions (ADEC 2016), emissions associated with future federally funded regional transportation plans must not exceed the budgeted limits.

3.3.1.4. Butte, Matanuska-Susitna 24-hour $PM_{2.5}$ Exceedances

Monitoring sites in the Butte area of the Matanuska-Susitna Borough have measured 24-hour $PM_{2.5}$ levels in excess of 35 µg/m3 on a few occasions in each of the last few years. Compliance with the 24-hr $PM_{2.5}$ NAAQS is determined using three years of air monitoring data. The design value (DV) is an average of 98th percentile 24-hr average $PM_{2.5}$ concentrations over three years. The

2014, 2015, and 2016 98th percentiles were 38.1 µg/m^3, 37.9 µg/m^3, and 29.2 µg/m^3, respectively, producing a 3-year average DV of 35.1 µg/m^3. The NAAQS is currently 35 µg/m3, an area is considered to violate the standards if the DV is 35.5 µg/m^3 or above. The DV cannot exceed 35.4 µg/m^3. If the area continues to experience elevated levels of $PM_{2.5}$, EPA may designate the area as a nonattainment area.

3.4. Greenhouse Gas Emissions

Greenhouse gases (GHGs) are gases in the atmosphere that absorb and emit radiant energy within the Earth's thermal infrared range, causing the greenhouse effect. Greenhouse gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and manmade fluorinated gases. The most common GHGs in Earth's atmosphere, CO_2, CH_4, and N_2O, have both natural and human-caused sources and sinks. However, since the Industrial Revolution, human activities, including the production, transport and burning of fossil fuels, have increased the atmospheric concentrations of these gases significantly. Fluorinated gases (sulfur hexafluoride (SF_6), hydrofluorocarbons (HFC), and perfluorocarbons (PFC)) are synthetic gases emitted from a variety of industrial processes. Greenhouse gas emissions are commonly reported in million metric tons (MMT) of carbon dioxide equivalents (CO_2e). The US produced 6,587 MMT CO2e in 2015 (EPA 2017c).

While Alaska has not established a target for GHG emissions, the ADEC Division of Air Quality quantified Alaska's greenhouse gas emissions from anthropogenic sources within Alaska from 1990 through 2015. ADEC's analysis found that Alaska's GHG emissions comprise approximately 0.63 percent and 0.09 percent of the nationwide and global GHG emissions, respectively (ADEC 2018). While Alaska ranks 40th among the United States, it ranks fourth highest in the nation on a per capita basis due to our small population and the presence of a large oil and gas industry.

Between 1990 and 2015, Alaska's gross annual GHG emissions ranged from approximately 39.01 MMT CO_2e to 54.64 MMT CO_2e (ADEC 2018). The GHG emissions in Alaska are predominantly produced from the industrial sector (oil and gas industry), followed by the transportation, residential and commercial, and electric generation sectors. Waste, agriculture, and industrial process sectors each comprise less than 1 percent of the total statewide GHG emissions.

Transportation

Transportation emissions from burning fuel contribute approximately one quarter of Alaska's GHG emissions. Carbon dioxide is the most prevalent greenhouse gas (82 percent). The transportation sector produces 35 percent of Alaska's carbon dioxide emissions. The CO_2 emissions are directly proportional to the quantity of fuel consumed, while the CH_4 and N_2O emissions depend on the type of equipment. In 2015, the GHG emissions by mode of transportation were predominantly produced by aircraft (72 percent), followed by onroad cars and trucks (27 percent), commercial marine vessels (0.8 percent) and other transportation sources combined including rail, snow machines, ATVs, construction equipment, and other mobile equipment (0.5 percent).

Electric Generation

Electric generation has consistently accounted for approximately 8 percent of Alaska's GHG emissions over the past 25 years.

3.5. Carbon Monoxide

More than 90 percent of the CO emissions statewide are a result of wildfires, nearly all of which occur in the Southeast Fairbanks and Kenai Peninsula boroughs. In 2014, 164,636 tons of CO were emitted by non-diesel onroad mobile (3 percent), non-diesel nonroad mobile (2 percent), waste (1 percent), and industrial sources (1 percent) (EPA 2015b). More than 80 percent of the non-diesel onroad mobile CO emissions are generated within the most densely populated boroughs connected to the road system: Anchorage, Matanuska-Susitna, Fairbanks North Star and Kenai Peninsula. Cold starts and warm-up idling are significant components of overall vehicle emissions.

Diesel engines emit far lower levels of CO than gasoline engines. Diesel engines run by creating pressure and do not require actual spark that gasoline engines require to start and diesel engines process fuel more efficiently than gasoline engines. The CO emissions for all of the sectors combined that include EMAs related to diesel onroad mobile, diesel nonroad mobile, locomotives, commercial marine vessels, and electricity generated from oil, account for less than one percent of the statewide CO emissions. It is unlikely that these EMAs will have much impact on reducing ambient CO concentrations. However, the promotion of electric vehicle use, through the installation of charging infrastructure (EMA 9), would contribute to less gasoline vehicles on the road over time, reducing the occurrence of cold starts and extended vehicle warm-ups in residential areas. Additionally, EMA 7 allows for the repower or replacement of both diesel powered and spark ignition engine powered airport ground support equipment with all electric engines (Appendix C). And EMA 8 includes the repower or replacement of port cargo handling equipment with all electric engines or equipment.

3.5.1. CO *Nonattainment Area* and *Maintenance Area*s

The EPA established NAAQSs for CO as follows:

- Primary 1-hour: 35 parts per million (ppm), not to be exceeded more than once per year;
- Primary 8-hours: 9 ppm, not to be exceeded more than once per year (EPA 2017b).

3.5.1.1. Anchorage CO Maintenance Area

A major portion of the Anchorage urban area was declared a *Nonattainment Area* for CO in 1978 (Appendix A Figure A-8). The Municipality of Anchorage (MOA) and ADEC prepared a CO attainment plan intended to meet the CO NAAQS by December 1987, which did not occur (ADEC 2013A). In 1990, the EPA designated Anchorage as a *Moderate Nonattainment Area*. The MOA and ADEC submitted a revised plan to bring the area into attainment by December 1995. However, the area was reclassified by the EPA as a *Serious Nonattainment Area* in 1998 after two violations of the NAAQS were measured in 1996. Anchorage has not violated the CO NAAQS since 1996 (ADEC 2013A). In 2002, the EPA approved Anchorage's attainment plan and designated Anchorage as a CO *Maintenance Area*. MOA and ADEC subsequently prepared a maintenance plan that demonstrated ambient CO emissions were low enough to ensure continued attainment of the NAAQS through 2023. Accordingly, the EPA reclassified Anchorage in 2004 as in attainment

with the CO NAAQS. The MOA has since developed an LMP for the second 10-year maintenance period (2014-2024) (ADEC 2013A). With approval of the LMP, a regional emissions budget and future forecasting of emissions or concentrations is no longer required.

The major source of ambient CO concentrations in Anchorage is from vehicle emissions during the winter from vehicle cold starts and warm up idling (ADEC 2013A). Cold engines emit considerably more CO at start-up than warm engines. In addition, many Anchorage drivers engage in extended vehicle warm-ups, particularly prior to their morning commute. As a consequence, a large portion of CO emissions occur mid-week in residential areas where morning commute trips begin. According to the emissions inventory compiled for base year 2007, almost 80 percent of winter season CO emissions in the *Maintenance Area* (125 tons CO per day) were from motor vehicles. The MOVES model suggested that start emissions account for about two-thirds of all motor vehicle emissions (ADEC 2013A). Other significant sources of CO in Anchorage include aircraft and residential wood burning. Airport operations at Anchorage International Airport and Merrill Field contributed 12.4 and 0.7 tons per day of CO, respectively.

The LMP includes continued monitoring and the following primary control measures to ensure continued attainment of the CO NAAQS: (1) an air quality public awareness program aimed at promoting use of engine block heaters to reduce CO cold start emissions and the promotion of bicycling, walking, mass transit and other alternatives to the single occupancy vehicle; (2) a transit marketing program; and (3) carpooling and vanpooling. The plan identifies contingency measures as well.

3.5.1.2. Fairbanks CO Maintenance Area

EPA designated the urban portion of the Fairbanks North Star Borough (FNSB) a *Nonattainment Area* for CO in 1991. Appendix A shows the boundaries of the North Pole (Figure A-9) and the Fairbanks-Fort Wainwright *Nonattainment* areas (Figure A-9). The Fairbanks area experiences severe wintertime temperature inversions, resulting in the trapping of pollutants near ground level, with little vertical dispersion. Low winds and the presence of hills around most of the urban area combine to limit horizontal dispersion as well. As a result, Fairbanks has the most significant air quality impacts in the state.

EPA approved the FNSB's CO Maintenance Plan and the FNSB officially became a CO *Maintenance Area* on September 27, 2004, initiating a 20-year maintenance planning period. The modeled emissions inventory developed for the area without local control measures estimated a total of 90.5 tons of CO emissions per day, with the majority of the emissions coming from onroad vehicles (45.2 tons), followed by area sources including residential wood combustion (25 tons per day), nonroad sources (16.8 tons per day), and point sources (3.5 tons per day). Approximately 4.2 tons per day were attributed to airport operations and locomotives contributed another 0.2 tons CO per day (ADEC 2013b).

The FNSB has not violated the NAAQS for carbon monoxide since 1999. Because the CO emissions were consistently well below 85 percent of the CO NAAQS (<7.65 ppm) during the first ten-year planning period, FNSB developed an LMP for the second 10-year maintenance planning period (ADEC 2013b). The EPA approved the LMP October 8, 2013.

The LMP includes continuation of monitoring and implementation of control measures: (1) expanded availability of plug-ins to promote use of engine block heaters to reduce CO cold start emissions; (2) a consumer-based oxygen sensor replacement program; (3) an episodic woodstove burn ban; and (4) voluntary programs that promote public awareness on actions to reduce CO, and transit system improvements.

4. ALLOCATION OF ENVIRONMENTAL MITIGATION TRUST FUNDS

Alaska has been allocated $8.125 million to fund projects within the 10 EMAs, as defined in Appendix C. The settlement requires the funds to be disbursed within 10 years from the Trust Effective Date of October 2, 2017, with no more than one third disbursed in the first year and no more than two thirds disbursed in the first two years.

As described below and in Table 1, Alaska intends to disburse the funds over a 5-year period on school buses, public transit buses, ferries/tugs and marine vessels, electric vehicle charging infrastructure and diesel engines used for prime power. Up to 15 percent of the trust may be allocated to the lead agency for administrative costs, to be reimbursed at a rate of up to 15 percent of each funded project. Each allocation of trust funds described in Table 1 includes the 15 percent administrative costs. The relative allocations of funds may change over time depending on the analysis of emission benefits and costs for each proposed project.

4.1. EMA 2 – School Buses and Public Transit Buses

Eligible Mitigation Action 2 includes the repower or replacement of Types A-D school buses, or Classes 4-8 shuttle or transit buses. Vehicles eligible for scrappage and repower or replacement include those with engine model years of 2009 or older. The engines/buses may be replaced with new cleaner diesel engines/vehicles, alternative fueled engines/vehicles (e.g., CNG, propane, electric hybrid), or all-electric engines/vehicles.

4.1.1. Type A-D School Buses

Alaska intends to allocate 50% of the VW Trust to the replacement of old high-pollution emitting school buses. A little more than half of the people providing public comment supported using the EMT funds to replace older diesel school buses. Nearly all school districts have eligible buses for replacement, some of which are more than 20 years old. There will not be any *mandatory* funding match requirement for school bus upgrade/replacement as the eligible recipients are government entities and there are no federal programs that support replacing or upgrading school buses other than the EPA's DERA rebate program which does not allow VW Trust funds to be used as mandatory cost-share.

Two request for applications (RFA) will be solicited for the upgrade/replacement of eligible school buses, each allowing for the disbursement of up to $2 million. The first solicitation will occur during the winter 2018/2019 and the second in late fall 2019. As described in Table 2, school bus projects will be evaluated based on:

- Cost effectiveness ($/lifetime short ton NOx reduction)

- Location in a NOx emission priority area
- Location in an air quality priority area
- Location within at-risk communities
- *Voluntary* matching funds

4.1.2. Class 4-8 Public Transit Buses

Alaska intends to allocate 10% of the VW Trust to the replacement of old high-pollution emitting public transit buses. Nearly 60% of the public responses supported use of the EMT funds to replace public transit buses. Several municipalities have eligible buses for replacement. Although not a condition of the VW Trust, Alaska will require 80% matching funds from applicants for the upgrade/replacement of eligible public transit buses because there are federal funds available to the state and urbanized areas for the replacement of public transportation and fixed-route buses via both state formula allocation and competitively. VW Trust funds may be used as mandatory cost-share for these federal funds.

Up to $800,000 will be made available for the upgrade/replacement of eligible public transit buses through an RFA in winter 2018/2019. As described in Table 2, public transit bus projects will be evaluated based on:

- Cost effectiveness ($/lifetime short ton NOx reduction)
- Location in a NOx emission priority area
- Location in an air quality priority area
- Location within at-risk communities
- *Voluntary* matching funds

4.2. EMA 4 – Ferries/Tugs and EMA 10 – DERA Marine Vessels

Ferries or tugs equipped with unregulated, Tier 1, or Tier 2 marine engines may be repowered under EMA 4. These tugs and ferries may be repowered with any new Tier 3 or Tier 4 diesel or alternate fueled engine, or with all-electric engines. In addition, under the DERA Option (EMA 10), commercial marine vessels with pre-Tier 3 engines operated at least 1,000 hours per year are eligible for upgrade.

Alaska intends to allocate 10% of the VW State Trust to upgrade eligible marine vessels, require mandatory matching funds, and cap the funds at $200,000 per project. Approximately 15% of the public comments supported the use of EMT funds to repower marine engines. Interest in upgrading eligible diesel engines in marine vessels has been expressed by the Inter-Island Ferry Authority and the City and Borough of Ketchikan, as well as private commercial fishing vessels and marine tour companies in Southeast Alaska.

The VW Trust stipulates funding limitations for the replacement of ferry/tug engines that are non-government owned (See Appendix C). Alaska will apply the same funding limitations to government-owned ferries and tugs. For eligible marine vessels other than ferries or tugs, the funding limitations established by the EPA under the DERA program would apply (See Appendix D).

Up to $800,000 will be made available for the upgrade/replacement of eligible marine engines through an RFA in late fall 2019. These projects will be evaluated based on:

- Cost effectiveness ($/lifetime short ton NOx reduction)
- Alaska residency or Alaska-based business
- *Voluntary* matching funds
- Applicant experience with managing grants

4.3. EMA 10 – DERA Prime Power

In recent years, Alaska has been allocated approximately $250,000 of federal funds per year through the EPA's State DERA program. The ADEC and AEA have historically used these funds, along with other state funds and Denali Commission funds, to repower or upgrade diesel engines in power houses in rural Alaska. The State DERA program requires a *mandatory* cost-share by the State, for which the EMT funds may not be applied per the terms of the VW settlement agreement. However, EMT funds may be applied as *voluntary* match. Under the State DERA program, as an incentive to providing voluntary match, if the state provides a 1:1 voluntary match to the State DERA funds, the EPA awards an additional 50 percent funding. To fully leverage federal funds for projects in rural Alaska, Alaska intends to set aside approximately $250,000 of the EMT annually for the state's voluntary match under the State DERA program for five years. Approximately 18% of the public comments supported use of EMT funds to replace older diesel engines used for prime power. VW State Trust funds will be made available for these projects winter 2018/2019 ($500,000), spring 2019, spring 2020 and spring 2021. The Alaska Energy Authority will determine which projects receive VW Trust funding based on the same criteria used to prioritize state Rural System Power Upgrade (RPSU) projects.

4.4. EMA 9 - Light-duty Zero-Emission Vehicle Supply Equipment

Alaska intends to allocate 15% of the EMT funds to electric vehicle charging infrastructure, the maximum amount allowable per the settlement agreement. One-third of the public comments supported use of the EMT funds for electric charging infrastructure. Alaska will allocate the funds regionally based on populations within the connected road systems as follows:

- Railbelt and Copper Valley Region (79% statewide population) - $950,000
- Southeast Region (10% statewide population) – $125,000
- Other areas of the state combined (11% statewide population) - $135,000

The Trust agreement establishes funding limitations based on the location and availability of the charging infrastructure: publically available on government-owned property (100%); publically available on non-government-owned property (80%); and generally non-public sites at work places or multi-unit buildings (60%) (See Appendix C). Alaska will require a minimum matching fund amount of 20% for all publically-available sites whether owned by government or non-government entities.

The funds will be made available to each of the areas as early as spring 2019. The Railbelt/Copper Valley and Southeast regions will each be required to develop a regional comprehensive plan that includes AEA, DEC, utilities, statewide and local transportation planners, local government, fleet

owners, electric vehicle owners, and car dealerships. The plans will include locations of existing infrastructure and proposed locations for new level 2 and level 3 charging stations, rationale for site selections, prioritization of site installation, and schedule. Within each region funds will be prioritized based on the population of the area served, traffic volumes/commuting corridors, average miles of road traveled, and the amount of anticipated NOx reduction. Plans will need to demonstrate how the EV stations are sited in the most cost-effective manner and will need to include agreements with the entities who will own and maintain each site (e.g., local utility or government). All installations will be required to have interoperability.

For areas outside of these two regions, an RFA will be solicited and projects will be evaluated following the same criteria for prioritizing charging sites described above.

5. EXPECTED RANGES OF EMISSION REDUCTIONS

The terms of the Trust require each beneficiary to provide a general description of the expected ranges of NOx emission reductions that would be realized by implementation of the EMAs identified in the Plan. To do so, AEA gathered fleet data from several school districts and municipalities and used the EPA's Diesel Emission Quantifier tool. However, the information presented below is for *demonstrative purposes only* and does not represent an agreement to pursue specific projects within the various EMAs. Separate RFAs will be solicited for school bus, transit bus, and ferry/tug projects and the applications will be evaluated based on the criteria previously presented.

The actual amounts of NOx emission reductions will depend on the types of projects, manufacture years of the engines being replaced, the type of replacement engine, fuel usage, and the amount of annual runtime, idling and start/stops of the engines. The amount of NO_x reductions will be determined for each funded project and will be presented in the semi-annual reports submitted to the Trustee.

5.1. EMA 2 - School Buses

None of the school districts interviewed were interested in all-electric or alternative fuel buses because of the upfront costs or unknowns; the preference was for new cleaner diesel buses which are considerably less expensive. However, in the future, school districts may choose to apply for the replacement of eligible diesel school buses with all-electric or alternative fuel buses, such as propane. Respondents indicated that the average cost of a new cleaner diesel school bus is approximately $135,000 and an all-electric bus is approximately $400,000. Accordingly, Alaska's proposed allocation of 50% of the EMT fund could replace approximately 25 older buses with cleaner diesel buses or 8 older buses with all-electric buses.

For purposes of estimating the amount of anticipated reduction in NOx emissions for this Plan, AEA used the EPA Diesel Emissions Quantifier (DEQ) tool and information from the four largest school districts in Alaska. The Anchorage and Kenai Peninsula Borough school districts provided model years, average miles driven per year, fuel usage, and idling time estimates for their district-owned fleet. These two school districts combined have more than 25 buses of model year 1998 and 1999, and average annual miles driven of approximately 9,200 and 7,500 miles, respectively.

The Fairbanks and Matanuska-Susitna Valley school districts use contracted school buses, more than 25 of which are model year 2007. Nearly all of the school buses in the rest of Alaska's school districts fall within the range of these model years. Because the school districts that own their buses do not replace the buses until they have adequate funds for replacement and there are currently school buses within some fleets that are more than 23 years old, a school bus lifetime was assumed to be 25 years. Based on the information for these four school districts and our assumptions, replacement of these model year buses with model year 2019 diesel buses could result in a reduction of 0.7 to 3.5 short tons of NOx emissions annually or a lifetime reduction of 9 to 14 short tons of NOx.

5.2. EMA 2 - Public Transit Buses

Alaska intends to allocate 10% of the VW Trust to the replacement of old high-pollution emitting public transit buses and require 80% in matching funds from recipients. Anchorage (17), Fairbanks (12), Matanuska-Susitna (9), Juneau (7), and Ketchikan (4) have eligible diesel buses for replacement (see Table 3). In addition, there are 20 smaller cutaway buses scattered in other communities throughout the state ranging from Model Year 2006 to 2009.

The Municipality of Anchorage and the City and Borough of Juneau are both interested in replacing older diesel buses with all-electric buses while Fairbanks North Star Borough is interested in newer diesel buses. The average cost of a new cleaner diesel 35-foot to 40-foot transit bus is $400,000 while an electric bus is $1,075,000; the cost of an alternative fuel bus falls between. An allocation of 10% of the EMT fund with a required 80% match could replace approximately 10 older buses with cleaner diesel buses or 4 older buses with all-electric buses.

For purposes of estimating the amount of anticipated reduction in NOx emissions for this Plan, AEA used the EPA Diesel Emissions Quantifier tool; model years, average miles driven per year, fuel usage, and idling time estimates provided by the Municipality of Anchorage and Fairbanks; and an assumed lifetime of 15 years. Based on the information for these two areas and our assumptions, replacement of 10 model year 2007 buses with 10 model year 2019 diesel buses could result in a reduction of approximately 1.9 short tons of NOx emissions annually or a lifetime reduction of 7 short tons of NOx. Replacing four of the buses with 4 all-electric buses could result in a reduction of approximately 0.9 short tons of NOx emissions annually or a lifetime reduction of 3.5 short tons of NOx.

5.3. EMA 4 – Ferries/Tugs and EMA 10 – DERA Marine Vessels

Ferries/tugs and other commercial marine vessels operated at least 1,000 hours per year equipped with unregulated, Tier 1, or Tier 2 marine engines may be repowered under EMA 4 and EMA 10 (DERA Option), respectively. It is difficult to estimate the amount of NOx reductions for these projects as the size of the engine, run time, fuel consumption, and idle time varies greatly as well as the type of the replacement engines (e.g., non-tiered mechanically controlled versus Tier 2).

Interest in upgrading eligible diesel engines has been expressed by the Inter-Island Ferry Authority, the City and Borough of Ketchikan, as well as private commercial fishing vessels and marine tour companies in Southeast Alaska. The cost of these projects can range from approximately $250,000 to well over $1 million. Alaska intends to allocate 10% of the State trust

to upgrade eligible marine vessels, require a 50% match and cap the allowable funds at $200,000 per project. This allocation would assist in upgrading at least 4 engines.

As an example, NASEO (2017) has provided the following typical emission impact per ferry per year as follows:

- Pre-control replaced with Tier 3: -38,198 pounds of NOx
- Pre-control replaced with Tier 4: -62,336 pounds of NOx
- Tier 1 replaced with Tier 3: -23,973 pounds of NOx
- Tier 1 replaced with Tier 4: -47,812 pounds of NOx
- Tier 2 replaced with Tier 3: -12,198 pounds of NOx
- Tier 2 replaced with Tier 4: -36,337 pounds of NOx

5.4. EMA 10 - DERA Prime Power

In 2014, electric generation from diesel fuel sources resulted in 10,257 tons of NO_x emissions. Under the DERA option (EMA 10), EMT funds may be used as voluntary match to repower or replace eligible stationary diesel engines used for power production.

We propose to allocate approximately 15% of the EMT State Trust funds to upgrade or replace diesel engines used for prime power in rural Alaska. This amount allows for the state to leverage State DERA funds to the maximum extent possible each year over 5 years. The State typically receives approximately $250,000 in State DERA. By using the EMT funds as voluntary match at a 1:1 ratio, we could leverage an additional $125,000 in EPA funds each year.

The cost of replacing an engine is approximately $100,000 to $200,000 if the generator is replaced as well. Over 5 years, with the use of 15% of the EMT along with $625,000 leveraged from the EPA, approximately 18 engines or 9 engine-generator sets could be replaced. The amount of NOx reduction is highly variable from engine to engine depending on the engine size, power load, efficiency, fuel usage, runtime, type of engine being replaced and type of replacement engine. Based on estimates of NOx reduction for previous DERA projects, replacement of an eligible diesel engine with a higher-tiered engine can result in 1-5 tons of NOx reduction over a 10-year period.

5.5. EMA 9 - Light-duty Zero-Emission Vehicle Supply Equipment

EMA 9 allows for up to 15 percent of Alaska's allocation of the trust to be used to fund the acquisition, installation, operation and maintenance of new light duty zero emission vehicle supply equipment (Level 1, Level 2 or fast charging equipment). There are too many factors to reasonably estimate the NO_x reductions from this EMA at this time. The anticipated reduction in NOx emissions would also depend on the amount of NOx produced by the source of electricity. The greatest emission reduction would occur in areas with hydropower or other renewable energy resources. This EMA will benefit air quality in the long term by providing infrastructure to promote electric vehicle use.

6. PUBLIC INPUT

The section below outlines the public outreach and public involvement that has been implemented by AEA since being designated the Lead Agency.

6.1. Goals for Outreach

The goals for public outreach were as follows:

- Gather input from interested stakeholders and the general public on how settlement funds should be distributed.
- Integrate input from the Governor's office and ADEC about projects and areas of interest as it relates to use of settlement funds.
- Distribute information about the settlement to stakeholders and the general public.

6.2. Target Audience

AEA targeted outreach to the following audience:

- General public
- Governor's office
- State and local governments:
    - ADEC
    - Alaska Department of Transportation and Public Facilities (ADOT&PF)
    - Local governments (Boroughs and Cities)
    - Metropolitan planning organizations for designated *Nonattainment* and *Maintenance* areas (Fairbanks Metropolitan Area Transportation Solutions (FMATS); Anchorage Metropolitan Area Transportation Solutions (AMATS))
    - School Districts
    - Port Authorities
- Tribes, Tribal government and regional Native organizations/corporations
- Alaska Native Tribal Health Consortium
- Federal agencies
- Electric utilities
- Equipment/service vendors

6.3. Communications Methods and Tools

6.3.1. Public engagement events

AEA staff presented information regarding the settlement and the Draft Plan and solicited feedback through facilitated Q&A, comment forms, links to online comment forms, email and phone. AEA also maintained consistent coordination directly with other stakeholder groups including National Tribal Air Association/ITEP and Alaska Native Tribal Health Consortium.

Meetings/presentations:

- Apr 13, 2017 Juneau Renewable Energy Cluster Working Group

- May 1-4, 2017 National Tribal Forum on Air Quality
- May 2017 Alaska Power Association Environmental Regulations Committee meeting
- Aug 10, 2017 Juneau Renewable Energy Cluster Working Group
- Sept 11-12, 2017 Intelligent Transportation Society annual meeting
- Sept 13-15, 2017 Alaska Power Association annual meeting
- Sept 19-21, 2017 Southeast Conference Annual Meeting
- Oct 19-21, 2017 Alaska Federation of Natives conference
- Oct 24, 2017 Alaska Tribal Conservation Alliance
- Nov 11, 2017 Juneau Renewable Energy Cluster Working Group
- Nov 13-17, 2017 Alaska Municipal League
- Nov 28-30, 2017 BIA Providers Conference
- Feb 9-11, 2018 Rural Small Business Conference
- Feb 12-16, 2018 Alaska Forum on the Environment
- Feb 13, 2018 Chugach Electric, ML&P, MEA EV infrastructure meeting
- Apr 10-12, 2018 Rural Energy Conference
- May 18, 2018 DOT&PF, AMATS and FMATS meeting

6.3.2. Public Notice

AEA received assistance from the media in advertising public comment opportunities both prior to the development of the Draft Plan and after the official public comment period opened with the publishing of the Draft Plan, including:

- http://www.alaskajournal.com/2018-06-06/state-seeks-input-plan-81m-vw-settlement-funds
- http://www.ktuu.com/content/news/State-of-Alaska-to-receive-81-million-from-Volkswagen-settlement-484601771.html
- http://fm.kuac.org/post/agency-seeks-input-using-vw-lawsuit-settlement-funds-improve-air-quality
- https://www.alaskapublic.org/2017/03/16/alaska-gets-millions-of-dollars-from-volkswagen-settlement/
- https://www.adn.com/business-economy/energy/2017/03/29/alaska-seeks-your-ideas-on-spending-8-million-from-volkswagen-settlement/

6.3.3. Surveys

AEA developed an online survey form located on our website for interested parties to submit comments. AEA sent the VW listserve notice of a survey soliciting information about interest in Eligible Mitigation Actions. The online survey was updated prior to the release of the Draft Plan and was also included as an appendix of the Draft Plan. The survey could be completed online or submitted to AEA via mail, email or fax.

AEA followed up with public transit fleet owners, school districts, the Alaska Railroad Corporation, and the Inter-Island Ferry Authority to gather information on current fleet/equipment in-use to assist in determining where opportunities exist.

AEA also developed an inventory of engines in rural diesel powerhouses to define the opportunity for Diesel Emission Reduction Act (DERA) projects to repower or replace diesel engines or gensets. This survey was completed through a combination of telephonic, email and on-site data collection.

6.3.4. Draft Beneficiary Mitigation Plan

AEA developed a Draft Plan to solicit public input. The Draft Plan was published on May 1, 2018 initiating a 60-day public comment period. The Draft Plan was distributed as follows:

- published on the AEA website
- published on the State of Alaska public notice site
- emailed to key audiences and listserve

6.3.5. Public Meetings

During the 60-day public comment period for the Draft Plan, public meetings were held in Anchorage, Fairbanks, and Juneau to describe the State's proposed allocation of the Trust funds amongst the Eligible Mitigation Actions and to solicit input. Two teleconferenced webinars were also held to make the presentations accessible to people outside these three areas. The presentation was posted to AEA's website as well.

- Anchorage – June 4, 2018 at AHFC Board Room
  - 3 pm – 5 pm – 7 attendees
  - 6 pm – 8 pm – 1 attendee
- Fairbanks – June 1, 2018 at FNSB Assembly Chambers
  - 3 pm – 5 pm – 3 attendees
  - 6 pm – 8 pm – 0 attendees
- Juneau – June 7, 2018 - (in person and as teleconference)
  - 3 pm – 5 pm – 10 attendees
  - 6 pm – 8 pm – 2 attendees
- Webinar – June 20, 2018 at 1pm – 3 pm
  - 3 attendees, technical difficulties
- Webinar – June 21, 2018 at 12 pm – 2 pm
  - 4 attendees

6.4. Summary of Public Comments

AEA received about 100 comments from email, phone, the first online survey prior to posting the Draft Plan, the second survey during the 60-day Draft Plan comment period, and the public meetings held during June 2018. Table 4 ranks the EMAs that received high public support. Table 5 characterizes the entities that provided input to Alaska's Plan.

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8. TABLES

Table 1. Proposed allocation of VW Environmental Mitigation Trust funds.

Percent of Total Fund Allocated	Eligible Mitigation Actions (EMAs)	2019			2020	2021
		Q1	Q2	Q3	Q2	Q2
50%	**EMA 2 – School Buses**					
	Match requirement: • none	$2 million		$2 million		
10%	**EMA 2 – Transit Buses**					
	Match requirement: • 80% • Applies to both government and non-government	$800,000				
10%	**EMA 4 – Ferries/Tugs; EMA 10 – Marine Vessels**					
	Match requirement: • 60% repower with diesel/alternative fuel • 25% (ferries/tugs) 40% (other marine vessels) repower with all-electric • Applies to both government and non-government			$800,000		
15%	**EMA 10 - Prime Power**					
	Match requirement: • none	$500,000	$250,000		$250,000	$250,000
15%	**EMA 9**					
	Match requirement: • 20% at publically available sites • 40% at workplace or multi-unit dwellings • Applies to both government and non-government owned property	$950,000 $125,000 $135,000				

Table 2. Project evaluation matrix for upgrade or replacement of eligible school buses and public transit buses.

Criteria	Criteria	Points	Total Possible Points
Cost effectiveness in lifetime reduction of NO_x emissions ($/short ton NOx reduction)	Least cost effective (<40th percentile)	10	30
	40th to 60th percentile	15	
	60th to 80th percentile	20	
	80th to 90th percentile	25	
	Most cost effective (90th to 100th percentile)	30	
NO_x emission priority area (total annual tons of on-road diesel NOx emissions by Census Area)	Least on-road NOx emissions (zero to 70th percentile): one point for each 10 percentiles	0-7	20
	70th to 80th percentile	10	
	80th to 90th percentile	15	
	90th to 95th percentile	18	
	Most on-road NOx emissions (95th to 100th percentile)	20	
Air quality priority area	Not located in priority area or least diesel particulate matter by Census Tract (<60th percentile)	0	10
	60th to 80th percentile diesel particulate matter	5	
	Located in maintenance area or >80th percentile diesel particulate matter	7	
	Projects located within non-attainment areas	10	
Environmental Justice Index – diesel particulate matter and at-risk population demographics	Zero to 90th percentile: one point for each 10 percentiles	0-8	10
	90th to 95th percentile	9	
	Located in most at-risk population Census Tract (95th to 100th percentile)	10	
Environmental Justice Index - traffic proximity and volume and at-risk population demographics	Zero to 90th percentile: one point for each 10 percentiles	0-8	10
	90th to 95th percentile	9	
	Located in most at-risk population Census Tract (95th to 100th percentile)	10	
Voluntary funding match	0.5 points for every 1% match up to 20 points	0.5 - 20	20

Table 3. Eligible public transit buses for replacement with VW Environmental Mitigation Trust funds. In addition, there are approximately 20 smaller cutaway buses scattered in other communities throughout the state ranging from Model Year 2006 to 2009.

Location	Total Number of Buses	Number of Eligible Buses	Eligible Model Years
Anchorage	50	17	2007
Fairbanks	14	12	1994-2007
Mat-Su Valley	9	9	1995
Juneau	18	7	2003-2006
Ketchikan	6	4	2008

Table 4. Summary of public support for the Environmental Mitigation Actions.

EMA Description	EMA #	Rank	Percent High Support
Class 4-8 transit buses	EMA 2	1	57 %
Class 4-8 school bus	EMA 2	2	52 %
ZEV supply equipment (15% of funds)	EMA 9	3	33 %
DERA Voluntary match for diesel powerhouses	EMA 10	4	18 %
Ferries/tugboats/marine vessels	EMA 4	5	15 %
Class 8 local freight trucks and port drayage trucks; Class 4-7 local freight trucks	EMA 1, EMA 6	6	14 %
Freight switcher locomotives	EMA 3	7	8 %
Forklifts and port cargo handling equipment	EMA 8	7	8 %
Airport ground support equipment	EMA 7	9	3 %
Shore power for ocean going vessels	EMA 5	10	1 %

Table 5. Summary of entities that provided input to Alaska's Draft Beneficiary Mitigation Plan for the Volkswagen Environmental Mitigation Trust.

Alaska Residents		
	Anchorage – 8 [1] Chugiak – 1 [1] Big Lake – 1 [1] Fairbanks – 2 [1,2] Kenai – 1 [1]	Trapper Creek – 1 [1] Juneau - 4 [1,2] Kodiak – 1 [1] Port Lions – 1 [2]
Government		
Federal Tongass National Forest [2] **Tribe** Native Village of Nightmute [1] Native Village of Kwigillingok [2]	**State** ADEC [1,2] DOT&PF Statewide Public Transit [3] DOT&PF – AMATS and FMATS [2,3] Alaska Railroad Corporation [2,3] Inter-Island Ferry Authority [2,3]	**Local** Municipality of Anchorage Transportation Department [1,2,3] MOA Solid Waste Services [1,2,3] Fairbanks North Star Borough Transit [3] City and Borough of Juneau [1] City and Borough of Sitka [1]
School Districts		
	Anchorage [1,2,3] Fairbanks North Star [2,3] Mat-Su [2,3] Kenai Peninsula Borough [2,3]	Sitka [2,3] Cordova [2,3] Craig [2,3] Iditarod Area [1]
ANCSA Corporation		
	Kootznoowoo, Inc. [1]	
Utilities		
Chugach Electric Association [1,2] Homer electric Association [1] Municipal Light and Power [1,2] Matanuska Electric Association [2]	Alaska Electric Light and Power [1,2] Cordova electric Cooperative [2] Kodiak Electric Association [1,2] Iliamna Newhalen Nondalton Electric Cooperative [2]	TDX Power (Sand Point, Manley, Adak) [1,2,3] City of Chefornak [2,3]
Organizations		
	Local Alaska Fisheries Development Foundation [2] Ketchikan Shipyard [2] Alaska Transit Association [3] 350 Juneau [1,2] Renewable Juneau [1,2]	**National** Diesel Technology Forum [1] NGVAmerica [1] The Hydrogen Association [1] Americans for Prosperity, Alaska [1]
Industry		
Local UnCruise Adventures [2] Kenai Fjords Tours [1] Reliant Transportation (ASD School Bus Contractor) [1]	**National** Blue Bird Corporation [2] The Lion Electric Company [2] New Flyer Industries [3] Cummins, Inc. [1,2,3] General Motors [1] Penske Truck Leasing [1] MedicAire, LLC Medidock [2] NordCo [1] Knoxville Locomotive Works [1,2]	**EV Infrastructure** Orange EV [1] Charge Point [1] Greenlots [1] SemaConnect Inc. [1] Innogy eMobility US [1]

[1] completed AEA survey
[2] expressed interest in VW through email, phone, or meeting
[3] contacted by AEA for additional information regarding fleet/project eligibility

9. FIGURES

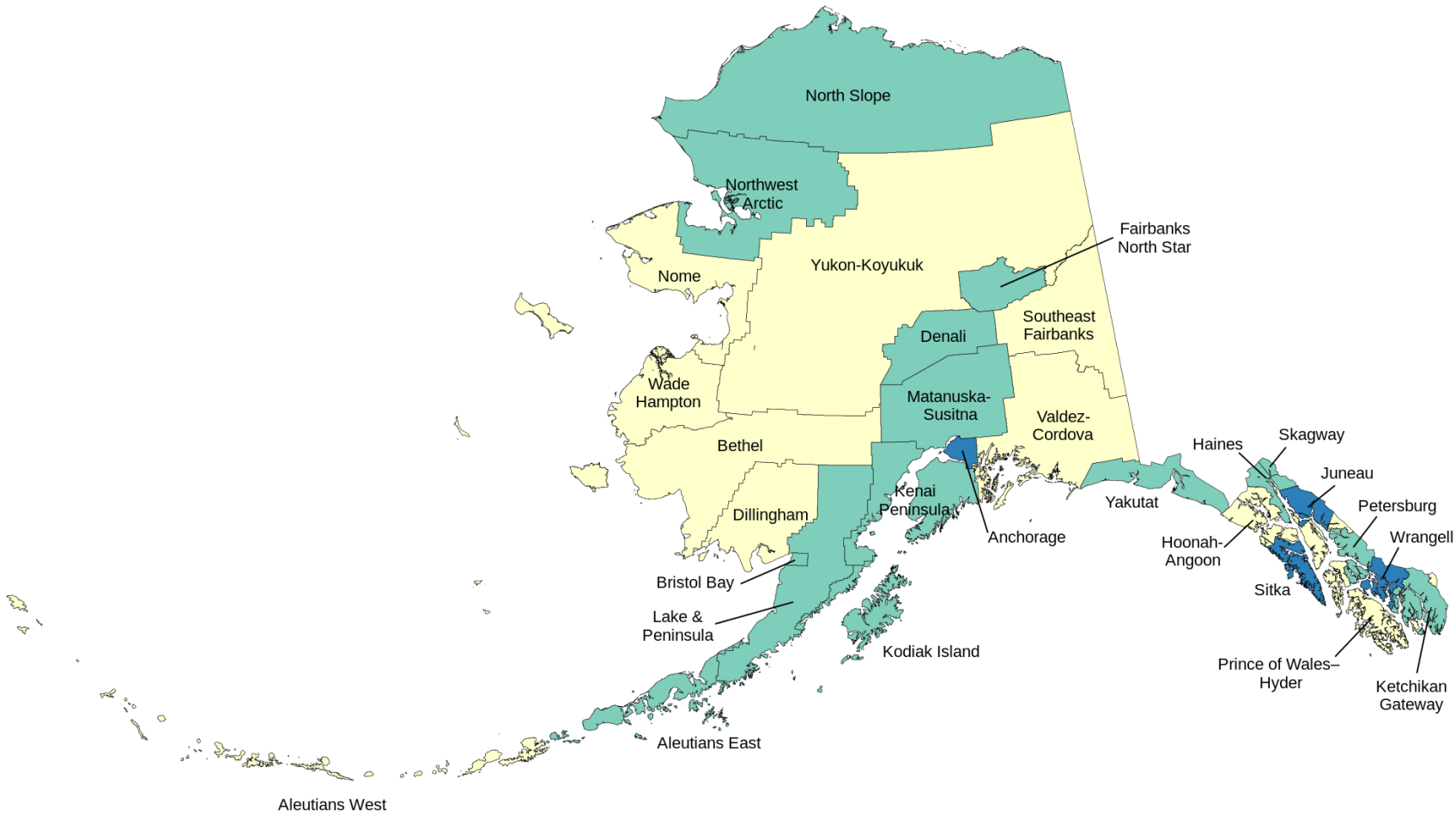


Figure 1. Map of the census area/boroughs of Alaska. Green areas represent boroughs, blue areas represent consolidated city-boroughs and yellow areas represent census areas.

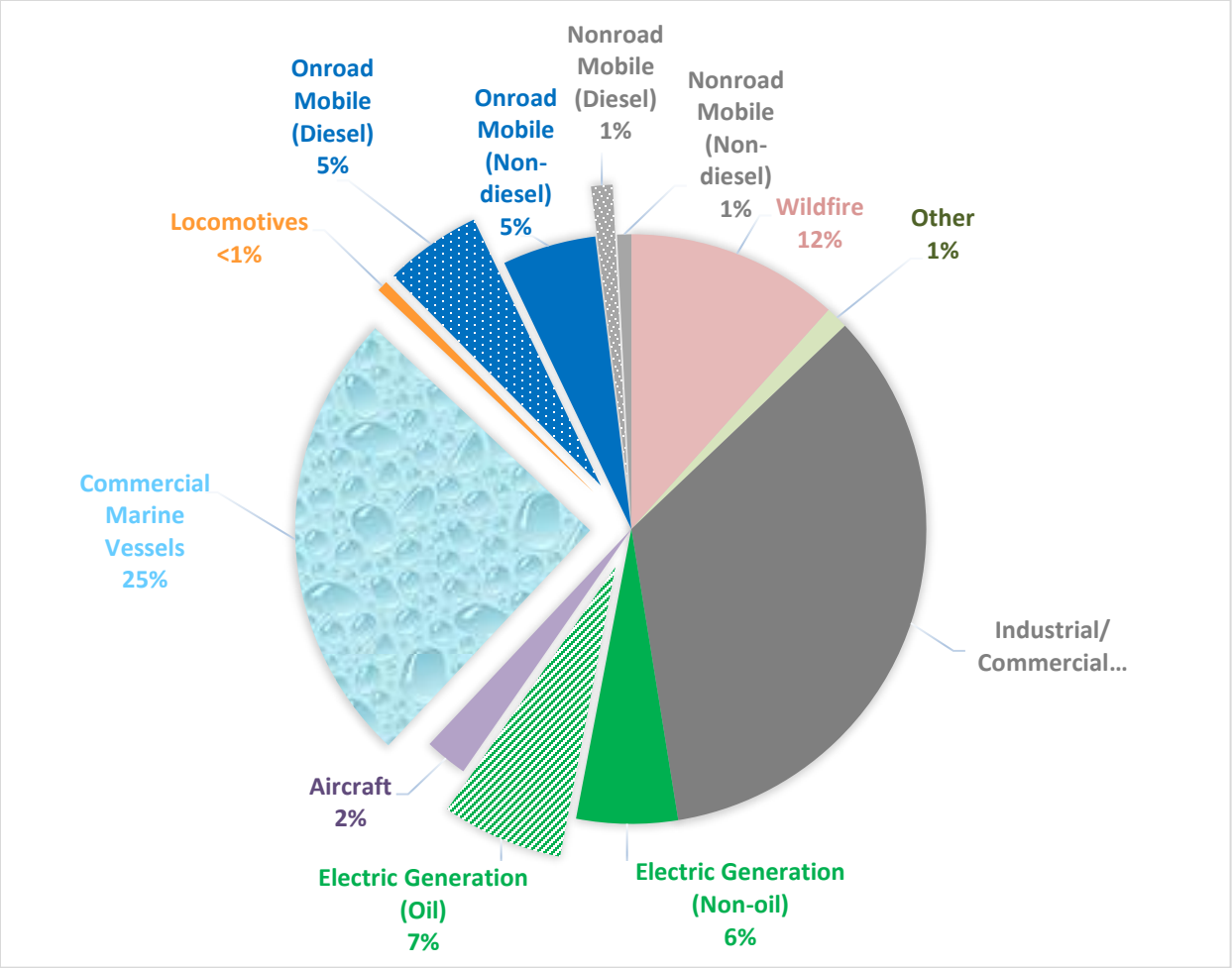


Figure 2. Source of NO_x emissions in Alaska by sector in 2014. NO_x emissions in Alaska in 2014 total 154,373 tons statewide. VW trust Eligible Mitigation Actions occur within the onroad diesel, nonroad mobile diesel, locomotive, commercial marine vessel, and electric generation from oil sectors. Source: EPA 2015b.

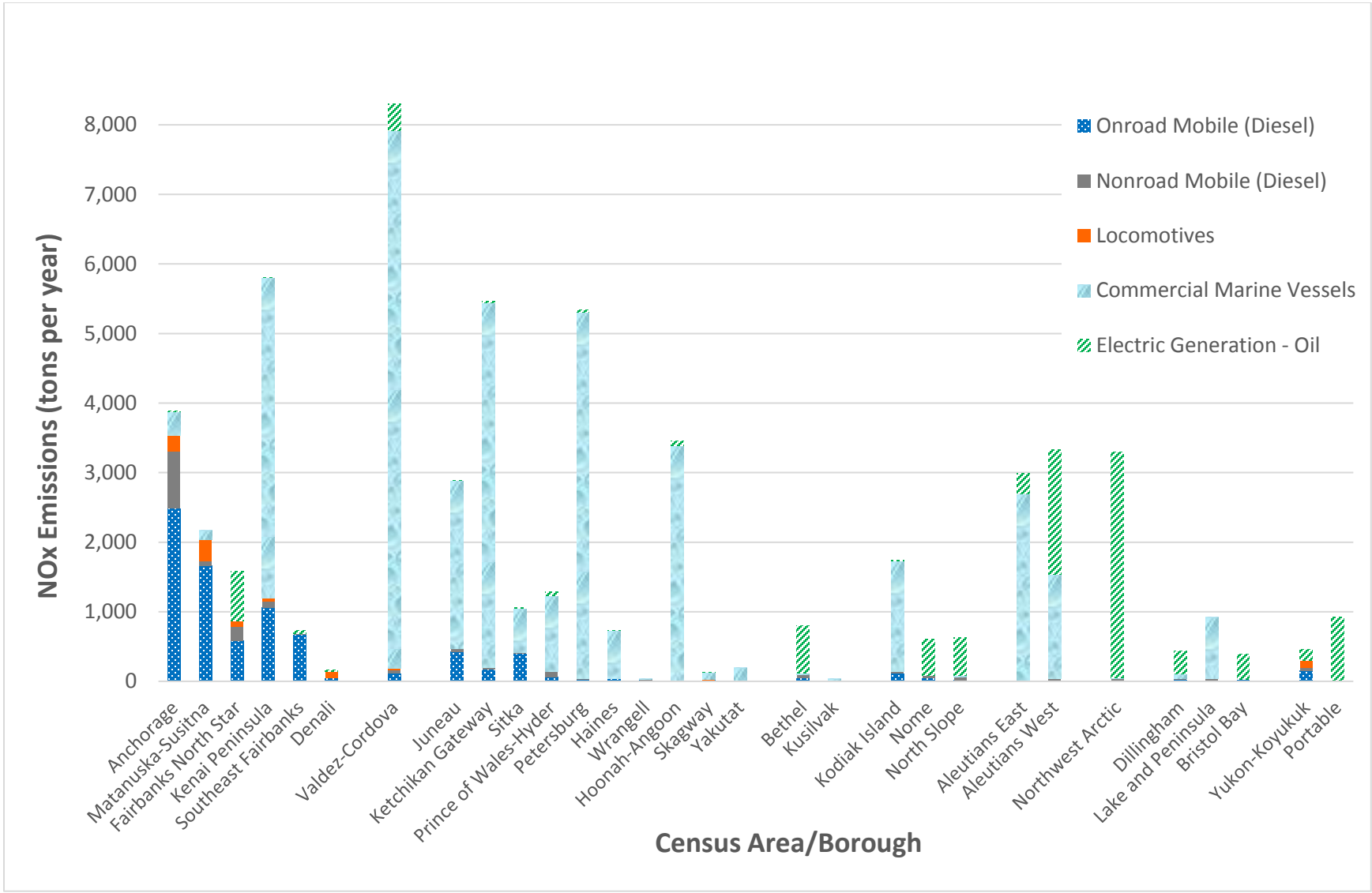
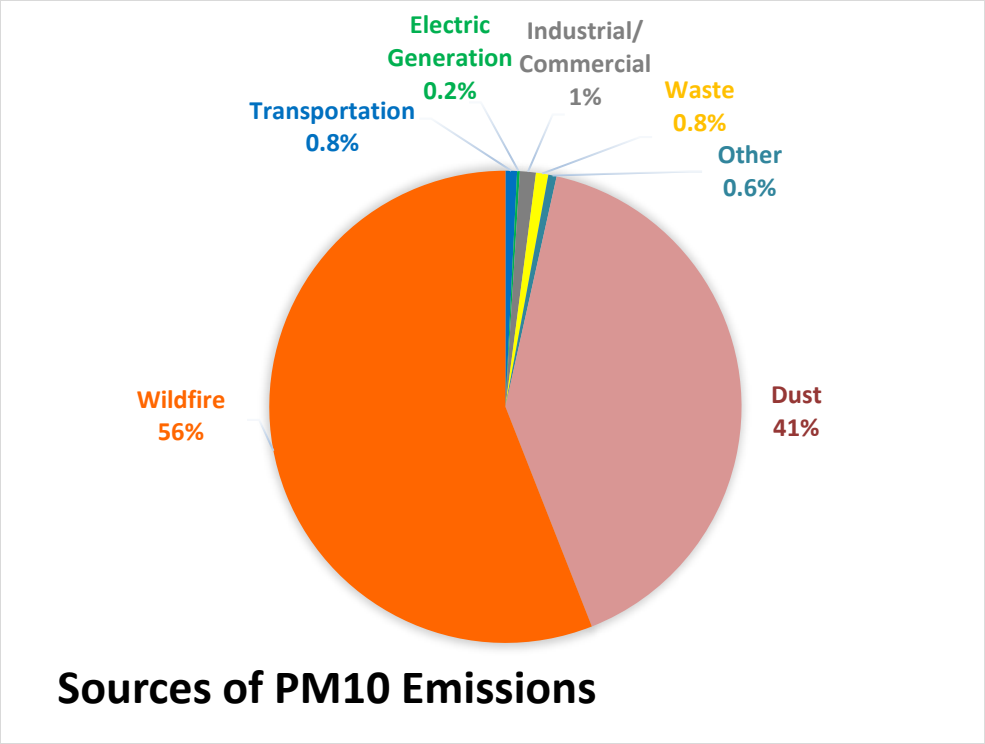


Figure 3. 2014 Diesel NOx emissions (tons per year) by Alaska census area/borough for the transportation and electric generation sectors that include Eligible Mitigation Actions under the VW Environmental Mitigation Trust. Source: EPA 2015b.



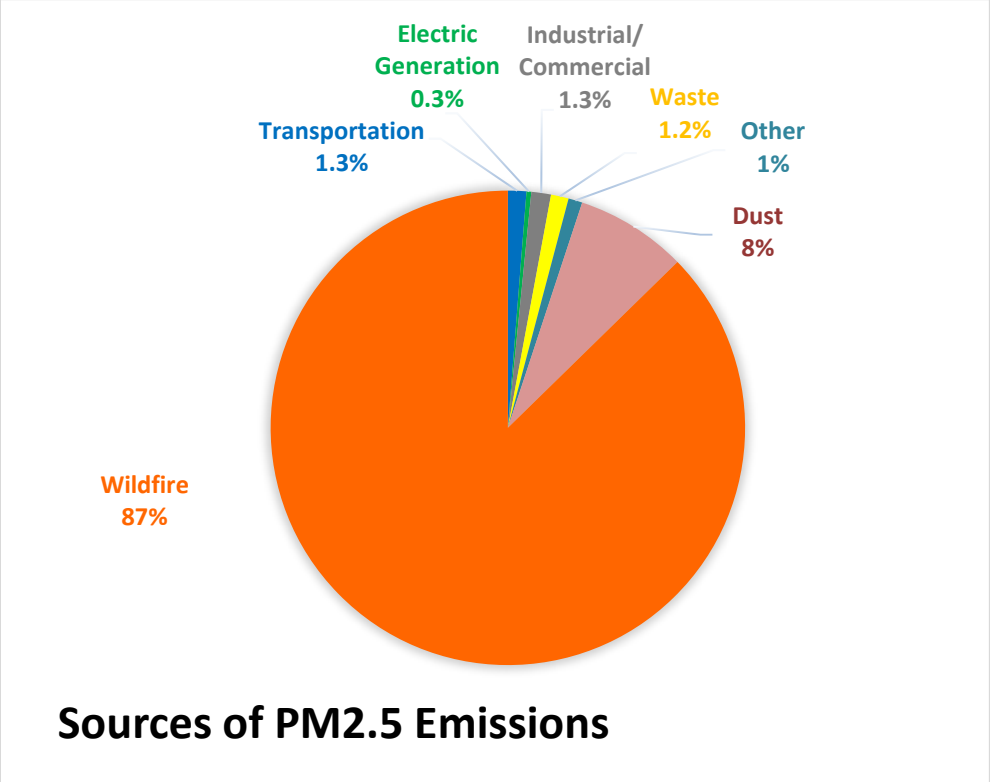


Figure 4. Source of particulate matter (PM_{10} and $PM_{2.5}$) emissions in Alaska by sector in 2014. Source: EPA 2015b.

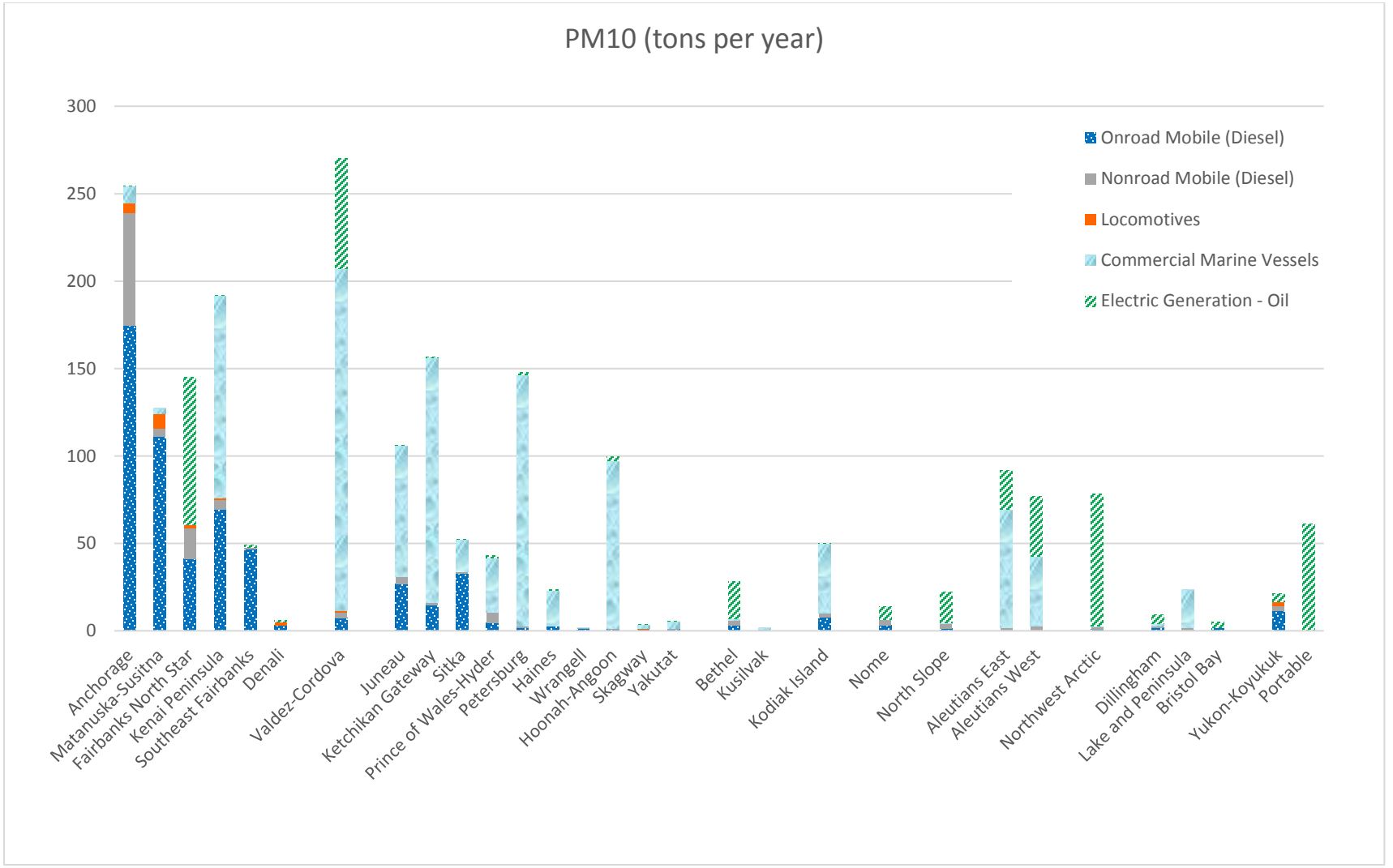


Figure 5. 2014 particulate matter (PM_{10}) emissions (tons per year) by Alaska census area/borough for the transportation and electric generation sectors that include Eligible Mitigation Actions under the VW Environmental Mitigation Trust. Source: EPA 2015b.

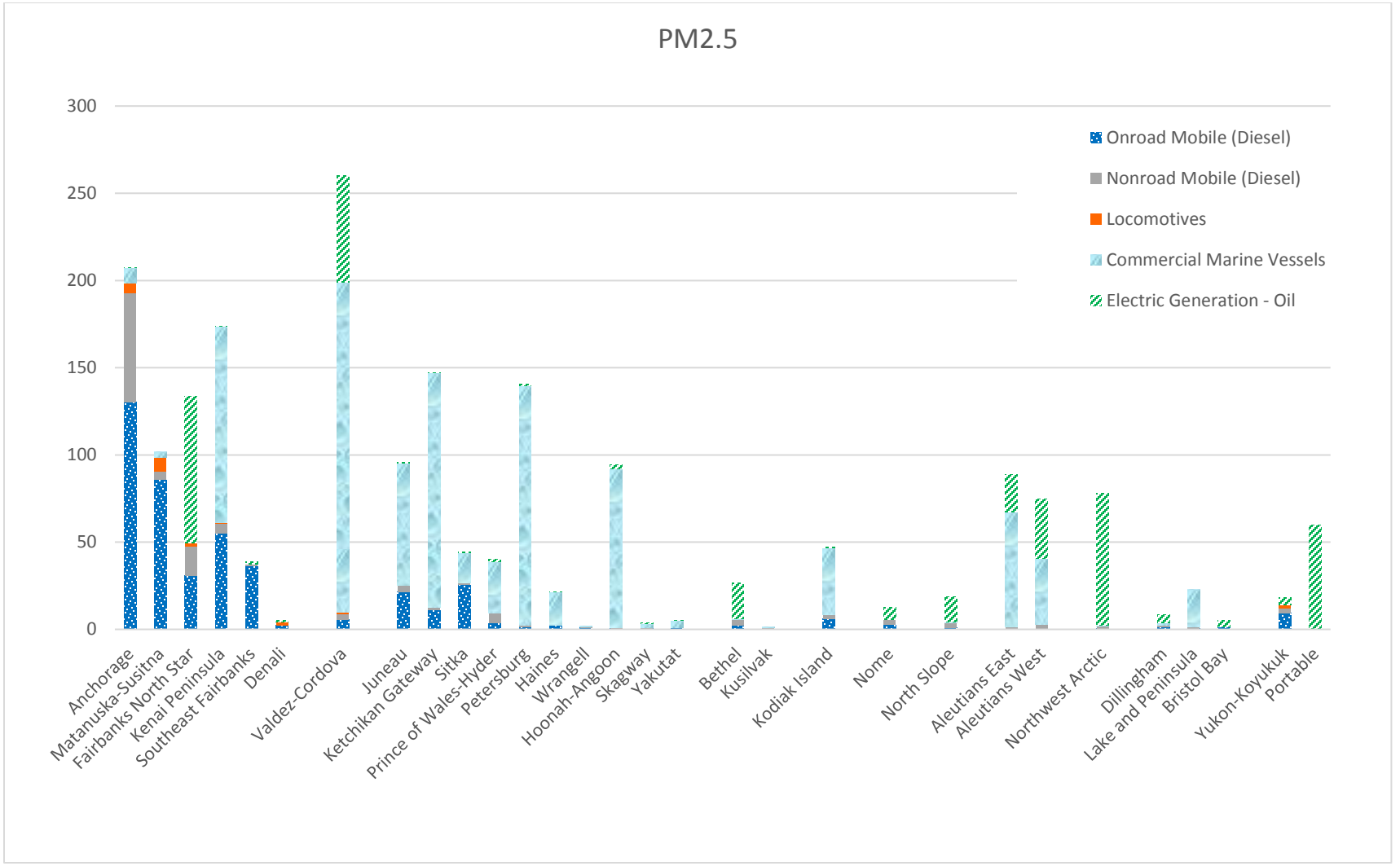


Figure 6. 2014 particulate matter ($PM_{2.5}$) emissions (tons per year) by Alaska census area/borough for the transportation and electric generation sectors that include Eligible Mitigation Actions under the VW Environmental Mitigation Trust. Source: EPA 2015b.

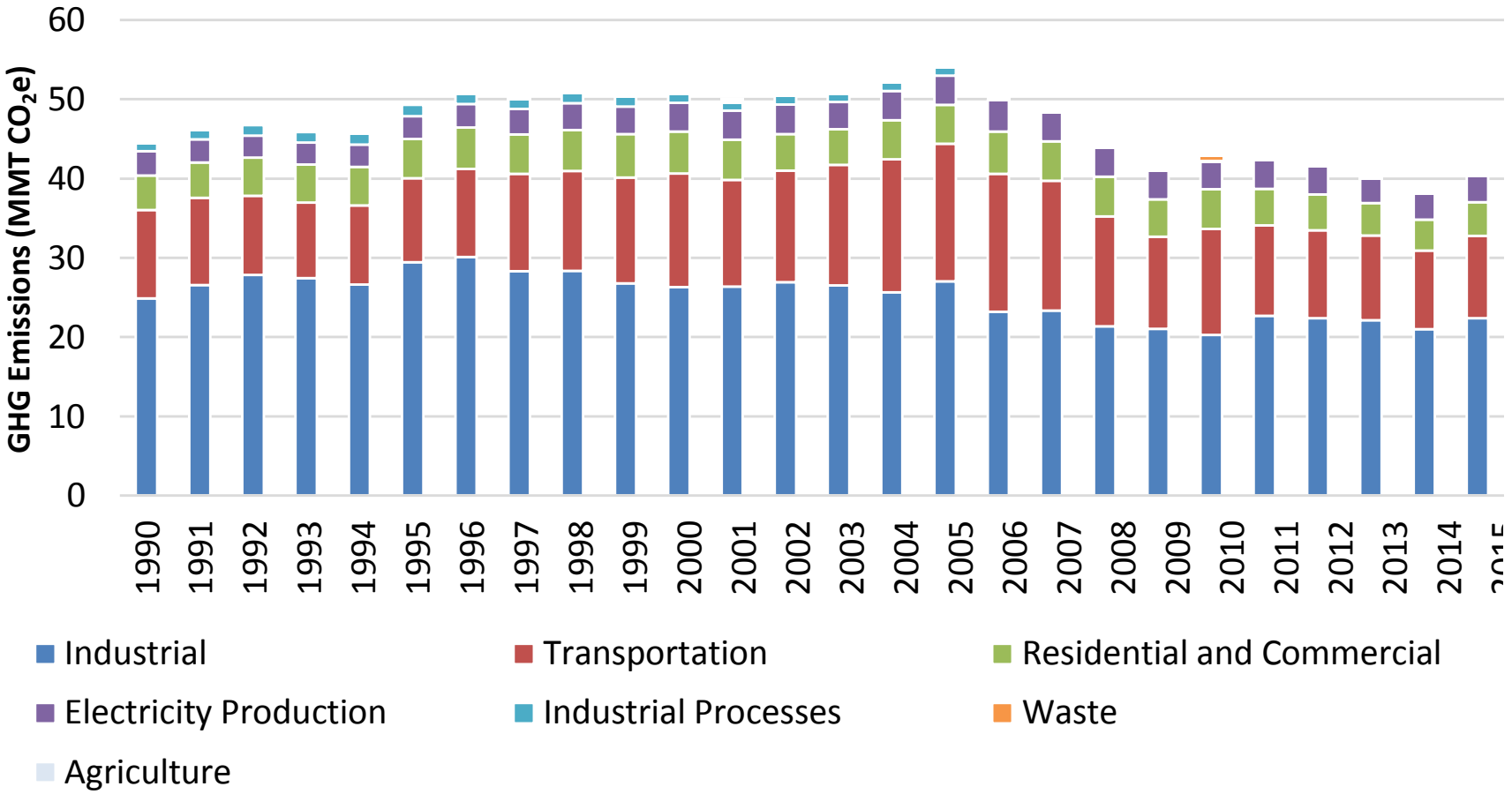


Figure 7. Alaska statewide greenhouse gas emissions in million metric tons of carbon dioxide equivalents (MMT CO_{2e} per year) by sector 1990 - 2015. Source: ADEC 2018.

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APPENDIX A:

AIR QUALITY MAPS

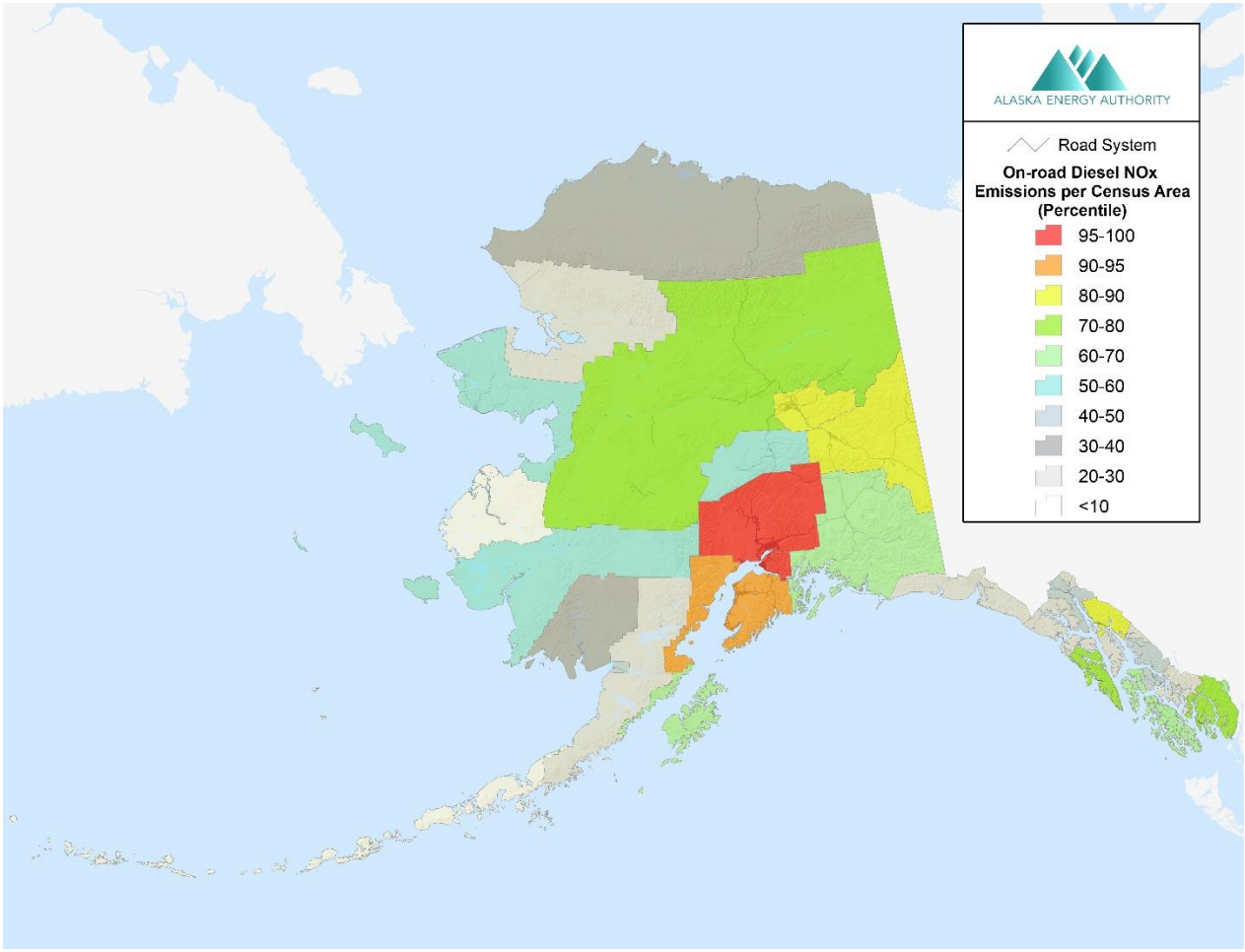


Figure A-1. Relative amount of on-road NOx emissions from diesel vehicles by Census Area.

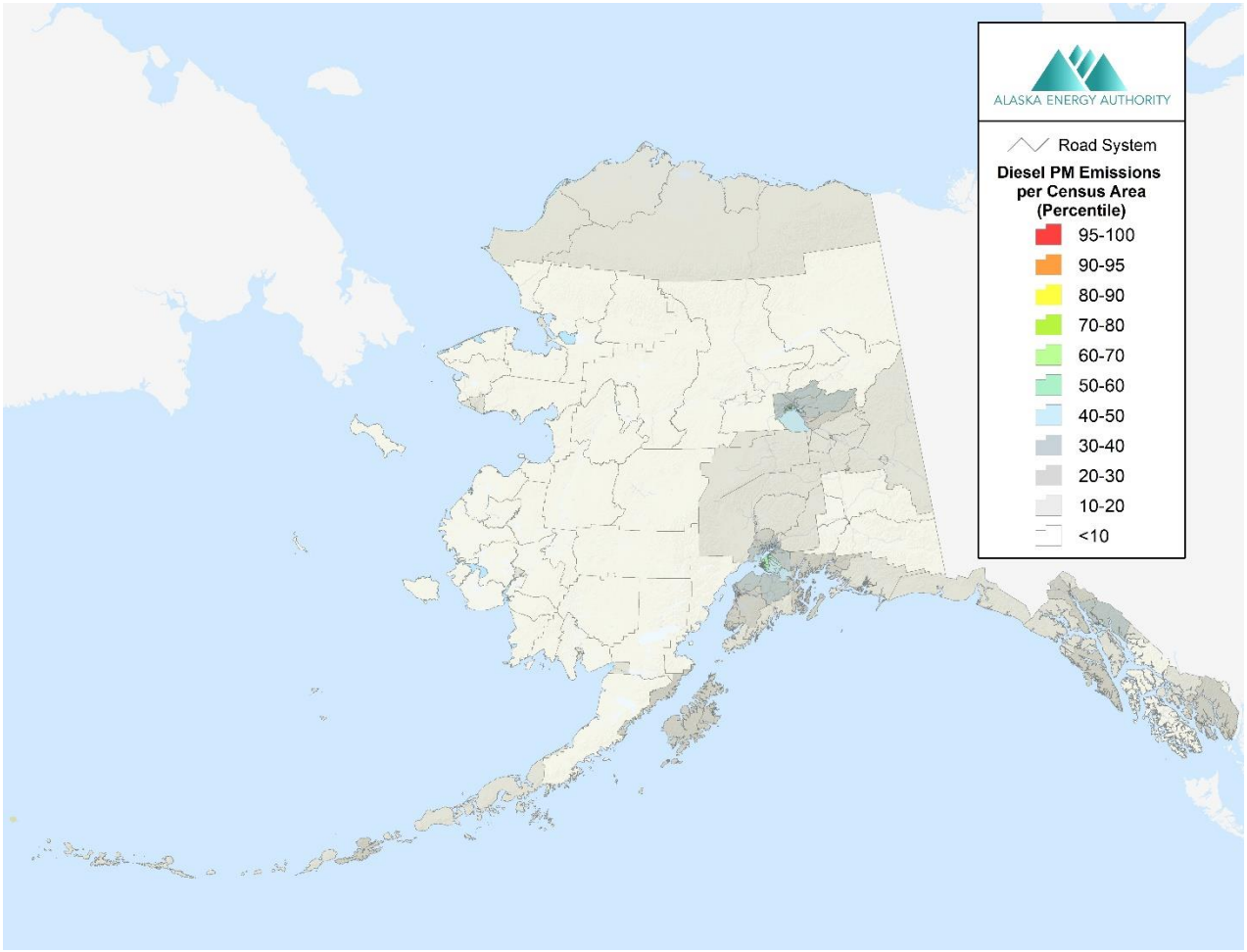


Figure A-2. Relative amount of diesel particulate matter (PM) by Census Tract statewide. See Figures A-2a through A-2d for detail within the populated portions of the state.

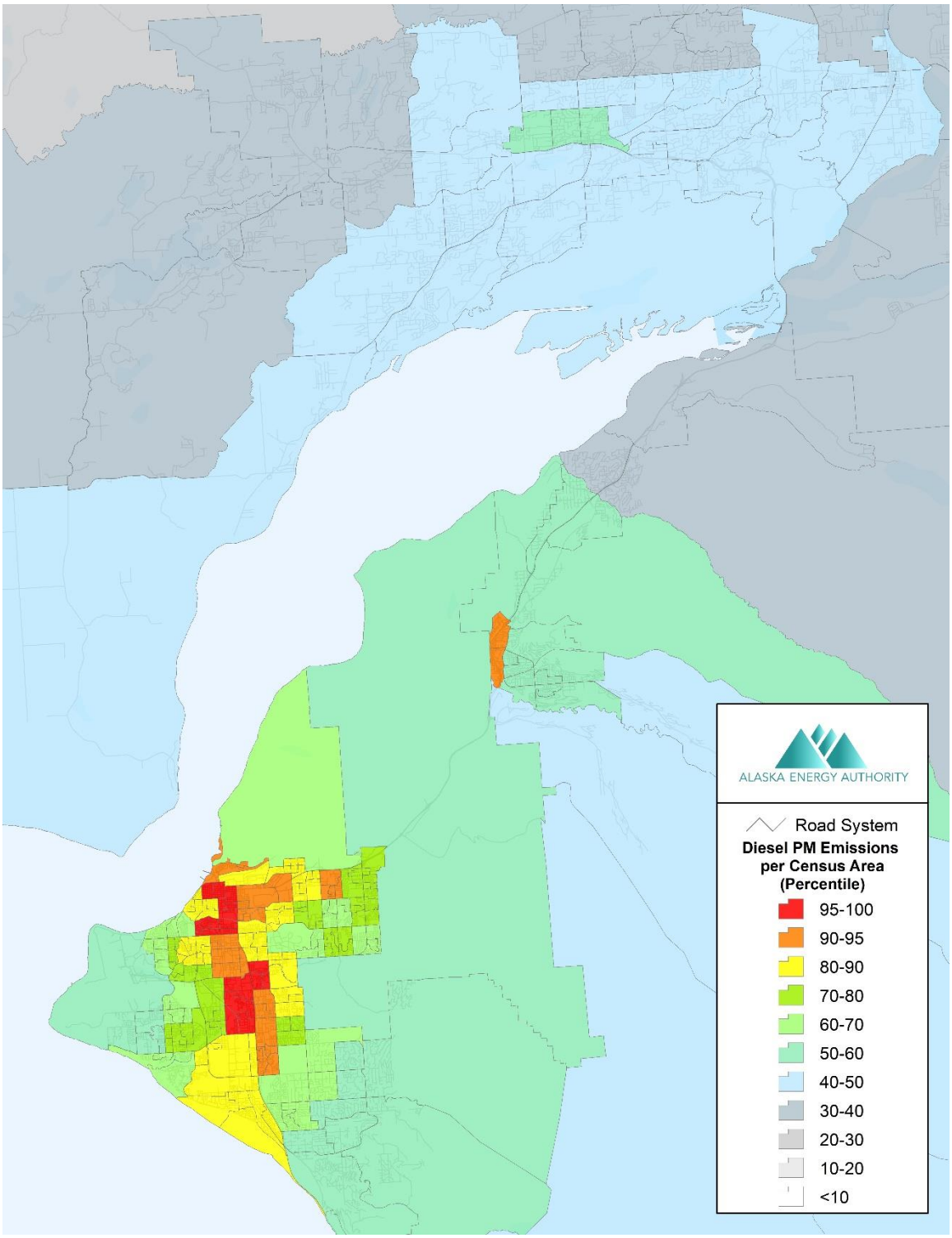


Figure A-2a. Relative amount of diesel particulate matter (PM) by Census Tract in Anchorage and Matanuska-Susitna.

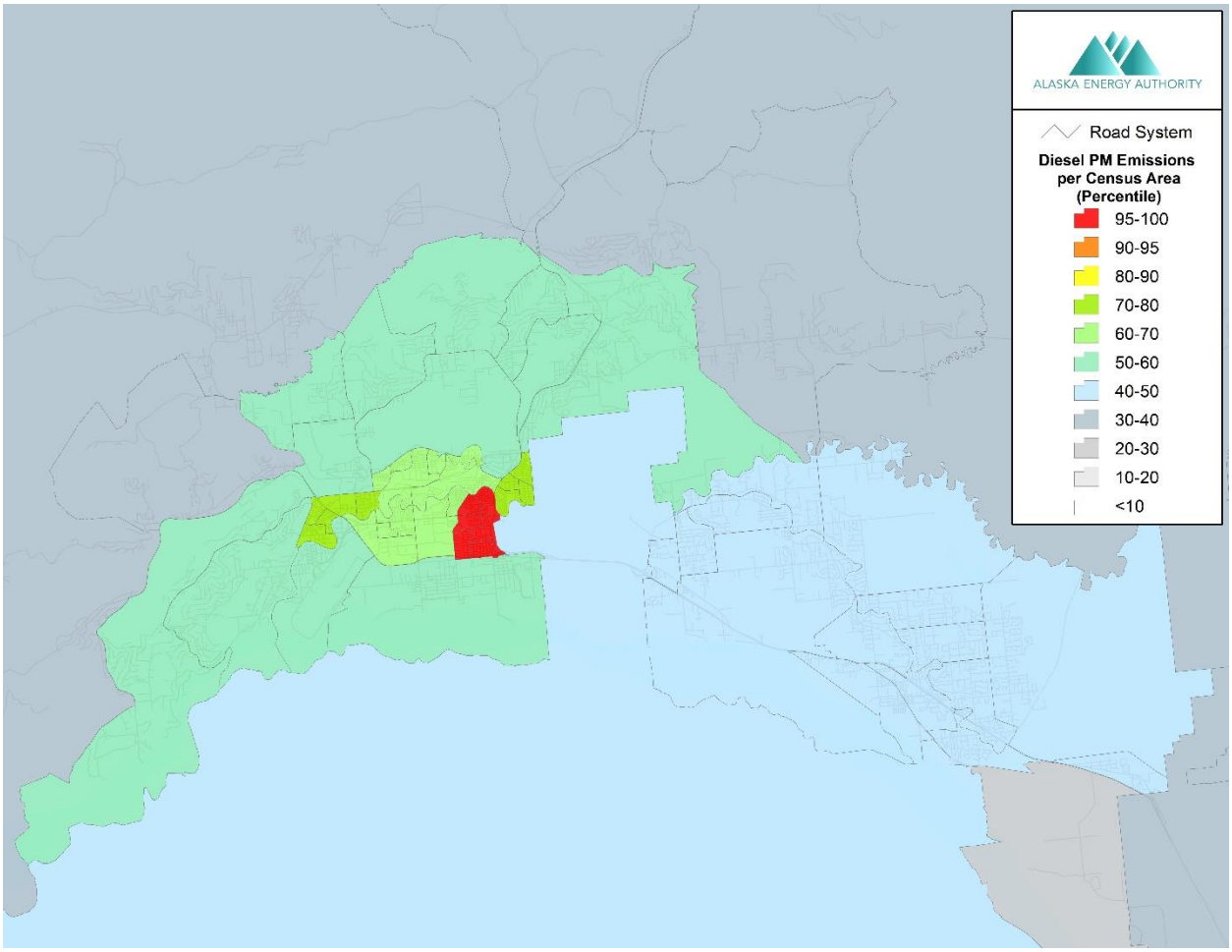


Figure A-2b. Relative amount of diesel particulate matter (PM) by Census Tract in the Fairbanks area.

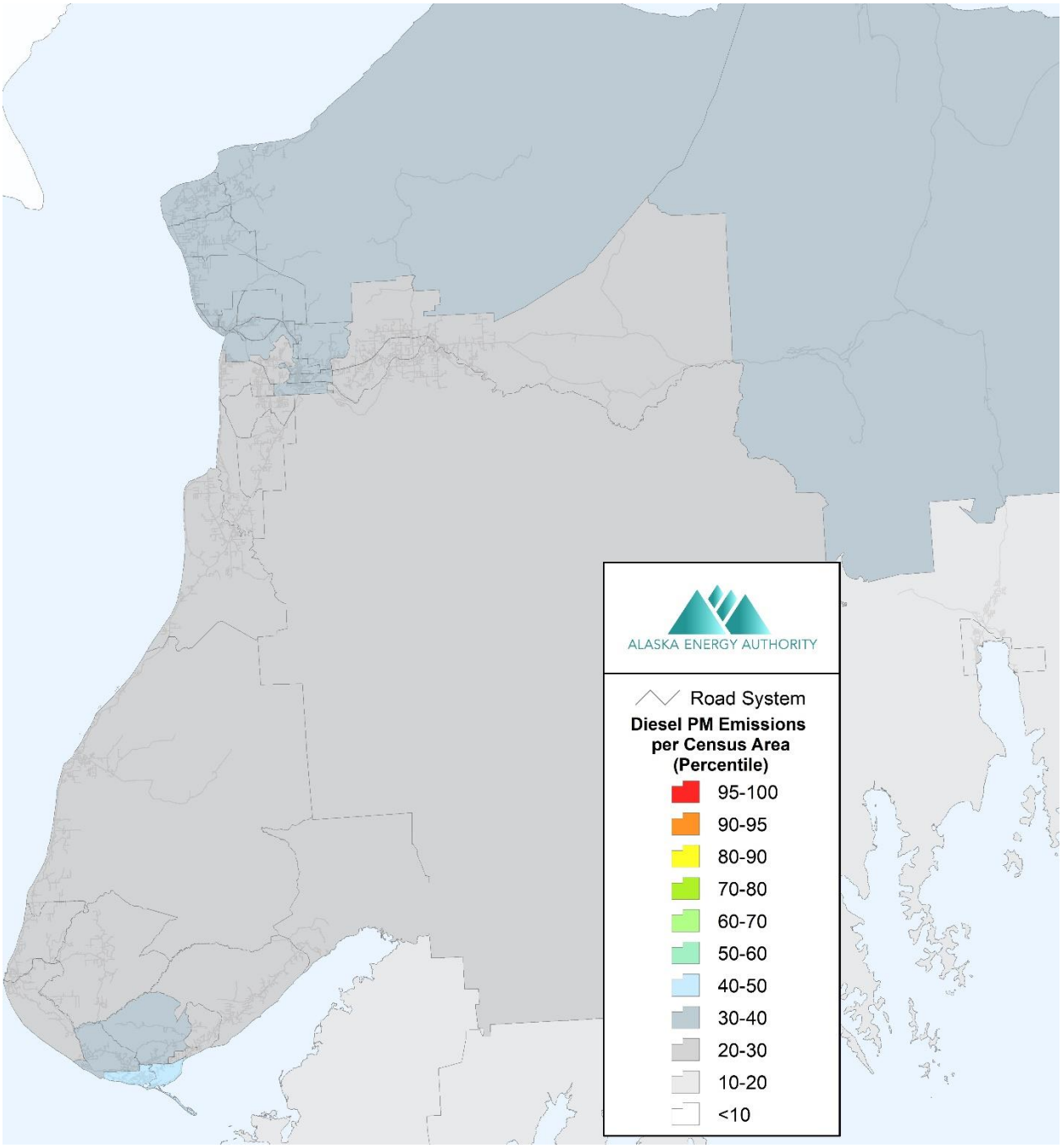


Figure A-2c. Relative amount of diesel particulate matter (PM) by Census Tract on Kenai Peninsula.

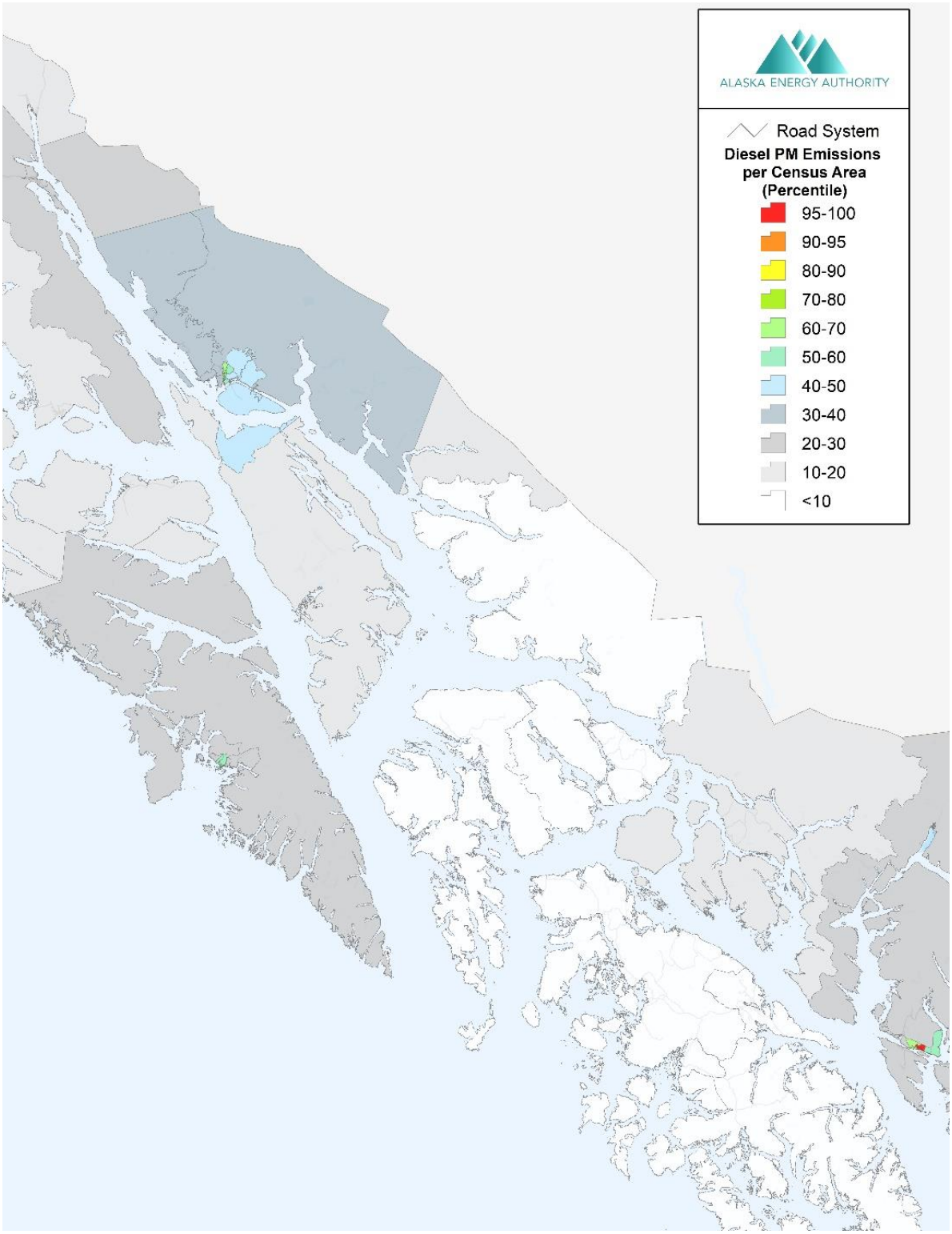


Figure A-2d. Relative amount of diesel particulate matter (PM) by Census Tract in Southeast Alaska.

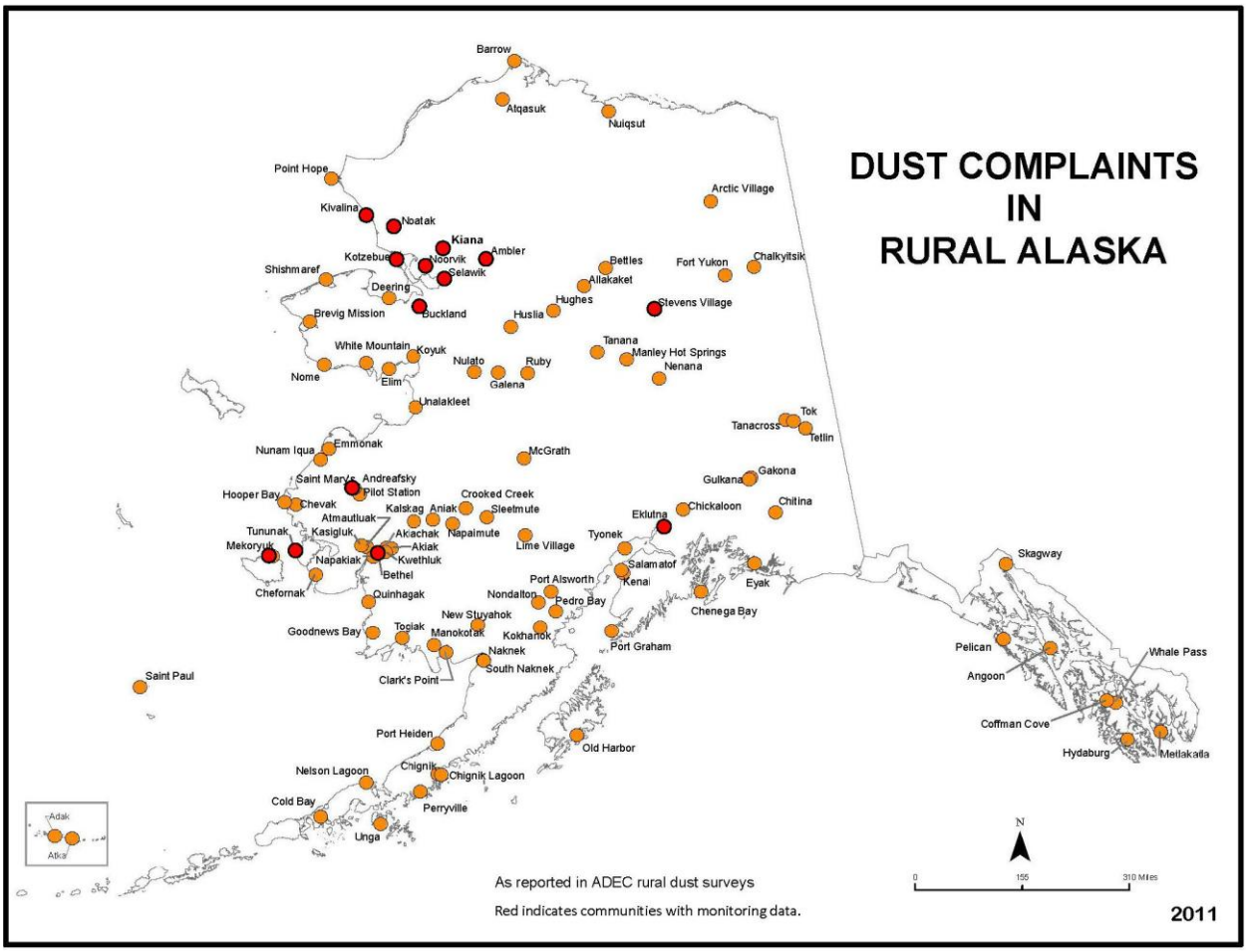


Figure A-3. Map of health complaints in rural Alaska related to ambient dust. Red indicates communities with monitoring sites. Source: ADEC 2011.

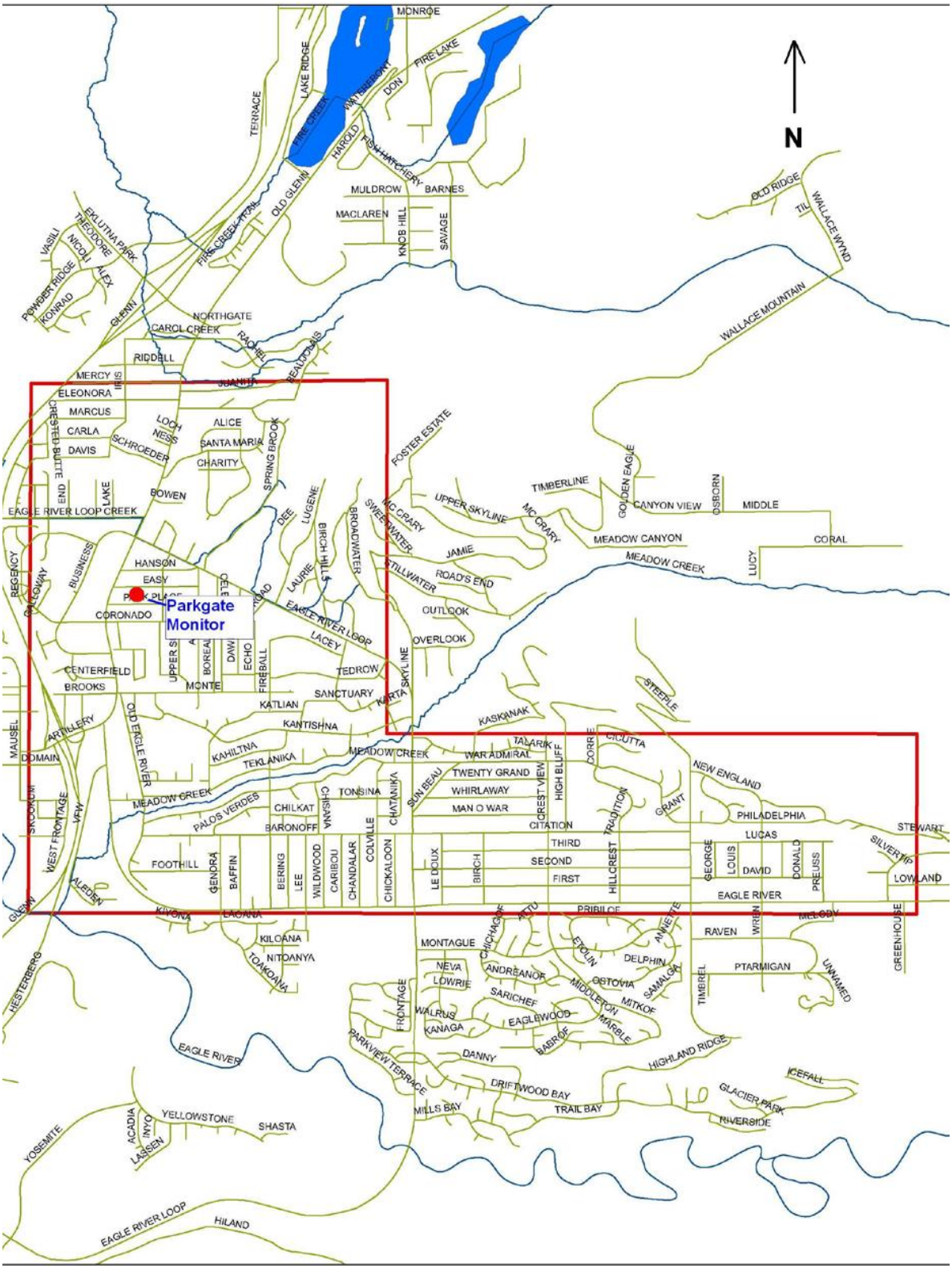


Figure A-4. Map of Eagle River PM_{10} *Maintenance Area* boundary with Parkgate PM_{10} monitoring site. Source: ADEC 2010.

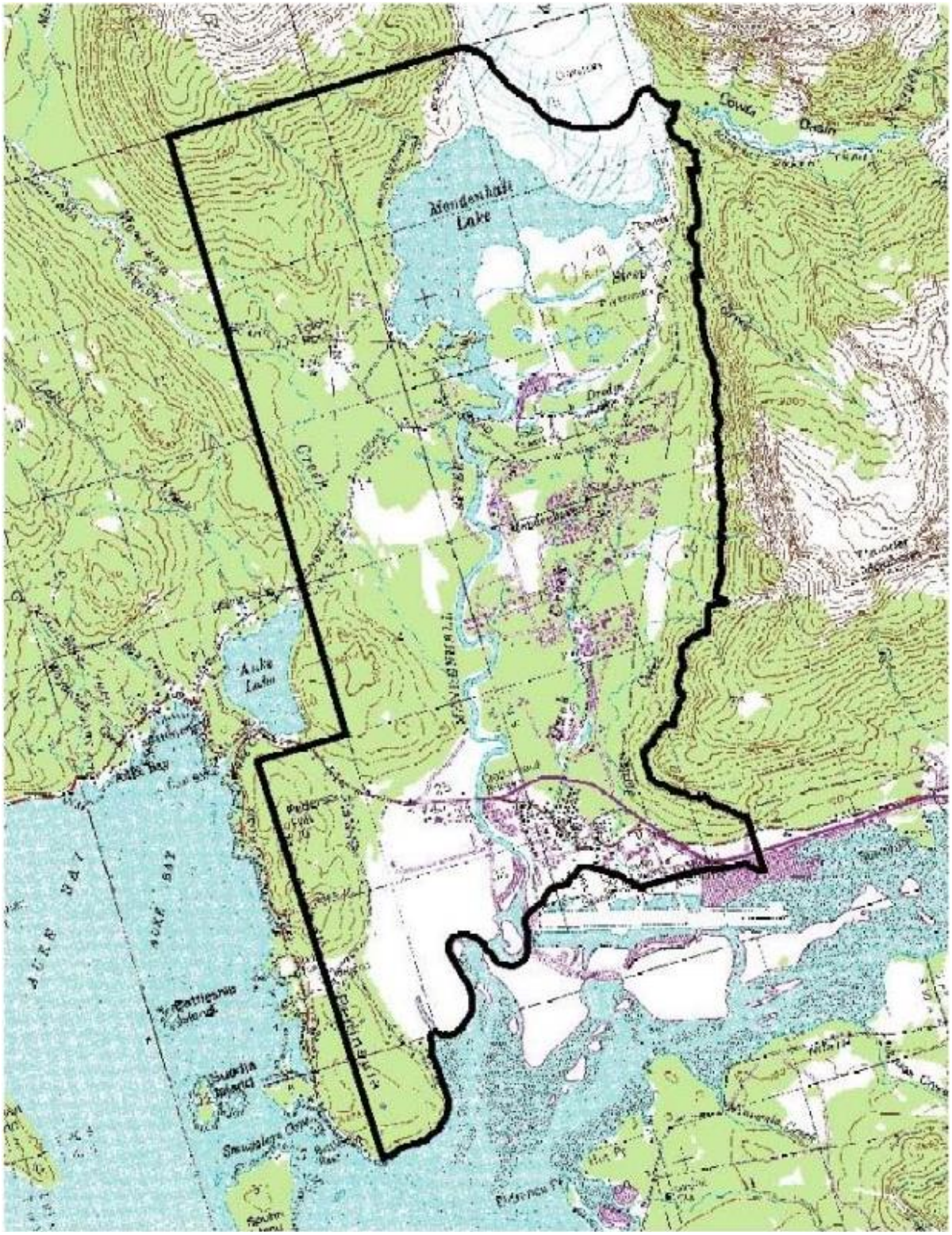
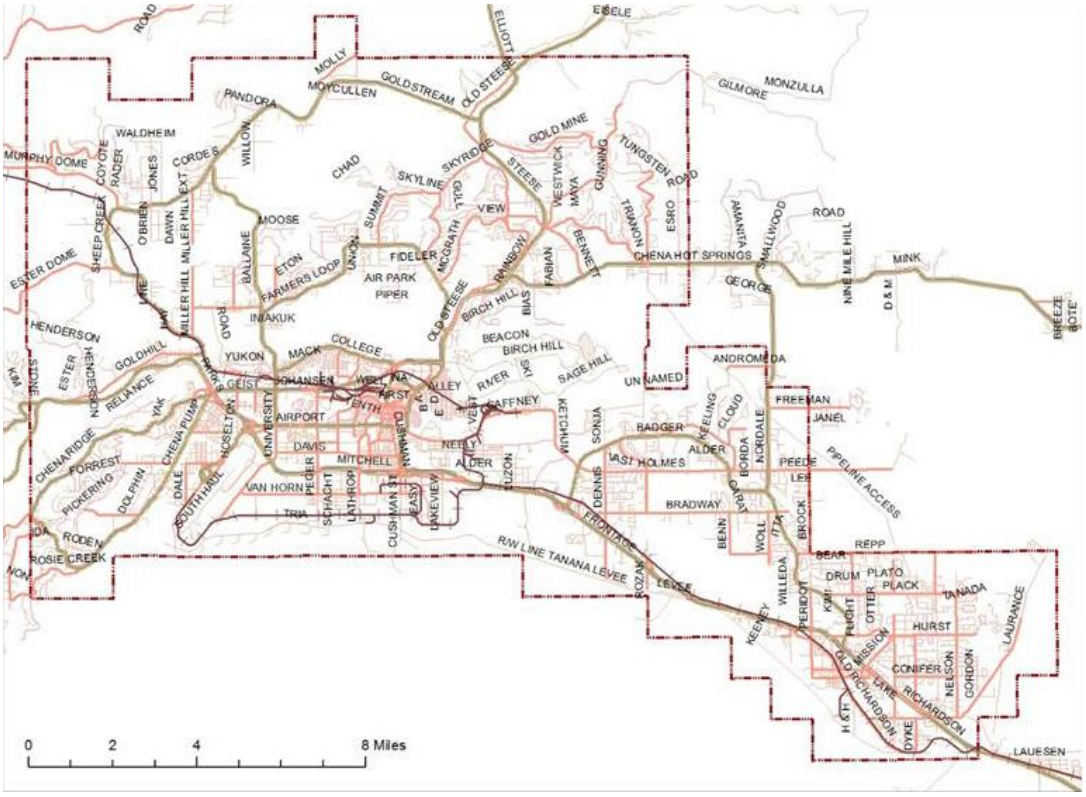


Figure A-5. Map of Mendenhall Valley PM_{10} *Maintenance Area* boundary, Juneau, Alaska. Source: ADEC 2009.



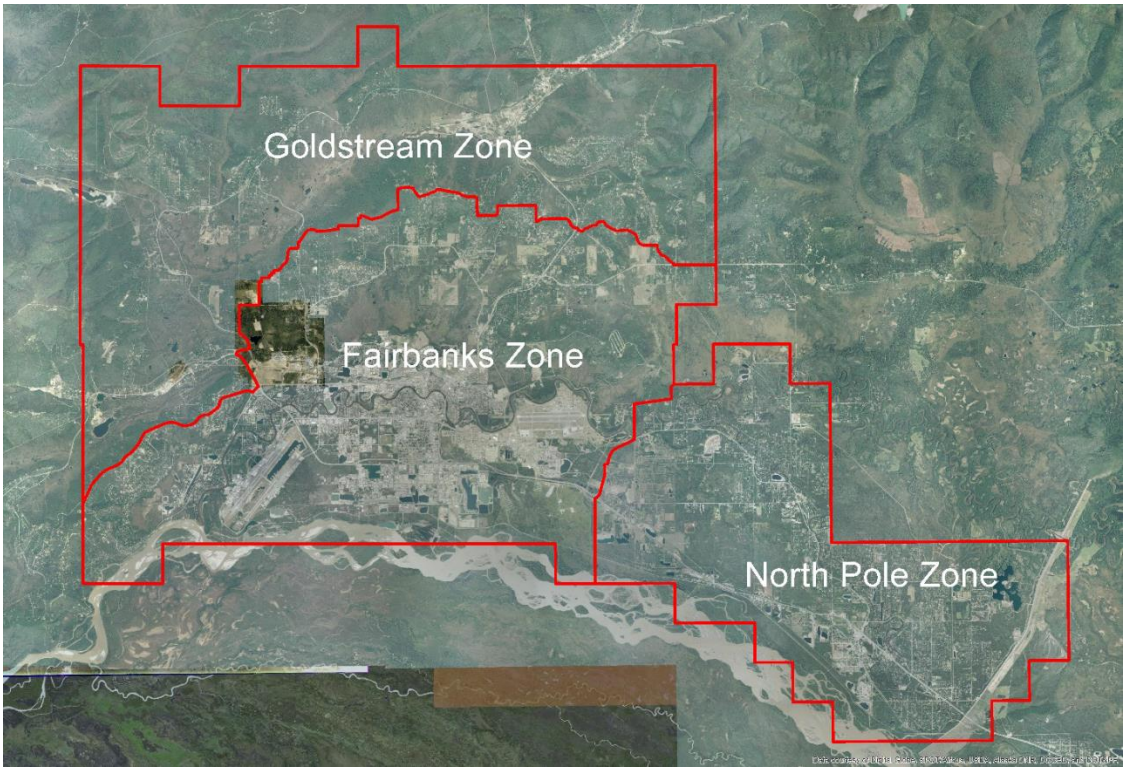


Figure A-6. Map of Fairbanks North Star Borough 24-hour $PM_{2.5}$ *Nonattainment Area* boundary. The area is divided into 3 air quality control zones, each with sub-area specific regulatory control measures. Source: ADEC 2016.

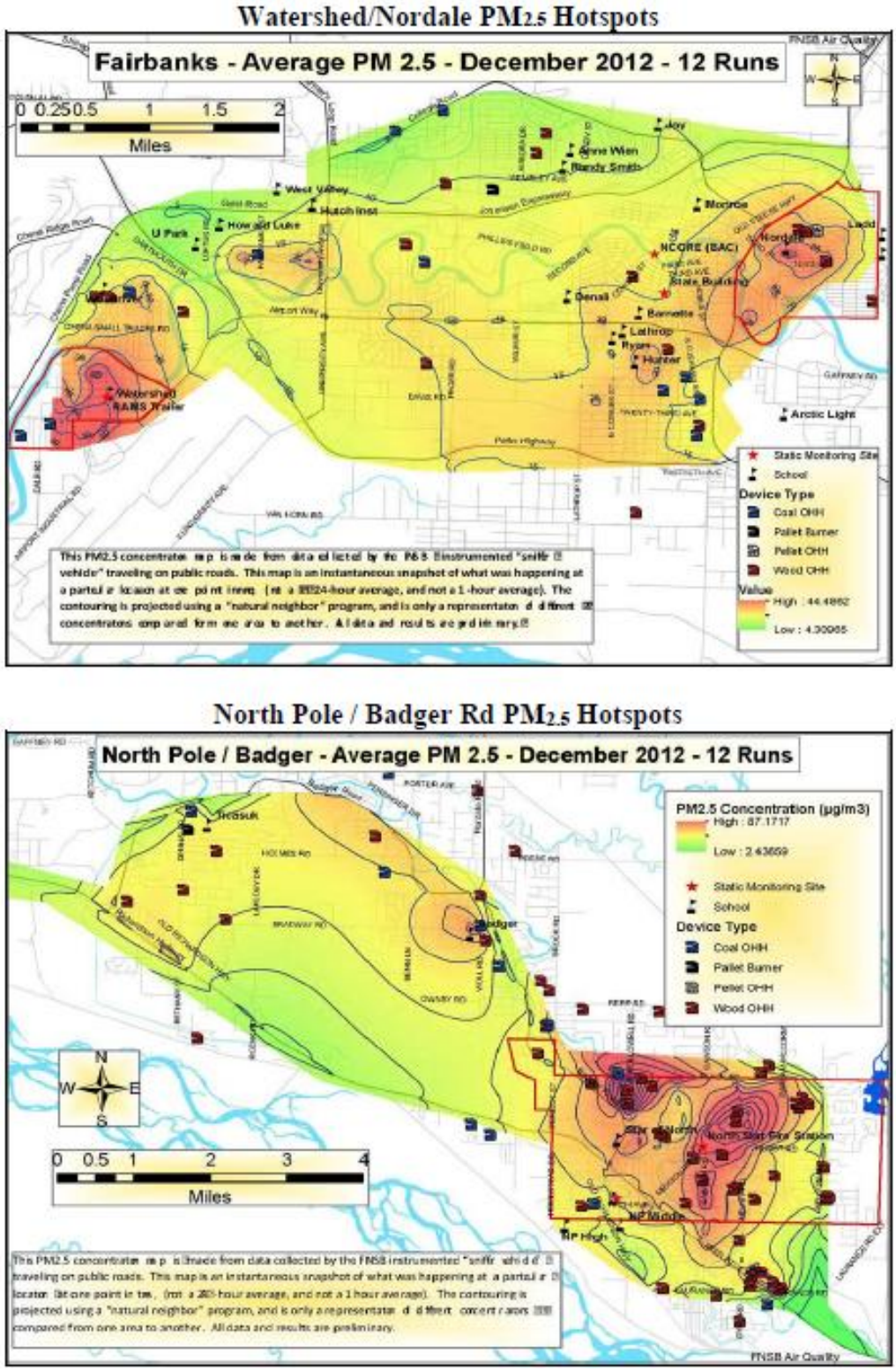


Figure A-7. Multiple $PM_{2.5}$ hotspots identified within Fairbanks North Star Borough $PM_{2.5}$ *Nonattainment Area*. Source: ADEC 2016.

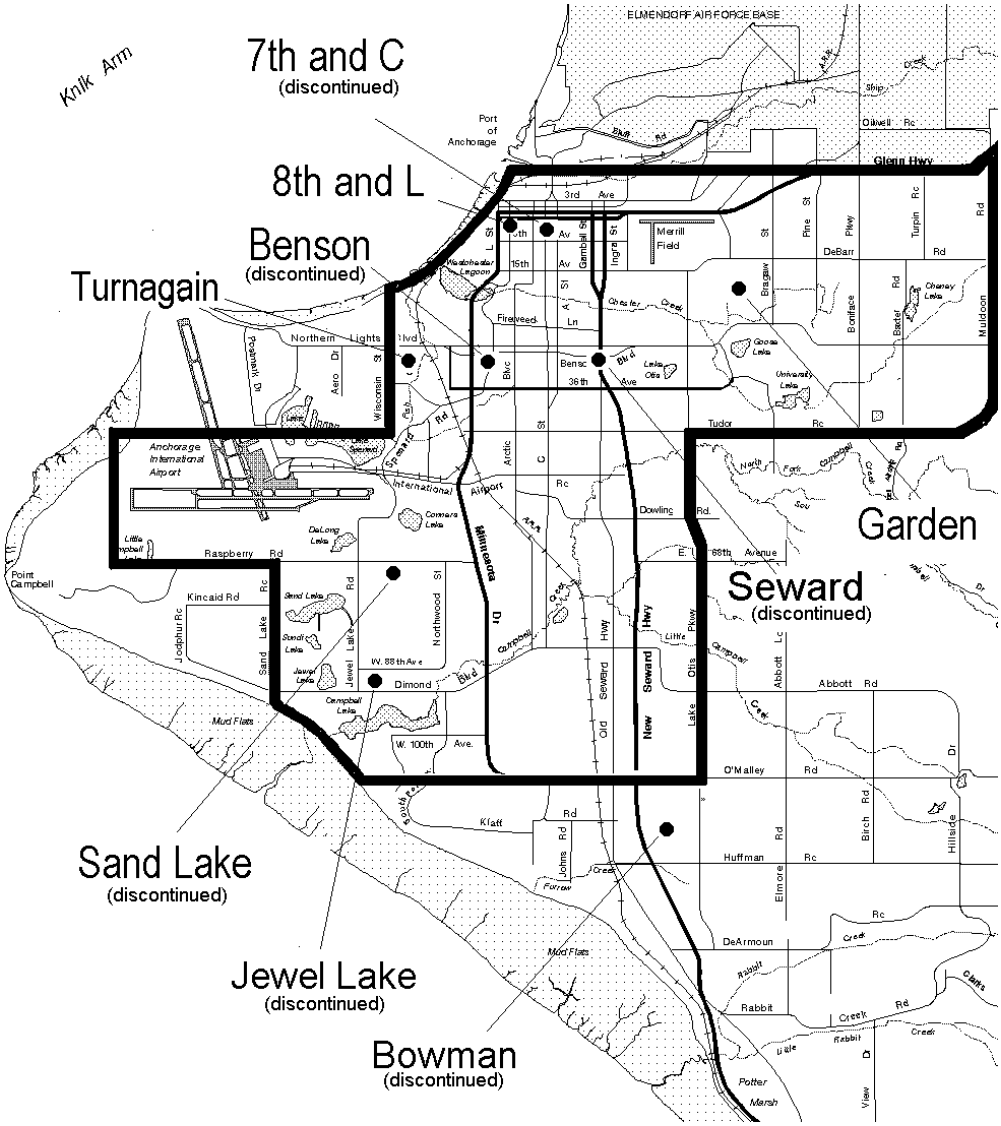


Figure A-8. Map of Anchorage carbon monoxide (CO) *Maintenance Area* boundary and CO monitoring sites. Several monitoring sites were discontinued because the measured CO values were low compared to comparable monitoring sites in the network. Source: ADEC 2013a.

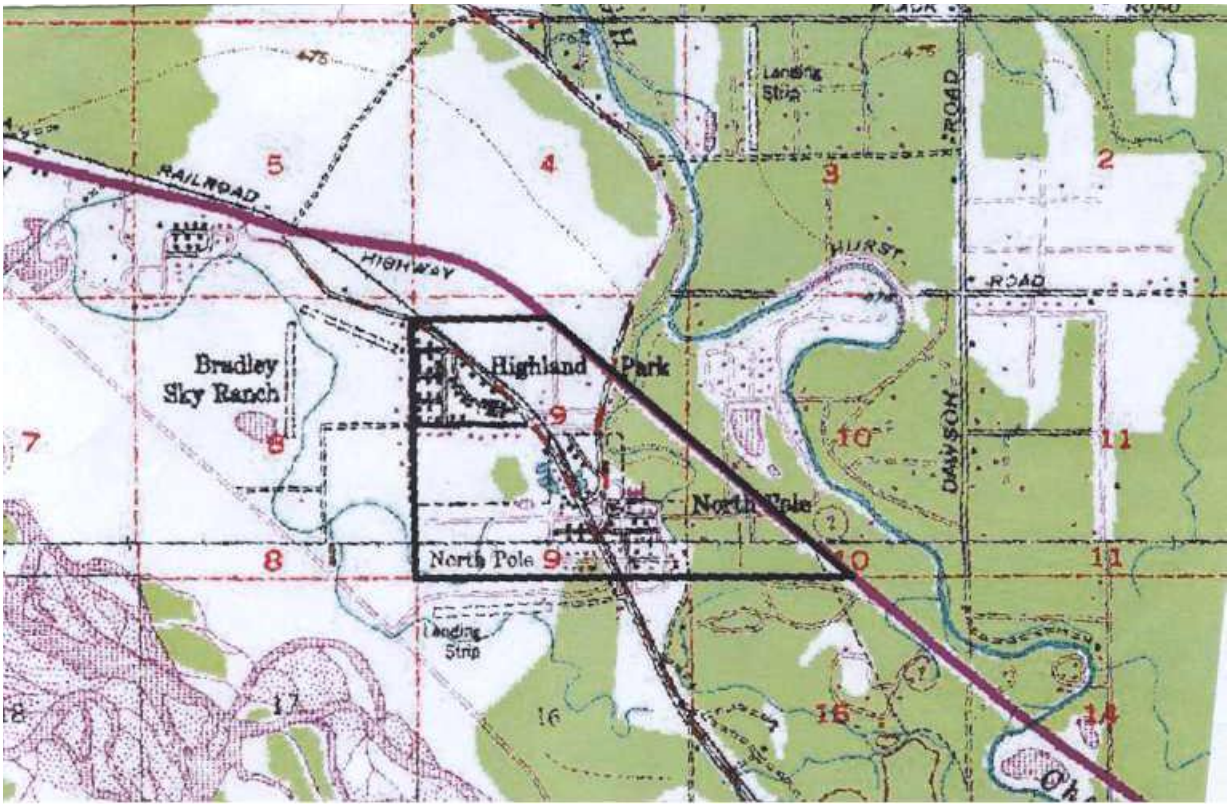


Figure A-9. Map of North Pole carbon monoxide *Maintenance Area* boundary, Fairbanks North Star Borough, Alaska. Source: ADEC 2013b.

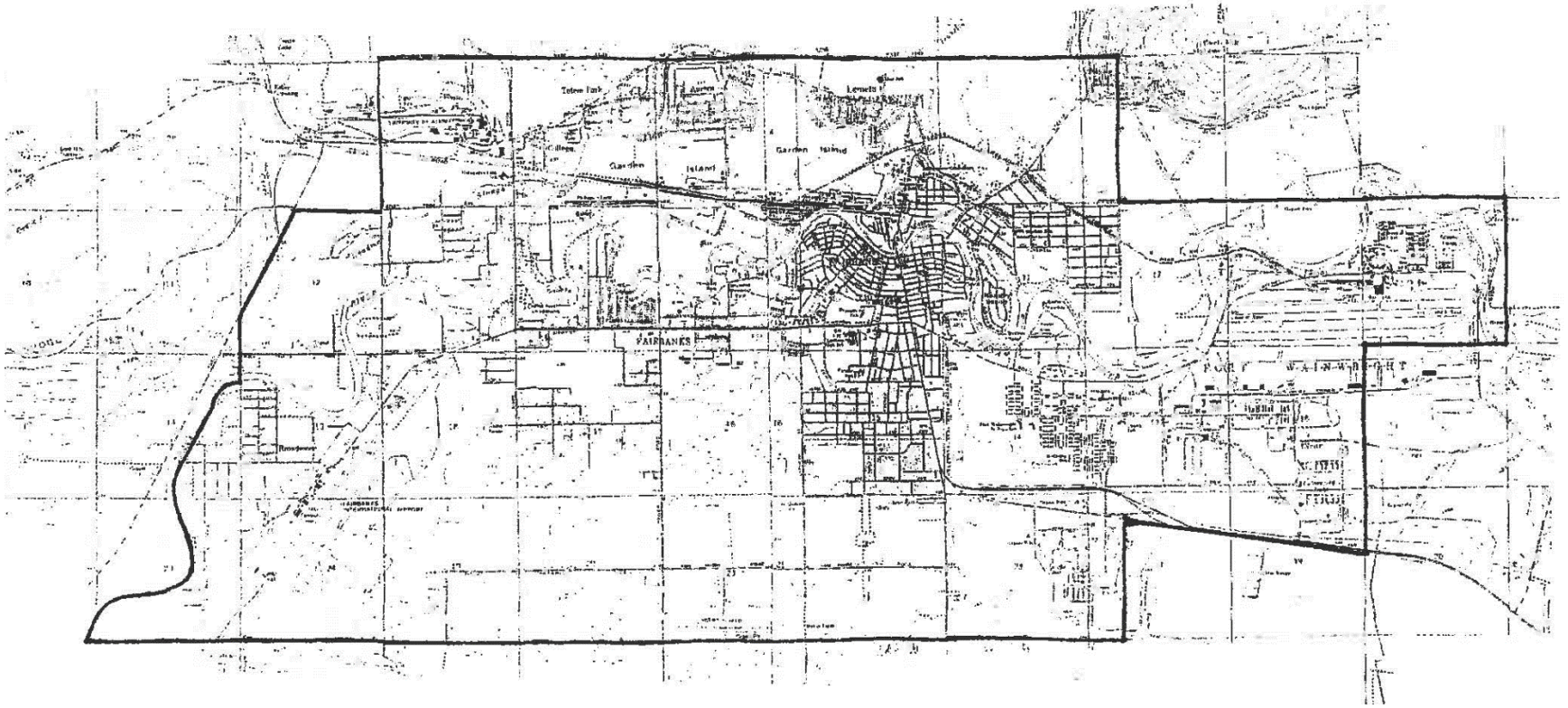


Figure A-10. Map of Fairbanks and Fort Wainwright carbon monoxide *Maintenance Area* boundary, Fairbanks North Star Borough, Alaska. Source: ADEC 2013b.

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APPENDIX B:

EPA ENVIRONMENTAL JUSTICE SCREENING MAPS

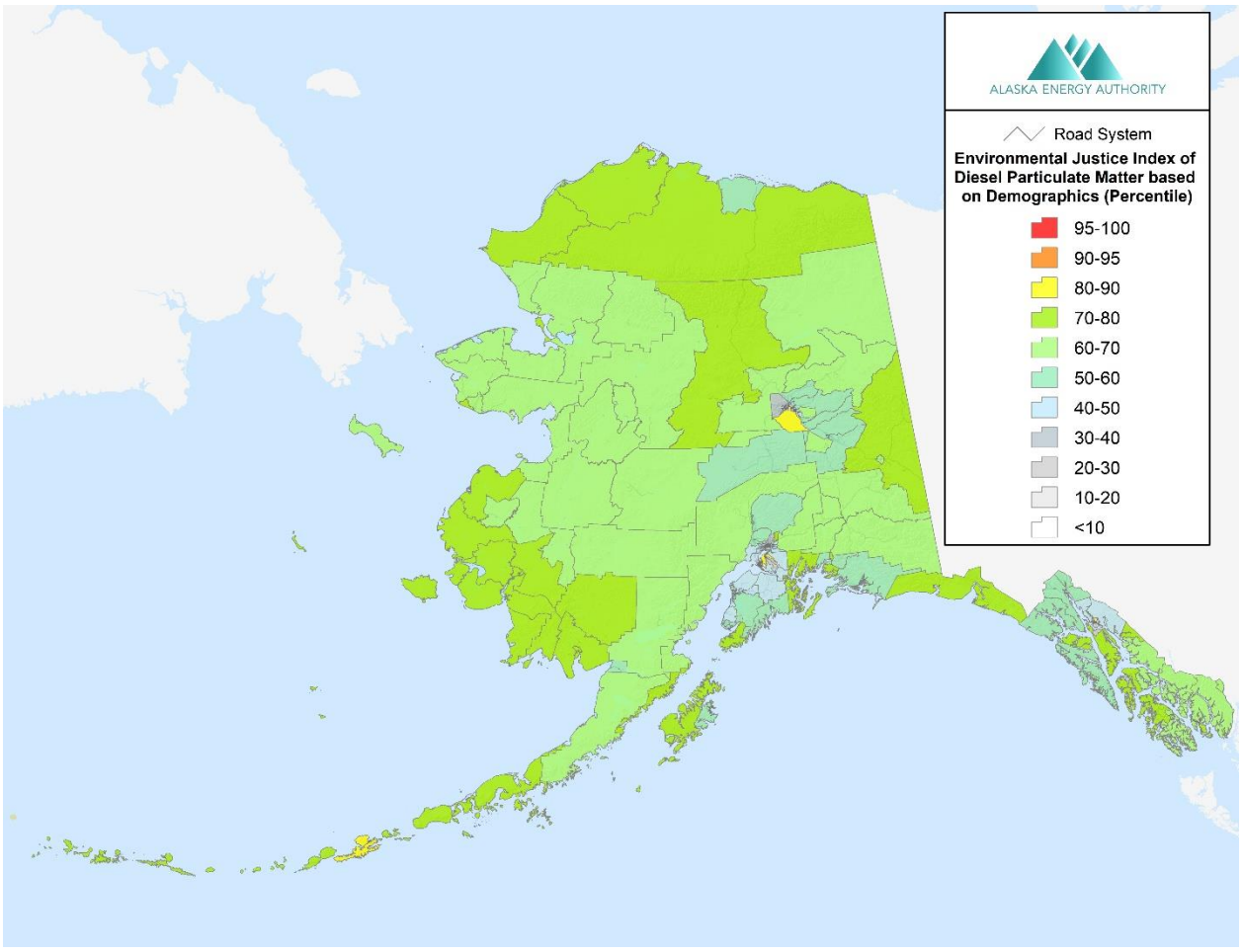

Figure B-1. EPA's environmental justice indices for particulate matter $PM_{2.5}$ generated from diesel emissions based on population demographics within Census Tracts. The indices are grouped by percentile rank. For example, communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to diesel particulate matter. Portions of Fairbanks, Southcentral, and Southeast are also within the 80-100th percentiles; see Figures B-1a through B-1d for detail. Source: EPA 2017b.

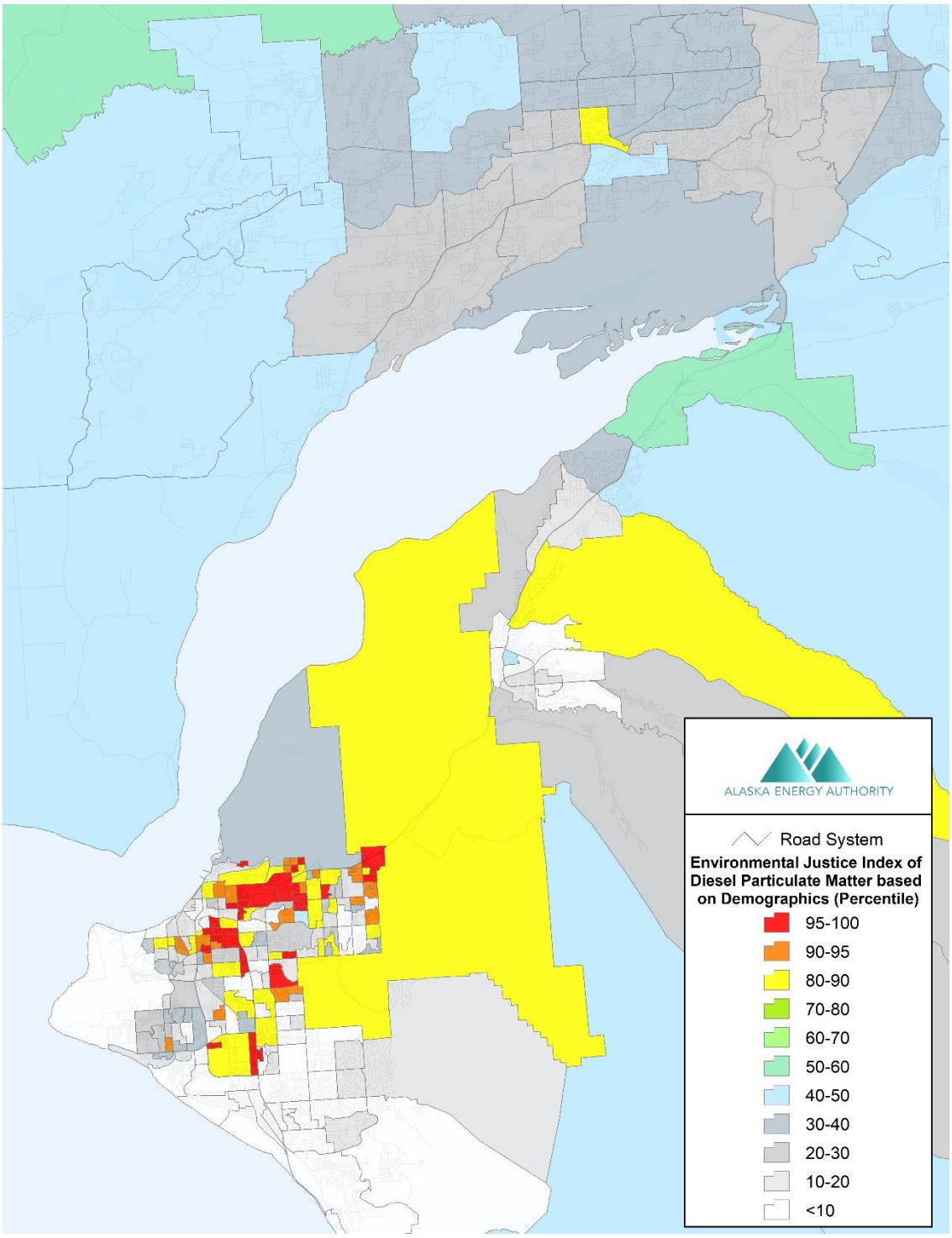

Figure B-1a. EPA's environmental justice indices for particulate matter $PM_{2.5}$ generated from diesel emissions based on population demographics within Census Tracts of Anchorage and Matanuska-Susitna Valley. The indices are grouped by percentile rank; communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to diesel particulate matter. Source: EPA 2017b.

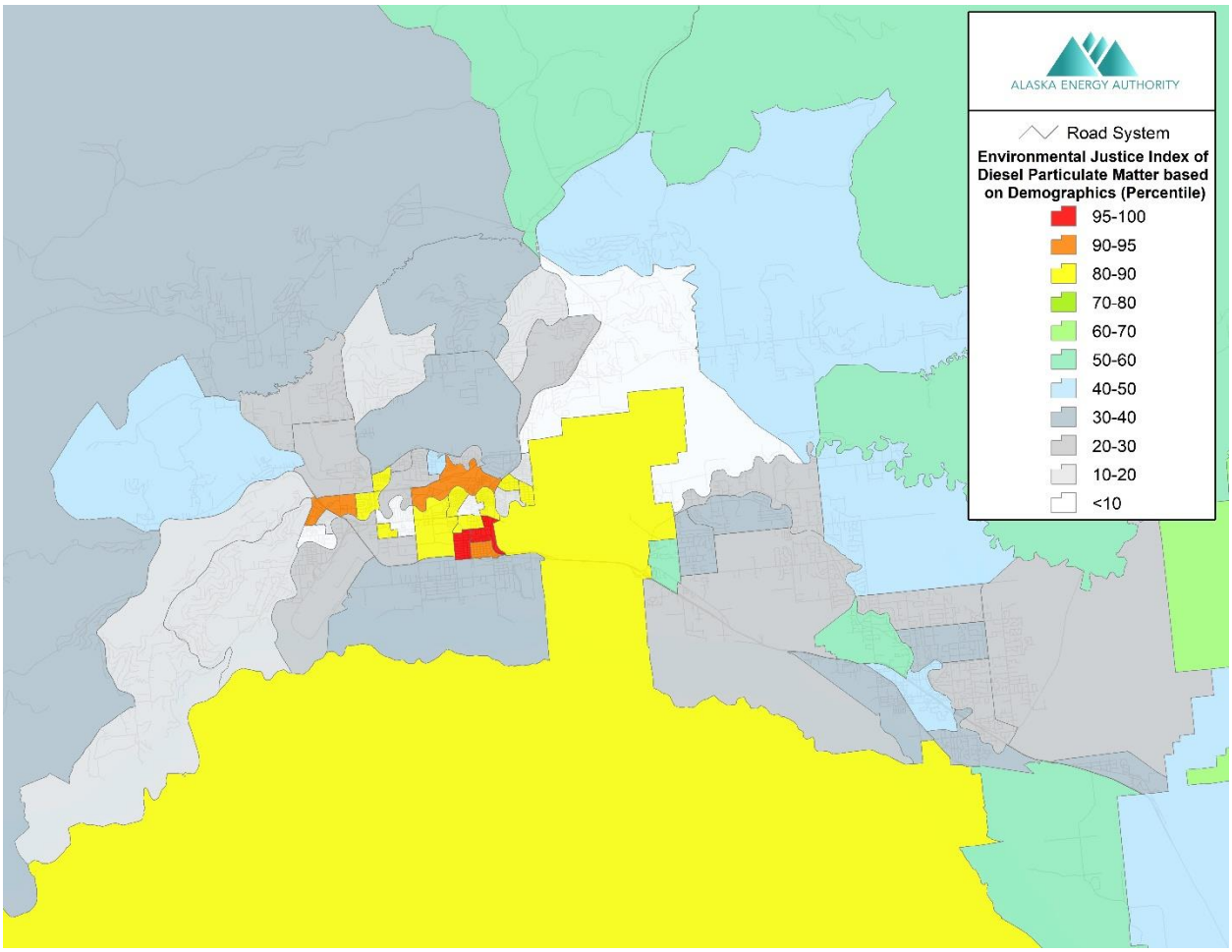

Figure B-1b. EPA's environmental justice indices for particulate matter $PM_{2.5}$ generated from diesel emissions based on population demographics within Census Tracts of the Fairbanks area. The indices are grouped by percentile rank; communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to diesel particulate matter. Source: EPA 2017b.

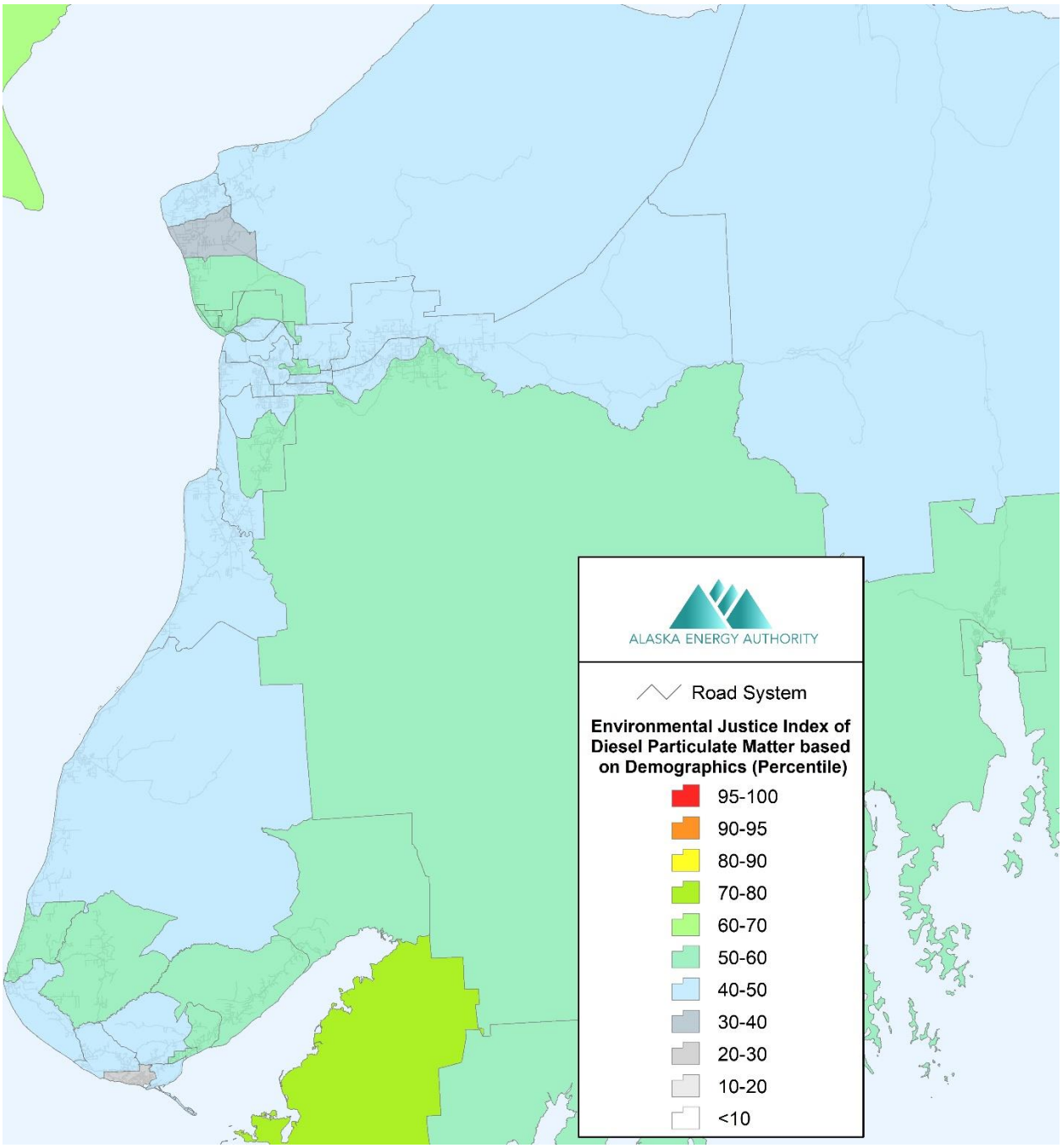

Figure B-1c. EPA's environmental justice indices for particulate matter $PM_{2.5}$ generated from diesel emissions based on population demographics within Census Tracts of the Kenai Peninsula. The indices are grouped by percentile rank; communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to diesel particulate matter. Source: EPA 2017b.

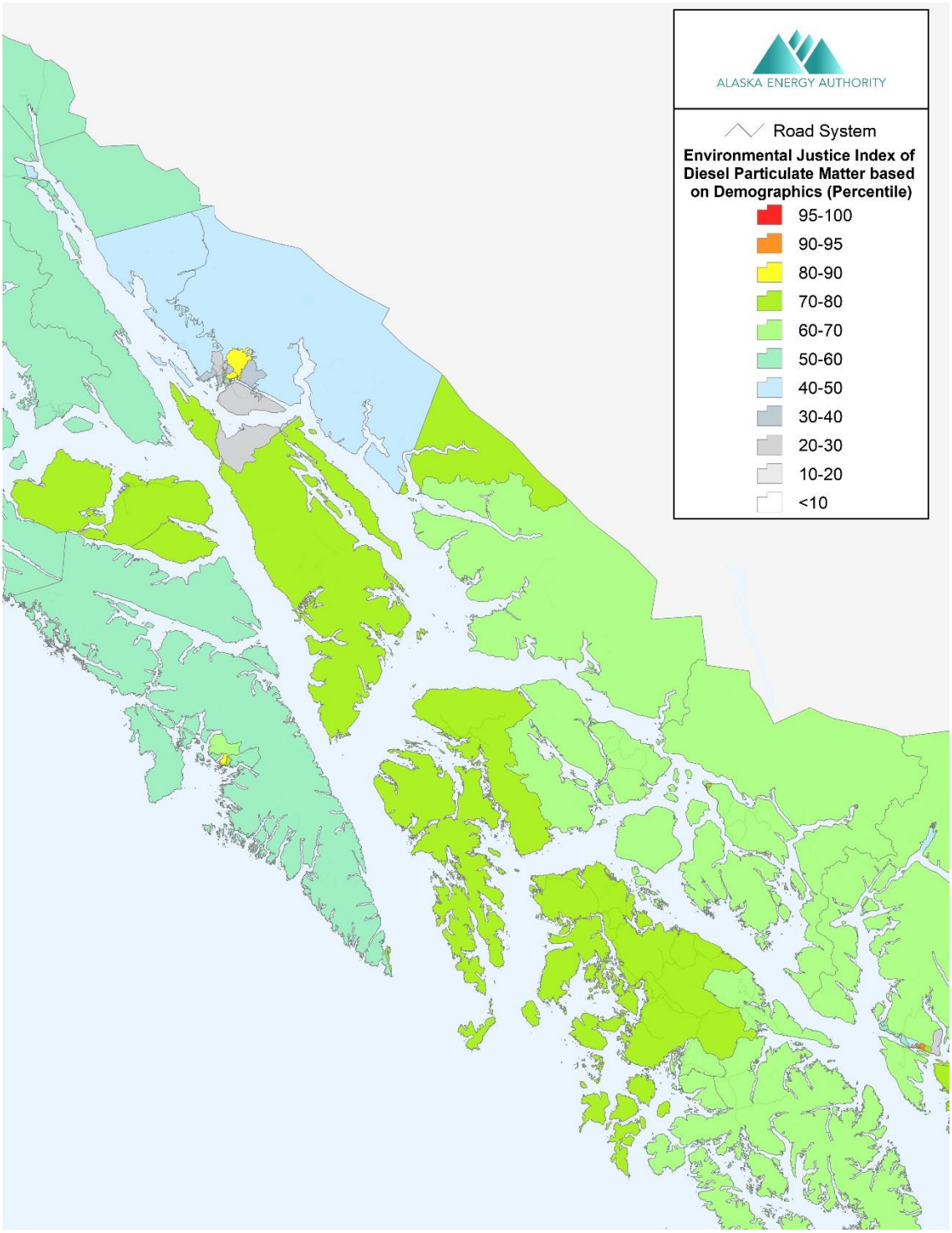

Figure B-1d. EPA's environmental justice indices for particulate matter $PM_{2.5}$ generated from diesel emissions based on population demographics within Census Tracts of Southeast Alaska. The indices are grouped by percentile rank; communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to diesel particulate matter. Source: EPA 2017b.

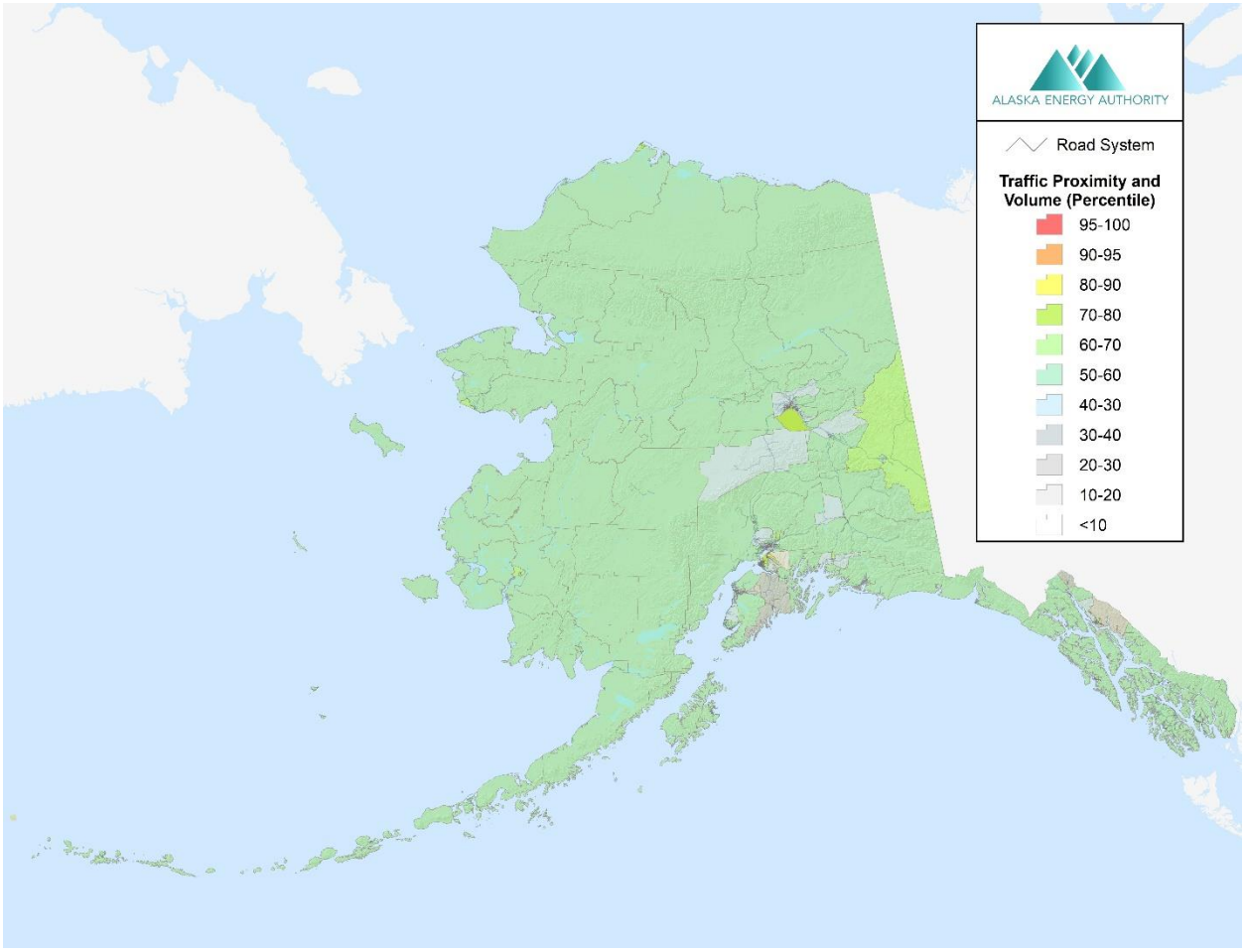

Figure B-2. EPA's environmental justice indices for traffic proximity and volume based on population demographics within Census Tracts of Alaska. The indices are grouped by percentile rank; communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to pollution from vehicles. Source: EPA 2017b.

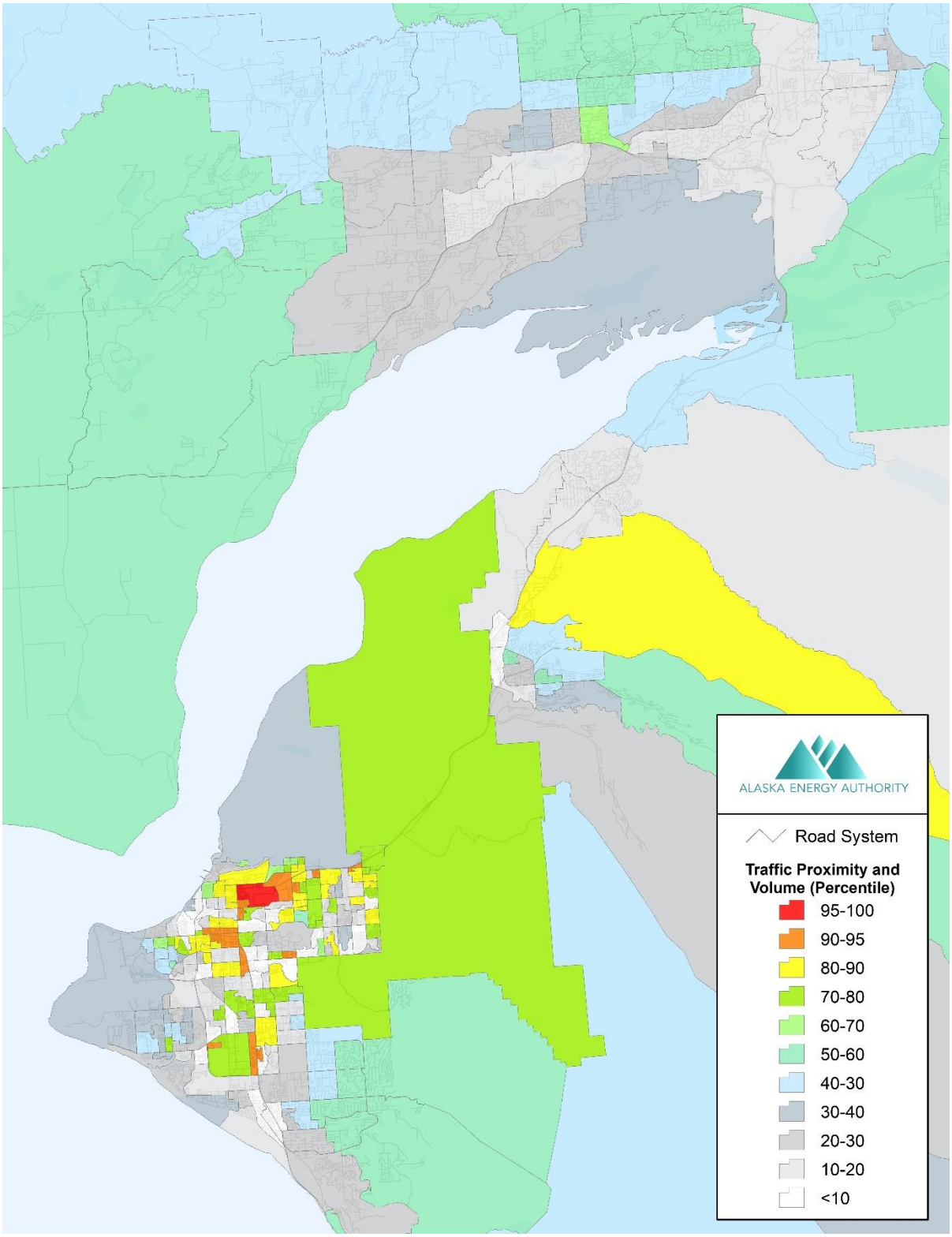

Figure B-2a. EPA's environmental justice indices for traffic proximity and volume based on population demographics within Census Tracts of Anchorage and Matanuska-Susitna Valley. The indices are grouped by percentile rank; communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to pollution from vehicles. Source: EPA 2017b.

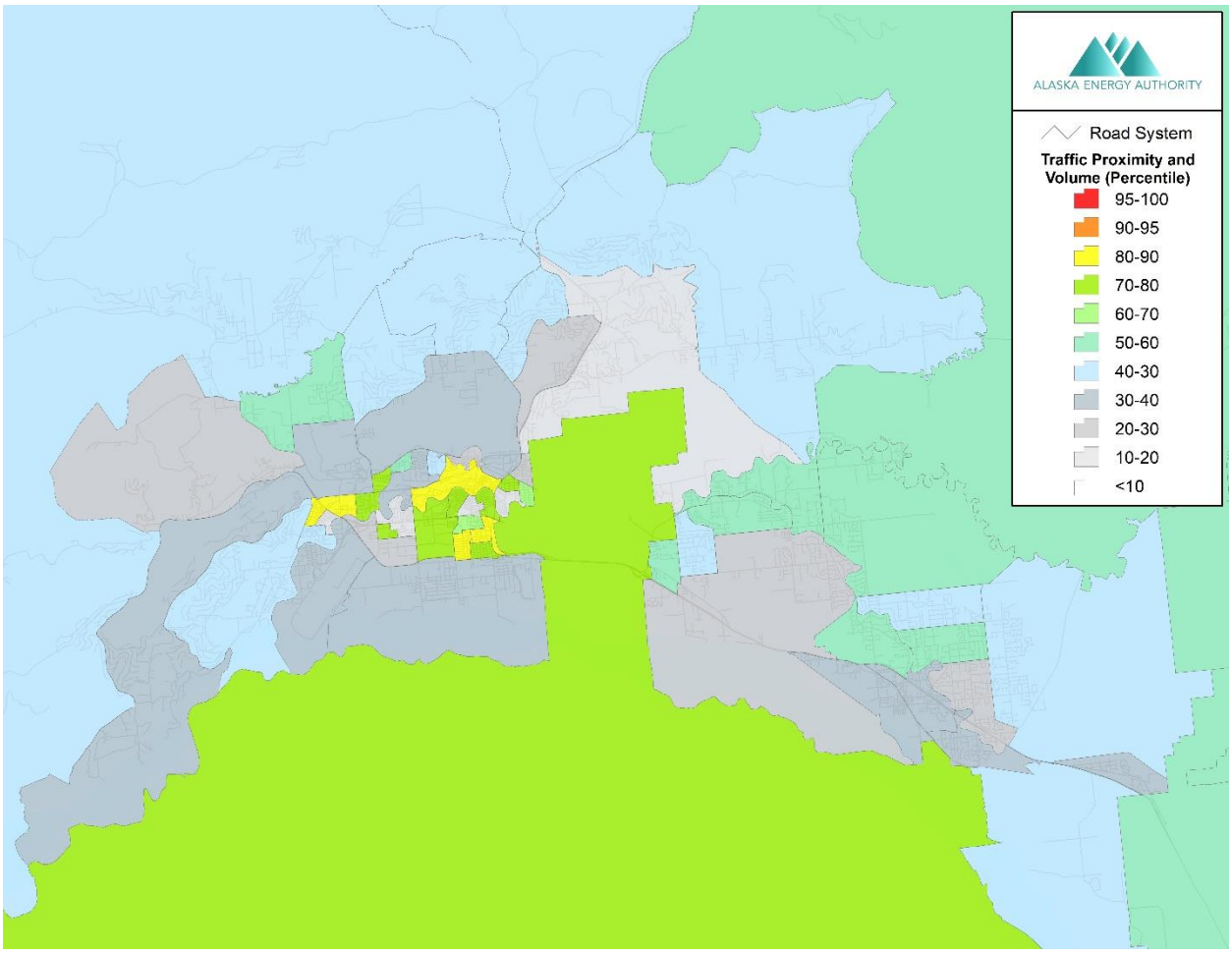

Figure B-2b. EPA's environmental justice indices for traffic proximity and volume based on population demographics within Census Tracts of the Fairbanks area. The indices are grouped by percentile rank; communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to pollution from vehicles. Source: EPA 2017b.

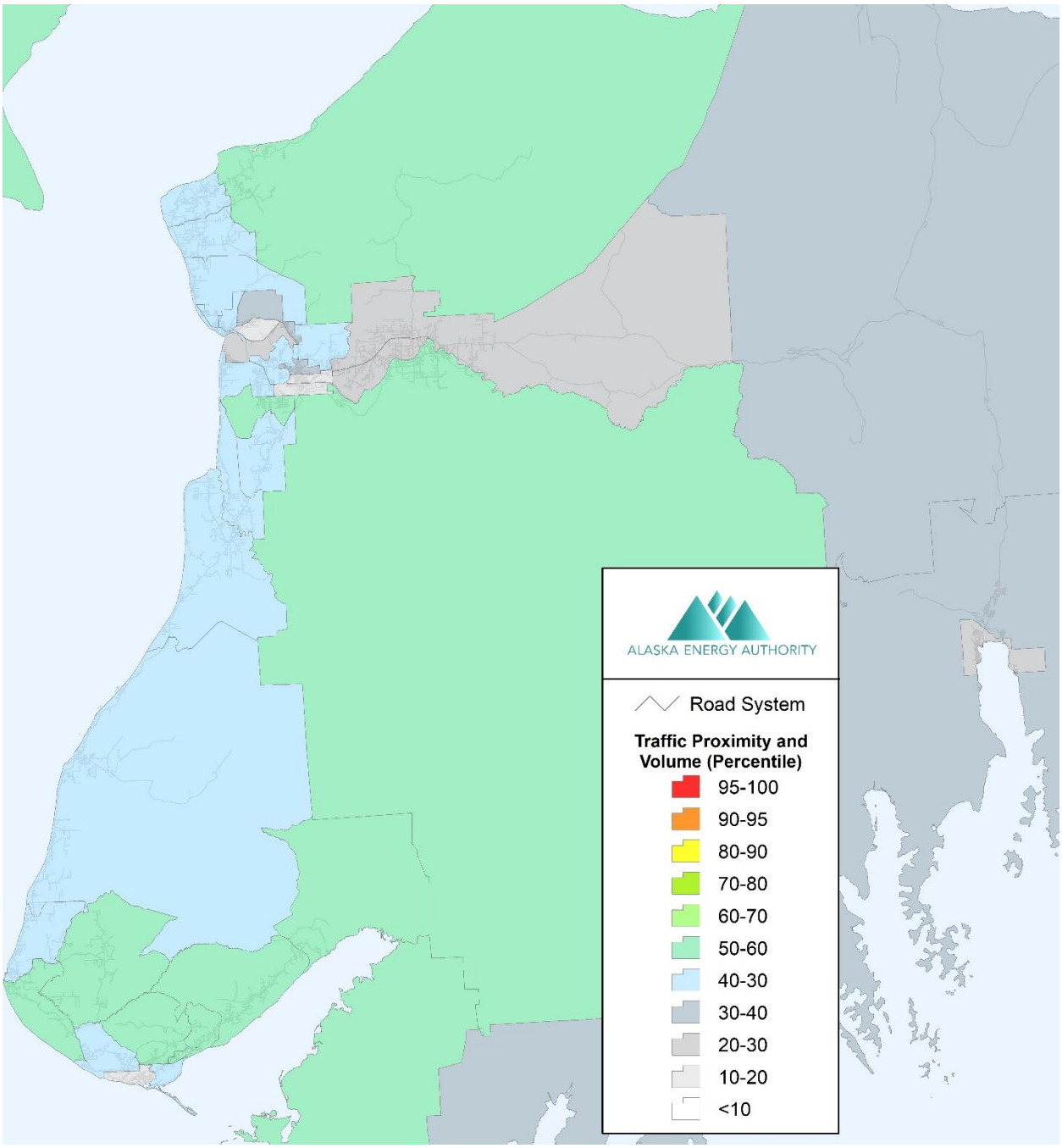

Figure B-2c. EPA's environmental justice indices for traffic proximity and volume based on population demographics within Census Tracts of the Kenai Peninsula. The indices are grouped by percentile rank; communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to pollution from vehicles. Source: EPA 2017b.

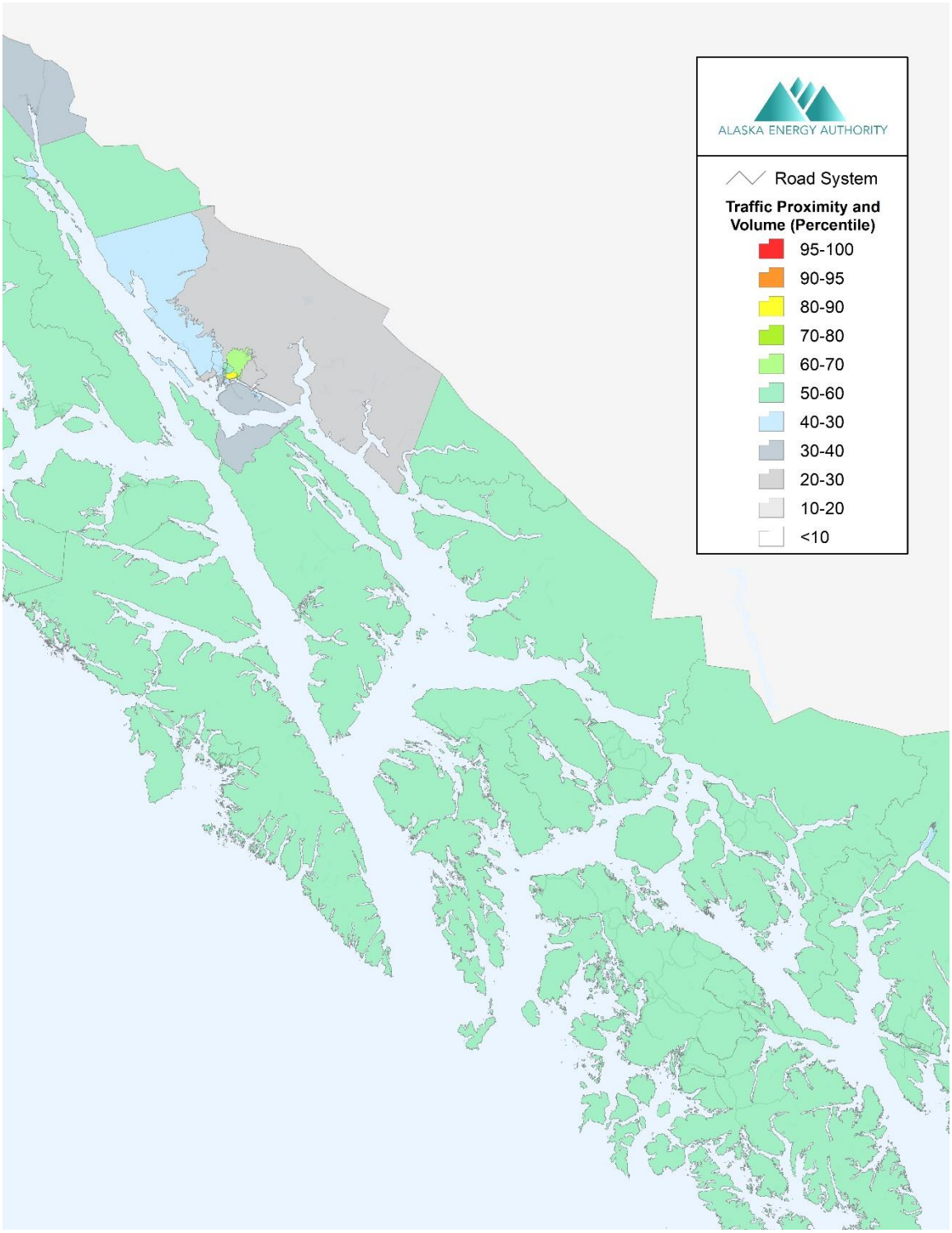

Figure B-2d. EPA's environmental justice indices for traffic proximity and volume based on population demographics within Census Tracts of Southeast Alaska. The indices are grouped by percentile rank; communities in the 95-100 percentile, the highest risk category presented in red, are the most vulnerable 5 percent of the communities in Alaska to pollution from vehicles. Source: EPA 2017b.

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APPENDIX C:

VW ELIGIBLE MITIGATION ACTIONS AND MITIGATION EXPENDITURES

Source: Appendix D2 of the 2.0 Liter Consent Decree.

1. Class 8 Local Freight Trucks and Port Drayage Trucks (Eligible Large Trucks)

a. Eligible Large Trucks include 1992-2009 engine model year Class 8 Local Freight or Drayage. For Beneficiaries that have State regulations that already require upgrades to 1992-2009 engine model year trucks at the time of the proposed Eligible Mitigation Action, Eligible Large Trucks shall also include 2010-2012 engine model year Class 8 Local Freight or Drayage.

b. Eligible Large Trucks must be Scrapped.

c. Eligible Large Trucks may be Repowered with any new diesel or Alternate Fueled engine or All-Electric engine, or may be replaced with any new diesel or Alternate Fueled or All-Electric vehicle, with the engine model year in which the Eligible Large Trucks Mitigation Action occurs or one engine model year prior.

d. For Non-Government Owned Eligible Class 8 Local Freight Trucks, Beneficiaries may only draw funds from the Trust in the amount of:

    1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.
    2. Up to 25% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.
    3. Up to 75% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.
    4. Up to 75% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

e. For Non-Government Owned Eligible Drayage Trucks, Beneficiaries may only draw funds from the Trust in the amount of:

    1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.
    2. Up to 50% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.
    3. Up to 75% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.

4. Up to 75% of the cost of a new all-electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

f. For Government Owned Eligible Class 8 Large Trucks, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.
2. Up to 100% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.
3. Up to 100% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.
4. Up to 100% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

2. <u>Class 4-8 School Bus, Shuttle Bus, or Transit Bus (Eligible Buses)</u>

a. Eligible Buses include 2009 engine model year or older class 4-8 school buses, shuttle buses, or transit buses. For Beneficiaries that have State regulations that already require upgrades to 1992-2009 engine model year buses at the time of the proposed Eligible Mitigation Action, Eligible Buses shall also include 2010-2012 engine model year class 4-8 school buses, shuttle buses, or transit buses.

b. Eligible Buses must be Scrapped.

c. Eligible Buses may be Repowered with any new diesel or Alternate Fueled or All-Electric engine, or may be replaced with any new diesel or Alternate Fueled or All-Electric vehicle, with the engine model year in which the Eligible Bus Mitigation Action occurs or one engine model year prior.

d. For Non-Government Owned Buses, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.
2. Up to 25% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.
3. Up to 75% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.
4. Up to 75% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

e. For Government Owned Eligible Buses, and Privately Owned School Buses Under Contract with a Public School District, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.
2. Up to 100% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.
3. Up to 100% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.
4. Up to 100% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

3. <u>Freight Switchers</u>

a. Eligible Freight Switchers include pre-Tier 4 switcher locomotives that operate 1000 or more hours per year.

b. Eligible Freight Switchers must be Scrapped.

c. Eligible Freight Switchers may be Repowered with any new diesel or Alternate Fueled or All-Electric engine(s) (including Generator Sets), or may be replaced with any new diesel or Alternate Fueled or All-Electric (including Generator Sets) Freight Switcher, that is certified to meet the applicable EPA emissions standards (or other more stringent equivalent State standard) as published in the CFR for the engine model year in which the Eligible Freight Switcher Mitigation Action occurs.

d. For Non-Government Owned Freight Switchers, Beneficiaries may draw funds from the Trust in the amount of :

1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine(s) or Generator Sets, including the costs of installation of such engine(s).
2. Up to 25% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) Freight Switcher.
3. Up to 75% of the cost of a Repower with a new All-Electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new All-Electric engine(s).
4. Up to 75% of the cost of a new All-Electric Freight Switcher, including charging infrastructure associated with the new All-Electric Freight Switcher.

e. For Government Owned Eligible Freight Switchers, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine(s) or Generator Sets, including the costs of installation of such engine(s).
2. Up to 100% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) Freight Switcher.
3. Up to 100% of the cost of a Repower with a new All-Electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new All-Electric engine(s).
4. Up to 100% of the cost of a new All-Electric Freight Switcher, including charging infrastructure associated with the new All-Electric Freight Switcher.

4. <u>Ferries/Tugs</u>

a. Eligible Ferries and/or Tugs include unregulated, Tier 1, or Tier 2 marine engines.

b. Eligible Ferry and/or Tug engines that are replaced must be Scrapped.

c. Eligible Ferries and/or Tugs may be Repowered with any new Tier 3 or Tier 4 diesel or Alternate Fueled engines, or with All-Electric engines, or may be upgraded with an EPA Certified Remanufacture System or an EPA Verified Engine Upgrade.

d. For Non-Government Owned Eligible Ferries and/or Tugs, Beneficiaries may only draw funds from the Trust in the amount of:

1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine(s), including the costs of installation of such engine(s).
2. Up to 75% of the cost of a Repower with a new All-Electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new All-Electric engine(s).

e. For Government Owned Eligible Ferries and/or Tugs, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine(s), including the costs of installation of such engine(s).
2. Up to 100% of the cost of a Repower with a new All-Electric engine(s), including the costs of installation of such engine(s), and charging infrastructure associated with the new All-Electric engine(s).

5. Ocean Going Vessels (OGV) Shorepower

a. Eligible Marine Shorepower includes systems that enable a compatible vessel's main and auxiliary engines to remain off while the vessel is at berth. Components of such systems eligible for reimbursement are limited to cables, cable management systems, shore power coupler systems, distribution control systems, and power distribution. Marine shore power systems must comply with international shore power design standards (ISO/IEC/IEEE 80005-1-2012 High Voltage Shore Connection Systems or the IEC/PAS 80005-3:2014 Low Voltage Shore Connection Systems) and should be supplied with power sourced from the local utility grid. Eligible Marine Shorepower includes equipment for vessels that operate within the Great Lakes.

b. For Non-Government Owned Marine Shorepower, Beneficiaries may only draw funds from the Trust in the amount of up to 25% for the costs associated with the shore-side system, including cables, cable management systems, shore power coupler systems, distribution control systems, installation, and power distribution components.

c. For Government Owned Marine Shorepower, Beneficiaries may draw funds from the Trust in the amount of up to 100% for the costs associated with the shore-side system, including cables, cable management systems, shore power coupler systems, distribution control systems, installation, and power distribution components.

6. Class 4-7 Local Freight Trucks (Medium Trucks)

a. Eligible Medium Trucks include 1992-2009 engine model year class 4-7 Local Freight trucks, and for Beneficiaries that have State regulations that already require upgrades to 1992-2009 engine model year trucks at the time of the proposed Eligible Mitigation Action, Eligible Trucks shall also include 2010-2012 engine model year class 4-7 Local Freight trucks.

b. Eligible Medium Trucks must be Scrapped.

c. Eligible Medium Trucks may be Repowered with any new diesel or Alternate Fueled or All-Electric engine, or may be replaced with any new diesel or Alternate Fueled or All-Electric vehicle, with the engine model year in which the Eligible Medium Trucks Mitigation Action occurs or one engine model year prior.

d. For Non-Government Owned Eligible Medium Trucks, Beneficiaries may draw funds from the Trust in the amount of:

    1. Up to 40% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.

2. Up to 25% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.
3. Up to 75% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.
4. Up to 75% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

e. For Government Owned Eligible Medium Trucks, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) engine, including the costs of installation of such engine.
2. Up to 100% of the cost of a new diesel or Alternate Fueled (e.g. CNG, propane, Hybrid) vehicle.
3. Up to 100% of the cost of a Repower with a new All-Electric engine, including the costs of installation of such engine, and charging infrastructure associated with the new All-Electric engine.
4. Up to 100% of the cost of a new All-Electric vehicle, including charging infrastructure associated with the new All-Electric vehicle.

7. <u>Airport Ground Support Equipment</u>

a. Eligible Airport Ground Support Equipment includes:

1. Tier 0, Tier 1, or Tier 2 diesel powered airport ground support equipment; and
2. Uncertified, or certified to 3 g/bhp-hr or higher emissions, spark ignition engine powered airport ground support equipment.

b. Eligible Airport Ground Support Equipment must be Scrapped.

c. Eligible Airport Ground Support Equipment may be Repowered with an All-Electric engine, or may be replaced with the same Airport Ground Support Equipment in an All-Electric form.

d. For Non-Government Owned Eligible Airport Ground Support Equipment, Beneficiaries may only draw funds from the Trust in the amount of:

1. Up to 75% of the cost of a Repower with a new All-Electric engine, including costs of installation of such engine, and charging infrastructure associated with such new All-Electric engine.
2. Up to 75% of the cost of a new All-Electric Airport Ground Support Equipment, including charging infrastructure associated with such new All-Electric Airport Ground Support Equipment.

e. For Government Owned Eligible Airport Ground Support Equipment, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new All-Electric engine, including costs of installation of such engine, and charging infrastructure associated with such new All-Electric engine.
2. Up to 100% of the cost of a new All-Electric Airport Ground Support Equipment, including charging infrastructure associated with such new All-Electric Airport Ground Support Equipment.

8. <u>Forklifts and Port Cargo Handling Equipment</u>

a. Eligible Forklifts includes forklifts with greater than 8000 pounds lift capacity.

b. Eligible Forklifts and Port Cargo Handling Equipment must be Scrapped.

c. Eligible Forklifts and Port Cargo Handling Equipment may be Repowered with an All-Electric engine, or may be replaced with the same equipment in an All-Electric form.

d. For Non-Government Owned Eligible Forklifts and Port Cargo Handling Equipment, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 75% of the cost of a Repower with a new All-Electric engine, including costs of installation of such engine, and charging infrastructure associated with such new All-Electric engine.
2. Up to 75% of the cost of a new All-Electric Forklift or Port Cargo Handling Equipment, including charging infrastructure associated with such new All-Electric Forklift or Port Cargo Handling Equipment.

e. For Government Owned Eligible Forklifts and Port Cargo Handling Equipment, Beneficiaries may draw funds from the Trust in the amount of:

1. Up to 100% of the cost of a Repower with a new All-Electric engine, including costs of installation of such engine, and charging infrastructure associated with such new All-Electric engine.
2. Up to 100% of the cost of a new All-Electric Forklift or Port Cargo Handling Equipment, including charging infrastructure associated with such new All-Electric Forklift or Port Cargo Handling Equipment.

9. <u>Light Duty Zero Emission Vehicle Supply Equipment</u>.

Each Beneficiary may use up to fifteen percent (15%) of its allocation of Trust Funds on the costs necessary for, and directly connected to, the acquisition, installation, operation and maintenance of new light duty zero emission vehicle supply equipment for projects as specified below. Provided, however, that Trust Funds shall not be made available or used to purchase or rent real- estate, other capital costs (e.g., construction of buildings, parking facilities, etc.) or general maintenance (i.e., maintenance other than of the Supply Equipment).

a. Light duty electric vehicle supply equipment includes Level 1, Level 2 or fast charging equipment (or analogous successor technologies) that is located in a public place, workplace, or multi-unit dwelling and is not consumer light duty electric vehicle supply equipment (i.e., not located at a private residential dwelling that is not a multi-unit dwelling).

b. Light duty hydrogen fuel cell vehicle supply equipment includes hydrogen dispensing equipment capable of dispensing hydrogen at a pressure of 70 megapascals (MPa) (or analogous successor technologies) that is located in a public place.

c. Subject to the 15% limitation above, each Beneficiary may draw funds from the Trust in the amount of:

    1. Up to 100% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that will be available to the public at a Government Owned Property.
    2. Up to 80% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that will be available to the public at a Non-Government Owned Property.
    3. Up to 60% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that is available at a workplace but not to the general public.
    4. Up to 60% of the cost to purchase, install and maintain eligible light duty electric vehicle supply equipment that is available at a multi-unit dwelling but not to the general public.
    5. Up to 33% of the cost to purchase, install and maintain eligible light duty hydrogen fuel cell vehicle supply equipment capable of dispensing at least 250 kg/day that will be available to the public.
    6. Up to 25% of the cost to purchase, install and maintain eligible light duty hydrogen fuel cell vehicle supply equipment capable of dispensing at least 100 kg/day that will be available to the public.

10. Diesel Emission Reduction Act (DERA) Option.

Beneficiaries may use Trust Funds for their non-federal voluntary match, pursuant to Title VII, Subtitle G, Section 793 of the DERA Program in the Energy Policy Act of 2005 (codified at 42 U.S.C. § 16133), or Section 792 (codified at 42 U.S.C. § 16132) in the case of Tribes, thereby allowing Beneficiaries to use such Trust Funds for actions not specifically enumerated in this Appendix D-2, but otherwise eligible under DERA pursuant to all DERA guidance documents available through the EPA. Trust Funds shall not be used to meet the non- federal mandatory cost share requirements, as defined in applicable DERA program guidance, of any DERA grant.

Eligible Mitigation Action Administrative Expenditures

For any Eligible Mitigation Action, Beneficiaries may use Trust Funds for actual administrative expenditures (described below) associated with implementing such Eligible Mitigation Action, but not to exceed 15% of the total cost of such Eligible Mitigation Action. The 15% cap includes the aggregated amount of eligible administrative expenditures incurred by the Beneficiary and any third-party contractor(s).

1. Personnel including costs of employee salaries and wages, but not consultants.
2. Fringe Benefits including costs of employee fringe benefits such as health insurance, FICA, retirement, life insurance, and payroll taxes.
3. Travel including costs of Mitigation Action-related travel by program staff, but does not include consultant travel.
4. Supplies including tangible property purchased in support of the Mitigation Action that will be expensed on the Statement of Activities, such as educational publications, office supplies, etc. Identify general categories of supplies and their Mitigation Action costs.
5. Contractual including all contracted services and goods except for those charged under other categories such as supplies, construction, etc. Contracts for evaluation and consulting services and contracts with sub-recipient organizations are included.
6. Construction including costs associated with ordinary or normal rearrangement and alteration of facilities.
7. Other costs including insurance, professional services, occupancy and equipment leases, printing and publication, training, indirect costs, and accounting.

APPENDIX D:

COMPARISON OF VW ELIGIBLE MITIGATION ACTIONS 1-9 AND ELIGIBLE MITIGATION ACTION 10 (DERA OPTION)

Source: EPA 2017.

United States Environmental Protection Agency

Office of Transportation and Air Quality
January 2017

Detailed Comparison of VW Eligible Mitigation Action 1-9 and Eligible Mitigation Action #10 (DERA Option)

Eligible Mitigation Actions 1-9 **Class 8 Local Freight Trucks and Port Drayage Trucks (Eligible Large Trucks)** **Class 4-7 Local Freight Trucks (Eligible Medium Trucks)** For, 1) Beneficiaries that have State regulations that already require upgrades to 1992-2009 engine model year trucks at the time of the proposed EMA, and 2) Eligible Trucks shall also include 2010-2012 engine model year trucks.				***Eligible Mitigation Action 10: DERA Option** **Class 5-8 Medium and Heavy Duty Highway Vehicles (including Drayage Trucks)**		
Activity	Vehicle and Equipment Eligibility (Engine Model Year or Tier)	Trust Funding Limits		Activity	Vehicle and Equipment Eligibility (Engine Model Year or Tier)	DERA Funding Limits
		Non-Gov. Owned	Gov. Owned			
Repower with new diesel or alternate fueled engine with the engine MY (model year) in which the EMA occurs or one engine model year prior	1992-2009	40%	100%	Repower with 2015 MY or newer engine (diesel or alternative fuel)	1994-2006	40%
				Repower with 2015 MY or newer engine certified to CARB's Optional Low-NOx standards	1994-2006	50%
Repower with all-electric engine with the engine MY in which the EMA occurs or one engine model year prior	1992-2009	75%	100%	Repower with 2015 MY or newer all-electric engine	1994-2010	60%
Replacement with new diesel or alternate fueled vehicle with the engine MY in which the EMA occurs or one engine MY prior	1992-2009	25% (50% for Drayage)	100%	Replacement with vehicle powered by 2015 MY or newer engine (diesel or alternative fuel) (2011 or newer for Drayage)	1994-2006	25% (50% for Drayage)
				Replacement with 2015 MY or newer engine certified to CARB's Optional Low-NOx standards	1994-2006	35%
Replacement with all-electric vehicle with the engine MY in which the EMA occurs or one engine model year prior	1992-2009	75%	100%	Replacement with 2015 MY or newer all-electric vehicle	1994-2010	45%
				Retrofits of verified exhaust control technologies	1994-2006	100%
				Verified Aerodynamic Technologies Low Rolling Resistance Tires (in conjunction with above activities)	1994-2006	100%
				Verified Idle Reduction Technologies (in conjunction with above activities)	1994-2006	100%

Eligible Mitigation Actions 1-9 **Class 4-8 School Bus, Shuttle Bus, or Transit Bus (Eligible Buses)** For, 1) Beneficiaries that have State regulations that already require upgrades to 1992-2009 engine model year buses at the time of the proposed EMA, and 2) Eligible Buses shall also include 2010-2012 engine model year class 4-8 school buses, shuttle buses, or transit buses.				***Eligible Mitigation Action 10: DERA Option** **Type A, B, C, D Buses** **Class 5-8 Transit, Shuttle, or other buses**		
Activity	Vehicle and Equipment Eligibility (Engine Model Year or Tier)	Trust Funding Limits		Activity	Vehicle and Equipment Eligibility (Engine Model Year or Tier)	DERA Funding Limits
		Non-Gov. Owned	Gov. Owned			
Repower with new diesel or alternate fueled engine with the engine MY in which the EMA occurs or one engine model year prior	2009 and older	40%	100%	Repower with 2015 MY or newer engine (diesel or alternative fuel)	1994-2006	40%
				Repower with 2015 MY or newer engine certified to CARB's Optional Low-NOx standards	1994-2006	50%
Repower with all-electric engine with the engine MY in which the EMA occurs or one engine MY prior	2009 and older	75%	100%	Repower with 2015 MY or newer all-electric engine	1994-2010	60%
Replacement with new diesel or alternate fueled vehicle with the engine MY in which the EMA occurs or one engine MY prior	2009 and older	25%	100%	Replacement with vehicle powered by 2015 MY or newer engine (diesel or alternative fuel)	1994-2006	25%
				Replacement with vehicle powered by a 2015 MY or newer engine certified to CARB's Optional Low-NOx standards	1994-2006	35%
Replacement with all-electric vehicle with the engine MY in which the EMA occurs or one engine MY prior	2009 and older	75%	100%	Replacement with 2015 MY or newer all-electric vehicle	1994-2010	45%
				Idle Reduction Technology (in conjunction with above activities, or on school buses previously retrofitted with verified emission control device)	1994-2006	100%

Eligible Mitigation Actions 1-9				***Eligible Mitigation Action 10: DERA Option**		
Freight Switchers Must currently operate 1000+ hours per year.				**Line Haul (freight and passenger) and Switcher Locomotives** Must currently operate 1000+ hours per year		
Activity	Vehicle and Equipment Eligibility (Engine Model Year or Tier)	Trust Funding Limits		Activity	Vehicle and Equipment Eligibility (Engine Model Year or Tier)	DERA Funding Limits
		Non-Gov. Owned	Gov. Owned			
Repower with new diesel or alternate fueled engine or generator sets that are EPA certified for the engine MY in which the EMA occurs	Pre-Tier 4	40%	100%	Repower with 2015 MY or newer Tier 4 engine	Unregulated – Tier 2; Tier 2+ switcher	40%
Repower with all-electric engine that is engine MY in which the EMA occurs	Pre-Tier 4	75%	100%	Repower with 2015 MY or newer all-electric engine	Unregulated – Tier 2; Tier 2+ switcher	60%
Replacement with new diesel or alternate fueled freight switcher that is EPA certified for the engine MY in which the EMA occurs	Pre-Tier 4	25%	100%	Replacement with vehicle/equipment powered by a 2015 MY or newer engine (diesel or alternate fuel)	Unregulated – Tier 2; Tier 2+ switcher	25%
Replacement with all-electric freight switcher that is engine MY in which the EMA occurs	Pre-Tier 4	75%	100%	Replacement with 2015 MY or newer all-electric vehicle/equipment	Unregulated – Tier 2; Tier 2+ switcher	45%
				Certified Remanufacture System or Verified Engine Upgrade	Unregulated - Tier 2+	40%
				Retrofit with verified exhaust control technology	Unregulated - Tier 2+	100%
				Idle reduction technology, including shore power	Unregulated – Tier 2+	40%
Ferries/Tugs				**Marine Engines** Must currently operate 1000+ hours per year.		
Repower with new Tier 3 or 4 diesel or alternate fueled engine	Pre-Tier 3	40%	100%	Repower with a 2015 MY or newer Tier 3 or Tier 4 engine (diesel or alternative fuel)	Pre-Tier 3	40%
Repower with new all-electric engine	Pre-Tier 3	75%	100%	Repower with 2015 MY or newer all-electric engine	Pre-Tier 3	60%
Certified Remanufacture System or Verified Engine Upgrade	Pre-Tier 3	40%	100%	Certified Remanufacture System or Verified Engine Upgrade	Pre-Tier 3	40%

Eligible Mitigation Actions 1-9				***Eligible Mitigation Action 10: DERA Option**		
Ocean Going Vessels (OGV) Shore Power				**Marine Shore Power Connection System**		
Activity	Vehicle and Equipment Eligibility (Engine Model Year or Tier)	Trust Funding Limits		Activity	Vehicle and Equipment Eligibility (Engine Model Year or Tier)	DERA Funding Limits
		Non-Gov. Owned	Gov. Owned			
Costs associated with shore-side system	n/a	25%	100%	Costs associated with shore-side system	n/a	25%
Airport Ground Support Equipment Forklifts and Port Cargo Handling Equipment				**Nonroad Diesel Engines**		
Repower with new all-electric engine	GSE: Pre-Tier 3 diesel; 3 g/bhp-hr and higher spark ignition Forklifts and Port CHE: Greater than 8000 lbs lift capacity	75%	100%	Repower with all-electric engine	0-50 HP = 2004 and newer; 51-300 HP = 1994 and newer; 301+HP = 1984 and newer	60%
Replacement with new all-electric airport ground support equipment		75%	100%	Replacement with 2015 MY or newer all-electric vehicle/equipment		45%
				Repower with a 2015 MY or newer engine (diesel or alternative fuel)		40%
				Replacement with vehicle/equipment powered by 2015 MY or newer engine (diesel or alternative fuel)		25%
				Retrofit with verified exhaust control technologies		100%
				Verified Engine Upgrade		40%
				Electrified Parking Spaces (Truck Stop Electrification)		
				Labor and equipment of eligible EPA SmartWay verified electrified parking space technologies	n/a	25%
Light Duty Zero Emission Vehicle Supply Equipment Level 1, level 2, or fast charging equipment that is not consumer light duty electric vehicle supply equipment						
See Appendix D-2 for details						

* DERA Option eligibility and cost-shares are subject to change pending final FY2017 State Clean Diesel Grant Program guidance.

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